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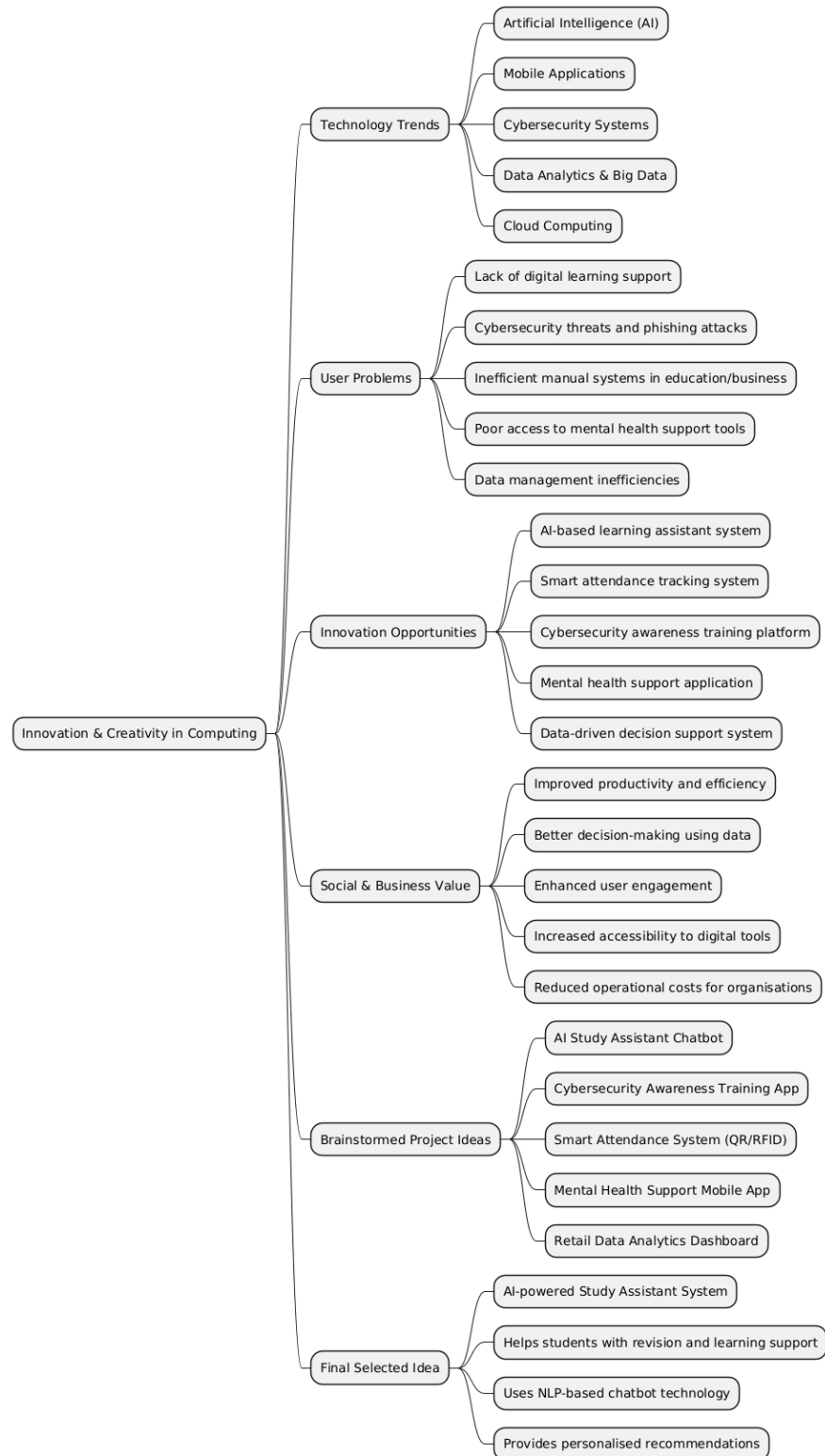
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TASK 1 – IDEATION & MIND MAP

1.1 Mind Map



1.2 Idea Generation

The brainstorming technique used in this project was an exploratory and structured brainstorming approach, which was aimed at finding a problem in the real world within the field of computing and digital technology (Endla and Endla, 2025). Early focus was on the following areas, which are very dynamic and impact societal and industry aspects: Artificial Intelligence, Cyber Security, Mobile Applications, and Data-driven systems.

Ideation process included considering the everyday problems of students, education institutions and digital users. One of the challenges identified was the growing need for personalised academic support, particularly in environments where learners find it difficult to learn independently, and to understand and revise efficiently. This is compounded by the absence of personalised tutoring as well as increased demands on workloads at school.

Special focus was given to the threats in the cyber world, the shortcomings of the traditional learning approach as well as the lack of adaptive digital learning systems (Mhlanga, 2024). These challenges revealed a discrepancy between the old fashioned ways of teaching and students' expectations in the 21st century. The project received its inspiration from the newest developments in AI systems such as natural language processing systems, intelligent tutoring systems, and adaptive learning platforms.

When looking at different ideas, it was evident that the solution that would have the greatest impact and be the most scalable to address the issues that were identified would be an AI based solution. The systematic ideation process ended with the final direction – the project direction that is relevant/grounded and technologically feasible and value creating.

1.3 Selected Project Idea

The selected project concept is the content of an AI Study Assistant System that is aimed at assisting students in their learning and revision. The system utilizes artificial intelligence and natural language processing technology, allowing for a user to interact with an intelligent chatbot that can give explanations, summarise content, create revision notes and provide personalised learning recommendations.

This is the most appropriate since it is closely linked to the problems that are currently facing in education and the transformation of education through digitalization in HEIs (Sahni, Verma and

Pratap, 2024). It addresses directly issues of independent learning and lack of personalised academic support and information overload of students.

This system is vital and valuable in learning. It can assist in achieving the maximum learning efficiency, engagement and support outside of the classroom (Pabba and Kumar, 2021). This project's technological features emphasize the application of AI in the learning environment, which is consistent with the modern developments in computing. Furthermore, it might be readily adapted to the different educational levels and topics, making it a long term applicable and effective tool.

1.4 References

- Endla, P. and Endla, P. (2025). Enhancing student creativity and understanding through brainstorming: An active learning approach. *AIP conference proceedings*, [online] 3361, pp.050002–050002. doi:<https://doi.org/10.1063/5.0298122>.
- Mhlanga, D. (2024). Digital transformation of education, the limitations and prospects of introducing the fourth industrial revolution asynchronous online learning in emerging markets. *Discover education*, 3(1), pp.1–18.
- Pabba, C. and Kumar, P. (2021). An intelligent system for monitoring students' engagement in large classroom teaching through facial expression recognition. *Expert Systems*. doi:<https://doi.org/10.1111/exsy.12839>.
- Sahni, S., Verma, S. and Pratap, R. (2024). Understanding digital transformation challenges for online learning and teaching in higher education institutions: a review and research framework. *Benchmarking*. doi:<https://doi.org/10.1108/bij-04-2022-0245>.

TASK 2 – AIM, OBJECTIVES & RESEARCH AREA

2.1 Project Aim

The purpose of this project is to design and study an intelligent based study assistant system, which can improve students' learning by providing personalized and intelligent academic support. The system is designed to utilize the Artificial Intelligence and Natural Language Processing capabilities to provide a learning support where the user can learn interactively with either an explanation of complex concepts or a summarisation of academic content or even a revision support. The project seeks to evaluate the potential of a successful learning efficiency, access and engagement system in higher education environment. The project includes various features that leverage artificial intelligence to improve the learning experience and meet the changing needs of digital learning. The project includes some features that utilize AI to improve the learning experience and address the shifting needs of digital learning.

2.2 Objectives

- Construct a concept of an AI study assistant using AI and NLP concepts.
- To find out about student learning behaviours and their difficulties in learning through secondary research.
- To develop a prototype design for the system to demonstrate the functioning of the system in a real school.
- To test the proposed system with a number of scenarios and theoretical performance analysis.
- To evaluate whether or not the school could have an impact on academic output, engagement and academic independence.

2.3 Research Area

The field of the research is related to Artificial Intelligence in Education (AIED), which includes Intelligent Tutoring System (ITS) and Adaptive Learning Technologies (ALT) (Lin, Huang and Lu, 2023). The domain combines computer science, machine learning, and education technology to develop systems to enhance the learning process.

This project's problem domain is the students who are educationally supported in a traditional education system who are not getting any personalised academic support. Many students have difficulties learning complex ideas independently, and bring little interaction to the classroom and/or external tutoring. This results in a deficiency in learning support that is sustained.

This research area is very relevant, due to the ubiquity of digital learning platforms and AI in the education sector. The application of AI in the learning space improves accessibility, improves efficiency and promotes autonomy of the learner.

2.4 Research Philosophy

The research uses a pragmatism philosophy which is a combination of qualitative and quantitative approaches in which the effectivity of the system is evaluated (Christensen, 2020). Among the various philosophies to choose from for computing based projects, pragmatism is seen as the most appropriate one since it permits flexibility in the use of various methods in solving real problems.

2.5 Research Tools & Databases

The research will use the following academic databases and tools for credible and high-quality sources:

- Google Scholar – for broad academic literature access
- IEEE Xplore – for computing and AI-focused research papers
- ScienceDirect – for peer-reviewed journal articles
- ACM Digital Library – for advanced computing and education technology research

These sources provide reliable, peer-reviewed and recent academic research for the project.

2.6 Search Strategy

The search strategy will include the use of targeted keywords like “AI in education”, “intelligent tutoring systems”, “adaptive learning technologies” and “student learning support systems”. Search results will be further narrowed and made more relevant by using boolean operators like AND, OR and NOT.

In addition, filters will be used to make sure the sources are from the last five years so they will be current and relevant. This will assist you to focus your academic search on the best information available and exclude outdated and irrelevant sources.

2.7 References

- Christensen, J.H. (2020). Enhancing mixed methods pragmatism with systems theory: Perspectives from educational research. *Systems Research and Behavioral Science*. doi:<https://doi.org/10.1002/sres.2751>.
- Lin, C.-C., Huang, A.Y.Q. and Lu, O.H.T. (2023). Artificial intelligence in intelligent tutoring systems toward sustainable education: a systematic review. *Smart Learning Environments*, [online] 10(1). doi:<https://doi.org/10.1186/s40561-023-00260-y>.

TASK 3 – RESEARCH STRATEGIES

3.1 Validity, Reliability & Generalisability

This work is based on reliable academic sources, a proper research methodology, and well-defined data collection methods, ensuring its validity. Validity is the degree of truthfulness in the research to measure the research object. For this project, validity is achieved by directly connecting the research instruments (survey, system evaluation criteria) with the goals of the AI study assistant system.

Reliability is ensured by having the same methods in the research process, especially in the methods and tools used to collect data and analyze the data (Coleman, 2022). When similar research is conducted on the same type of situation, the results would be the same. This is achieved using a universal set of questionnaires and a set of evaluation criteria for system performance.

The extent to which findings are generalizable to a broader population is referred to as "generalisability. While this project is centered around a student sample, the results could be applicable to any educational setting where AI tools for learning are used, especially in higher education.

3.2 Ethical Considerations

Ethics are very important for ethical research practice. In line with the principles of General Data Protection Regulation (GDPR), this study guarantees that data collected is adequately secured and processed in a legal way.

Informed consent will be obtained before any type of data collection is conducted with all participants (Laryeafio and Ogbewe, 2023). The rationale for research and for the use of the data gathered will be explained to the research participants.

All data is kept private and no personal information, or sensitive data is shared or misused. Participants' anonymity will be ensured by the anonymisation of all the data gathered.

Research subjects are anonymous throughout the research process; there is no chance of following back to the individual responses.

Data will be used responsibly and in an ethical manner: securely stored, restricted from access and properly disposed of at the end of the project.

3.3 Data Collection Methods

The research method in this study is the combination of survey, interview and system testing to get a comprehensive data.

Students will answer questionnaires about their learning difficulties, and their attitudes towards the study tools based on AI. This is selected as it allows for recruitment of a larger number of people to be achieved in an efficient manner.

Qualitative feedback on experiences of and expectations of users of an AI learning system will be obtained through interviews (Kinney et al., 2024). This will give you the opportunity to delve deeper into each person's point of view.

Using simulated scenarios, system testing will be used to test the proposed AI study assistant concept. This is particularly important in computing projects where it assists to establish the usefulness and working of the system.

The selection of these methods is determined with an aim to a balanced approach that will enable to capture the numerical data and detailed feedback from the users.

3.4 Pilot Study

To evaluate the effectiveness of the survey and research instruments, the pilot study will be done using a small number of respondents. This is an initial step that will help identify areas of potential difficulty with questions in terms of clarity, structure and relevance.

Participants will give feedback about the content and this will be analysed to find out what needs to be improved (Abdelazeem et al., 2022). Common issues include unclear questions, multiple answers to a question or unclear instructions.

The pilot will be used to make changes that will increase the quality of the data collected during the final research phase, and help improve the survey design.

3.5 Data Analysis Methods

The quantitative data will be analysed using statistical analysis (percentages, charts and graphs) to determine trends and patterns of student responses. This will enable it to grasp the overall attitude towards AI learning platforms.

Qualitative data (responses) will be analysed using a thematic analysis which will involve coding and categorising responses into themes (Christou, 2022). This assists in determining trends, ideas and user experience in general.

Using both techniques will ensure a full analysis of the facts, incorporating a numbers analysis and context.

3.6 Limitations

This study has some limitations. Due to time constraints, data collection and analysis might be limited. Moreover, results might not be representative given sample size restrictions.

The project is conceptual and may also have challenges to simulate or test the AI system completely due to technical limitations. These restrictions might affect the scope but do not substantially affect the validity of the research results.

3.7 References

- Abdelazeem, B., Abbas, K.S., Amin, M.A., El-Shahat, N.A., Malik, B., Kalantary, A. and Eltooby, M. (2022). The effectiveness of incentives for research participation: A systematic review and meta-analysis of randomized controlled trials. *PLOS ONE*, 17(4).
- Christou, P.A. (2022). How to Use Thematic Analysis in Qualitative Research. *Journal of Qualitative Research in Tourism*, 3(2), pp.79–95. doi:<https://doi.org/10.4337/jqrt.2023.0006>.
- Coleman, P. (2022). Validity and Reliability within Qualitative Research for the Caring Sciences. *International Journal of Caring Sciences*, [online] 14(3), pp.2041–2045. Available at: <https://oro.open.ac.uk/81588/>.
- Kinney, M., Anastasiadou, M., Zolotov, M.N. and Santos, V. (2024). Expectation management in AI: A framework for understanding stakeholder trust and acceptance of artificial intelligence systems. *Heliyon*, 10(7), pp.e28562–e28562. doi:<https://doi.org/10.1016/j.heliyon.2024.e28562>.
- Laryeafio, M.N. and Ogbewe, O.C. (2023). Ethical Consideration dilemma: Systematic Review of Ethics in Qualitative Data Collection through Interviews. *Journal of Ethics in Entrepreneurship and Technology*, [online] 3(2), pp.94–110. doi:<https://doi.org/10.1108/JEET-09-2022-0014>.

TASK 4 – APPENDICES

Appendix B – Mind Map

The mind map is targeted at innovation in computing, specifically AI and digital education systems. Key branches include:

- Technology Trends: AI, cybersecurity, cloud computing, data analytics
- User Problems: lack of personalised learning, poor study support, information overload
- Innovation Ideas: AI tutoring system, adaptive learning tools, chatbot-based assistance
- Social Value: improved education access, better learning outcomes, efficiency in study processes

The resulting concept that was chosen from this process is the Study Assistant System that uses AI to give individualised academic support to students.

Appendix D – Supporting Research Notes

A first study examined various topics such as AI in education and cybersecurity software, and mobile learning applications. The final focus was chosen, based on:

- AI is relevant in education systems in a significant way today.
- Tightening up on the standards for technology-led personalized learning
- Academic literature evidence for AI Tutoring Systems
- Feasibility of conceptual prototype to be implemented in computing domain

List of the keywords you have employed in your research:

- AI in education
- Intelligent tutoring systems
- Adaptive learning technologies
- Student learning support systems

Appendix E – Planning Evidence Summary

Supporting planning activities included:

- Brainstorming multiple computing-based project ideas
- Evaluating real-world educational problems
- Selecting final project based on feasibility and impact
- Reviewing academic literature from IEEE, ACM, and Google Scholar
- Aligning project with innovation and creativity learning outcomes

TASK 5 – PROJECT PLAN (GANTT CHART)

Task Mode ▾	Task Name ▾	Duration ▾	Start ▾	Finish ▾	Predecessors ▾
	Topic Selection	3 days	Mon 22-06-26	Wed 24-06-26	
	Literature Review	7 days	Thu 25-06-26	Fri 03-07-26	1
	Idea Development	5 days	Mon 06-07-26	Fri 10-07-26	2
	Research Design	5 days	Mon 13-07-26	Fri 17-07-26	3
	Data Collection Planning	4 days	Mon 20-07-26	Thu 23-07-26	4
	Analysis Planning	4 days	Fri 24-07-26	Wed 29-07-26	5
	Report Compilation	6 days	Thu 30-07-26	Thu 06-08-26	6
	Final Submission Preparation	3 days	Fri 07-08-26	Tue 11-08-26	7

Figure 1: Schedule Table

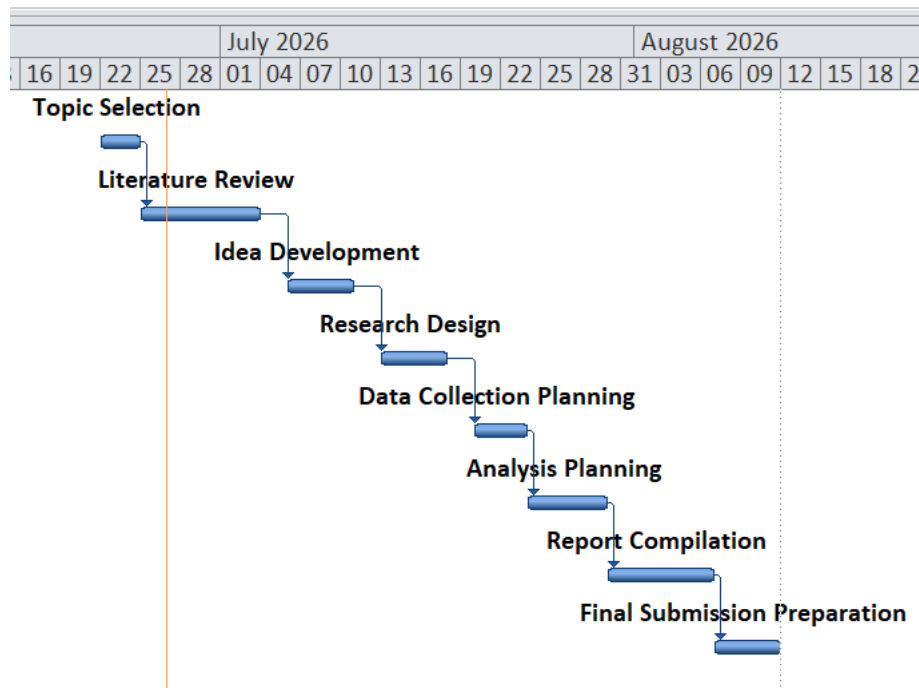


Figure 2: Gantt Chart

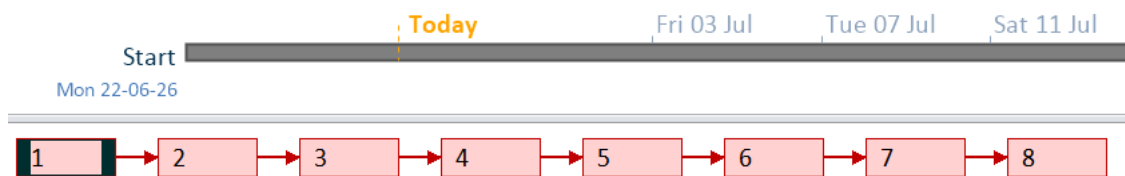


Figure 3: Network Diagram

Table 1: Milestone

Milestone	Date
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Project Approval	03/07/2026
Research Completion	15/07/2026
Draft Completion	03/08/2026
Final Submission	06/08/2026