Research Article

Smart Study Planner AI-Based Academic Stress Reduction and Student Learning Outcomes Improvement

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DOI: https://doi.org/10.5281/zenodo.20052967

Abstract

AI is changing how the learning manifestation of university students is delivered through making it more intelligent and customised to each student. This time, the researcher will present an intelligent study planner, which will reduce academic stress and enhance performance during the learning process by integrating AI in the present paper. The planner, in this case, takes into account such issues as the study habits, the workload, or the personal learning preferences of students based on machine learning and analytics. Based on this information, it constructs custom, self-adaptive timetables of study. The system also tracks our performance and adjusts our plans as we go to ensure that we remain on track and efficient. The findings indicate that AI-supported planners may help to increase engagement, enhance grades and reduce stress, yet we must continue to be concerned with data privacy, ethics, and technological constraints in the future.

Manuscript Information

- **ISSN No:** 2583-7397
- **Received:** 01-04-2026
- **Accepted:** 25-04-2026
- **Published:** 06-05-2026
- **IJCRM:**5(3); 2026: 64-69

- **Plagiarism Checked:** Yes
- **Peer Review Process:** Yes

How to Cite this Article

Vaishali, Jain A, Duggar R. Smart study planner: AI-based academic stress reduction and student learning outcomes improvement. Int J Contemp Res Multidiscip. 2026;5(3):64-69.

Access this Article Online

www.multiarticlesjournal.com

KEYWORDS: Artificial intelligence, personalised learning, adaptive learning, study planner, academic stress, learning analytics, machine learning.

1. INTRODUCTION

In the current competitive academic life, as students of the university, we are always faced with heavy workloads, deadlines and tremendous pressure to perform. The analysis of academic workload has indicated that the overwhelming amount of work and lack of time-management skills are the two key factors causing stress and low grades [3].

The old-fashioned study planning takes a rather conservative and adaptive stance and fails to adapt to the learning patterns of the individuals. Although current adaptive learning systems apply the concept of Artificial Intelligence (AI) to customise the content, they nevertheless lack the element of real-time flexibility and time dynamism [2], [15]. Artificial intelligence learning applications and tools tailored to our behaviour and interests have already proven tangible improvements in the level of student engagement and learning performance [4], [6], [16].

The educational data mining techniques and learning analytics are critical in terms of predicting performance and identifying patterns of learning [5], [9], [14]. Machine-learning models can go a step further and predict performance accurately and take wise decisions, though the quality of data is very crucial [11].

2. LITERATURE REVIEW

According to recent studies in research, AI is turning out to be a very significant element of contemporary education. Researchers such as [1] and [13] provide a good background of how AI could improve the efficiency of learning, the personalisation of the educational process, and student engagement.

The adaptive learning instruments in [2] and the AI-based experiences in [4] go a step further to customise the material and the routes according to how each student requires. They are not so good at the real-time changes, and they cannot scale up in large classes.

Big data analytics and data mining, discussed in [5], [9], and [14], are incredibly helpful in discovering areas of low performance and points that need improvement. Models of machine learning that are used in [11] can also make predictions, although in case you have high-quality and enough data.

Automated feedback in the form of intelligent tutoring systems [10] and an AI feedback loop [12] may be used to give personalised feedback that can improve the results. However, they are able to reduce human interaction and tend to be concentrated on a limited number of subjects.

In [8], user modelling and in [16], framework designs, seek to learn more about student preferences to accommodate learning to them. They work, but require large amounts of data, and they are not very easy to implement in actual classes.

According to the research on workload and stress in [3], there is an evident connection between heavy loads, stress and performance. On the same note, AI scheduling [15] can be used to plan tasks, but it does not address real-time stress problems fully.

The question of ethics and practical implementation continues to be raised. Other works such as [7] and [17] address the issue of data privacy, transparency and absence of concrete rollout strategies in AI within the classroom.

Table 1. Overview of Literature Review

Reference	Model / Approach	Contributions	Limitations
[1]	AI in Education Review	Provides a comprehensive overview of AI applications in education	Lacks practical implementation details
[2]	Adaptive Learning System (Algorithm-based)	Improves personalised learning using adaptive algorithms	Limited real-time adaptability
[3]	Academic Workload Analysis	Explains the relationship between student stress and performance	Does not include AI-based solutions
[4]	AI-based Learning Platforms (System-level)	Introduces adaptive platforms in higher education	Faces scalability challenges
[5]	Learning Analytics Model (Prediction-focused)	Predicts student performance using analytics techniques	Highly dependent on data quality
[6]	AI-driven Personalised System (ML-based)	Uses machine learning for personalised learning experiences	Requires high computational resources
[7]	AI Ethics Framework	Highlights ethical issues in AI-based education	Lacks practical solutions
[8]	User Modelling System	Models users' behaviour for adaptive educational systems	Complex to implement
[9]	Educational Data Mining	Extracts insights from student data	Raises privacy concerns
[10]	Intelligent Tutoring System	Provides personalised feedback using systems like AutoTutor	Limited subject/domain coverage

A. Research Gap

Although there are notable advances in the use of Artificial Intelligence in the educational field, there are a number of gaps. The majority of research works pay more attention to individualised learning but pay little attention to academic stress management [3], [17]. It is also common that many of the current systems do not have real-time adaptive scheduling in order to accommodate the changing workloads [2], [15]. Moreover, the fact that little attention is paid to the mental stress of students, how AI-based learning systems can be implemented in practice, and how these systems are assessed over the long term are also issues of concern [7], [11], [13].

3. Proposed AI Model

The model proposed is a study-planning system powered by AI, which is custom-tailored. It gathers and evaluates information like academic timetable, deadline on duties and studies and previous performance. The system uses machine-learning algorithms to come up with customised study plans [9],[11].

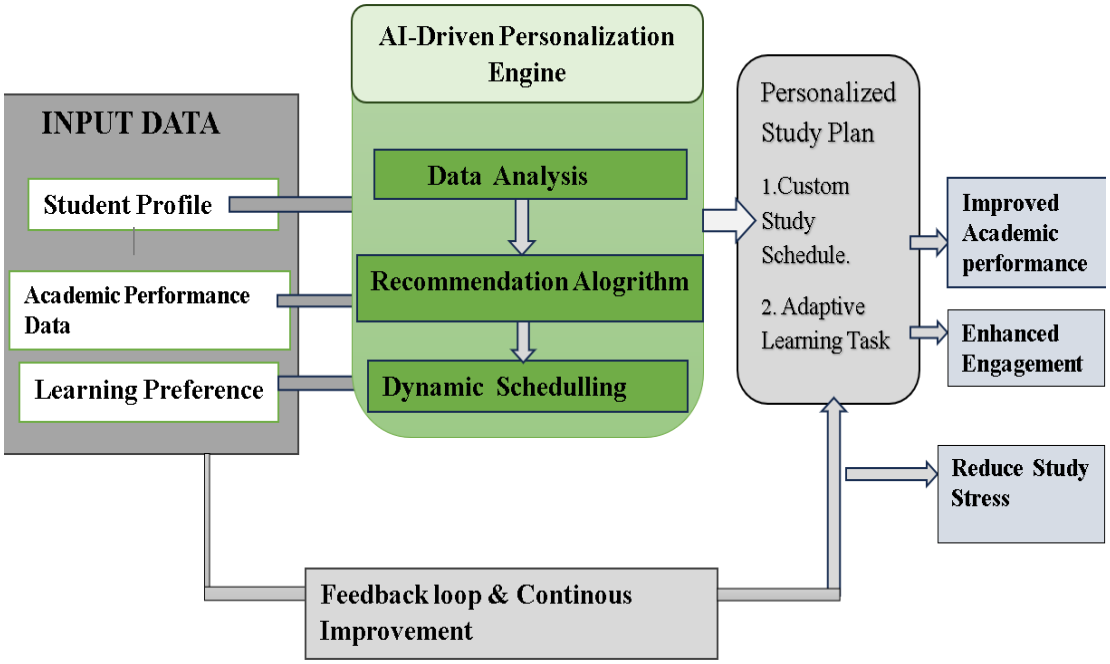


Figure 1. AI-Based Smart Study Planner Model to Reduce Academic Stress to Optimise Learning

The working process of the proposed AI-based smart system of study planner is illustrated in Figure 1. The model assumes inputs as profiles of the students, their performance, and their learning preferences. An AI system takes this information and analyses it, provides suggestions and builds a flexible schedule. According to this process, the system provides a student with an individual study plan.

4. RESEARCH METHODOLOGY

We are quite mixed-method, using numbers and stories to determine the effectiveness of our test AI study planner. We will focus on things that are measurable in terms of grades and all, and also examine more intimate areas in life, such as our level of stress and how interested we are [5], [14]

A. Data Collection

The data was gathered in this study to learn the impact that academic stress and study planning have on the learning outcomes of students. Primary and secondary data were utilised in order to gather valid data concerning the usefulness of an artificial intelligence-based study planner. The primary data was in the form of a questionnaire that was filled out by the students. The questionnaire was regarding academic stress, time and learning capabilities. The responses of students were noted using a 5-point scale and included Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. This approach contributed to the ability to comprehend the level of agreement of students that an AI-based study planner is useful. The research responses were put in a tabular format to facilitate analysis.

Table 2: Academic Stress and Learning Survey of the students

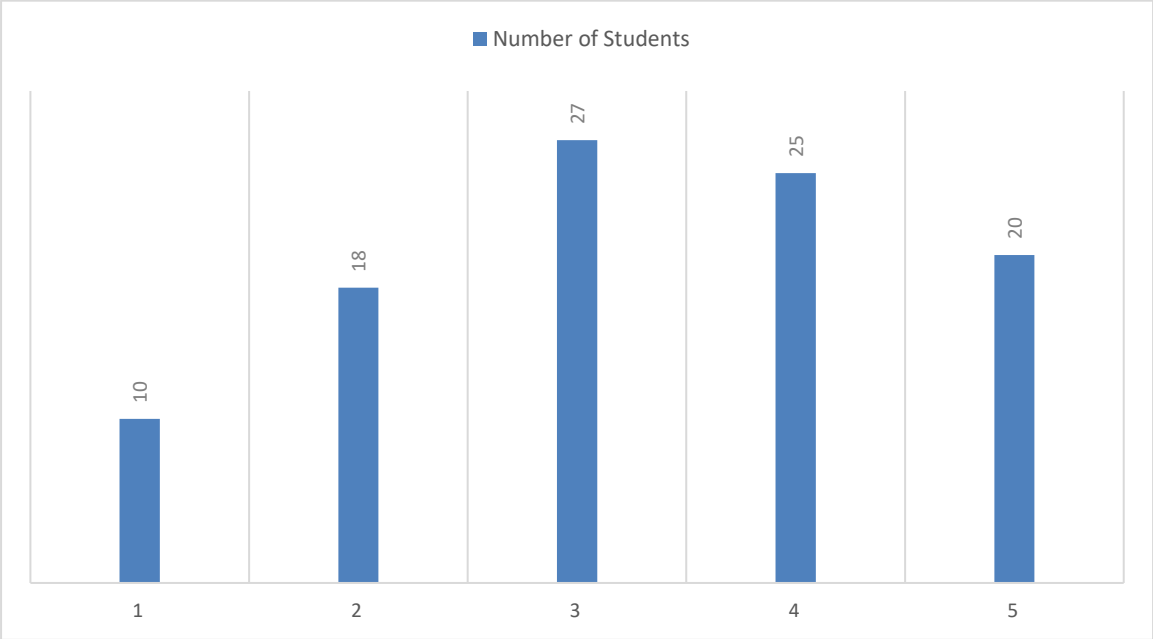
Survey Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
AI study planner helps reduce academic stress	4	6	8	20	12
An AI study planner helps manage study time effectively	3	5	7	18	17
AI study planner improves learning efficiency	2	4	6	19	19

The received answers were systematised into a tabular dataset and subjected to simple statistical analysis to get a glimpse of the effect of the AI-based system of personalised learning on academic performance and stress levels of students.

Table 3: Sample data that is used in the chart

Rating	Number of Students
1	10
2	18
3	27
4	25
5	20

Figure 2: Student Response When using the AI tool



The subsequent bar chart is a representation of the ratio of student answers relating to the use of AI tools in learning activities. The answers were quantified using a Likert scale of five points, in which 1 would mean very low usage and 5 would mean very high usage. An overwhelming majority of students chose rating 3 and 4, which represent moderate to high means of AI learning tools.

B. System Workflow

The system suggested is structured and complies with a workflow:

- Data input to the system, such as student information, course workload, likes, and preferences.
- Cleaning and sanitising the data to have it in the right format.
- Searching patterns and interpreting the information with the help of AI.
- Plan Generation (individual learning plan)
- Evaluating (measuring performance and progress)

This chain continues to be enhanced and allows the system to significantly adjust on demand [15], [2].

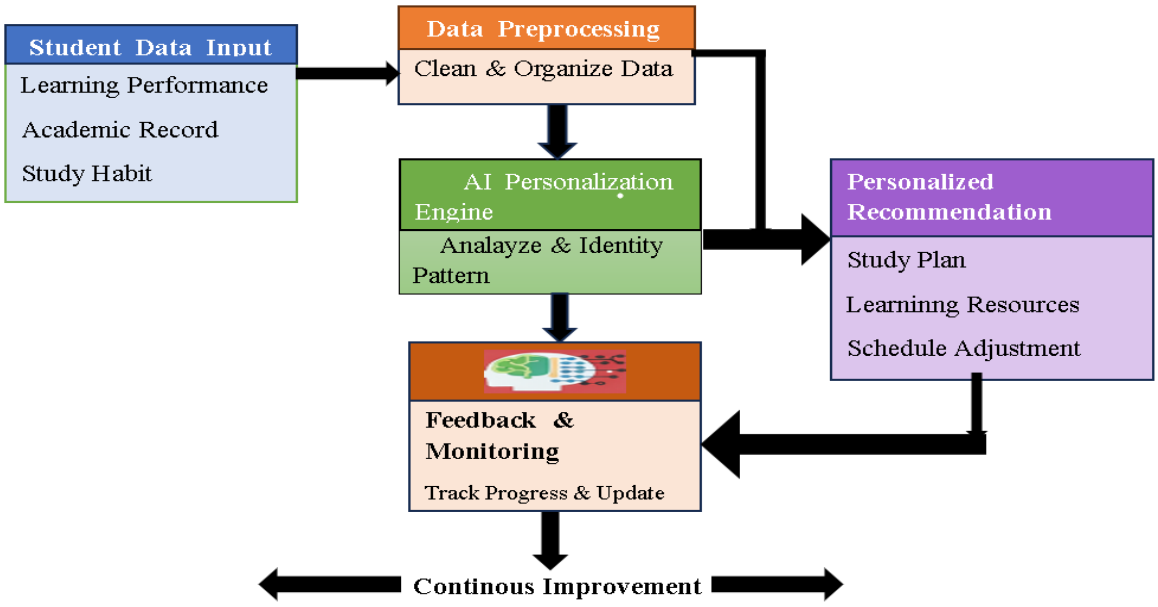


Figure3. Workflow of the Proposed AI-Based Personalised Learning System

The chart illustrates the operation of the AI-based Smart Study Planner system. This is done by first gathering and systematising student information on learning performance, educational records and studying habits.

5. Conceptual Analytical Framework

The article explains the promise of artificial intelligence to be used in developing an intelligent study planner. The framework is present to demonstrate how the large inputs of the system, such as input data, processing in the AI, and final products, may assist the students to increase the learning outcomes and decreasing the academic stress.

The framework commences with the gathering of the input variables under consideration, such as the profile of the student, the student's academic load, the learning preferences, and past school achievements. The inputs assist the system to determine the behaviour of the student, his/her study profiles and their study habits, and give the system a platform on which to advance further analysis [5], [9].

Artificial intelligence and machine learning are methods of processing the received data. The information is manipulated with these technologies, creating patterns of the image and producing meaningful insights that may be applied to the planning of the study, as well as in personalised study [11], [16].

This analysis is based on the statement that the personal study plans and system adaptation are elaborated; the needs of individual students are taken into consideration. These schedules are dynamically diversified by the planner of the study depending on the progress and performance of the students in order to make the learning and time management more efficient [2], [15].

The system also has monitoring mechanisms that monitor the performance of students and update the study plan in real time. It is a continuous process of feedback that will sustain efficiency and guarantee daily improvement in the learning outcome [12].

6. RESULTS AND DISCUSSION

The research findings suggest that a proposed AI-based solution, Smart Study Planner, can provide a channel for organising the academic processes of students with increased efficiency and

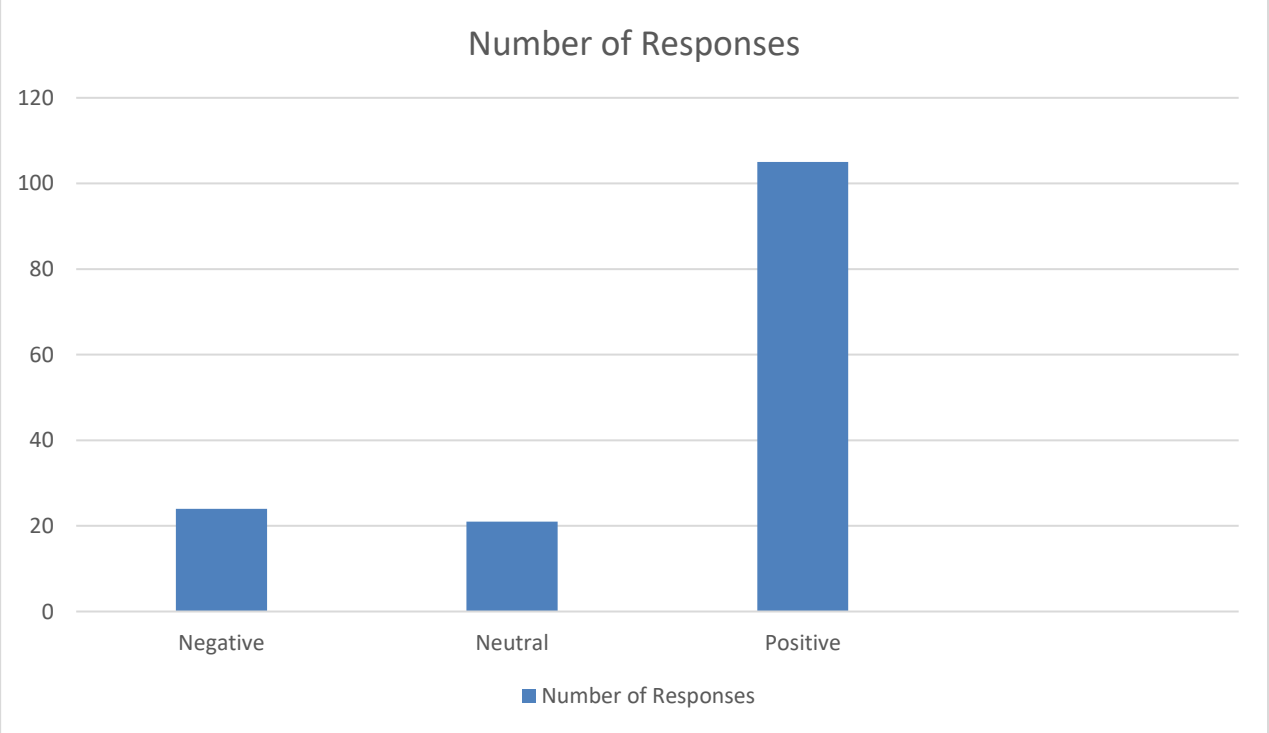
reduce the amount of academic stress. The study of the survey materials provided showed a reliance among the students. The perceptions of the students on the stress reduction, the time management and the learning efficiency were measured on the five-point Likert scale.

In the case of AI-based study planners, most students were positive reacting. Most of the answers are in the Agree and Strongly Agree range, which presupposes that the students think AI tools allow planning the study sessions and make the learning process more efficient.

Table 4: Overview of Student Perception of AI Study Planner

Response Category	Number of Responses	Percentage (%)
Negative (Strongly Disagree + Disagree)	24	16%
Neutral	21	14%
Positive (Agree + Strongly Agree)	105	70%

Figure 4: Distribution of student opinion



The chart demonstrates the attitude of the students toward the AI-based study planner regarding the sense of its usefulness. The results show that the positive responses are the most common responses, followed by some neutral and negative responses. The given tendency suggests that students are generally satisfied with AI-based study planning instruments and can comprehend the potential it has in better organising the study, reducing the rates of stress, and improving the learning outcomes.

7. CONCLUSION

The idea, which underlies the conclusion which has been made by the researchers, is the possibility of an intelligent study planner (AI) program to improve the conditions in the area of academic performance and academic stress. It is also worth individualising and personalising learning plans that would eventually result in the overall productivity of the students through the use of AI and machine learning, yet we also have to become better to achieve the goal of solving the practical problems and making the mainstream a reality.

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