From Prompts to Progress: AI-Assisted Learning Analytics

1. Introduction

This technical report presents an analytical review of AI-assisted learning interactions recorded during the 2024/2025 academic year. The analysis focuses on understanding how students across different educational levels and academic disciplines engage with AI tools, the types of tasks supported, usage intensity, and the resulting learning outcomes. The report is based on structured session-level data visualized through an Excel dashboard.

2. Data Description

The dataset consists of individual AI interaction sessions, where each row represents a unique learning session. Key variables include:

- Session ID – Unique identifier for each AI interaction session
- Student Level – High School, Undergraduate, or Graduate
- Discipline – Academic field (e.g., Biology, Computer Science, Engineering, Business, etc.)
- Session Date – Date of AI usage
- Session Length (minutes) – Duration of interaction with the AI assistant
- Total Prompts – Number of prompts submitted during a session
- Task Type – Nature of the task (Writing, Studying, Homework Help, Coding, Brainstorming, Research)
- AI Assistance Level – Scale indicating intensity of AI usage
- Final Outcome – Result of the session (Assignment Completed, Idea Drafted, Confused, Gave Up)

The dataset was cleaned and aggregated using Microsoft Excel to generate summary statistics and visual insights.

3. Methodology

The analysis employed descriptive analytics techniques, including:

- Frequency and count analysis to determine dominant usage patterns
- Aggregation by student level, discipline, and task type
- Comparative analysis of AI usage levels and session outcomes
- Visualization using bar charts, donut charts, and trend lines

No predictive modeling was applied; the focus was on identifying patterns, trends, and performance indicators.

4. Analysis and Findings

- 4.1 Student Level Analysis

Undergraduate students account for the highest proportion of AI usage. This indicates stronger adoption of AI tools at this academic level, likely due to heavier coursework demands and greater exposure to digital learning technologies. High school and graduate students show comparatively lower engagement levels.

- 4.2 Discipline-Based Usage

Biology records the highest number of AI prompts, followed by Engineering and Computer Science. This suggests that concept-heavy and problem-oriented disciplines benefit most from AI assistance, particularly for explanations, summaries, and academic writing support.

- 4.3 Task Type and Session Length

Writing tasks dominate AI usage and are associated with the longest session durations. Studying and homework help also show significant engagement, while brainstorming and research tasks occur less frequently and involve shorter sessions.

- 4.4 AI Usage Level Trends

AI usage peaks at moderate levels (levels 3–4), indicating optimal engagement. Extremely high or low usage levels are less common and do not correspond to the highest productivity, suggesting diminishing returns from excessive reliance.

- 4.5 Learning Outcomes

Most sessions conclude with positive outcomes—either assignments completed or ideas drafted. However, a smaller proportion of sessions end with users feeling confused or giving up, indicating gaps in prompt clarity, AI guidance, or user understanding.

5. Insights

- AI is primarily used as a productivity and learning support tool rather than a quick reference system.
- Balanced AI usage leads to better academic outcomes than minimal or excessive use.
- Undergraduate students and science-oriented disciplines benefit most from AI integration.
- Writing-focused tasks are the strongest driver of sustained AI engagement.

6. Recommendations

- Promote AI Literacy: Provide training on effective prompting and ethical AI use to improve session outcomes.
- Encourage Balanced Usage: Guide students toward optimal AI assistance levels to avoid over-dependence.
- Target Support for Confused Outcomes: Analyze failed or confused sessions to improve guidance and learning design.

- Expand Adoption Across Disciplines: Encourage AI use in lower-adoption fields through tailored academic use cases.
- Continuous Monitoring: Update and review the dashboard regularly to track evolving usage patterns and outcomes.

8. Conclusion

The AI-Assisted Learning Analytics Dashboard provides valuable insights into how students interact with AI tools in academic environments. The findings demonstrate that AI, when used responsibly and at moderate levels, enhances learning efficiency and supports successful academic outcomes. These insights can inform institutional strategies for integrating AI into teaching and learning practices.