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RESEARCH ARTICLE

Digital Note Taking, Traditional Handwritten Notes, and Academic Performance Among University Students

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Abstract

This quantitative study examined the effects of digital and handwritten note-taking on students' academic performance at Indiana Aerospace University from May to June 2025. A structured questionnaire using a four-point Likert scale was administered to 100 students selected through stratified random sampling. The instrument assessed perceptions of digital and handwritten note-taking in terms of comprehension, retention, focus, organization, and academic impact, as well as challenges encountered. Results indicated that digital note-taking was highly valued for convenience, accessibility, organization, and multimedia integration. Conversely, handwritten note-taking was perceived to better support memory retention, concentration, and deeper cognitive processing. Both methods were associated with improved academic performance when aligned with students' learning preferences. However, students reported challenges such as technical distractions in digital note-taking and cognitive strain during manual writing. The findings suggest that no single method is universally superior; rather, effectiveness depends on learning context and individual differences. The study recommends that institutions and educators promote flexible note-taking strategies and provide training to help students optimize both digital and traditional methods.

Keywords: *digital notes, physical notes, student academic performance, traditional handwritten notes, note-taking*

Introduction

The rapid integration of digital technologies into education has significantly transformed students' learning behaviors, particularly in note-taking practices. While traditional handwritten note-taking has long been associated with improved comprehension and memory retention, the increasing availability of laptops, tablets, and cloud-based applications has encouraged a shift toward digital note-taking. These digital tools offer advantages such as portability, organization, real-time editing, and multimedia integration, making them attractive to modern learners.

Despite the growing preference for digital tools, educational theories present mixed implications regarding their effectiveness. Cognitive Load Theory suggests that handwritten note-taking promotes deeper processing because learners must summarize and encode information actively. Dual Coding Theory further supports this by highlighting the role of motor activity in strengthening memory. In contrast, Media Richness Theory emphasizes the benefits of digital platforms in presenting information through multiple formats, though it also warns of possible distractions that may hinder learning.

Given these contrasting perspectives, it remains unclear whether digital or handwritten note-taking leads to better academic outcomes. Many studies focus on one method in isolation, with limited context-specific research among university students in technology-integrated environments. At Indiana Aerospace University, students frequently use both methods across different disciplines, making it an ideal setting to investigate their comparative effectiveness.

This study, therefore, aims to examine the impact of digital and handwritten note-taking on students' academic performance, focusing on comprehension, retention, focus, organization, and challenges encountered. The findings intend to guide students, educators, and institutions in selecting and supporting effective note-taking strategies within modern learning environments.

Research Objectives

This study aimed to assess a study between digital note-taking and traditional handwritten notes on the academic performance of students at Indiana Aerospace University for the A.Y. 2024-2025.

1. Assess a study between digital note-taking and traditional handwritten notes on academic performance.
   1.1. digital notes;
   1.2. traditional handwritten notes; and
   1.3. student's academic performance?
2. Rank the challenges faced by Indiana Aerospace University students A.Y. 2024-2025.

Methodology

Research Design

The study employed a quantitative descriptive research design to examine the relationship between note-taking methods and academic performance. A survey approach was used to collect measurable data on students' perceptions and experiences with digital and handwritten note-taking.

Participants

The respondents consisted of 100 students from Indiana Aerospace University during A.Y. 2024–2025, representing 4.21% of the total student population (2,373). Stratified random sampling ensured proportional representation from the university's four academic schools, with 25 students selected from each school.

Research Instrument

A structured questionnaire was developed using a four-point Likert scale (4 – Strongly Agree to 1 – Strongly Disagree). The instrument had three main sections:

- Digital Note-Taking – convenience, organization, accessibility, and multimedia use
- Handwritten Note-Taking – comprehension, retention, focus, and cognitive engagement
- Problems Encountered – technical issues, distractions, and learning difficulties

The instrument was reviewed for clarity and relevance before administration.

Data Collection Procedure

Permission to conduct the study was obtained from the university administration. The questionnaire was distributed via Google Forms, and participants were selected using stratified random sampling. Students were informed of the study's purpose, assured of confidentiality, and provided informed consent prior to participation.

Data Analysis

Data were analyzed using descriptive statistics, including frequency counts, percentages, weighted means, and ranking. Weighted means determined the perceived effectiveness of each note-taking method, while ranking identified the most common challenges experienced by students.

Ethical Considerations

Participation was voluntary, with the right to withdraw at any time. Responses were anonymized, securely stored, and used solely for research purposes. The study adhered to ethical standards concerning confidentiality, transparency, and responsible data handling.

Results and Discussion

Digital Note-Taking

Digital note-taking involves using electronic devices, such as laptops, tablets, and smartphones, to record, organize, and store information. This method has become increasingly popular in academic settings due to its convenience, flexibility, and ease of editing and updating notes. Digital note-taking also supports the integration of multimedia elements, such as images, videos, and hyperlinks, which can further enhance the learning experience and engagement with the material.

Table 1 presents the perception of students in terms of the effectiveness of digital note-taking methods:

Table 1. *Digital Note-Taking*

Indicators	*Weighted Mean*	*Description*
Digital note-taking enables me to include multimedia elements such as images, videos, and hyperlinks.	3.46	Agree
I find it easier to share my digital notes instantly with classmates for group study or project work.	3.44	Strongly Agree
Digital notes allow access anytime and anywhere via cloud synchronization	3.44	Strongly Agree

across devices.		
Using digital notes helps me efficiently organize and search my study materials through tags or folders.	3.3	Strongly Agree
Digital note-taking is more convenient than handwritten notes because it allows quick editing and saving.	3.23	Strongly Agree
Average Weighted Mean	3.37	Strongly Agree

Legend: 4.21-5.00: Strongly Agree, 3.41- 4.20: Agree, 2.61.3.40: Neutral, 1.81-2.60: Disagree, 1.81 - 2.60: Strongly Disagree

Traditional Handwritten Note-Taking

Traditional handwritten note-taking involves using pen and paper to capture, organize, and store information. This method is widely recognized for its ability to enhance memory retention and comprehension by engaging students in an active writing process. Handwritten notes also allow for flexibility, enabling students to personalize their materials through annotations and diagrams, contributing to a more interactive learning experience.

Table 2 presents the perception of students in terms of the effectiveness of digital note-taking methods:

Table 2. *Traditional Handwritten Note-Taking*

Indicators	*Weighted Mean*	*Description*
Taking notes manually supports my handwriting quality and spelling skills development.	36.6	Strongly Agree
Handwritten notes improve my comprehension and long-term retention of lecture material.	3.31	Strongly Agree
I feel more confident recalling information when I study from handwritten notes.	3.28	Strongly Agree
Writing notes by hand helps me focus more during lectures compared to typing on a device.	3.15	Agree
Physical notes allow me to personalize my materials through drawings, highlights, and margin annotations.	3.13	Agree
Average Weighted Mean	3.24	Agree

Legend: 4.21-5.00: Strongly Agree, 3.41- 4.20: Agree, 2.61.3.40: Neutral, 1.81-2.60: Disagree, 1.81 - 2.60: Strongly Disagree

Student Academic Performance

Table 3 presents the impact of students on student academic performance:

Table 3. *Student Academic Performance*

Indicators	*Weighted Mean*	*Description*
The way I take notes improves my comprehension, retention, and exam performance significantly.	3.46	Strongly Agree
I perform better academically in subjects where I primarily use note-taking methods that enhance my understanding.	3.4	Strongly Agree
In subjects where I use notes, my academic performance improves due to the structured organization and easy access to key information.	3.39	Strongly Agree
My overall academic performance has improved due to consistent and effective note-taking habits.	3.33	Strongly Agree
The note-taking method I use matches my personal learning style, helping me achieve higher grades.	3.33	Strongly Agree
Average Weighted Mean	3.38	Strongly Agree

Legend: 4.21-5.00: Strongly Agree, 3.41- 4.20: Agree, 2.61.3.40: Neutral, 1.81-2.60: Disagree, 1.81 - 2.60: Strongly Disagree

Student academic performance refers to the measurable outcomes of a student's learning process, comprehension, and retention of content. It encompasses cognitive understanding of the material, study habits, and note-taking methods.

Problems Encountered

The problems encountered in "A Study between Digital Note Taking and Traditional Handwritten Notes on Academic Performance" include concerns over digital notes, physical notes, and student academic performance.

Table 4 presents the problems encountered in a study comparing digital note-taking and traditional handwritten notes on academic performance.

Table 4. *Problems Encountered*

Indicators	*Frequency*	*Rank*
I find digital note-taking inconvenient compared to taking notes by hand due to technical issues or distractions.	42	1
Despite having note-taking habits, I continue to face challenges in my academic performance due to my inability to focus during lectures while concentrating on taking notes.	35	2

I have difficulty maintaining focus during lectures when writing notes by hand, leading to missed information.	31	3
I do not perform well in subjects where my note-taking methods do not effectively support my learning.	26	4
In subjects where I use notes, my academic performance is affected due to a lack of organization and difficulty in accessing key information.	25	5.5
My academic performance is negatively impacted because I often feel too exhausted from note-taking to have enough energy left to study effectively.	25	5.5
Adding multimedia elements to digital notes does not improve my understanding and sometimes complicates review.	20	7
Digital notes make it harder for me to organize or quickly find important study materials.	15	8
Studying from handwritten notes makes me less confident in recalling knowledge during exams.	14	9
Writing notes manually does not help me retain or comprehend the subject matter better than typing.	13	10

The top five note-taking problems students face are: 1) technical issues or distractions in digital note-taking, 2) difficulty focusing during lectures, 3) challenges with handwriting focus, 4) poor performance when note-taking methods don't align with learning needs, and 5) disorganized notes.

The highest-ranked problem is the inconvenience of digital note-taking, scoring 42. Technical issues, such as device malfunctions and distractions, increase cognitive load, reducing focus on lectures and hindering effective note-taking (Paas, Renkl, & Sweller, 2020).

The second problem, with a score of 35, is difficulty maintaining focus while taking notes. Dual Coding Theory suggests that handwriting engages both verbal and motor processes, but dividing attention between writing and listening can reduce comprehension and retention (Sadoski & Paivio, 2019).

The third issue, scoring 31, is difficulty staying focused when writing by hand, leading to missed information. Cognitive Load Theory explains that handwriting's cognitive demands can cause students to miss key points if they are not fully engaged (Paas, Renkl, & Sweller, 2020).

The fourth problem, scoring 26, is poor performance in subjects where note-taking methods do not align with learning needs. Media Richness Theory suggests that subjects requiring visual aids benefit from digital tools, while those needing deeper cognitive engagement may be better suited to handwriting (Lim, Lee, & Choi, 2021).

Lastly, the fifth problem, scoring 25.5, is poor organization and difficulty accessing notes.

Both theories emphasize that well-organized notes are essential for effective learning. Disorganized digital or handwritten notes hinder students' ability to locate key information, impacting performance.

Conclusion

The study demonstrated that both digital and handwritten note-taking methods positively influence students' academic performance when used effectively. Digital note-taking was favored for its convenience, accessibility, and organizational features, while handwritten note-taking was associated with stronger memory retention, concentration, and deeper cognitive engagement. These findings indicate that the effectiveness of a note-taking method depends largely on individual learning preferences and academic contexts rather than the method itself.

However, challenges such as technical distractions, cognitive overload, and difficulties maintaining focus were reported for both approaches. Addressing these issues through institutional support, training workshops, and structured study strategies may enhance the benefits of each method. Ultimately, promoting a balanced and flexible approach to note-taking can help students maximize learning outcomes in technology-enhanced educational environments.

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