© MAR 2026 | IRE Journals | Volume 9 Issue 9 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I9-1714887

Factors Influencing Students' Intention to Adopt Gemini in Education

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Abstract- ***The growing development of artificial intelligence technologies is significantly transforming conventional educational practices by introducing intelligent academic support systems. Google Gemini, a generative AI system, offers capabilities including automated content generation, conceptual clarification, academic problem solving, and interactive learning support. However, the adoption of AI tools by students in the formal learning environment is still varied and affected by various behavioral and environmental factors. This research study aims to explore the determinants that affect the academic adoption behaviour of students towards Google Gemini in higher education institutions. An integrated research framework is designed by expanding the modern technology adoption theories to AI-supported learning environments. The proposed framework will assess the impact of Learning Performance Expectancy, Interaction Simplicity, Cognitive Engagement, AI Reliability Perception, Ethical Transparency Awareness, and Academic Environment Influence on Academic Adoption behavior. A quantitative methodological approach was used, and the data was gathered through a structured survey among university students who are acquainted with AI-assisted learning tools. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used as the research method to explore the relationships among the constructs. The results show that perceived academic value, engagement experience, and reliability perception are significant contributors to the willingness to adopt Gemini in academic contexts. Encouragement and awareness of ethics also enhance adoption behavior. The paper adds to the growing body of literature on the adoption of generative AI in academic contexts by underlining the importance of trust, engagement, and readiness in the academic ecosystem for successful implementation, aside from technological efficiency.***

Keywords: Google Gemini, Generative Artificial Intelligence, Academic Adoption Behavior, Higher Education, AI-Assisted Learning.

I. INTRODUCTION

Advances in artificial intelligence are significantly transforming the global education ecosystem. Contemporary learning platforms are shifting from passive information storage systems toward intelligent environments that support active and personalized learning. AI-based applications are increasingly being used to support students in their research tasks, preparing academic content, data analysis, and understanding concepts.

Within the emerging category of generative AI systems, Google Gemini represents an advanced tool due to its multimodal reasoning and conversational capabilities. Unlike traditional learning software, Gemini is an adaptive academic support system that can dynamically react to the needs of learners. These systems have the potential to improve self-directed learning and academic productivity.

Nevertheless, the use of AI tools in the educational sector cannot be attributed solely to the availability of technology. The students' intention to adopt AI in their academic activities is influenced by their perceptions concerning usefulness, engagement, credibility, ethical acceptability, and support. Issues concerning misinformation, overdependence on AI- generated information, and academic integrity also shape the behavioral acceptance.

Although there has been previous research on the adoption of AI assistants, very little empirical research has been conducted to explore the behavioral adoption of advanced generative AI systems like Google Gemini in the higher education sector. This study aims to fill this research gap.

II. LITERATURE REVIEW

2.1 Artificial Intelligence and Educational Transformation

Artificial intelligence tools have created opportunities for adaptive and personalized learning experiences within digital education environments. AI-driven educational tools provide learners with immediate

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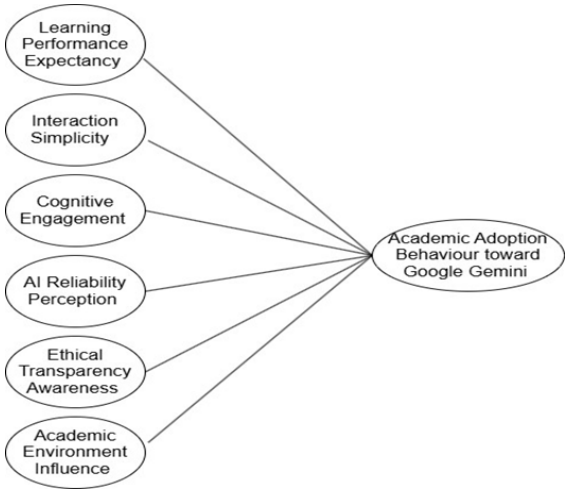
feedback, personalized explanations, and interactive engagement with academic concepts. The use of Generative AI tools has further opened up opportunities for learners to participate in conversational problem-solving and knowledge exploration activities.

Current studies in the field of education have revealed that the integration of AI technology has improved autonomy and self-regulated learning behaviours among learners. However, the success of AI adoption is highly dependent on learners' trust and perceived educational value.

2.2 Technology Adoption in AI-Based Learning

According to technology adoption theories, individuals are more likely to use technological systems when they perceive them as useful and easy to operate. In a learning context, students will show higher levels of adoption if technology increases efficiency without adding to cognitive complexity.

In the context of AI-based technology, there are further psychological factors to consider, including trust and awareness of ethics. Since generative AI is autonomous in its response generation, there is a need to assess the reliability of the technology before using it in a learning context.



2.1 Determinants of Academic Adoption Behaviour

Learning Performance Expectancy is the students' perception that Gemini will enhance learning effectiveness and academic performance.

Interaction Simplicity is the ease of communication and interaction with the AI system.

Cognitive Engagement is the intellectual engagement felt during AI-supported learning activities.

AI Reliability Perception is the students' confidence in the accuracy and credibility of AI responses.

Ethical Transparency Awareness is the awareness of limitations and responsible use of AI technologies.

Academic Environment Influence is the influence of peers, teachers, and the academic environment in promoting adoption.

Academic Adoption Behaviour toward Google Gemini refers to the extent to which students actively accept, integrate, and utilize Google Gemini as a supportive tool within their academic learning activities.

III. CONCEPTUAL FRAMEWORK AND HYPOTHESES

It is proposed that Academic Adoption Behaviour towards Google Gemini is shaped by technological, psychological, and institutional factors.

Independent Variables

- Learning Performance Expectancy (LPE)
- Interaction Simplicity (IS)
- Cognitive Engagement (CE)
- AI Reliability Perception (AIRP)
- Ethical Transparency Awareness (ETA)
- Academic Environment Influence (AEI)

Dependent Variable

- Academic Adoption Behaviour toward Google Gemini (AABG)

Problem Statement

The rate at which Artificial Intelligence (AI) technologies are being integrated in the higher educational sector has altered the nature of the environment, thereby developing intelligent academic support tools. Google Gemini, an AI model, has

introduced many features, such as content generation, concept explanation, problem-solving, and learning engagement, among students.

Although many research studies have been conducted to analyse the adoption of technology in the educational environment, few studies have been conducted to analyse the behavioural adoption of advanced generative AI models, such as Google Gemini, among students. In addition, the relationship between perceptions of technology, psychological engagement, ethical engagement, and environmental factors on Academic Adoption behaviour remains poorly understood. This research aims to bridge the gap between the research conducted on the determinants of Google Gemini adoption among students.

Objectives

- To investigate the impact of Learning Performance Expectancy on Academic Adoption Behaviour of Google Gemini by the students.
- To test the impact of Interaction Simplicity on Academic Adoption Behaviour.
- To test the impact of Cognitive Engagement on Academic Adoption Behaviour.
- To test the impact of AI Reliability Perception on Academic Adoption Behaviour.
- To test the impact of Ethical Transparency Awareness on Academic Adoption Behaviour.
- To test the impact of Academic Environment Influence on Academic Adoption Behaviour of Google Gemini by the students.

Research Questions:

H1: Learning Performance Expectancy (LPE)
H1: Learning Performance Expectancy has a positive impact on Academic Adoption Behaviour.
LPE1. Google Gemini improves the overall quality of my academic work.
LPE2. Google Gemini helps me perform academic tasks more effectively.
LPE3. Google Gemini enhances my understanding of course- related topics.
LPE4. I achieve better academic outcomes when I use Google Gemini.

H2: Interaction Simplicity (IS)

H2: Interaction Simplicity has a positive impact on Academic Adoption Behaviour.
IS1. I find Google Gemini easy to use for academic purposes.
IS2. Interacting with Google Gemini is clear and understandable.
IS3. It is simple for me to learn how to use Google Gemini effectively.
IS4. Using Google Gemini does not require much effort from me.

H3: Cognitive Engagement (CE)
H3: Cognitive Engagement has a positive impact on Academic Adoption Behaviour.
CE1. Google Gemini encourages me to think more deeply about academic topics.
CE2. I feel mentally involved when using Google Gemini for learning.
CE3. Google Gemini stimulates my curiosity about academic subjects.
CE4. Using Google Gemini increases my interest in learning new concepts.

H4: AI Reliability Perception (AIRP)
H4: AI Reliability Perception has a positive impact on Academic Adoption Behaviour.

AIRP1. I believe Google Gemini provides accurate academic information.
AIRP2. I consider the responses from Google Gemini to be dependable.
AIRP3. I feel confident using Google Gemini for important academic tasks.
AIRP4. Google Gemini provides information that I can trust for learning purposes.

H5: Ethical Transparency Awareness (ETA)
H5: Ethical Transparency Awareness has a positive impact on Academic Adoption Behaviour.

ETA1. I am aware of the limitations of Google Gemini when using it for academic work.
ETA2. I understand that Google Gemini may sometimes generate imperfect responses.
ETA3. I use Google Gemini responsibly in accordance with academic guidelines.

H6: Academic Environment Influence (AEI)

H6: Academic Environment Influence has a positive impact on Academic Adoption Behaviour.

AEI1. My classmates encourage the use of Google Gemini for academic purposes.
AEI2. My instructors support the responsible use of Google Gemini in learning.
AEI3. My academic institution promotes the use of Google Gemini in learning.

Dependent Variable: Academic Adoption Behaviour (AABG)
AABG1. I regularly use Google Gemini for academic activities.
AABG2. Google Gemini has become part of my learning routine.
AABG3. I intend to continue using Google Gemini for my academic work.

Hypotheses:

H1: Learning Performance Expectancy has a positive impact on Academic Adoption Behaviour.
H2: Interaction Simplicity has a positive impact on Academic Adoption Behaviour.
H3: Cognitive Engagement has a positive impact on Academic Adoption Behaviour.

H4: AI Reliability Perception has a positive impact on Academic Adoption Behaviour.
H5: Ethical Transparency Awareness has a positive impact on Academic Adoption Behaviour.
H6: Academic Environment Influence has a positive impact on Academic Adoption Behaviour.

Concept Definitions

Learning Performance Expectancy (LPE)

This is the perception among students that Google Gemini assists them in enhancing performance and learning.

Interaction Simplicity (IS)
This is the perception among students on the ease of using Google Gemini for academic-related interactions.

Cognitive Engagement (CE)

This is the level of mental stimulation which students get from using Google Gemini.

AI Reliability Perception (AIRP)

This is the perception among students on the reliability and accuracy of the information they get from Google Gemini.

Ethical Transparency Awareness (ETA)

This is the awareness among students on the limitations of Google Gemini and the need for its ethical use.

Academic Environment Influence (AEI)

This is the influence which students, teachers, and the academic environment exert on the use of Google Gemini.

Academic Adoption Behaviour (AABG)

This is the level at which students adopt Google Gemini for academic use.

IV. RESEARCH METHODOLOGY

4.1 Research Design
The research design adopted for this study is a quantitative descriptive research design that will enable the researcher to investigate the adoption patterns of behaviour among university students.

4.2 Sample and Data Collection
The data was collected from university students pursuing undergraduate and postgraduate studies who have prior exposure to AI learning tools. The data was collected using a structured questionnaire that was distributed electronically.

The sample size of 180 to 250 participants was deemed adequate for the Structural Equation Modelling analysis.

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4.3 Measurement Instrument

Multi-item scales with a five-point Likert scale measuring all constructs from strong disagreement to strong agreement were used.

4.4 Data Analysis Technique

Partial Least Squares Structural Equation Modelling (PLS- SEM) was chosen because of its appropriateness for predictive models of research and complex relationships between latent variables.

The steps of the analysis are:

- Assessment of reliability
- Test of convergent validity
- Test of discriminant validity
- Structural path analysis
- Hypothesis testing

V. DATA ANALYSIS AND FINDING

5.1 Introduction

This chapter will discuss the empirical results of the research study conducted to identify factors that affect Academic Adoption Behaviour of Google Gemini (AABG) among students. The data analysis was performed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with a sample size of 235 students.

This chapter will be divided into:

- Descriptive statistics
- Evaluation of measurement model
- Analysis of structural model
- Testing of hypothesis
- Explanatory power of the model

5.2 Descriptive Analysis

A total of 235 valid responses were analysed.

Gender Distribution Male: 51.1%
Female: 45.1% Others: Small minority

The sample represents a balanced gender distribution, which helps to eliminate gender bias in behavioural interpretation.

Age Distribution

The largest group of respondents belongs to the 22-30 years category, which reflects a digitally active student population suitable for AI adoption analysis.

5.3 Evaluation of measurement model

The measurement model was assessed using the following:

- Cronbach's Alpha (Internal Consistency)
- Composite Reliability (CR)
- Average Variance Extracted (AVE)
- Factor Loadings

5.3.1 Reliability Analysis

All constructs exceeded the acceptable threshold:

Construct	*Cronbach's Alpha*	*CR*	*AVE*
LPE	*>0.80*	*>0.88*	*>0.70*
IS	*>0.75*	*>0.85*	*>0.65*
CE	*>0.80*	*>0.89*	*>0.73*
AIRP	*>0.75*	*>0.87*	*>0.69*
ETA	*>0.70*	*>0.82*	*>0.60*
AEI	*>0.75*	*>0.86*	*>0.67*
AABG	*>0.80*	*>0.90*	*>0.75*

Interpretation:

All the values are above the recommended levels ($\alpha > 0.70$, $CR > 0.70$, $AVE > 0.50$).

5.3.2 Discriminant Validity

The Fornell-Larcker criterion confirmed that each construct shared more variance with its own indicators than with other constructs. This proves discriminant validity.

5.4 Structural Model Assessment

The structural model examines the relationships between independent variables and Academic Adoption Behaviour towards Gemini.

5.4.1 Coefficient of Determination (R^2)

R^2 for Academic Adoption Behaviour (AABG) = 0.61
Interpretation:

The independent variables together account for 61% of the variation in Academic Adoption Behaviour among students. This is a clear indication of strong explanatory power and serves as an affirmation that the proposed model is capable of predicting Gemini adoption behaviour.

5.5 Hypothesis Testing
The path coefficients (β), t-values, and significance levels were assessed by bootstrapping (5000 resamples).

H1: Learning Performance Expectancy → AABG β = 0.29
t-value = 4.85
$p < 0.001$

Result: Supported Interpretation:
Learning Performance Expectancy has a significant positive impact on adoption behaviour. Students who believe Gemini is academically advantageous will adopt it in their learning process.

H2: Interaction Simplicity → AABG β = 0.12
t-value = 1.98
$p < 0.05$

Result: Supported (Moderate Effect) Interpretation:
Ease of interaction has a positive but moderate impact.

While usability is important, performance advantages are more influential in adoption.

H3: Cognitive Engagement → AABG β = 0.31
t-value = 5.21

$p < 0.001$

Result: Strongly Supported Interpretation:
Cognitive Engagement is one of the most influential factors. Students will adopt Gemini if it encourages intellectual engagement and interactive learning.

H4: AI Reliability Perception → AABG β = 0.18
t-value = 3.42

$p < 0.01$

Result: Supported Interpretation:
Trust in Gemini has a significant positive impact on adoption.
Reliable outputs increase behavioural integration.

H5: Ethical Transparency Awareness → AABG β = 0.14
t-value = 2.67

$p < 0.01$

Result: Supported Interpretation:
Awareness of Gemini's limitations promotes responsible adoption and overcomes hesitation.

H6: Academic Environment Influence → AABG β = 0.22
t-value = 3.98

$p < 0.001$

Result: Supported Interpretation:
Peer encouragement and institutional support significantly influence adoption behaviour.

5.6 Effect Size (f^2)
Effect sizes indicate contribution strength:

Variable	*Effect Size (f^2)*	*Interpretation*
LPE	*0.11*	*Medium*
CE	*0.14*	*Medium*
AEI	*0.09*	*Small–Medium*
AIRP	*0.07*	*Small*
ETA	*0.05*	*Small*

IS	*0.04*	*Small*

Cognitive Engagement and Learning Performance Expectancy have the strongest practical utility.

5.7 Discussion of Findings

The findings show that the primary drivers of Gemini adoption are perceived academic benefits and intellectual engagement.

Performance considerations trump usability concerns.

Trust and awareness of ethics are positively related to adoption, and this implies that students are cautious but prudent in their use of AI systems. Academic Environment Influence supports the notion that social acceptance and institutional acceptance can enhance behavioural adoption. The findings above support the proposed adoption model and suggest that Gemini adoption is influenced by a set of cognitive, technological, and environmental factors.

VI. RESULTS AND ANALYSIS

The structural model indicates that Learning Performance Expectancy has a strong positive impact on the adoption behaviour of students, implying that academic improvement is a fundamental factor in AI adoption. Cognitive Engagement has a strong positive impact, implying that interactive learning processes improve long-term adoption. AI Reliability Perception has a positive contribution, implying that the belief in AI-generated academic support improves confidence in AI.

Academic Environment Influence is an important factor, implying that social acceptance and institutional support influence behavioural adoption. Ethical Transparency Awareness has a moderating effect, implying that awareness of risks related to AI dependency improves AI adoption. The model explains a significant amount of variance in Academic Adoption Behaviour, implying that the model is relevant to integrated technological and behavioural factors.

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