The Impact of AI Tools on Students' Learning Experience

Assignment 2: Survey Development & Analysis

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Research Questions

RQ1

Do students who use AI tools complete their academic tasks in less time while maintaining or improving the quality of their work compared to those who do not use AI tools?

RQ2

Does the frequency of AI tool usage increase students' motivation and engagement during their studies?

RQ3

Do students who include AI tools into their study routines demonstrate better long-term retention of learned material compared to those who do not?

Survey Design

1 Target Group

TU Wien students from programs such as Data Science, Computer Science, and Business Informatics

2 Data Collection Method

Online survey with both quantitative and categorical questions

3 Total Respondents

98 participants

4 Question Types

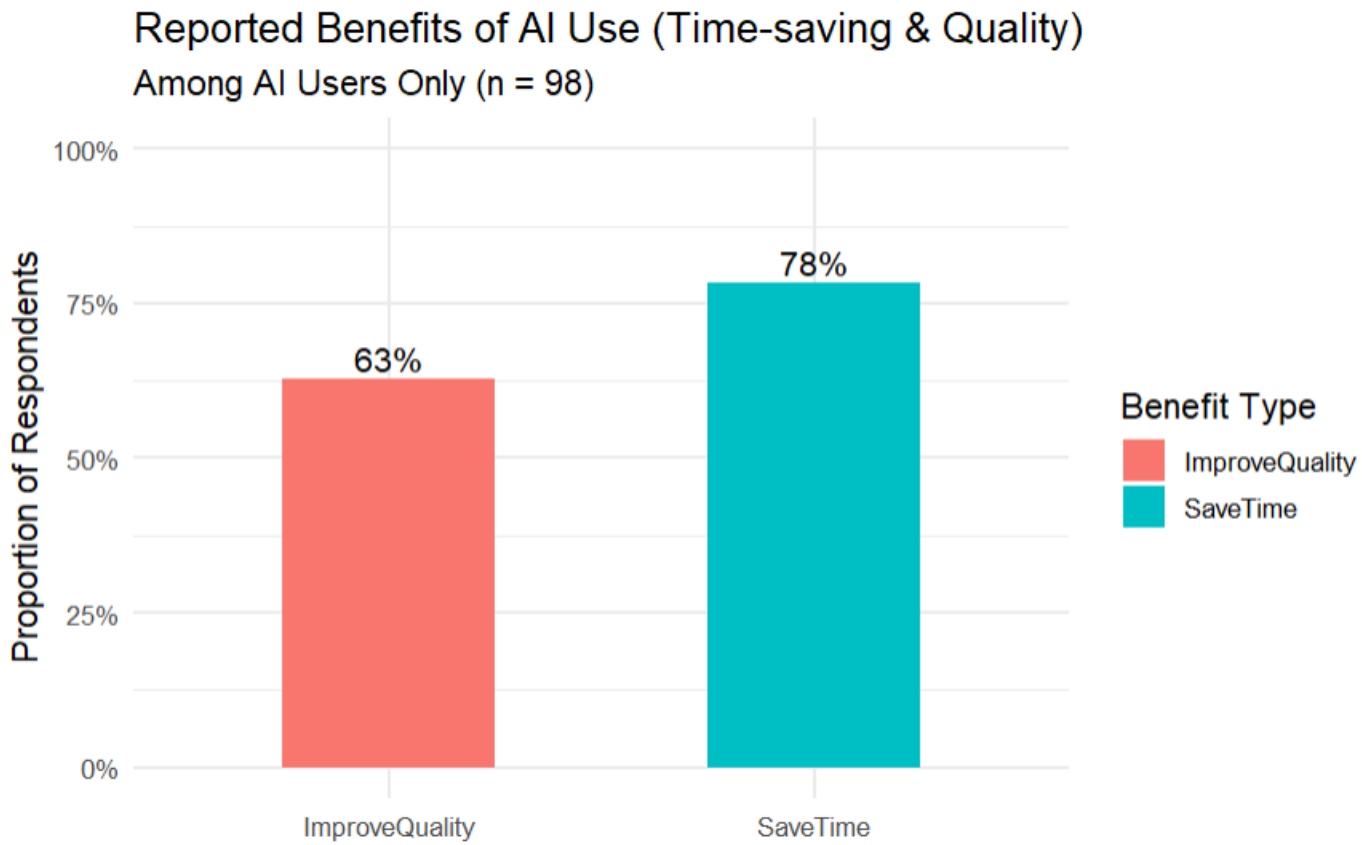
- Demographics (age, gender, program)
- AI tool usage and frequency
- Opinions on time-saving, quality, motivation, and retention (Likert-style)

Exploratory Data Analysis – RQ1: Time-Saving & Quality Improvement

Research Question:
Do AI tools help students complete academic tasks faster and with better quality?

Findings:

- 78% of AI users said AI tools saved them time
- 63% reported improved quality of academic work
- Analysis based on 98 AI-using students
- No comparison to non-users was possible due to lack of data

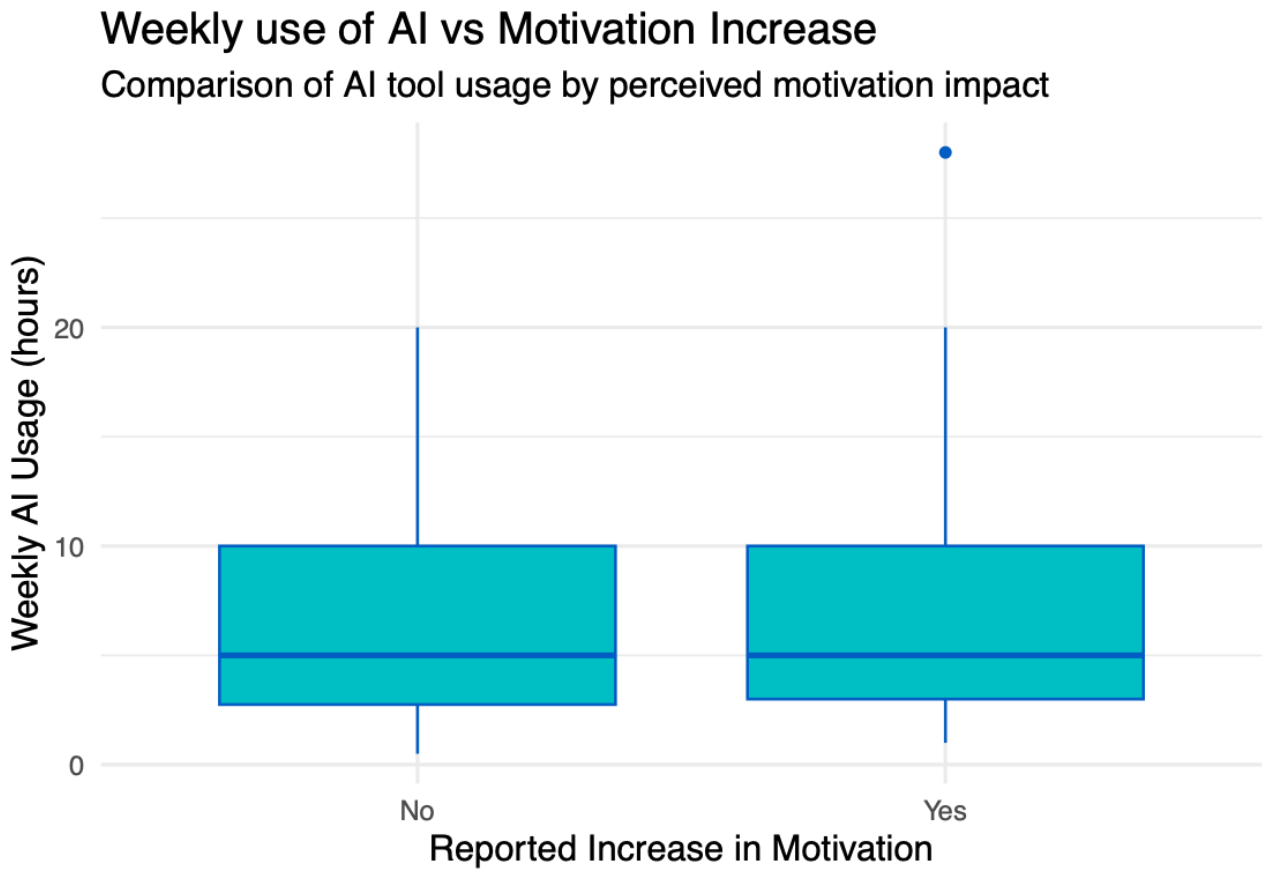


Exploratory Data Analysis – RQ2: Motivation vs. AI Usage Frequency

Research Question:
Does the frequency of AI tool usage increase students' motivation and engagement?

Findings:

- Median, first quartile, and third quartile of weekly AI usage are nearly identical for both groups (5, 4, and 10 hours respectively).
- This suggests no significant difference in AI usage between those who reported an increase in motivation and those who did not.



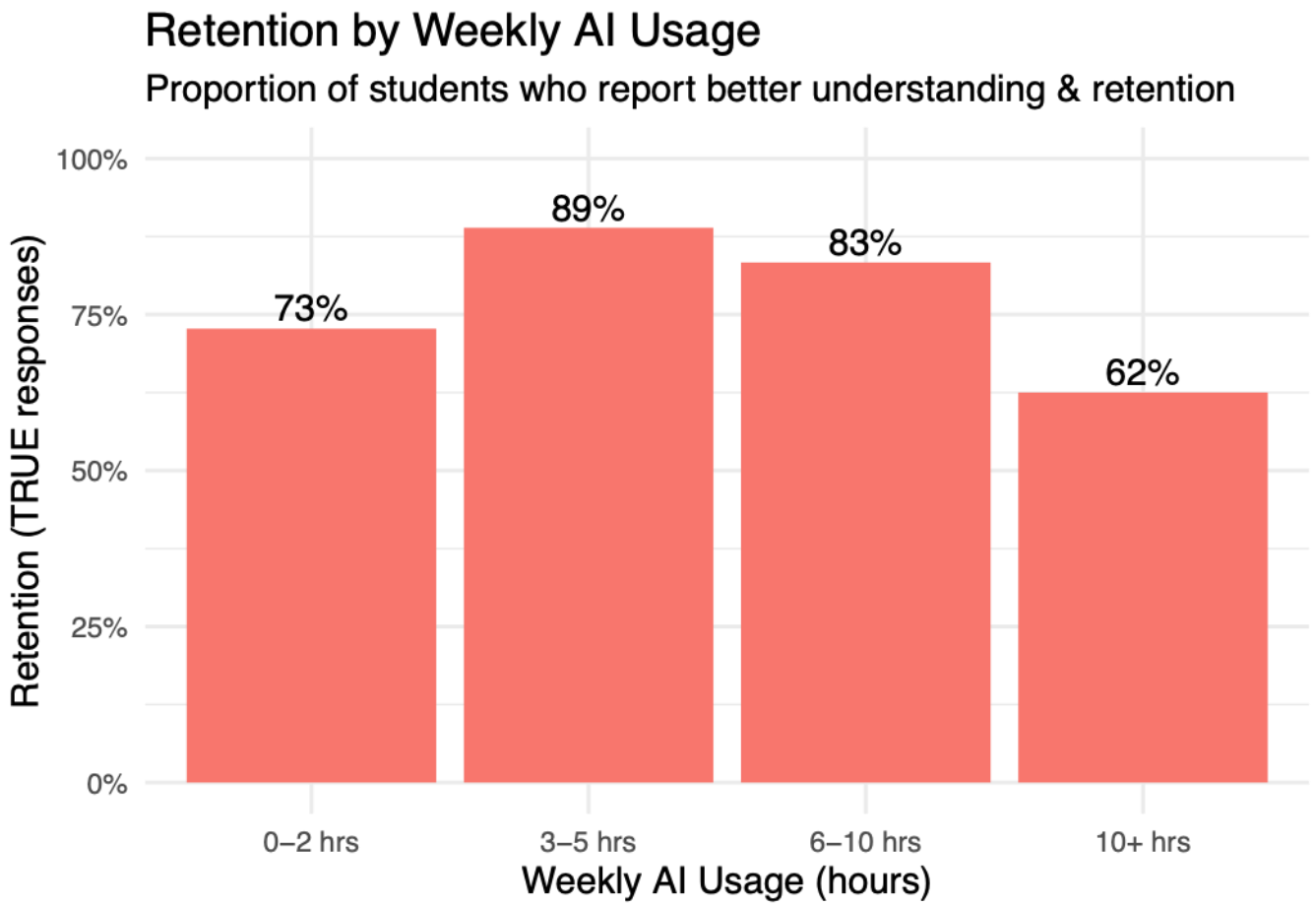
Exploratory Data Analysis – RQ3: Retention vs. AI Usage Frequency

Research Question:

Do students who use AI tools more frequently report better long-term retention of learned material?

Findings:

- 3–5 hrs/week users reported the highest retention (89%)
- 6–10 hrs/week also high (83%)
- Retention drops for 10+ hrs/week (62%)
- Moderate usage appears more effective for retention than excessive usage



Descriptive Inference – Summary Statistics

Summary Statistics

Age

Average age was 25.8 years, with a few possible outliers on the largest ages.

Weekly AI Usage

Students used AI tools for an average of 7.0 hours/week, with a few high-usage outliers skewing the data.

Variable	Mean	SD	Min	Max
Age	26.04	3.93	20	45
AI Hours	7.0	5.7	0.5	28

Analytic Inference – RQ1: Time-Saving & Quality (Binomial Test)

Research Question

- Do AI tools help students complete academic tasks faster and with better quality?

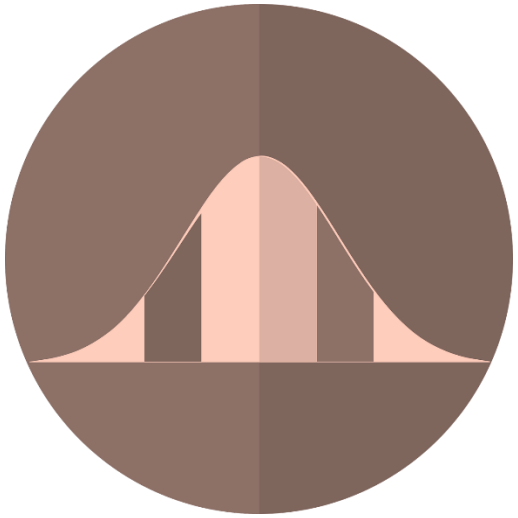
Statistical Test

- One-sample binomial test (tested against 50% baseline)

Results

- **Time-saving:** 78% agreed, $p < 0.00001$ → significant
- **Quality improvement:** 62% agreed, $p = 0.0098$ → significant

RQ1



Interpretation!

A statistically significant majority of AI users report both time-saving and quality benefits.

Analytic Inference – RQ2: Motivation & AI Usage (Logistic Regression)

Research Question

- Does the number of hours spent using AI tools per week predict students' motivation levels?

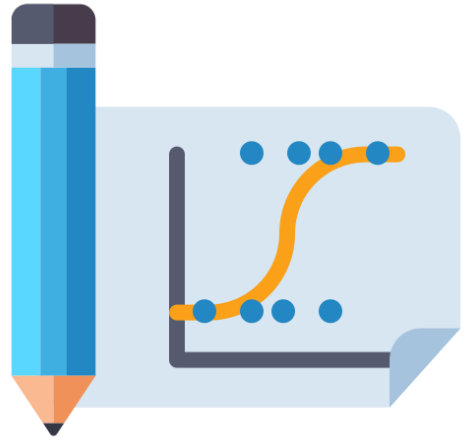
Statistical Test

- **Logistic regression**
  Outcome: Motivation (binary)
  Predictor: AI Hours (numeric)

Results

- **Coefficient for ai_hours:** 0.005
- **p-value:** 0.867
- **Interpretation**:
  Not statistically significant

RQ2



Interpretation!

No significant relationship found between AI usage hours and reported motivation.

Analytic Inference – RQ3: Retention & AI Usage (Logistic Regression)

Research Question

- Does weekly AI usage predict whether students report better understanding and long-term retention?

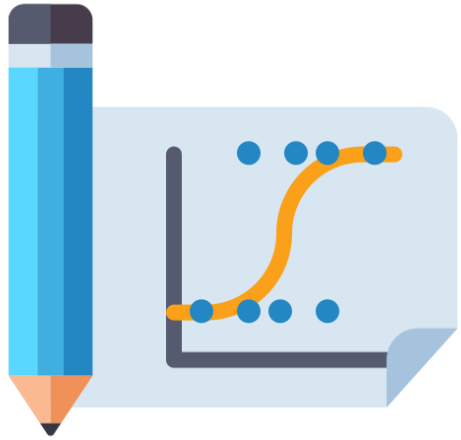
Statistical Test

- **Logistic regression**
  Outcome: Retention (binary)
  Predictor: AI Hours (numeric)

Results

- **Coefficient for ai_hours:** -0.041
- **p-value:** 0.31
- **Interpretation**:
  Not statistically significant

RQ3



Interpretation!

No significant relationship found between weekly AI usage and reported retention."

Discussion & Conclusion

"AI tools are widely used and perceived as beneficial, especially for task efficiency and quality. However, their effect on motivation and learning retention is less clear."

- **RQ1:** Significant majority of students reported time-saving (78%) and improved quality (62%) using AI tools
- **RQ2:** No significant link between weekly AI use and reported motivation
- **RQ3:** No significant link between weekly AI use and perceived retention