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Module: Changemakers, Creativity and Value Creation

Component 1 Innovation and Research

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Task 1

13 May 2026 11:00

IDEATION & MIND MAP

Introduction

Creativity and innovation have played a significant role in transforming society and improving people's lives. Technological developments have changed the way individuals communicate, work and learn. Innovation encourages problem-solving and helps create value for both individuals and communities [1]. In the field of computing, emerging technologies such as artificial intelligence, cloud computing and cybersecurity continue to influence modern society.

As a computing student, several areas of interest can be explored through research projects. These include artificial intelligence, cybersecurity, mobile applications, data analytics and cloud computing. Each area has the potential to address real-world problems and contribute to social and economic development.

Artificial intelligence has become one of the most important innovations in recent years [2]. Many university students now rely on AI chatbots to assist with assignments, research and revision. This development has created opportunities for personal AI-powered tools that are increasingly used in education to support learning, generate ideas and improve productivity and personalised learning, but has also raised concerns regarding academic integrity and overreliance on technology [3].

Several project ideas were considered:

- Cybersecurity awareness among students.
- Mobile applications for time management.
- Social media and academic performance.
- Cloud computing adoption.
- AI chatbots and student learning.

Among these ideas, I selected "The Impact of Artificial Intelligence Chatbots on University Students' Learning Experience" as my project topic. I chose this topic because it aligns with my computing studies and focuses on an emerging trend that is influencing higher education. I believe that the findings of this project may help educational institutions understand how AI technologies can be used responsibly to create value for students and society.



Figure 1 : Concept of the idea,

Mind map:

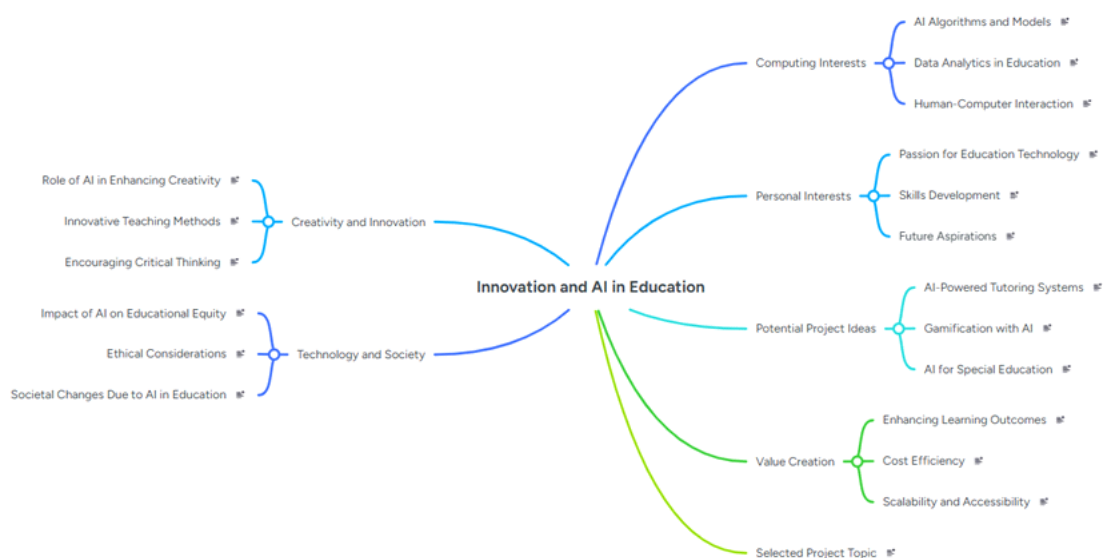


Figure 2 Mind Map

Mind Map Explanation

The mind map illustrates the process used to develop the research topic, "Innovation and AI in Education." The central idea is connected to six main branches that explore different aspects of the topic. Computing Interests highlights areas such as AI algorithms, data analytics in education and human-computer interaction, showing how computing supports educational innovation. Personal Interests focuses on educational technology, skills development and future career aspirations. Potential Project Ideas presents different AI applications, including AI-powered tutoring systems, gamification and special education. Creativity and Innovation demonstrate how AI encourages creative teaching methods and critical thinking. Technology and Society considers the wider impact of AI, including ethical issues and educational

equality. Finally, Value Creation shows how AI can improve learning outcomes, accessibility and efficiency, leading to the selected research topic [4]

Task 2

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Research Proposal, Research Area.

The Impact of Artificial Intelligence Chatbots on University Students' Learning Experience.

Artificial Intelligence (AI) has become one of the fastest-growing technologies in education. AI chatbots such as ChatGPT, Microsoft Copilot and Google Gemini are increasingly being used by university students to support independent learning, complete coursework, revise topics and improve academic understanding. These tools can provide instant explanations, generate ideas and assist with problem-solving, making learning more accessible and efficient.

Although AI offers many educational benefits, it has also raised concerns regarding academic integrity, over-reliance on technology, inaccurate information and reduced critical thinking skills [3]. As universities continue to integrate digital technologies into teaching and learning, it is important to understand how students are using AI and whether it has a positive or negative impact on their learning experience.

This research will investigate university students' experiences with AI chatbots by collecting both numerical and opinion-based data. The findings will help identify the benefits, limitations and ethical issues surrounding AI use in higher education. The research may also provide recommendations for universities on how AI can be used responsibly while supporting effective learning [5].

Innovation

Innovation is the process of introducing new ideas, technologies or methods that create value and improve existing systems. In higher education, AI chatbots represent an innovative development because they provide personalised learning support that was previously unavailable through traditional educational resources.

Unlike standard search engines, AI chatbots can answer questions conversationally, explain complex topics, generate examples and provide instant feedback. These features allow students to learn at their own pace and receive support whenever they need it. As AI technology continues to develop, universities are beginning to explore how these tools can enhance teaching, improve student engagement and increase learning efficiency [6].

This research is innovative because it investigates a current technology that is rapidly changing how students learn. Rather than focusing only on the advantages of AI, the study also explores challenges such as academic honesty, information accuracy and responsible AI use. The findings may contribute to future discussions about integrating AI into higher education while maintaining academic standards.

The Aim of this project

This research aims to investigate how Artificial Intelligence chatbots influence the learning experiences, study habits and academic performance of university students.

Research Question

How do Artificial Intelligence chatbots affect the learning experiences of university students, and what benefits and challenges do students associate with their use?

Research Objectives

The research will achieve the following objectives:

1. To identify how frequently university students use AI chatbots for academic purposes.
2. To investigate the main reasons students use AI chatbots during their studies.
3. To evaluate the positive impact of AI chatbots on learning, productivity and academic performance.
4. To examine the ethical concerns and challenges associated with AI chatbot usage in higher education.
5. To provide recommendations for the responsible and effective use of AI chatbots within universities [7].

SMART Objectives



The objectives have been developed using the SMART framework to ensure they are realistic and achievable [8].

SMART Criteria	Explanation
Specific	The research focuses on university students' use of AI chatbots for academic learning.
Measurable	Data will be collected through questionnaires and analysed using percentages, charts and participant responses.
Achievable	The project can be completed using an online questionnaire and a review of academic literature within the available timeframe.
Relevant	AI has become an important topic in computing and education, making the research highly relevant to current learning practices.
Time-bound	The research activities will be completed according to the project schedule over an eight-week period.

Research Philosophy

This research will adopt a “Pragmatism” research philosophy. Pragmatism focuses on solving practical problems by selecting research methods that best answer the research question. Rather than following only one research approach, pragmatism allows researchers to combine both quantitative and qualitative methods to gain a broader understanding of the topic [9].

The philosophy is appropriate because this study aims to collect numerical data about AI usage while also exploring students' opinions and experiences. Combining these methods will produce more balanced findings and provide a clearer understanding of how AI chatbots influence learning [10].

Research Databases and Search Tools



A range of reliable academic databases will be used to gather secondary research and support the literature review.

Google Scholar is used to locate peer-reviewed journal articles, conference papers and academic books related to Artificial Intelligence and education.

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Google Scholar

Impact of Artificial Intelligence Chatbots on University Students' Learning 🔍

• Articles ○ Case law

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Stand on the shoulders of giants

IEEE Xplore provides high-quality computing and engineering research, making it useful for identifying recent studies on AI technologies making it easy to do some research for this project .

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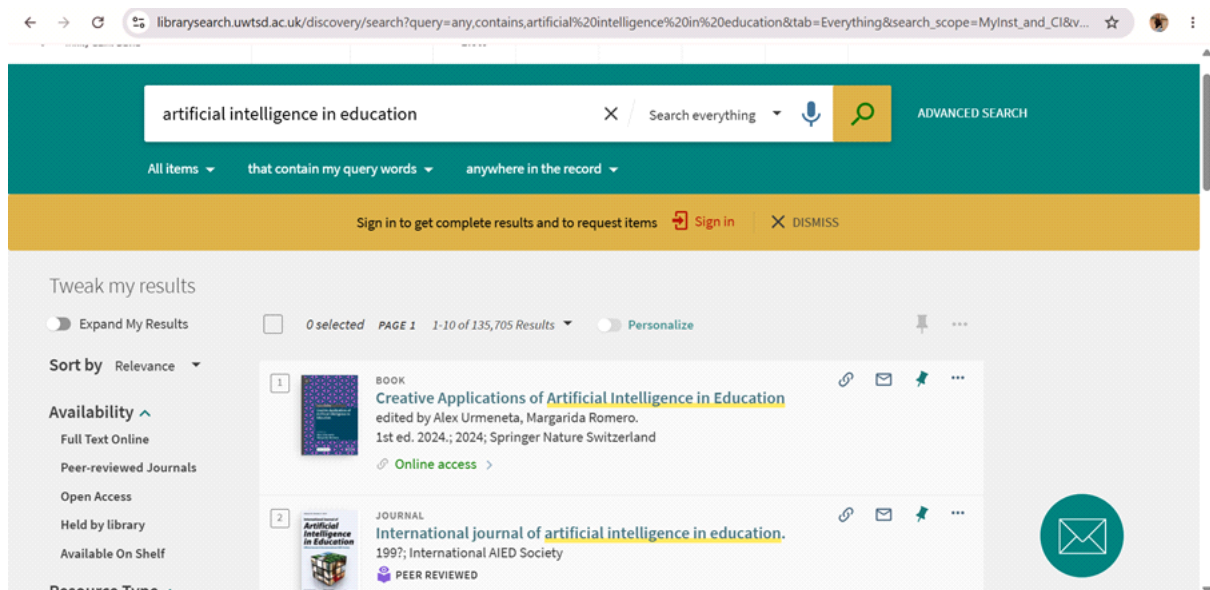
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Edge intelligence through in-sensor and near-sensor computing for the artificial intelligence of things

Artificial intelligence technology transforms traditional sensors from passive data collectors into active computing nodes, performing data...

Yongmin Baek, Byungjoon Bae, ... Kyusang Lee in npj Unconventional Computing

The university's online library database was also used to access subscription-based journals that are not freely available elsewhere.



Using several databases improves the quality of the literature review by ensuring that information is gathered from credible and up-to-date academic sources.

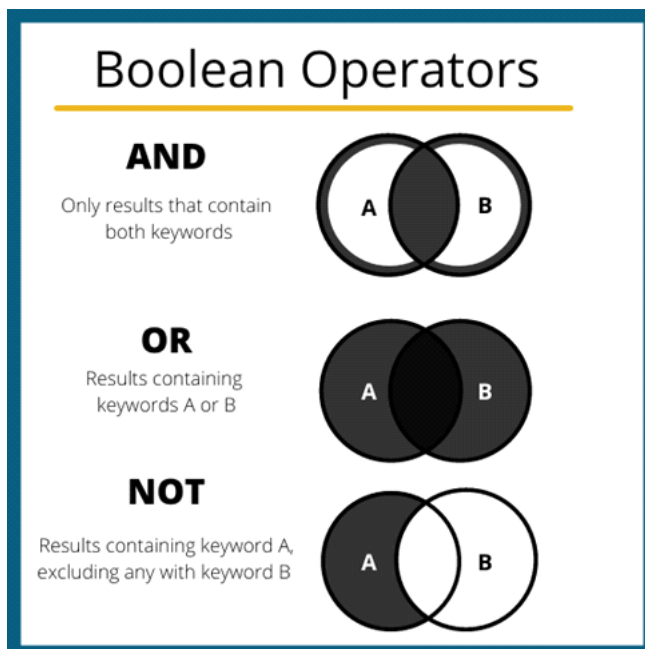
Search Strategy

To identify relevant literature, several keywords and search techniques will be used.

Keywords:

1. Artificial Intelligence in education
2. AI chatbots for students
3. ChatGPT learning experience
4. Student perceptions of AI
5. Educational technology
6. AI and higher education
7. Digital learning tools

Boolean Operators



The following Boolean operators will improve search accuracy:

- Artificial Intelligence “AND” Education
- ChatGPT “OR” AI Chatbot
- University Students “AND” Learning
- Artificial Intelligence “AND” Academic Performance

To improve the quality of the literature, search results were filtered to include peer-reviewed publications, English-language articles and studies published within the last five years where appropriate. Older landmark studies on innovation and research methodology was included to provide theoretical background.

Task 3

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Research Strategies

To ensure that the research produces trustworthy findings, it is important to consider validity, reliability, generalisability and ethical issues throughout the project. These factors improve the overall quality of the research and increase confidence in the results [11].

Validity

Validity refers to whether the research measures what it is intended to measure. In this project, validity will be improved by designing questionnaire questions that are directly linked to the research aim and objectives. The questionnaire will be written using clear and simple language to reduce misunderstanding. A pilot study will also be conducted before distributing the final questionnaire to identify unclear questions and improve the quality of the data collection instrument. Using academic literature to support the questionnaire design will further strengthen the validity of the research [12].

Reliability

Reliability refers to the consistency of the research findings. To improve reliability, all participants will receive the same questionnaire with identical instructions and response options. Microsoft Forms will be used to distribute the questionnaire because it records responses accurately and reduces the risk of manual data entry errors. Closed-ended questions will also increase consistency because every participant answers the same questions using the same response scale [13].

Generalisability

Generalisability is the extent to which the research findings can be applied to a wider population. This study will collect responses from university students studying different courses and at different academic levels where possible. Although the research will use a relatively small convenience sample due to time constraints, collecting responses from students with different backgrounds may improve the relevance of the findings. However, because the sample is limited to one university, the results may not represent the opinions of all university students [14].

Ethical Considerations

Ethics are essential when conducting research involving human participants. Before completing the questionnaire, participants will receive an information statement explaining the purpose of the research and how their responses will be used. Participation will be voluntary, and students may withdraw from the study at any stage without giving a reason. No personal information such as names or student identification numbers will be collected, ensuring anonymity and confidentiality. All collected data will be stored securely and used only for academic purposes. The research will also follow university ethical guidelines and use correct IEEE referencing to avoid plagiarism.

This study will adopt a mixed-methods research strategy, combining both quantitative and qualitative approaches. Using more than one research method provides a broader

understanding of students' experiences with Artificial Intelligence chatbots and allows the findings to be supported by both numerical and descriptive data.

The primary data will be collected using an online questionnaire created with Microsoft Forms. The questionnaire is appropriate because it allows data to be collected quickly from a large number of university students while remaining cost-effective. Most questions will be closed-ended using multiple-choice or Likert-scale responses to make analysis straightforward. One optional open-ended question will also be included to allow participants to provide additional comments about their experiences with AI chatbots.

Secondary data will be collected from peer-reviewed journal articles, academic books and conference papers accessed through Google Scholar, IEEE Xplore, ScienceDirect and the university library. Reviewing existing literature will provide background information, support the discussion of findings and compare the results with previous research.

Pilot Study

Before distributing the questionnaire to all participants, a pilot study was conducted with eight university students. The purpose of the pilot study is to identify unclear questions, estimate the time required to complete the questionnaire and improve the overall quality of the data collection method.

The pilot participants reported that the questionnaire was easy to understand and took approximately five minutes to complete. However, they suggested simplifying some technical terminology, improving the order of several questions and including a question about verifying AI-generated information before submitting academic work.

Following this feedback, the questionnaire will be revised by simplifying technical language, improving the logical sequence of questions and adding one question related to checking the accuracy of AI-generated responses before use. A copy of the pilot questionnaire is included in Appendix .

Data Analysis

Quantitative Analysis

The quantitative data collected from the questionnaire will be analysed using descriptive statistics.

The responses will be organised into tables before calculating frequencies and percentages. Bar charts and pie charts will be created to present the results visually and make it easier to identify trends.

For example, the researcher will calculate the percentage of students who use AI chatbots daily, weekly or rarely. The researcher will also compare students' opinions about whether AI improves learning or creates academic challenges.

Using quantitative analysis allows the findings to be presented clearly and objectively [15], [16].

Quantitative techniques include:

Quantitative analysis include following techniques to present the work.

- Frequency analysis
- Percentages

- Pie charts
- Bar charts
- Comparison tables.

Qualitative Analysis

Although the questionnaire mainly contains closed-ended questions, participants will have the opportunity to provide additional comments at the end.

These comments will be analysed using “thematic analysis”. The researcher will read each response carefully before grouping similar ideas together into themes [17].

Possible themes may include:

- Improved understanding
- Faster learning
- Time saving
- Ethical concerns
- Dependence on AI
- Information accuracy.

The researcher will then discuss how these themes relate to the research question and compare them with findings from previous studies.

Using qualitative analysis helps explain the reasons behind the numerical results and provides a deeper understanding of students' experiences.



Appendix

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Questionnaire

Please tick one answer only.

1. What is your age group?

- ☐ 18–20
- ☐ 21–23
- ☐ 24–26
- ☐ 27+

2. What is your gender?

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

3. How often do you use AI chatbots for studying?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Never

4. Which AI chatbot do you use most often?

- ☐ ChatGPT
- ☐ Microsoft Copilot
- ☐ Google Gemini
- ☐ Other

5. AI chatbots improve my understanding of course materials.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

6. AI chatbots help me complete coursework more efficiently.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral

- ☐ Disagree
- ☐ Strongly Disagree

7. I always verify AI-generated information before using it in assignments.

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Never

8. Universities should provide guidance on the responsible use of AI tools.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

9. AI chatbots improve my overall learning experience.

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

10. Would you recommend AI chatbots to other university students for learning?

- ☐ Yes
- ☐ No
- ☐ Not Sure

Pilot Feedback

Before distributing the questionnaire to a larger group, a pilot study was conducted with “five university students”. The purpose of the pilot study was to identify any problems with the questionnaire and ensure that the questions were easy to understand.

Most participants stated that the questionnaire was simple to complete and that the questions were relevant to the research topic. However, several useful suggestions were made.

Some students recommended simplifying a few technical words so that all participants could understand them more easily. Others suggested adding response options instead of asking participants to type answers. One participant also recommended including a question about checking the accuracy of AI-generated information before using it for coursework.

The pilot study helped improve the quality of the questionnaire before the main data collection began.

Improvements

Following the pilot study, several improvements were made to the questionnaire.

1. Technical language was simplified.
2. Questions were reordered to improve the flow.
3. Multiple-choice response options were added where appropriate.
4. A question about verifying AI-generated information was included.
5. Instructions were made clearer.
6. The questionnaire was shortened to reduce completion time.

These improvements increased the clarity, reliability and overall quality of the research instrument.

Proposed Research Poster



Figure 3 Proposed Research Poster

Project Gantt Chart:

GANTT CHART – RESEARCH PROJECT TIMELINE

The Impact of Artificial Intelligence Chatbots on University Students' Learning Experience



Figure 4 Project Gantt Chart

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