

Assessment 1: Innovation & Research

Project Proposal: AI-Based Smart Study Planner for University Students

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Introduction

Digital technology continues to change how students learn and manage their academic work. In higher education, many students struggle with time management, balancing deadlines and organising their workload effectively. Although there are many digital planners available, most of them require manual input and do not adapt to individual study habits or changing priorities.

Artificial Intelligence (AI) offers new opportunities to create more personalised and adaptive systems. AI can analyse patterns, provide recommendations and adjust schedules based on user behaviour. This project proposes the development of an AI-Based Smart Study Planner designed to support university students in managing their time more effectively and improving productivity.

This proposal outlines the development of the idea, the research philosophy that guides the project, and the strategies that will be used to collect and analyse data. By combining innovation with structured research methods, the project aims to create a practical and useful solution that adds value to student' academic experience.

Task 1 – Ideation & Mind Map

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Innovation plays a central role in shaping modern education by introducing new or improved solutions that create value for individuals and society [1]. In the current Conceptual Age, digital technologies, particularly Artificial Intelligence (AI), are transforming how students learn and manage academic responsibilities. Creativity is essential to this process, as innovative solutions must be both novel and useful [2]. Through divergent and convergent thinking and guided by design thinking principles such as empathy and prototyping, computing solutions can be developed to address real-world challenges [2].

A significant issue within higher education is ineffective time management, which has been linked to increased stress and lower academic performance [3]. Traditional planners are often static and fail to adapt to changing workloads. Research highlights the growing role of AI in higher education, particularly in adaptive systems that personalise learning and analyse behavioural data to improve engagement and productivity [4].

The proposed AI-Based Smart Study Planner integrates innovation theory, design thinking and AI research to create social, economic and productivity value. By offering personalised scheduling and intelligent task prioritisation, the system aims to enhance academic performance and reduce student stress, demonstrating clear alignment with changemaking principles. Based on the ideation process, this project has been selected to be taken forward for further development due to its practical relevance and potential impact within higher education.

Figure 1: AI-Based Smart Study Planner Mind Map



Mind Map available at :
<https://mm.tt/map/3953030317?t=2fgrczPXQ7>

Task 2 – Aim, Objectives and Research Area

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Aim

The aim of this project is to design, develop and evaluate an AI-Based Smart Study Planner that enhances university students' academic productivity through personalised and adaptive scheduling supported by Artificial Intelligence techniques.

This aim reflects a structured problem-solving approach and focuses on developing a practical solution to a real educational challenge.

Objectives

To achieve this aim, the project will pursue the following objectives:

1. To examine appropriate research methodologies for evaluating technology-based educational systems [5].
2. To explore the application of mixed methods research in system development and evaluation [6].
3. To design a user-centred prototype informed by technology acceptance principles [7].
4. To implement AI-based adaptive scheduling features within the proposed system.
5. To evaluate the system's effectiveness and user acceptance through structured data collection and analysis [7][12].

These objectives follow **SMART** principles by being specific, measurable, achievable, relevant to the research problem, and aligned with the overall project development process.

Research Philosophy

This project adopts a **Pragmatist research philosophy**. Pragmatism focuses on practical outcomes and allows researchers to select methods that best address the research problem [5]. Rather than limiting the study to a purely quantitative or qualitative approach, pragmatism supports methodological flexibility.

Since this project involves both developing a functional AI system and evaluating its effectiveness, pragmatism is appropriate. It enables the integration of performance measurements with user experience feedback. This ensures that the research not only produces theoretical understanding but also delivers practical value.

Research Design

A **mixed-methods research design** will be implemented. Mixed methods combine quantitative and qualitative data to provide a more comprehensive understanding of research problems [6].

Quantitative data may be collected through structured surveys measuring perceived usefulness, ease of use and productivity improvements. Qualitative data may be gathered through open-ended responses exploring student experiences with the system.

Using both approaches strengthens the reliability and validity of findings by allowing triangulation of data sources [6].

Research Area Justification

The research area integrates three key domains:

- Artificial Intelligence in higher education
- Technology acceptance and user behaviour
- Applied research methodology

Artificial Intelligence applications are increasingly being integrated into higher education to support adaptive learning and personalised systems [12]. However, the success of such technologies depends heavily on user acceptance.

According to the Technology Acceptance Model, perceived usefulness and perceived ease of use significantly influence whether users adopt new systems [7]. Therefore, the Smart Study Planner must be both functionally effective and easy to use to achieve real impact.

Combining AI innovation with structured research methodology ensures that the project maintains academic credibility while addressing practical educational needs[5].

Search Strategy and Databases

Consistent with Unit 1 Topic 3, which emphasises identifying “known knowns” through credible research, a structured search strategy was applied.

Academic literature was identified using the following academic databases:

- Google Scholar
- IEEE Xplore
- ScienceDirect
- University online library databases

Search keywords included:

- “Artificial Intelligence in higher education”
- “Mixed methods research design”
- “Pragmatism research philosophy”
- “Usability engineering software systems”

Boolean operators (AND, OR) were used to refine search results, and filters were applied to

prioritise peer-reviewed journal articles and academic books. This systematic approach ensures that sources are reliable, relevant and academically credible.

Task 3 – Research Strategies

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Validity

Validity refers to the extent to which a research instrument accurately measures what it intends to measure [11]. In this project, validity is essential to ensure that the collected data genuinely reflects the effectiveness and usability of the AI-Based Smart Study Planner.

Construct validity will be achieved by designing survey questions that directly align with the project objectives, particularly those relating to time management, perceived usefulness, ease of use and productivity improvement. These constructs are informed by established research frameworks such as technology acceptance theory, ensuring theoretical alignment.

Content validity will be strengthened by reviewing the survey questions against relevant literature before distribution. Questions will be clear, concise and directly linked to the research aim. Additionally, conducting a pilot study will help identify ambiguous or misleading questions, further improving validity.

Reliability

Reliability refers to the consistency and stability of research results across different contexts and participants [11]. To enhance reliability, all participants will receive identical survey questions and instructions. Using structured Likert-scale questions (e.g., strongly agree to strongly disagree) ensures standardisation and reduces subjective interpretation.

Internal consistency can be evaluated by comparing responses to related questions measuring similar constructs, such as usefulness and satisfaction. If responses demonstrate consistency across similar items, this increases the reliability of the instrument.

Clear data collection procedures and consistent administration conditions will further minimise measurement error.

Generalisability

Generalisability refers to the extent to which research findings can be applied beyond the immediate study sample [8]. Since this project will likely involve students from a single university or programme, external validity may be limited.

However, representativeness can be improved by including participants from different academic disciplines and year groups. Providing a detailed description of the sample population will allow readers to assess how transferable the findings may be to other contexts.

Although the project may not achieve full generalisability, its findings can still offer valuable insights into the use of AI-based planning systems within higher education settings.

Ethical Considerations

Ethical considerations are fundamental in educational and technology research [9]. This project will follow key ethical principles, including informed consent, voluntary participation, confidentiality and data protection.

Participants will be provided with clear information outlining the purpose of the research, how their data will be used and their right to withdraw at any time. No personally identifiable data will be

collected unless strictly necessary. All responses will be anonymised and stored securely in compliance with data protection guidelines.

Given that the system may involve behavioural data such as study habits and scheduling patterns, transparency will be maintained regarding how this data is processed. Participants will be informed if any automated decision-making features are implemented within the AI system.

Adhering to ethical guidelines strengthens the credibility and integrity of the research process.

Data Collection Methods

A mixed-methods approach will be applied to data collection, combining quantitative and qualitative strategies. This approach allows for a broader understanding of system effectiveness and user experience.

1. Quantitative Method

A structured online survey will be distributed to participating students. The survey will include Likert-scale questions measuring:

- Perceived usefulness
- Perceived ease of use
- Impact on productivity
- Satisfaction with scheduling features

Quantitative data enables statistical comparison and identification of patterns across participants.

2. Qualitative Method

Open-ended questions will be included within the survey to allow participants to describe their experiences, challenges and suggestions. This qualitative component provides depth and context to numerical findings.

Pilot Study Design

A pilot study will be conducted with approximately 5–8 students prior to the main data collection phase. The purpose of the pilot is to evaluate:

- Clarity of questions
- Survey structure
- Estimated completion time
- Technical functionality

Participants will be asked to provide feedback on confusing wording, unclear instructions or repetitive questions. Based on this feedback, modifications will be made to improve both clarity and reliability.

The pilot questionnaire and feedback summary will be included in the Appendix section of the proposal.

Quantitative Analysis

Quantitative data will be analysed using descriptive statistics such as means, percentages and frequency distributions. These methods will help identify trends in perceived usefulness and productivity improvements.

If sample size permits, a simple comparative analysis may be conducted to explore differences between demographic groups (e.g., year of study). Statistical analysis strengthens objectivity and supports evidence-based conclusions.

Qualitative Analysis

Qualitative responses will be analysed using thematic analysis [10]. This process involves familiarisation with the data, generating initial codes, identifying recurring themes and interpreting patterns.

Thematic analysis allows deeper insight into user perceptions and highlights potential areas for system improvement. By combining qualitative insights with quantitative findings, the evaluation process becomes more comprehensive and balanced.

References

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Appendix

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Pilot Survey Questionnaire

Section 1: Background Information

1. What year of study are you currently in?

- ☐ Year 1
- ☐ Year 2
- ☐ Year 3
- ☐ Postgraduate

2. What course are you studying?

(Short answer)

Section 2: Perceived Usefulness

Please indicate your level of agreement with the following statements:

(1 = Strongly Disagree | 5 = Strongly Agree)

- 1. The AI-Based Smart Study Planner would help me manage my time more effectively.
- 2. The system would make it easier to organise and prioritise my academic tasks.
- 3. Using this planner would improve my overall productivity.

Section 3: Ease of Use

- 1. I think the planner would be easy to understand and use.
- 2. I would feel confident using this system without needing additional support.

(1–5 Likert scale)

Section 4: Open Feedback

- 1. Which feature of the Smart Study Planner do you find most useful, and why?
- 2. Do you have any suggestions for improving the system?

Pilot Feedback Summary

A pilot study was conducted with 5 university students to evaluate the clarity and relevance of the questionnaire. Overall, participants reported that the questions were clear and easy to understand. Two students suggested simplifying the wording of the productivity-related question to make it more specific. Minor adjustments were made to improve clarity and ensure consistent

interpretation of the Likert scale.

Participants also confirmed that the survey length was appropriate and could be completed within a reasonable time. Based on the feedback received, small refinements were implemented before the full data collection stage to enhance validity and reliability.