Context

1. Introduction

Generative artificial intelligence (GenAI) tools such as ChatGPT have rapidly transformed learning in higher education. Since late 2022, these systems have become part of everyday student work—from brainstorming and summarising readings to coding and academic writing. Yet, evidence on whether AI use actually improves academic performance remains mixed.

Some studies report that structured AI integration can enhance student learning outcomes and higher-order thinking (Wang & Fan, 2025), while others warn that overreliance on such tools may limit independent problem-solving and critical reasoning (Kasneci et al., 2023). Chen et al. (2025) emphasise that the effect of AI depends heavily on AI literacy; students who verify outputs and understand limitations tend to perform better than those who adopt information uncritically.

This project therefore asks:

Does using ChatGPT or AI tools improve student performance at the University of Exeter?

This question addresses a timely pedagogical issue. As universities seek responsible ways to integrate AI into teaching and assessment, understanding how patterns of AI use relate to academic achievement can guide fair digital learning policy and ethical AI literacy education. The study contributes to the public good by providing evidence for responsible GenAI adoption in UK higher education. It also aligns with the University of Exeter's Education and Digital Strategy by promoting transparent, data-driven insights into student learning behaviour. The project supports the broader objectives of the UK Data Service (UKDS) for ethical, reproducible, and FAIR-compliant research data stewardship (Wilkinson et al., 2016).

An anonymised online survey (approximately 15 items, under 5 minutes) will collect quantitative data on Exeter students' study habits, attendance, sleep, and AI use frequency, alongside banded coursework and exam marks. The DataGenerator.ipynb simulates this dataset (about 350 participants) to demonstrate realistic relationships between AI engagement and performance. Using Python (pandas, NumPy, matplotlib, seaborn, scipy), the DataAnalysis.ipynb visualises patterns and tests whether moderate, verified AI use correlates with higher academic achievement.

Ultimately, this study will help educators and policymakers understand how students can use AI ethically and effectively—as a complement rather than a substitute for their own analytical skills.
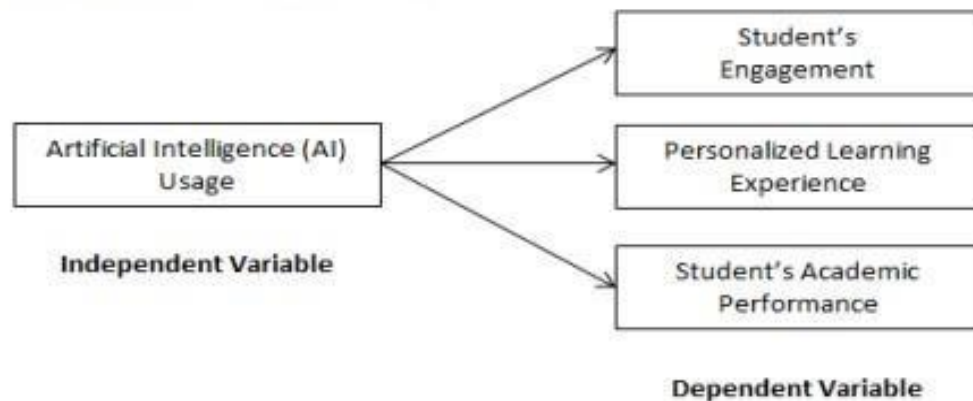
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2. Data Visualisation Research

The visualisation design for this proposal draws on recent studies examining how AI literacy relates to academic outcomes. To ensure accessibility and clarity, three exemplars of visualisation practice from recent literature were reviewed (ONS, 2023; Wilke, 2019). These models informed the figures created in DataAnalysis.ipynb and presented in Figures.pdf.

Example 1 — Conceptual Framework
Adapted from Ma'amor et al. (2024), *The Effect of Artificial Intelligence (AI) on Students' Learning*, *Information Management and Business Review* 16 (3S), pp. 856–867. © The Author(s) 2024, CC BY 4.0.

Figure 1: Conceptual Framework

Example 2 — Correlation Matrix of AI Literacy Factors and Academic Outcomes
Adapted from Beširović, S., Polz, E. & Tink, I. (2025), *Exploring Students' AI Literacy and Its Effects on Their AI Output Quality, Self-Efficacy and Academic Performance*, *Smart Learning Environments* 12 (1), Article 384. © The Author(s) 2025, CC BY 4.0.

Table 3 Descriptive results, normality distribution, and reliability coefficients, correlations

No	Variables	Mean	SD	Skewness	Kurtosis	Cronbach's	1	2	3	4	5	6
1	TU	2.62	1.51	1.002	.163	.964	1	.617**	.622**	.607**	.228**	.130*
2	CA	4.73	1.50	−.383	−.678	.944		1	.803**	.523**	.131*	.324**
3	PA	4.59	1.46	−.491	−.405	.920			1	.612**	.262**	.275**
4	SE	3.12	1.44	.388	−.593	.913				1	.368**	.207**
5	OUT	3.18	1.78	.363	−.876	.957					1	.041
6	AP	5.92	1.11	−1.583	3.576	.839						1

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

Example 3 — Main Challenges or Limitations in AI Use for Learning
Adapted from Vieriu, A.M. & Petrea, G. (2025), *The Impact of Artificial Intelligence (AI) on Students'*

Table 3. Main challenges or limitations encountered when using IA.

Thematic Categories	Frequency	Example Responses
Accuracy of Information	60	The information is often incorrect and needs to be verified; I'm frequently unsure if the answers provided are accurate, and I need to cross-check with other sources; AI tools often pull from unverified or outdated databases, leading to unreliable results; some AI responses include irrelevant information, while others are incomplete or misleading.
Over-dependence on Technology	7	Excessive reliance on AI reduces critical thinking and academic independence; I worry that students will become overly dependent on technology, leading to a lack of problem-solving abilities; the growing dependence on AI may cause people to neglect their own cognitive and analytical skills.
Various Errors	6	Sometimes the AI doesn't fully understand my question, leading to irrelevant responses; there are frequent writing errors and lack of grammatical accuracy in AI-generated content; certain tasks are beyond the AI's capability, such as more complex or nuanced problems; there is a lack of human interaction, which limits the overall learning experience.
Other Challenges	6	AI cannot replicate emotional nuances in text, which impacts its relevance in some contexts; concerns about privacy and ethics arise, especially regarding how personal data is used by AI.