THE Role of AI Tools on the Research Writing of Senior High School Students in Region XI: A Multiple Case STUDY

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ABSTRACT

This qualitative multiple case study explored the experiences, opportunities, and drawbacks of using AI writing tools in research writing among Senior High School students in selected public and private institutions in Region XI. Five cases were examined through in-depth interviews and thematic analysis of actual student responses. The findings revealed six emerging themes on students' experiences with AI writing tools and another six themes describing the opportunities and drawbacks of their use in research writing. Most cases showed similar experiences in using AI for grammar, organization, confidence-building, and receiving positive or neutral teacher feedback. However, differences emerged in AI dependence, originality, fact-checking, and ethical awareness. While some balanced AI use with critical thinking, others showed over-reliance and less engagement with their own content.

KEYWORDS: *Education, research writing, artificial intelligence, academic integrity, Philippines.*

INTRODUCTION

Research writing involves presenting findings and arguments in a structured manner, informed by rigorous inquiry (Khalifa & Albadawy, 2024). It requires clarity, logical reasoning, and an academic tone (Cooperman & Brandão, 2023). However, many students find this process challenging due to difficulties in conducting thorough literature reviews and organizing data (Benbellal & Khaldi, 2021). Artificial Intelligence (AI) has emerged as a valuable tool to ease these burdens. AI supports efficiency by assisting with drafting, data analysis, and grammar corrections (Chiu et al., 2024). However, over-reliance on AI poses significant challenges, particularly in critical aspects of research writing. Studies show that depending too much on AI can weaken

students' critical thinking skills (Xiao, 2024; Pratiwi, 2024), hinder the development of analytical and organizational abilities (Zhai et al., 2024), and reduce motivation to refine their writing independently as added by Warschauer et al., (2023).

Globally, Biermann et al. (2022) reported that in Canada, frequent use of AI has diminished students' research writing skills. Similarly, LaGioia (2024) documented cases in California where students submitted fully AI-generated papers, raising concerns about plagiarism and poor paraphrasing, summarizing, and argumentation skills.

In the Philippines, Barrot (2023) raised concerns in a school in Manila about how AI-generated text negatively impacts second-language writing, particularly in academic contexts. The study found that while AI tools like ChatGPT assist in producing grammatically correct sentences, the outputs often lack the depth, coherence, and critical analysis required for research writing, making it difficult for students to develop their language skills fully. Similarly, in Cavite, Santiago et al. (2024) observed that reliance on AI for error detection risks undermining students' ability to engage critically with their work. In Pangasinan, Ventayen (2023) further reported that half of the students admitted to using AI for assignments, raising serious concerns about academic honesty and research skill development.

In the Davao Region, a study by Obenza et al. (2024) revealed that students view AI tools positively, citing their ability to make tasks faster and easier. However, this perceived efficiency comes with significant risks. Solis and Idul (2024) found that frequent users of AI writing tools admitted to feeling lazy and demotivated, relying on AI-generated content instead of engaging deeply with their work.

There has been a rising number of students using AI-writing tools, yet few multiple-case studies have been conducted on this phenomenon, particularly within the context of Practical Research Writing. While previous studies have generally concentrated on university-level students, this study specifically examines how AI influences the development of research writing skills, critical thinking, and academic integrity among SHS students. In order to address this research gap, this study shall discuss both opportunities and drawbacks concerning the use of AI writing tools in research writing. Precisely, it will detail the experiences of senior high school students in Region XI in understanding the

pros and cons of using AI writing tools for research to explore how these tools can support and hinder the research writing process.

In order to effectively disseminate the results of this study, the findings will be shared with the Department of Education through regional district meetings to inform curriculum development and enhance methods of AI-assisted teaching.

Purpose Statement

1. What are the experiences of senior high school students in using AI writing assistants in doing their research?
2. What are the opportunities and drawbacks of using these tools?
3. What explains the similarities and differences of each case?

Theoretical Lens

This study was seen through the lens of three theories. The first theory, the Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), is a widely recognized framework for understanding technology adoption. The second theoretical lens, Innovation Diffusion Theory (IDT), proposed by Everett Rogers (1962), examines how innovations like AI tools are communicated within a social system over time. IDT emphasizes factors such as perceived relative advantage, compatibility, complexity, observability, and trialability, all of which influence the adoption of new technologies. The third theoretical lens focused on the ethical implications of AI use, as discussed by Floridi et al. (2018). As AI tools became more integrated into educational settings, ethical concerns around fairness, transparency, and accountability emerged. These considerations were essential to ensuring the responsible use of AI in academic contexts, addressing issues like bias in AI-generated content and its impact on students' learning processes.

METHODS

Research Design. This research employed a qualitative multiple-case study design to explore the role of AI tools in the research writing of selected Senior High School students in Region XI who used such tools for their Practical Research outputs. Qualitative research was appropriate for capturing the participants' experiences and the meanings they ascribed to them, as it allowed for in-depth exploration through interviews and focus group discussions (Creswell & Poth, 2016). The case study method, as described by Creswell (2013).

Participants. This study involved five Senior High School students from public and private schools across three divisions in Region XI: Davao Oriental (North and South Districts), Mati City, and Panabo City. Participants were enrolled in Practical Research I or II for the school year 2024–2025 and were selected using maximum variation sampling (Douglas, 2022) to ensure diversity in academic strand, school type, and personal background. Represented strands included HUMSS, GAS, STEM, TVL, and ICT. Inclusion criteria required students to be currently enrolled in Practical Research I or II, have experience using AI writing tools like ChatGPT, Grammarly, QuillBot, or Cici, and be willing to participate with informed consent.

Data Sources. For this study, the primary data sources were qualitative, including interview transcripts and profiles of the five cases, as well as records from key informants. The raw interview transcripts, validated interview guide, and field notes formed a comprehensive database. Field notes capturing events, discussions, and linguistic and para-linguistic behaviors observed during the interviews—along with reflections—served as valuable sources for analysis and interpretation. Teachers played a crucial role in triangulating, validating, and confirming participants' experiences with AI writing tools.

Data Analysis. For a comprehensive interpretation and analysis of the qualitative data, Braun and Clarke's (2006) six-phase thematic analysis method was employed. This method provided a systematic yet flexible approach to analyzing patterns within the data. The six stages used were: (1) Familiarization with the data, (2) Generating initial codes, (3) Searching for themes, (4) Reviewing potential themes, (5) Defining and naming themes, and (6) Producing the final report.

RESULTS

Experiences of Senior High School Students in Using AI Writing Assistants in Research Writing

The first theme, Research Support, highlights how AI tools functioned as study partners by simplifying the research process into manageable steps, offering motivational feedback, and preserving students' ownership of ideas. The second theme, Improve Writing Assistance, reflects students' experiences of using AI tools to enhance the clarity, accuracy, and overall quality of their written work.

Table 1

Experiences of Senior High School students in Using AI Writing Assistants in doing Research

Essential Theme	Core Ideas
Research Support	Scaffolding research steps Providing peer-like encouragement Viewing AI as a learning aid and a research study buddy Functioning as a personal teacher or tutor
Improve Writing Assistance	Enhancing grammar accuracy Paraphrasing draft text Refining style and word choice
Enhanced Idea Generation	Brainstorming concepts Generating research questions Offering fact-based prompts
Faster Information Access	Instant retrieval of data Locating national/local/global issues/theories/SPSS
Increased Research Efficiency	Condensing large volumes of information Streamlining thought organization Structuring the research process
Need for Critical Review	Reviewing AI outputs to avoid errors, biases and irrelevant content Getting wrong answers if not prompted correctly Giving outdated resources and references Double checking is necessary before finalizing the output

The third theme, Idea Generation, captures how students utilized AI tools to overcome writer's block, generate research questions, and explore potential directions for their studies. The fourth theme, Faster Information Access, describes how AI tools enabled students to instantly retrieve relevant data, concrete examples, and contextual insights on national, local, or global issues. The fifth theme, Increased Research Efficiency, emphasizes how AI tools enhanced students' capacity to manage academic research by condensing lengthy texts into digestible summaries, organizing scattered ideas, and providing structural templates for writing. The sixth theme, Need for Critical Review, underscores the importance of carefully evaluating AI-generated content to avoid errors, bias, and irrelevance.

Opportunities and Drawbacks of Using AI Writing Tools Based on the Experiences of Senior High School Students

The first theme, Faster Output, illustrates how AI tools helped students complete tasks faster by providing instant answers and summarizing content, which allowed more time for analysis.

Table 2

Opportunities and Drawbacks of AI Writing Assistants

Essential Themes Opportunities	Core Ideas	Drawbacks
Faster Output	Accelerate task completion	Unreliable responses
	Provide quick answers	
	Free up time for deeper work	
Streamlined Workflows	Organize chaotic thoughts	Overreliance on AI
	Structure research outlines	
	Simplify task processes	
Enhanced Clarity of Works	Improve grammar accuracy	Surface-level understanding
	Paraphrase effectively	
	Boost readability of the research	
Expanded Research Horizons	Suggest relevant theories	Outdated suggestions
	Build academic vocabulary	
	Guide methodological tools (SPSS)	
	Find citations faster	
Strengthened Verification Skills	Fact-check AI outputs	Extra verification workload
	Refine personal solutions	
	Evaluate suggestions critically	
Responsible AI Use	Avoid plagiarism	Ethical anxiety
	Cite AI contributions properly	
	Uphold academic integrity	

The second theme, Streamlined Workflows, shows how AI tools helped organize ideas, create outlines, and simplify research writing. The third theme, Enhanced Clarity of Works, highlights how AI tools improve grammar and readability, enhancing students' ability to express ideas clearly. The fourth theme, Expanded Research Horizons, demonstrates how AI broadens students' academic perspectives by suggesting frameworks, terminologies, and research methods. The fifth theme, Strengthened Verification Skills, emphasizes the growing need for students to critically evaluate AI-generated content. The sixth theme, Responsible AI Use, shows that students learned to navigate AI ethically, ensuring academic integrity by avoiding plagiarism and citing sources properly.

Similarities and Differences Between Cases Experiences of Senior High School Students in Using AI Writing Assistants in Research Writing

Research Support was evident in Cases 1, 3, and 4, where AI helped students structure tasks, clarify ideas, and maintain authorship. Improved Writing Quality was prominent in Cases 1, 3, and 4, where AI tools enhanced grammar, clarity, and vocabulary. Students appreciated real-time feedback and paraphrasing that modeled academic language.

Table 3

Similarities and Differences of Experiences, Opportunities, and Drawbacks With AI Writing Assistants

Experiences	Case Unit		
	Similar	Different	Remarks
Research Support	C1, C3, C4		Cases C1, C3, and C4 highlighted that AI provided scaffolding for research steps, acted like a study buddy, and still let them retain creative control.
		C2	Case C2 emphasized AI's role in idea generation (though sometimes outdated) rather than positioning it as a "study buddy."
		C5	Case C5 noted AI was used primarily for saving time and boosting efficiency, not for supporting study processes or creativity.
Improve Writing Assistance	C1, C3, C4		Cases C1, C3, and C4 praised AI for correcting grammar, paraphrasing effectively, and boosting overall readability.
		C2	Case C2 prioritized speed and direct answers over detailed writing support.
		C5	Case C5 acknowledged increased motivation and efficiency but did not describe AI improving specific writing skills.
Idea Generation	C2, C4		Cases C2 and C4 reported that AI helped them generate concepts, form research questions, and suggest methodological prompts.
		C1	Case C1 preferred process scaffolding and writing help, without emphasizing ideation.

		C3	Case C3 noted that while AI offered ideas, many of the suggested readings were outdated.
		C5	Case C5 focused on speed and motivation, not on AI's role in sparking new ideas.
Faster Information Access	C2, C3		Cases C2 and C3 used AI for instant data retrieval and pinpointing relevant issues (national, local, or global).
		C1	Case C1 concentrated on study support and writing but did not highlight AI for swift information access.
		C4	Case C4 leveraged grammar and workflow help, without mentioning information-finding.
		C5	Case C5 described time savings and efficiency gains, not rapid information access.
Increase Research Efficiency	C1, C3, C5		Cases C1, C3, and C5 leveraged AI to streamline thought organization, condense large volumes of data, and structure their research process.
		C2	Case C2 highlighted idea generation and instant answers rather than overall efficiency gains.
		C4	Case C4 emphasized writing clarity and sentence structuring but did not speak to broad research efficiency.
Need for Critical Review	C1,C3,C4,C5		The 4 cases reported that AI outputs need to be reviewed, doubled check and fact check in other reliable sources such as Google scholar to check if the information and references given are correct.
		C2	Only Case 2 mentioned that he did not do verification and solely rely on AI because of time constraints and his status as a working student.
Opportunities and Drawbacks			
Faster Output	C1, C2, C4		C1, C2, & C4 described faster completion, reduced overthinking, and immediate answers.

		C3	C3 flagged that some AI suggestions were outdated, limiting the benefit of pure speed.
		C5	C5 noted that faster output sometimes compromised depth, making responses feel superficial or "dumb."
Streamlined Workflows	C1, C2, C3, C4		C1, C2, C3, & C4 reported AI organizing thoughts, structuring outlines, and simplifying their research process.
		C5	C5 focused only on grammar suggestions and did not mention workflow or task-management benefits.
Enhanced Clarity	C3, C4, C5		C3, C4, & C5 valued grammar correction, paraphrasing support, and improved readability.
		C1	C1 emphasized speed and efficiency without highlighting writing clarity.
		C2	C2 likewise prioritized quick answers over deeper editing or clarity improvements.
Expanded Research Horizons	C1, C2, C4, C5		C1, C2, C4, & C5 employ AI for theory connections, vocabulary building, SPSS guidance, and faster citation-finding.
		C3	C3 found many AI-suggested readings (RRL) outdated, which undercut the "new horizons" advantage.
Strengthened Verification Skills	C1, C3, C4		C1, C3, & C4 actively fact-checked AI outputs, refined their own solutions, and critically evaluated suggestions.
		C2	C2 did minimal verification—often accepting AI output without further fact-checking.
		C5	C5 similarly relied on AI with only occasional verification, rather than systematic fact-checking.
Responsible AI Use	C2, C3, C4, C5		C2, C3, C4, & C5 recognized plagiarism risks, stressed proper citation, and voiced ethical concerns about AI-generated work.

		C1	C1 felt confident integrating AI as a guide and did not express anxiety about misuse or detection.

Enhanced Idea Generation featured in Cases 1, 2, and 3, where AI helped students overcome writer's block, brainstorm, and refine themes. Faster Information Access was clear in Cases 1, 3, and 5. Need for Critical Review was highlighted by Cases 1, 3, 4, and 5, who consistently verified AI outputs to avoid factual errors and fabricated citations.

Opportunities and Drawbacks of Using AI Writing Tools Based on the Experiences of Senior High School Students

In response to the second research question concerning the opportunities and drawbacks of AI writing tools in Senior High School students' research writing, several themes emerged: students experienced greater speed, more efficient organization, clearer expression, and broader exposure to academic content. These benefits, however, were tempered by challenges related to misinformation, shallow understanding, and ethical ambiguity, reflecting a nuanced dynamic between AI-enhanced research and the need for thoughtful human oversight.

DISCUSSION

Experiences of Senior High School Students in Using AI Writing Assistants in Research Writing

Research Support. The theme's finding is in consonance with Khalifa and Albadawy (2024), who emphasized that AI-powered platforms such as ChatGPT assist students in structuring research proposals, generating preliminary ideas, and outlining key arguments, thereby making the initial phases of research writing less daunting.

Improve Writing Assistance. This theme reflects students' experiences of using AI tools to enhance the clarity and overall quality of their written work. This finding is supported by the study of Subramanian et al. (2024), who noted that AI writing assistants provide real-time feedback on grammar, style, and organization, enabling students to produce more polished texts.

Idea Generation. This captures how students utilized AI tools to overcome writer's block, generate research questions, and explore potential directions for their studies. This finding is in consonance with Khalifa and Albadawy (2024), who noted that AI applications help students explore various conceptual angles, thereby theme fostering creativity and flexibility in content development.

Faster Information Access. Immediate access allowed students to spend less time locating sources and more time analyzing and integrating information into their writing. This finding is in consonance with the study of Khalifa and Albadawy (2024), who reported that AI applications streamline the research process by rapidly identifying relevant materials and summarizing key points, thus improving the efficiency of literature reviews.

Increased Research Efficiency. This theme emphasizes how AI tools enhance students' capacity to manage academic research by condensing lengthy texts into digestible summaries, organizing scattered ideas, and providing structural templates for writing. This finding is in consonance with the study of Tamilselvi et al. (2023), which confirmed that AI-powered tools improve workflow by minimizing time spent on mechanical aspects of writing.

Need for Critical Review. This theme underscores the importance of carefully evaluating AI-generated content to avoid errors, bias, and irrelevance. This finding is in consonance with the study of Kollár and Alshibli (2024), who discussed the phenomenon of "artificial hallucinations," where AI tools produce content that appears credible but is factually incorrect.

Opportunities and Drawbacks of Using AI Writing Tools Based on the Experiences of Senior High School Students

Faster Output. This theme aligns with Angga et al. (2024) and Shi et al. (2022), who found that paraphrasing tools enhance fluency and productivity. However, unreliable AI responses, such as inaccuracies or outdated content, often required time for verification, reflecting concerns raised by Kuentzel et al. (2011) and the Checklist for Validating Trustworthy AI (2022). Consequently, while AI boosts productivity, its effectiveness depends on students' ability to critically assess and verify results.

Streamlined Workflows. The theme shows how AI tools helped organize ideas, create outlines, and simplify research writing. This aligns with Nazim (2024) and Subramanian et al. (2024), who noted that AI aids in reducing time spent on mechanical tasks. However, overreliance on AI may reduce students' independence, as explained by Crisci (2025), and Shalevska and Kostadinovska-Stojchevska (2024), who noted that cognitive offloading can undermine creativity.

Enhanced Clarity of Works. The theme highlights how AI tools improve grammar and readability, enhancing students' ability to express ideas clearly, supported by Woo et al. (2023) and Malik et al. (2023). However, excessive reliance on AI for language correction can reduce critical engagement with the text, a concern echoed by Octaberlina et al. (2024) and Crisci (2025), who warned that it might inhibit cognitive development.

Expanded Research Horizons. This theme demonstrates how AI broadens students' academic perspectives by suggesting frameworks, terminologies, and research methods. Khalifa and Albadawy (2024) and Sharma et al. (2024) support this by showing AI helps students organize large amounts of information. However, outdated or irrelevant AI suggestions highlight the need for caution, echoing the warnings of Kollár and Alshibli (2024) and Fatimah et al. (2024) about AI's tendency to generate "artificial hallucinations."

Strengthened Verification Skills. This theme emphasizes the growing need for students to critically evaluate AI-generated content. As noted by Kollár and Alshibli (2024), AI often produces incorrect information, making verification crucial. Han and Choi (2022) and Kuentzel et al. (2011) support this by noting that cross-checking enhances students' analytical skills. However, the verification process can be time-consuming and exhausting, as observed by Kharipova et al. (2024) and Gordon et al. (2023), leading to student fatigue.

*Responsible AI Use. T*he theme shows that students learned to navigate AI ethically, ensuring academic integrity by avoiding plagiarism and citing sources properly. Ros and Samuel (2024) and Guo and Zaini (2024) stress the importance of transparency in AI usage. However, ethical concerns persist, with students fearing accusations of cheating and struggling with the lack of clear institutional guidelines, as highlighted by Golding et al. (2024) and Shalevska and Kostadinovska-Stojchevska (2024). The uncertainty about AI policies, as

reported by Zaidy (2024) and Akhoon et al. (2024), further exacerbates these anxieties.

Similarities and Differences Between Cases Experiences of Senior High School Students in Using AI Writing Assistants in Research Writing

Research Support was evident in Cases 1, 3, and 4, where AI helped students structure tasks, clarify ideas, and maintain authorship. Students viewed AI as a "study buddy" that supported organization and motivation. These experiences align with Khalifa and Albadawy (2024), Rosdiana et al. (2024), and Syarifah and Fakhruddin (2024), who found that AI supports planning and coherence. Afifah (2024) also noted improved productivity without loss of control over content. In contrast, Case 2 used AI mainly for early brainstorming, expressing skepticism about content accuracy—echoing Santiago et al. (2023) and Sharma et al. (2024) on the risks of misinformation. Case 5 emphasized AI's role in time management rather than in-depth support, reflecting Tamilselvi et al. (2023), Subramanian et al. (2024), and Shen & Andaya (2024) on AI's utility in reducing mechanical workload but not replacing critical thinking.

Improved Writing Quality was prominent in Cases 1, 3, and 4, where AI tools enhanced grammar, clarity, and vocabulary. Students appreciated real-time feedback and paraphrasing that modeled academic language. This reflects findings by Subramanian et al. (2024), Malik et al. (2023), Woo et al. (2023), and Samantaray and Azeez (2024) on AI's role in refining expression. In contrast, Case 2 prioritized speed over writing improvement, consistent with Angga et al. (2024), who noted limited skill gains without active engagement. Case 5 found AI motivating but didn't report writing gains, reflecting concerns from Shen and Andaya (2024), Plecerda (2024), and Kruk and Kałużna (2024) about overreliance limiting skill development.

Enhanced Idea Generation featured in Cases 1, 2, and 3, where AI helped students overcome writer's block, brainstorm, and refine themes. These benefits match Lee and Han (2023), who noted AI's role in stimulating creativity. Cases 4 and 5, however, did not emphasize idea generation, showing that its usefulness may depend on individual writing needs.

Faster Information Access was clear in Cases 1, 3, and 5. Students described how AI condensed information, organized thoughts, and simplified drafting—supporting Tamilselvi et al. (2023), Angga et al. (2024), Woo et al.

(2023), Malik et al. (2023), and Afifah (2024), who observed greater efficiency without sacrificing originality. Case 2 focused more on idea retrieval than workflow streamlining. Case 4 used AI mainly for sentence-level polishing, consistent with Shi et al., (2022) on AI's limited role in broader efficiency unless paired with content organization tools.

Need for Critical Review was highlighted by Cases 1, 3, 4, and 5, who consistently verified AI outputs to avoid factual errors and fabricated citations. This aligns with Kollár and Alshibli (2024), Pokorni (2024), Dyson (2024), Monteith et al. (2023), who warned about AI inaccuracies and stressed structured verification. In contrast, Case 2 admitted to unverified use due to time constraints, reflecting Monteith et al. (2023) on the risks of relying on AI without fact-checking.

Opportunities and Drawbacks of Using AI Writing Tools Based on the Experiences of Senior High School Students

A prominent benefit mentioned in Cases 1, 2, and 4 was the faster output facilitated by AI tools, which helped students accomplish tasks more efficiently, reduce overthinking, and concentrate on content creation. This resonates with Angga et al. (2024), Tamilselvi et al. (2023), and Khalifa & Albadawy (2024), who highlight how AI speeds up fluency, task initiation, and early-stage writing processes. Similarly, Rosdiana et al. (2024) found that AI support during the early stages of writing helped structure arguments more coherently. However, as seen in Case 3, the experience of faster output was disrupted by outdated suggestions, requiring manual correction and indicating a need for human intervention. In Case 5, students noted that although the tool expedited the process, it often resulted in shallow responses, supporting Subramanian et al. (2024) and Octaberlina et al. (2024) in their critique of AI overreliance. These cases reflect that AI's time-saving benefits are best realized when coupled with critical engagement, as Shen & Andaya (2024) suggest.

Students also described how AI tools contributed to more streamlined workflows, particularly in Cases 1, 2, 3, and 4, where they used AI to organize ideas, construct outlines, and move from planning to drafting. This reflects Nazim (2024) and Subramanian et al. (2024), who note that AI helps reduce cognitive load and enhances content refinement. Yet in Case 5, the student used AI solely for grammar correction, suggesting limited engagement with its broader planning functions.

Additionally, some students from Cases 3 and 4 warned that heavy reliance on AI impeded their independent idea development—an example of what Crisci (2025) calls cognitive offloading, where mental effort is displaced onto external systems.

Another theme, enhanced clarity, was noted in Cases 3, 4, and 5, where students found that AI tools improved their grammar, diction, and readability. This finding is consistent with Subramanian et al. (2024), Woo et al. (2023), and Malik et al. (2023), who observed that AI tools enhance language quality and assist with clear communication. By contrast, Cases 1 and 2 focused primarily on efficiency, with little attention to clarity improvements, suggesting a more pragmatic approach to AI use. This divergence supports Garg (2024), who found that students who use AI's editorial functions deliberately are more likely to produce refined academic texts.

The theme of expanded research horizons emerged from Cases 1, 2, 4, and 5, where students used AI to explore new ideas, frameworks, and tools for data analysis. This aligns with Sharma et al. (2024), who describe AI's value in navigating dense academic texts and generating thematic connections. However, Case 3 experienced the limits of this capability, as AI suggestions lacked accuracy or relevance—highlighting issues raised by Kollár and Alshibli (2024) around AI hallucinations and information integrity. Some students also expressed that AI summaries promoted a surface-level understanding, echoing concerns by Dangin & Hikmah (2024) about reduced engagement with academic texts.

Students in Cases 1, 3, and 4 demonstrated strengthened verification skills, critically assessing AI-generated content by fact-checking, rephrasing, or cross-referencing. This pattern reflects a growing awareness of AI's fallibility, consistent with Han and Choi (2022), who emphasize how verification supports research credibility. Nevertheless, Case 2 showed passive AI use, and Case 5 revealed inconsistent fact-checking—behaviors that Shah (2024) and Octaberlina et al. (2024) warn may weaken critical thinking and academic rigor.

Finally, the theme of responsible AI use was reflected in Cases 2, 3, 4, and 5, where students expressed concern over plagiarism, authorship, and academic honesty. Despite valuing AI's utility, they maintained a clear sense of ethical boundaries, yet also reported anxiety around institutional misunderstandings of their AI use. This tension aligns with Ros and Samuel

(2024), who note the absence of formal guidance in many schools. Conversely, Case 1 presented confident use of AI without explicit attention to ethical implications—a stance that, while self-assured, may risk crossing boundaries if institutional policies are unclear, as Plecerda (2024) warns.

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