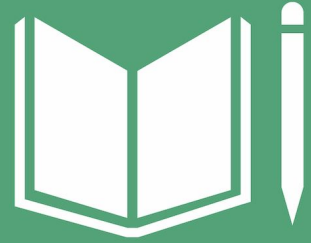


Investigating Note-Taking Strategies for Improving Quality of Education

4 QUALITY
EDUCATION



Group 04

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Motivation

Focus: The **UN's SDG 4** aims to provide inclusive and quality education for all.

Goal: To evaluate the performance of **Stylus** based note-taking regarding **Memory Retention** and **Perceived Usefulness**.

Knowledge Gap: **Stylus** based note-taking not explored sufficiently in comparison to **Longhand (pen and paper)** and **Laptop**.



How do you take notes?

Credits: Thomas Lohnes, Getty Images

Research Question and Hypotheses

RQ:

- How does the **Note-Taking Strategy** impact **Memory Retention**?
- How does the **Note-Taking Strategy** impact **Perceived Usefulness**?

Hypotheses:

- H1: **Stylus** based note-taking has a higher rate of **Memory Retention** compared to **Longhand**.
- H2: **Stylus** based note-taking has a higher rate of **Perceived Usefulness** compared to **Laptop**.

Study Design

Nature: Field Study (RWTH Informatik-Zentrum)

Structure: Between-Groups Design (3 x 1)

IV: Note-Taking Strategies (Stylus, Longhand, Laptop)

DV:

- **Memory Retention**
 - Evaluated using a Quiz (7-point Likert Scale)
- **Perceived Usefulness**
 - Questionnaires regarding Satisfaction, Multitasking and Distraction (7-point Likert Scale)

No of Trials: 3 (Devices) x 4 (Participants) = 12 trials

Experiment

Apparatus:

- Longhand (pen and paper)
- Stylus (with tablet)
- Laptop (using Notion)
- Google Forms (for data collection)

Procedure:

- Informed consent, briefing & manipulation check
- Pseudo-lecture video shown for note taking
- Appear for a quiz after a short break for Memory Retention
- Questionnaires regarding Perceived Usefulness
- Debriefing

Data Analysis (Descriptive)

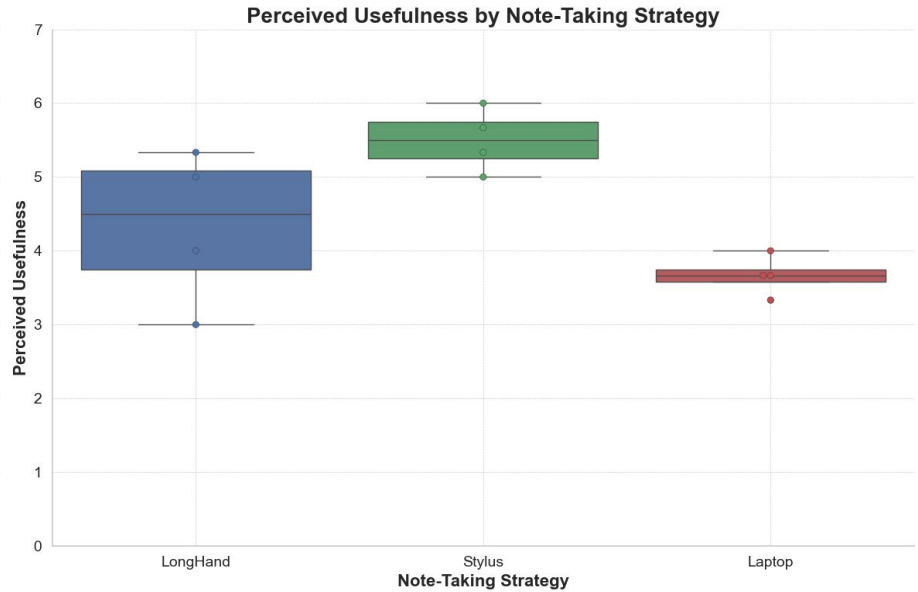
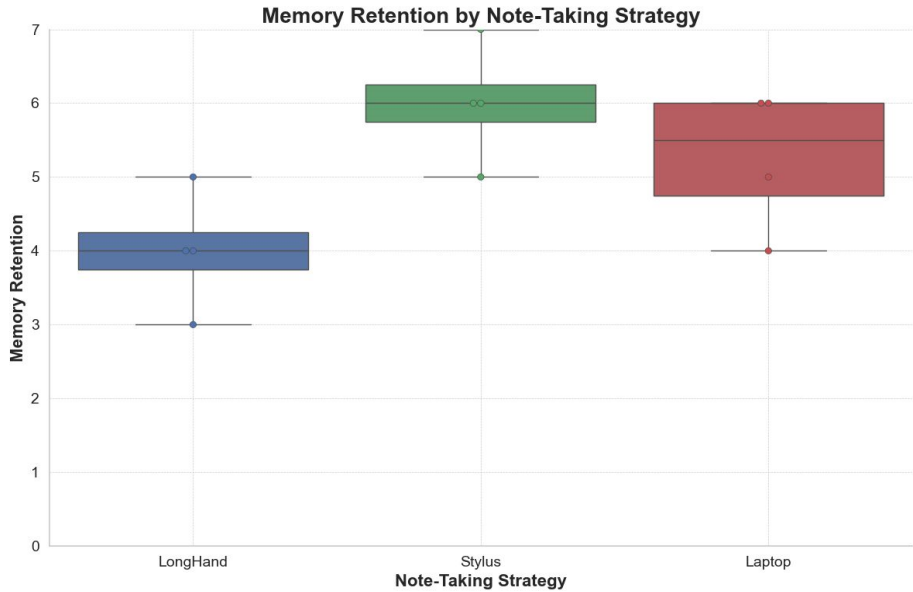
Mean and S.D:

- Determine Mean and SD of Memory Retention and Perceived Usefulness for different note-taking strategies

Memory Retention		
Condition	Mean	S.D
Notebook	4.0	0.7
Stylus	6.0	0.71
Laptop	5.25	0.82
Perceived usefulness		
Condition	Mean	S.D
Notebook	4.33	0.91
Stylus	5.5	0.37
Laptop	3.66	0.23

Data Analysis (Descriptive)

Box Plots:



Data Analysis (Descriptive)

Shapiro-Wilk Test:

- To determine whether the data is normally distributed
- Value > 0.05 indicates that data is normally distributed

Memory Retention		
Condition	p-value	Normal Distribution
Notebook	0.68	Yes
Stylus	0.69	Yes
Laptop	0.27	Yes

Perceived usefulness		
Condition	p-value	Normal Distribution
Notebook	0.65	Yes
Stylus	0.97	Yes
Laptop	0.68	Yes

Data Analysis (Inferential)

One Way ANOVA:

- Indicates significant difference in the D.V
- p-Value < 0.05 indicate there exists significant difference

One Way ANOVA			
Dependent variable	F-Statistics	p-value	Significance Difference
Memory Retention	5.4	0.028	Yes
Perceived Usefulness	7.5	0.019	Yes

Data Analysis (Inferential)

Tukey's HSD:

- Pairwise comparison between groups
- H1 :True
- H2 :True

Tukey's HSD(Memory Retention) FWER=0.05						
Group 1	Group 2	Mean diff	P-adj value	Lower	Upper	Reject
Laptop	Longhand	-1.25	0.157	-2.9597	0.4597	False
Laptop	Stylus	0.75	0.469	-0.9597	2.4597	False
Longhand	Stylus	2.0	0.023	0.2903	3.7097	True

Tukey's HSD(Perceived Usefulness) FWER=0.05						
Group 1	Group 2	Mean diff	P-adj value	Lower	Upper	Reject
Laptop	Long Hand	0.157	0.383	-0.667	2.001	False
Laptop	Stylus	1.83	0.01	0.499	3.167	True
Longhand	Stylus	1.167	0.086	-0.167	2.501	False

Results & Discussion

- H1: **Stylus** based note-taking has a higher rate of **Memory Retention** compared to **Longhand**
 - The data **supports** this hypothesis
- H2: **Stylus** based note-taking has a higher rate of **Perceived Usefulness** compared to **Laptop**
 - The data **supports** this hypothesis
- Hence, it can be argued that **Stylus** based note-taking is the most versatile and useful strategy, enabling students to do more.

Limitations

Manipulation and Biases: Some study participants had a higher affinity for their chosen note-taking strategy than others.

Limited Educational Level: All participants were RWTH students. No information regarding students from primary or secondary education or vocational training.

Future Work

- Inclusion of students from different educational levels
- Extend the duration of study (time span - one semester)
- Recruit a larger number of participant for the study (20 to 30 per condition)
- Include more substantial content for lectures and varied questions for quiz

Conclusion

Motivation: To evaluate the performance of **Stylus** based note-taking

Hypotheses:

- H1: **Stylus** based note-taking has a higher rate of **Memory Retention** compared to **Longhand**
- H2: **Stylus** based note-taking has a higher rate of **Perceived Usefulness** compared to **Laptop**

Study Design: Between-Groups (3 x 1)

Results:

- H1: **True**
- H2: **True**

References

- [1] Yang, H. H., Shi, Y., Yang, H., & Pu, Q. (2020). The impacts of digital note-taking on classroom instruction: A literature review. In *Technology in Education. Innovations for Online Teaching and Learning: 5th International Conference, ICTE 2020, Macau, China, August 19-22, 2020, Revised Selected Papers 5* (pp. 61-72). Springer Singapore. <https://doi.org/10.14742/ajet.6688>
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- [5] Davis, F. D., Granić, A., & Marangunić, N. (2023). The technology acceptance model: 30 years of TAM. *Technology*, 1(1), 1-150. <https://doi.org/10.1007/978-3-030-45274-2>