

Statistics Without Borders

Survey Data Generation & Analysis

IBM 6530 Marketing Analytics Term Project

Team Members

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Date
May 2025





Introduction

Background

Statistics Without Borders is finding it difficult to craft a thorough generative AI policy that balances using AI tools with human expertise, organizational credibility, and volunteer involvement. The organization has been careful around AI technologies without jeopardizing its mission of offering free data science services to socially responsible communities.

Objectives 1







Assess Volunteer Perceptions and Readiness for Generative AI Integration

Objectives 2

Evaluate Current AI Tool Usage and Potential Risks in Pro Bono Projects

Methodology

- **Tools:** CPP AI Usage and Policy Survey, Rstudio
- **Focus:** Compare preferences between **Interactive** and **Static** AI policy types
- **Experimental Condition:** Stratified sampling across CPP students by department, course type, and academic level

Interactive AI Policies	Static AI Policies
 Adaptive responses	 Fixed, rule-based responses
 Encourages user interaction & feedback	 One-directional, no feedback mechanism
 Examples: Chatbots, AI writing assistants	 Examples: PDFs, static tutorials



What level of familiarity do students have with generative AI tools?

RESEARCH QUESTION

What level of familiarity do students have with generative AI tools?

Survey Questions Used

"AI Expertise Level" Questions

"Agreement with AI Knowledge and Experience" Questions

Answer to research question

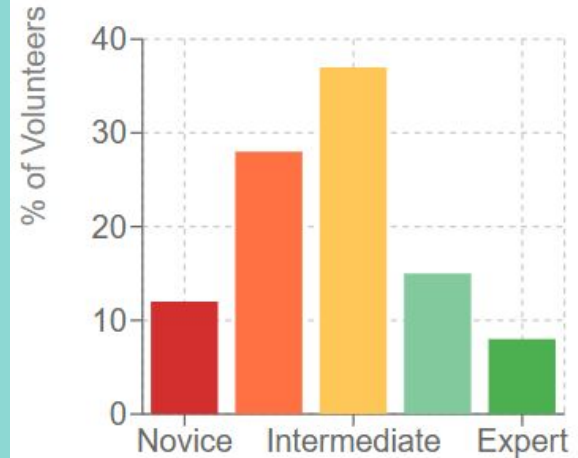
Status


- 8% in "Novice" or "Expert" status
- 15% in "Advanced"
- 28% in "Beginner"
- 37% in "Intermediate"

Confidence is slightly behind

- 54% agree to strongly agree (effective use of AI Tools)
- 46% confident in the evaluation of AI outputs

Self-Reported AI Expertise Levels





What concerns do students have about integrating AI into pro bono projects?

RESEARCH QUESTION

What concerns do students have about integrating AI into pro bono projects?

Survey Questions Used

"AI Concerns" Questions

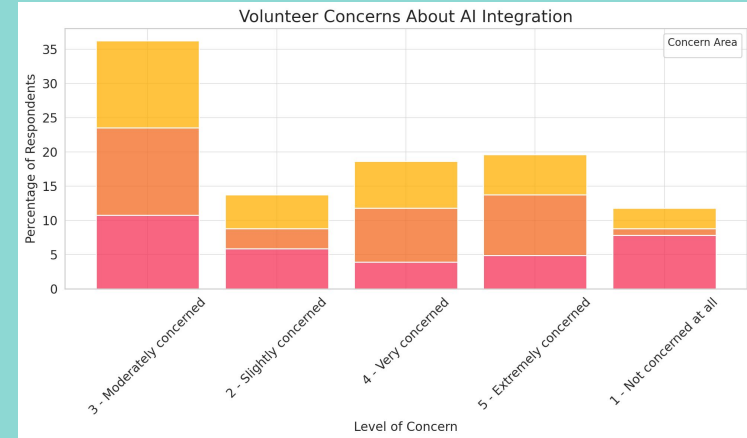
Statistical Method

Percentage analysis of concern levels & cross-tabulation

Findings

Three concerns

- Data Privacy
 - 65% rating as “very concerned” or “extremely”
- Academic Integrity/ Plagiarism
 - 57% at “highly concerned”
- AI reliance affecting critical thinking skills
 - 54% at “highly concerned”





What training or support would students need to feel comfortable using AI?

RESEARCH QUESTION

What training or support would students need to feel comfortable using AI?

Survey Questions Used

"Instructor Support on AI Use " Questions

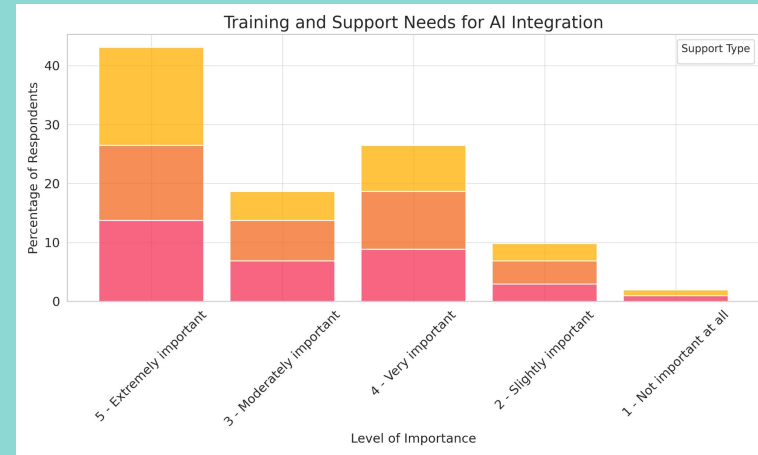
Statistical Method

Percentage analysis and ranking of importance

Findings

Clear priorities for training & support

- “Clear guidelines about when/how AI can be used for assignments”
 - 77% rating “very important” or “extremely important”
- “Training on effective prompting techniques”
 - Followed closely with 71%
- “Discussions about AI ethics & limitations”
 - 66%



What AI tools are currently being used informally by students?

RESEARCH QUESTION

What AI tools are currently being used informally by students?

Survey Questions Used

AI Usage Questions

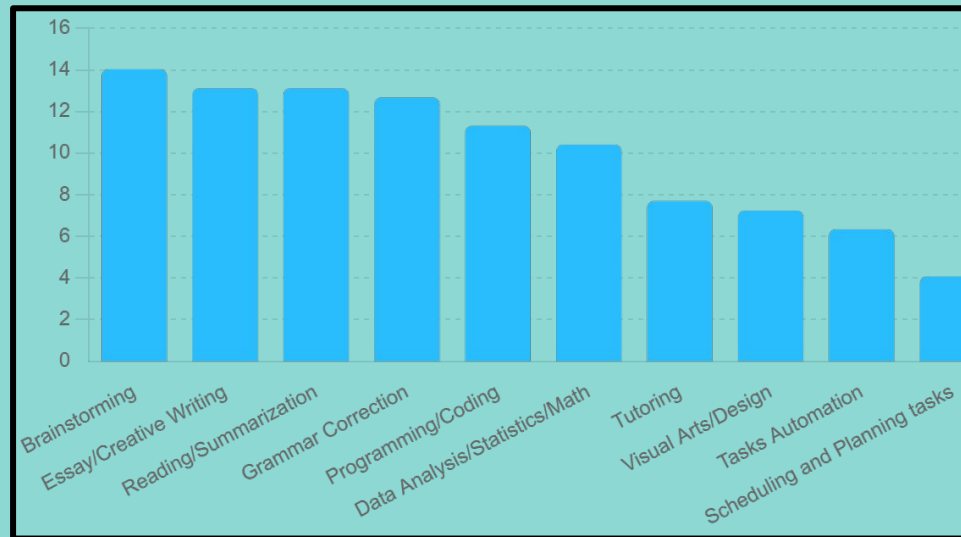
Statistical test used

Frequency Analysis

Key Findings

Programming/Coding, Task Automation, Scheduling had low adoption

underused categories represent strong opportunities for workshops and target demos,





**Do students with different levels of technical expertise
differ in their attitudes towards AI integration?**

RESEARCH QUESTION

Do students with different levels of technical expertise differ in their attitudes towards AI integration?

Survey Questions Used

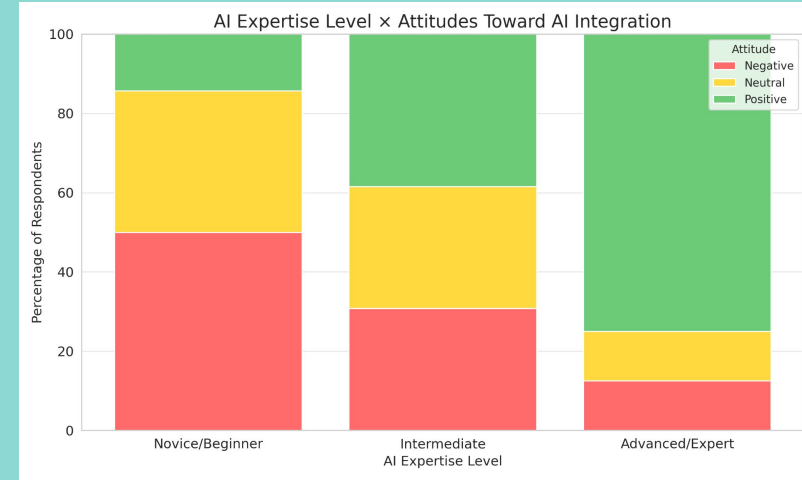
Cross-tabulation of "AI Expertise Level" with "Agreement with AI Knowledge and Experience Questions" and "AI Concerns" responses

Statistical test used

Cross-tabulation analysis and chi-square test of independence

Answer to research question:

- Significant relationship between technical expertise & attitudes towards AI integration
 - $\chi^2 = 16.38$, $df = 8$, $p < 0.05$
- Higher AI expertise demonstrated more positive attitudes
 - 85% expressing favorable views
 - Concerned about ethical issues, bias & fairness
- Less AI expertise
 - Practical challenges, usability & reliability
- Training & support should be tailored to students with varying expertise levels



What is The Self-Rated Level of AI Knowledge and Experience Among Students?

RESEARCH QUESTION

What is The Self-Rated Level of AI Knowledge and Experience Among Student?

Survey Questions Used

Agreement with AI knowledge and experience questions

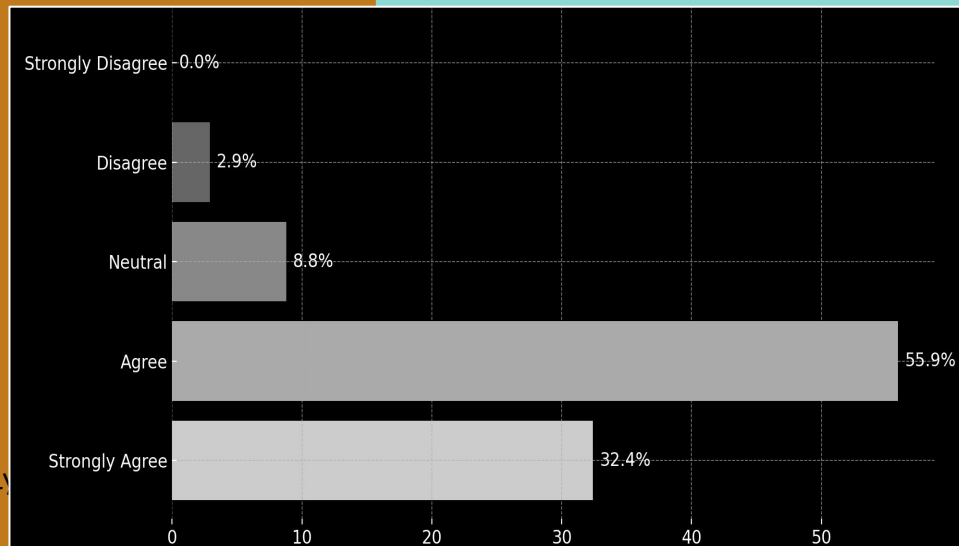
Statistical Method

Percentage distribution of responses across scale points.

Findings

Among 34 respondents

- 11 (32.4%) **Strongly Agree**
- 19 (55.9%) **Agree**
- 3 (8.8%) are **Neutral**
- 1 (2.9%) **Disagree**
- 0 (0%) **Strongly Disagree**
- Overall, **88.3%** of participants (Agree + Strongly Agree) self-report familiarity with AI



What Types of Projects Might Benefit Most From AI Tool Integration?

RESEARCH QUESTION

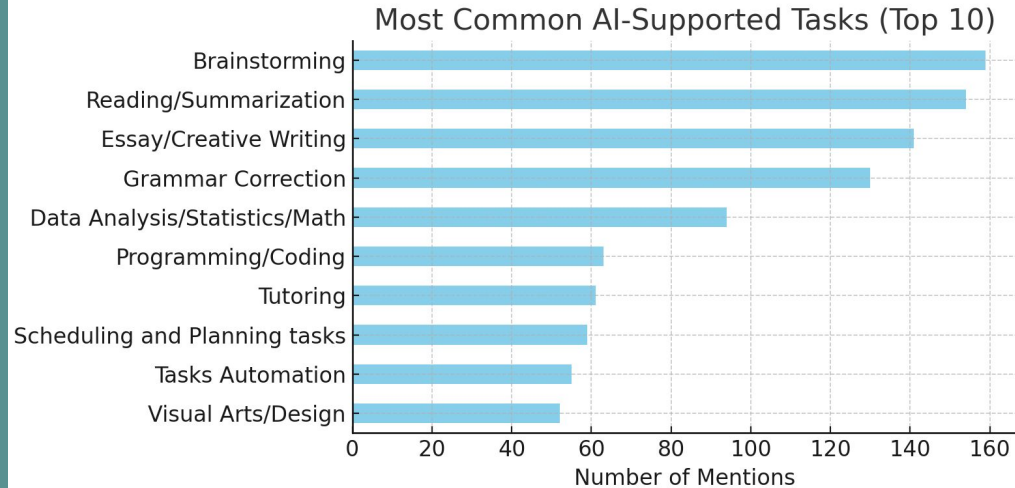
Task Usage Frequency

Survey Questions Used: 5. AI Tools Usage

Statistical Method: Chi-square test

Findings

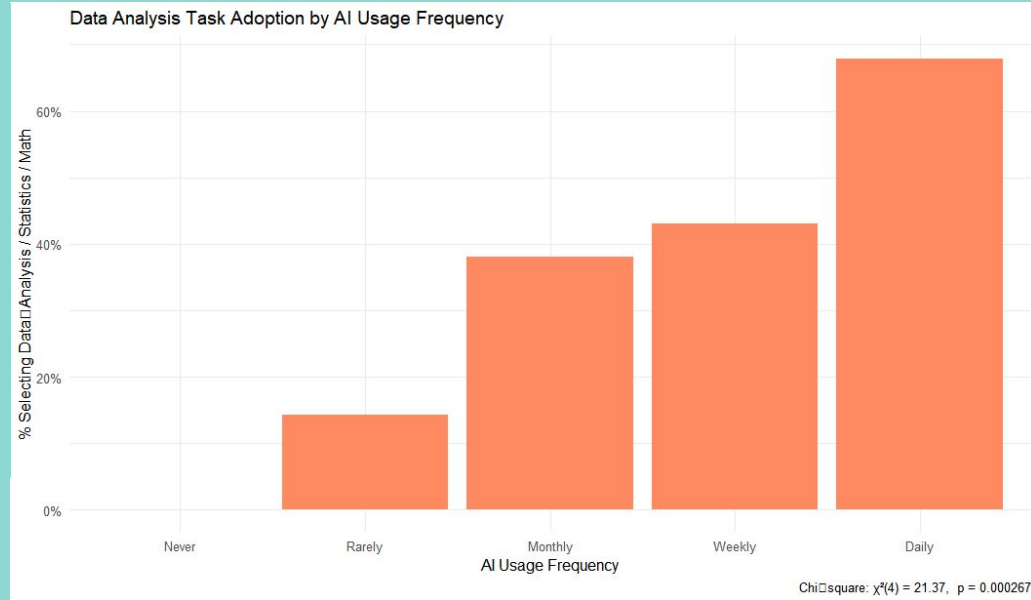
- Brainstorming & Reading/Summarization and Essay/Creative Writing showed that AI is being used for its thinking capabilities through various AI models.
- Grammar correction and statistics/data analysis/math are also highly ranked, which implies using AI for both editorial and technical polishing.
- Programming/Coding and Tutoring demonstrate moderate usage, probably fueled largely by students within the fields of STEM and technology.
- Less prominent—but still noteworthy—activities such as Scheduling and Planning, Tasks Automation, and Visual Arts/Design indicate potential applications outside the usual scholarly writing purposes."



AI TASK USAGE x AI USAGE FREQUENCY

Findings

- “Never” users have a 0% adoption.
 - 14% of “Rarely” users seek the help of AI for analysis.
 - Rises to 38% for “Monthly” users
 - 44% for “Weekly” users
 - 68% of “Daily users taking the lead”them choosing data analysis tasks
-
- $p = .0003$ indicates that the frequency of AI usage and preference for the use of data analysis tasks are not independent.
 - Students who use AI more frequently are likely to use it for intense analytical purposes.



```
data: ct
X-squared = 21.371, df = 4, p-value = 0.0002673
```



What potential data security risks do students perceive in AI tool usage?

RESEARCH QUESTION

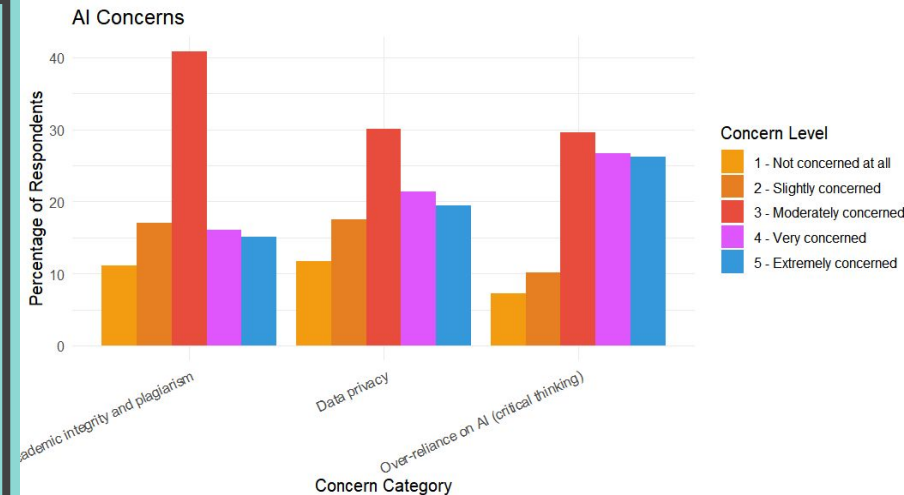
Data

Survey Questions Used: AI Concerns [Academic integrity and plagiarism], [critical thinking skills], [Data privacy]

Statistical Method: Descriptive Statistics

Findings

- **Data privacy ranks highest among AI-related concerns.**
 - More than 45% indicate they are very (4) or extremely concerned (5).
 - Whereas concerns regarding academic integrity & plagiarism on AI revolve around 'moderate' levels



AI TASK CONCERNS

CONCERN	MEAN	% SELECTING 4 or 5
Critical thinking	3.54	52.9%
Data privacy	3.19	40.8%
Academic Integrity/ Plagiarism	3.07	31.1%

Findings

- Over-reliance on AI (Critical Thinking) is a top concern, with the highest average score (3.54) and over half of respondents (52.9%) rating it as a strong concern (4 or 5).
- Data Privacy comes second, with a mean of 3.19 and 40.8% expressing strong concern—suggesting moderate anxiety about sensitive data use.
- Academic Integrity/Plagiarism is the least concerning issue for respondents in this sample, with only 31.1% selecting high concern and a lower mean of 3.07.



**Does a student's confidence in evaluating
AI-generated outputs correlate with their
ability to correctly define prompt engineering?**

RESEARCH QUESTION

Survey Questions Used

Which of the following best describes "prompt engineering"?

What is "few-shot learning" in the context of prompt engineering?

How would you best define "hallucination" in the context of AI?

AI Knowledge [I am confident in evaluating the accuracy and relevance of AI-generated outputs]

Confidence

Statistical Method

Box & jitter plot

Pearson correlation

Findings

$r = 0.16$ is a weak positive correlation

$p \approx 0.02$ is below 0.05

Interpretation

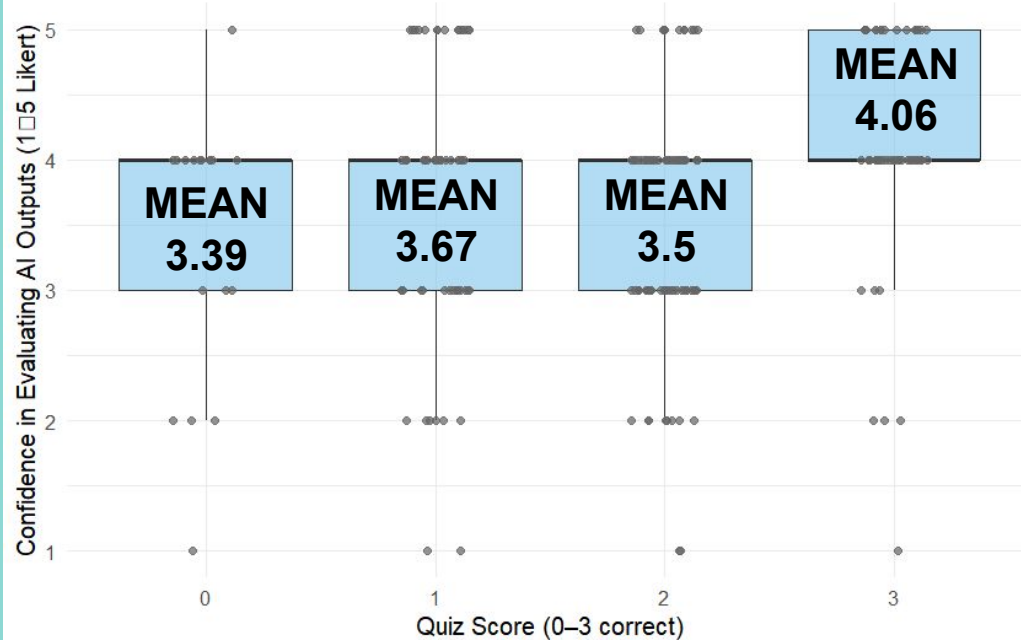
Weak positive correlation

Statistically significant but not strong

Many students overestimated their AI evaluation skills

Confidence vs Composite AI Knowledge Score

Pearson $r = 0.16$, $p = 0.0196$



Pearson's product-moment correlation

```
data: as.numeric(as.character(df$quiz_score)) and df$confidence
t = 2.353, df = 204, p-value = 0.01958
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.02643709 0.29274712
sample estimates:
      cor
0.1625509
```




Do students attitudes toward AI integration differ across demographic characteristics?

RESEARCH QUESTION

AI Integration x Demographic

Survey Questions used

“AI Expertise Level” Question

Attitude indicator

“AI Concerns” Questions

“Agreement with AI Knowledge & Experience” Questions

Statistical Method

Constructed Scale, Chai-squared Test



Attitude Indicator

Goal

To measure each student's overall sentiment toward AI integration, their positive beliefs and concerns are combined into a single score.

Calculate 2 Averages for Each Student

Positive Mean = The average of the 5 positive agreement questions

Concern Mean = The average of the 3 AI concern questions.

Create Attitude Score

Attitude Index = Positive Mean – Concern Mean

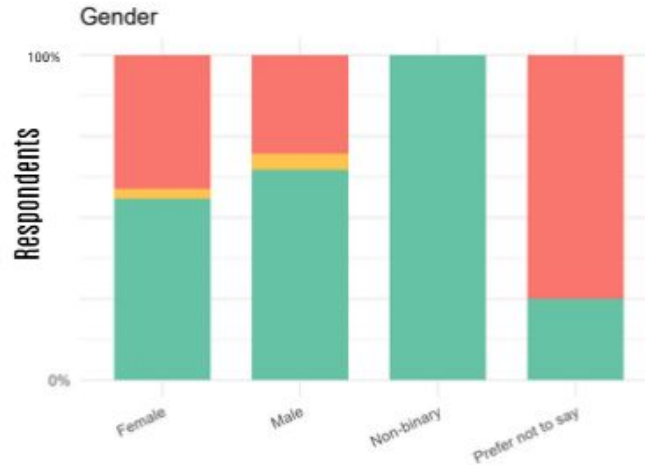
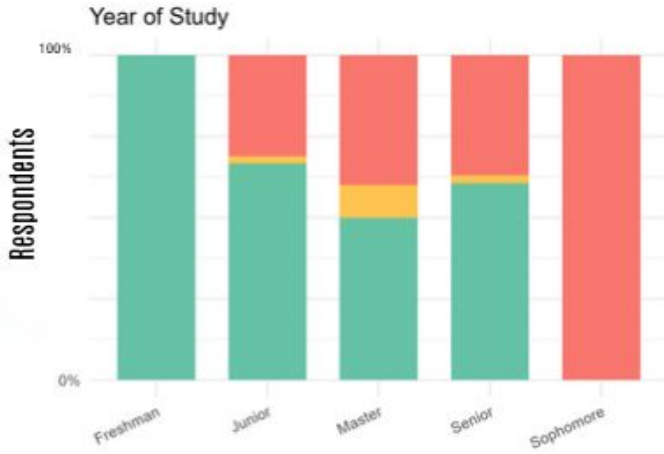
Categorize Three Levels

Positive Attitude: Score > 0

Neutral Attitude: Score = 0

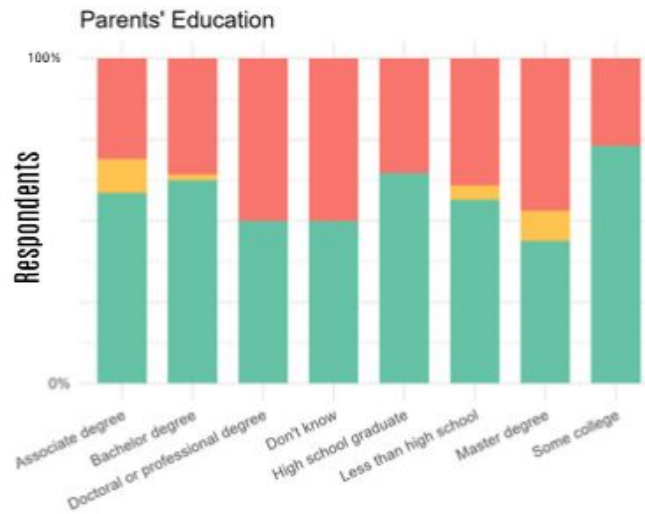
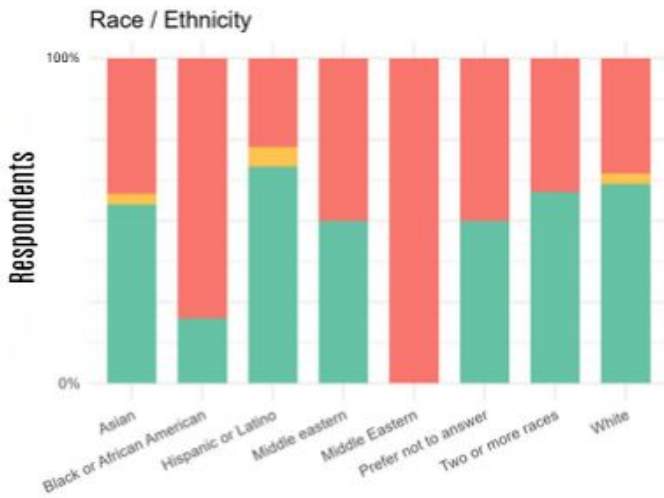
Negative Attitude: Score < 0

Chi-Square Test
Xsquared =8.67
df=8
p-value=0.3708



Chi-Square Test
Xsquared =6.15
df=6
p-value=0.4056

Positive - ■
Neutral - ■
Negative - ■



Chi-Square Test
Xsquared=13.52
df=14
p-value=0.4863

Chi-Square Test
Xsquared=11.75
df=14
p-value=0.6264



AI Integration x Demographic

Findings

No significant differences were found for any demographic variable

All p-values > 0.05

Chi-square results proved that demographic background is not significant enough to make a difference towards AI integration

Key Insights

RQ1: Technical Expertise Drives Attitude

$\chi^2(4) = 20.7, p = 0.0004$

Students with higher AI expertise show significantly more positive attitudes.

RQ2: Frequent AI Users = Deeper Use

$\chi^2(4) = 21.4, p = 0.0003$

Daily users most likely to use AI for complex tasks like data analysis.

RQ3: Top Support Need: Policy Clarity

77 % rated “Clear guidelines” $\geq 4/5$

Students want policies they can understand
Over 50 % “very/extremely concerned” about
Data privacy, Plagiarism, and Loss of critical thinking

RQ9: Weak Correlation for AI Confidence & Knowledge Accuracy

$r = 0.16, p = 0.02$

While statistically significant due to the large sample, the correlation is weak

Concluded, Students’ confidence in evaluating AI outputs does not strongly predict their actual understanding or ability to define prompt engineering correctly.



Summary

The data we wrangle and analyze led to some pretty good insights and unexpected insights. Not just about CPP students but maybe where a college student stands with AI. CPP students are early adopters of Artificial intelligence but concerns still remain about privacy, ethics, and learning.

Most-used AI tasks

Essay writing, summarisation, brainstorming, data analysis.

Frequent AI Users = Deeper Use

Daily users most likely to use AI for complex tasks like data analysis.

Top Support Need: Policy Clarity

Students want policies they can understand
Majority “very/extremely concerned” about Data privacy, Plagiarism, and Loss of critical thinking

Ethical concerns still high

50 % “very/extremely” worried about privacy, plagiarism, loss of critical thinking

Demographics not a divider

Year, gender, race, parent education: no significant attitude differences

Under-used features

Task automation, scheduling, visual design & coding rank lowest → training opportunities.

