

Assignment 1 Innovation & Research

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TASK 1 – IDEATION & MIND MAP

1.1 Introduction to Innovation and Creativity

The process of innovation focuses on designing novel or enhanced products that solve real-life challenges, whereas creativity is the skill to produce innovative and original ideas (Kabangire and Korir, 2023). Innovation and creativity play a significant role in enhancing quality of life and boosting productivity. The healthcare industry is currently going through major shifts, pushed by the rising needs of patients, the quick pace of technological progress, and the requirement for improved healthcare services (Thacharodi *et al.*, 2024). Artificial intelligence (AI) plays a significant role in healthcare by accelerating examination processes, facilitating personalised therapies, aiding automation, and enhancing decision-making accuracy, ultimately making healthcare more efficient and accessible.

1.2 Mega Health Market

As one of the fastest-growing industries, healthcare is consistently integrating innovative technologies to enhance the quality of care, increase operational efficiency, and address the growing demands of patients. In recent times, technologies like AI, cloud platforms, IoT, telehealth, and wearable devices have altered the approach to delivering healthcare services. Essentially, these technologies help with faster diagnosis, remote monitoring, personalised therapy plans and more solid decision-making by using real-time data (Iyanna *et al.*, 2022). With the integration of AI, healthcare has been improved by introducing new healthcare solutions via telehealth, enabling patients to access care remotely. AI generally benefits the healthcare sector by processing large volumes of medical data, speeding up routine paperwork and tasks, and contributing to better treatment outcomes at lower costs (Amjad, Kordel, and Fernandes, 2023). The urgent need for advancements in healthcare is essential to develop systems that are more accessible, affordable, and efficient, addressing the increasing challenges posed by an ageing population, mental health issues, and evolving patient expectations.

1.3 Brainstorming Possible Computing Projects

Before selecting the final project idea, numerous computing projects were reviewed ([Refer to Appendix A: Mind Map](#)). The first idea is to develop an AI mental health chatbot, which delivers continuous emotional support to students, addresses typical mental health concerns, and motivates them to consult professionals when needed (Chin *et al.*, 2023). This project combines AI with healthcare to directly enhance students' well-being, providing practical assistance rather than just theoretical solutions.

Another idea is to develop an app that helps users remember their medicine schedules. The mobile feature offers reminders and notifications to support the tracking of patients' medication schedules (Paul *et al.*, 2024). The system is capable of identifying missed doses and thereby helping to ensure more reliable adherence to treatment. The approach can be advantageous for senior citizens and people with chronic health issues, where maintaining regular habits is highly significant.

The next idea proposes a digital hospital appointment system that makes it easy for patients to book, modify, or cancel their appointments online, helping hospitals manage schedules more efficiently. Potential advantages include reducing wait times, lowering paperwork, and enhancing communication efficiency between patients and healthcare providers (Chouhan *et al.*, 2023).

An IoT-enabled system for monitoring patients is another project idea. This project involves the use of wearable sensors that perpetually record health data like heart rate, blood pressure, and body temperature. The primary feature of this project is to facilitate continuous health surveillance and timely detection of medical issues by automatically sharing data with medical experts (Abdulmalek *et al.*, 2022). Based on the assessment, the chosen idea is the AI mental health chatbot, as it is innovative and impactful regarding social concerns, effectively meeting the increasing mental health demands of university students.

1.5 Selected Project Idea

The selected project involves creating an AI-driven mental health chatbot designed specifically for university students. The chatbot will employ AI and natural language processing (NLP) techniques to engage in friendly conversations, offer emotional support and stress relief tips, and guide users to professional mental health resources when appropriate (Balcombe, 2023). The chatbot will operate uninterruptedly, ensuring students can seek help whenever they feel it is necessary. The purpose of the chatbot is to support the university's current counselling services, not to serve as a substitute. Support systems that are easy to reach, confidential, and timely are intended to promote students' well-being and encourage them to seek assistance earlier (Casu *et al.*, 2024).

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TASK 2 – AIM, OBJECTIVES & RESEARCH AREA

2.1 Background

Mental health problems have increasingly become a major challenge affecting university students globally. Students frequently face emotional challenges, including stress, anxiety, depression, and loneliness, because of academic demands, financial problems,

social adjustments, and personal responsibilities (Salimi *et al.*, 2021). Such challenges can negatively influence multiple aspects of life, including educational performance, physical health, and overall well-being. Research indicates that numerous students hesitate to seek professional assistance because of stigma, insufficient awareness, extended wait times, or limited availability of counselling resources (Campbell *et al.*, 2022).

AI technology can deliver quick, confidential, and streamlined mental health services to help overcome some of these challenges. AI-powered chatbots are designed to answer users' questions, offer coping tips, evaluate users' emotional well-being, and lead students to professional support services when required. AI chatbots provide an alternative to conventional therapy by being available at all times and supporting a greater volume of users more cost-effectively (Balcombe, 2023). As a result, AI has the potential to improve the existing mental health services at universities, allowing more students to receive assistance.

2.2 Research Aim

The study aims to explore how an AI-powered mental health chatbot can improve mental wellbeing support for university students.

2.3 Research Objectives

The research objectives will be-

- To investigate the mental health challenges faced by university students.
- To examine how AI-powered chatbots can support student mental well-being.
- To identify students' expectations and preferences for using an AI mental health chatbot.
- To analyse the benefits and limitations of AI chatbots in providing mental health support.
- To recommend practical improvements for developing an effective, user-friendly, and accessible AI mental health chatbot for university students.

2.4 Research Philosophy

The research will employ the positivism philosophy, which focuses on gathering objective and factual data to address the study questions effectively. According to positivism, knowledge is gained through scientific methods like observation and measurement, rejecting reliance on individual perspectives or assumptions (Park, Konge and Artino Jr, 2020). To analyse the effectiveness of AI mental health chatbots for university students, obtaining reliable and consistent data from a large sample through standardised questionnaires is crucial. Responses from surveys can be quantified, compared, and statistically analysed to identify patterns and connections (Story and Tait, 2019).

This approach delivers unbiased and accurate data, which can be employed to measure the efficiency and applicability of AI chatbots. This study will adopt the positivism philosophy, as it will rely on quantitative data, objective analysis, and evidence-based conclusions. By applying statistical analysis to survey findings, this research can recommend accurate and trustworthy improvements to AI-supported mental health support for university students, while reducing researcher bias and strengthening the validity of the conclusions.

2.5 Research Strategy and Literature Search

A systematic literature review will be carried out to identify significant previous studies on AI-based mental health chatbots and student well-being. Academic platforms such as Google Scholar, ResearchGate, and ScienceDirect are regarded as trustworthy locations for accessing scholarly materials, which encompass peer-reviewed journal articles, conference papers, and review studies (Jamali, Nicholas, and Herman, 2016). In academic circles, these databases are commonly regarded as dependable sources for research purposes.

The literature searches employ a combination of keywords and Boolean operators to enhance result accuracy. Table 1 shows the search strategy in detail.

Keywords	Boolean Search Example
AI chatbot	"AI chatbot" AND healthcare
Mental health chatbot	"Mental health chatbot" AND university students
Student wellbeing	"Student wellbeing" OR "mental wellbeing"
Digital mental health	"Digital mental health" AND AI NOT children

Table 1: Search Keywords and Boolean Operators

Source: Self-developed

Research studies will be selected according to the predefined inclusion and exclusion criteria specified in Table 2.

Inclusion Criteria	Exclusion Criteria
Published after 2020	Published before 2020
Peer-reviewed journal articles	Non-peer-reviewed sources
English language	Non-English publications
Computer Science and Healthcare studies	Studies unrelated to AI or healthcare
Focus on university students or similar populations	Studies involving irrelevant populations

Table 2: Inclusion and Exclusion Criteria

Source: Self-developed

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TASK 3 – RESEARCH STRATEGIES

3.1 Research Quality

Research quality has significance because it ensures that the findings are valid, reliable, and trustworthy. At every phase of the research, the study's validity, reliability, generalisability, and ethical considerations will be maintained carefully.

Validity indicates that the questionnaire accurately measures the intended variable (Vu,

2021). The survey questions will derive from earlier research involving AI chatbots and student mental health, aligning with the objectives of this study.

The concept of reliability is about obtaining consistent results during the research process (Vu, 2021). Standardised surveys and the same questionnaire will be used among all the participants. Conducting a pilot study will help to detect any unclear questions before the full survey is launched.

Generalisability refers to the ability to determine whether the findings of a research study apply to the broader population (Ünal, Yurdakul and Maden, 2025). Therefore, analysing a large and diverse group of university students (100 participants) in their responses can be beneficial, as the findings can offer valuable insights for similar educational contexts.

Considering ethical aspects is also necessary. Participants will be given comprehensive details about the study's purpose before completing the questionnaire, allowing them to decide if they prefer to provide informed consent. Participation is entirely optional, and students can opt out whenever they wish if they feel uncomfortable with the research (Ehidiamen and Oladapo, 2024). To protect confidentiality, the information will not be shared with anyone outside the designated research team. Students will be invited to take part anonymously through a method that prevents the collection of names or personal identifiers. This study will comply strictly with the General Data Protection Regulation (GDPR) guidelines by safeguarding research data, allowing access only to authorised personnel, and using the information solely for educational purposes (Mohammad Amini *et al.*, 2023). This guarantees the protection of participants' rights while enhancing the overall trustworthiness and quality of the research.

3.2 Data Collection Method

The research will intend to primarily gather data through the use of a questionnaire. It is beneficial to use a questionnaire since it allows efficient data collection from a large group of university students in a short period. Using a questionnaire is justified because it is cost-effective, simple to distribute online, and helps participants to complete it at their convenience (Sukmawati, 2023). The positivist nature of the study means that it collects measurable data by using structured questionnaires, which can be subsequently analysed through descriptive and inferential statistical methods.

To understand students' perspectives on employing AI-based chatbots for mental health support, a closed-ended survey with demographic and 5-point Likert scale questions will be conducted. The questions will include demographic information, the mental health issues students are experiencing, and their views on an AI-based mental health chatbot ([Refer to Appendix B: Questionnaire](#)).

Before the questionnaire is distributed to the entire sample, a preliminary pilot test will be carried out with approximately 5-10 university students ([Refer to Appendix C: Pilot Feedback Form](#)). The pilot study serves as an early step to identify and address potential issues such as unclear language, confusing questions, or technical difficulties before the actual survey launch (Fraser *et al.*, 2018). Participants will be invited to give their feedback on the clarity, length, and relevance of the questionnaire. The feedback from respondents will be acknowledged, and the final survey will be distributed once the required revisions have been made. Implementing these steps improves the trustworthiness, validity, and quality of the research instrument.

3.3 Data Analysis

Data analysis generally relies on two methods: quantitative analysis and qualitative analysis. Quantitative analysis focuses on numerical data and statistical methods, whereas qualitative analysis emphasises gathering and evaluating text-based data to understand views and experiences (Schoonenboom, 2023). This study will employ quantitative data analysis since the questionnaire consists solely of closed-ended questions using a five-point Likert scale. Microsoft Excel will be used to analyse the gathered data to determine frequencies, percentages, and mean scores (Kumar, 2023). The findings will be presented graphically with pie charts and bar charts. The use of quantitative data can be beneficial

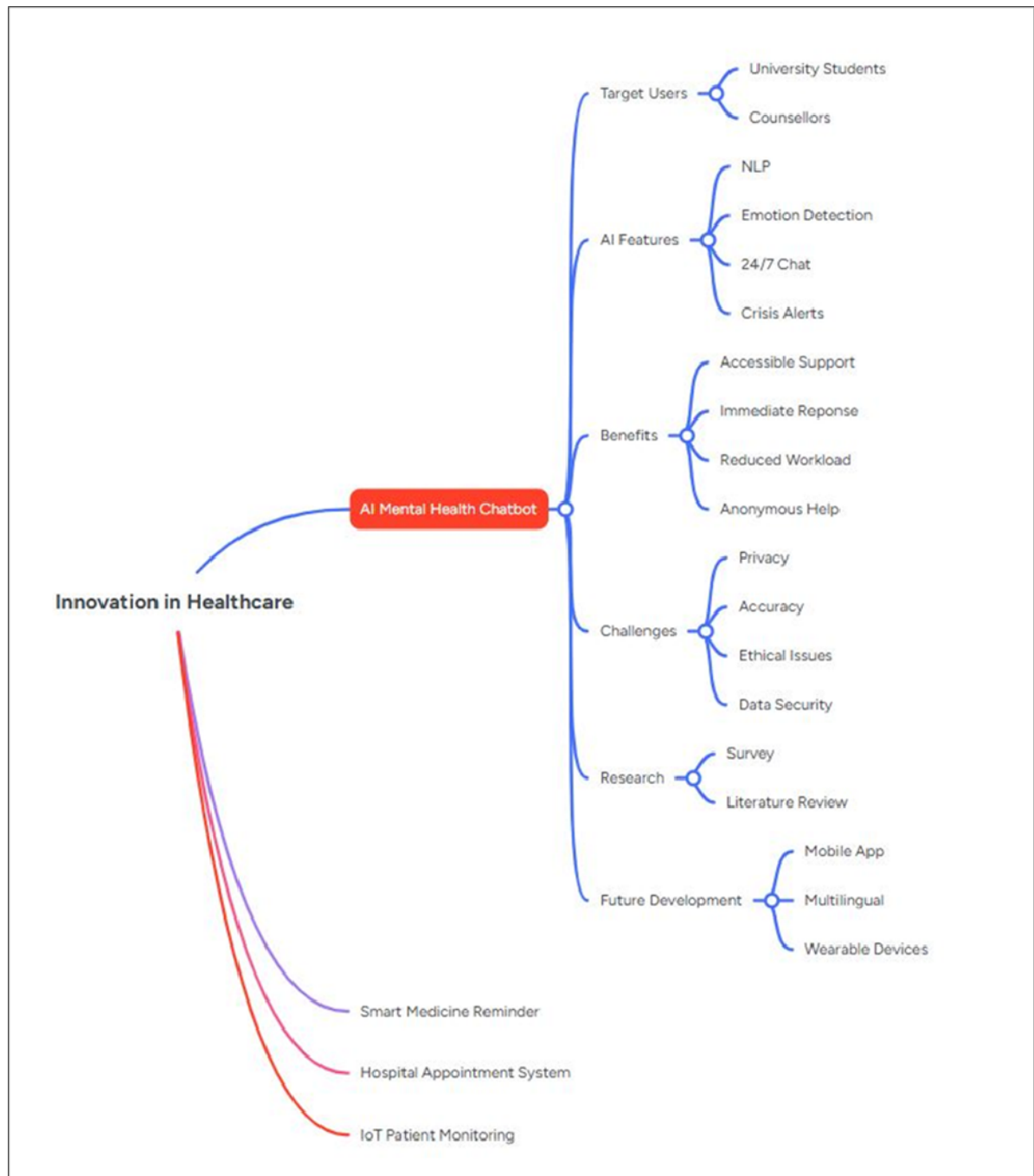
when aligned with a positivist research approach, as this method provides measurable, reliable, and objective findings.

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APPENDICES

Appendix A: Mind Map



Appendix B: Questionnaire
Section A: Demographic Information

- What is your age?
 - ☐ Below 18
 - ☐ 18–20
 - ☐ 21–23
 - ☐ Above 23
- What is your gender?
 - ☐ Male

- ☐ Female
- ☐ Prefer not to say
- What is your level of study?
 - ☐ Undergraduate
 - ☐ Postgraduate
 - ☐ Doctoral
 - Have you ever used an AI chatbot (e.g., ChatGPT, Gemini, or Copilot)?
 - ☐ Yes
 - ☐ No

Section B: Students' Mental Health Challenges

Please indicate your level of agreement with the following statements using the scale below:

(1 = Strongly, 5 = Strongly Agree)

- I often experience stress due to my university studies.
- Mental health challenges can affect students' academic performance.
- Universities should provide more mental health support for students.

Section C: AI Mental Health Chatbots

- AI-powered mental health chatbots can provide useful support to university students.
- I would be willing to use an AI mental health chatbot if it were available at my university.
- AI mental health chatbots should be available 24 hours a day to support students.

Appendix C: Pilot Feedback Form

Question	Response
Name (Optional)	_____
Date	_____
Was the purpose of the questionnaire clear?	☐ Yes ☐ No
Were the questions easy to understand?	☐ Yes ☐ No
Were any questions confusing? If yes, please specify.	_____ _____
Was the questionnaire length appropriate?	☐ Too Short ☐ Appropriate ☐ Too Long
Did the response options match the questions?	☐ Yes ☐ No
Did you experience any difficulties while completing the questionnaire?	_____ _____
Do you have any suggestions to improve the questionnaire?	_____ _____
Overall, how would you rate the questionnaire?	☐ Excellent ☐ Good ☐ Fair ☐ Poor
Any additional comments	_____ _____

