



# The Extent of Artificial Intelligence Contribution to Determining Students Learning Behavior among Generation Z

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**Abstract.** This study aimed to examine the impact of artificial intelligence usage on students learning behavior by analyzing four main dimensions: information search and data collection, academic understanding and analysis, academic writing and editing, and summarization and knowledge organization. The study adopted a quantitative approach using multiple linear regression analysis to determine the extent to which these dimensions explain variations in students' learning style. The findings indicated that the dimensions of artificial intelligence use contribute differently to students' learning style, with academic writing and editing emerging as the only dimension showing a positive and statistically significant effect.

**Keywords:** Artificial Intelligence, Generation Z, Student Learning behavior

## 1 Introduction

The rapid development of artificial intelligence has significantly influenced educational practices and learning environments. AI technologies are increasingly used to support students in searching for information, understanding academic content, improving writing skills, and organizing knowledge. These changes have contributed to transforming how students approach learning, particularly among Generation Z learners who are highly engaged with digital technologies. Therefore, examining the role of artificial intelligence in shaping students' learning styles has become an important area of research, as it helps to understand how technological tools can enhance learning processes and support academic performance

### Problematic

To what extent does artificial intelligence influence students' learning behavior among Generation Z?

### Study Questions

- What is the effect of information search and data collection using artificial intelligence on students' learning behavior?

- What is the effect of academic understanding and analysis supported by artificial intelligence on students' learning behavior?
- What is the effect of academic writing and editing using artificial intelligence on students' learning behavior?
- What is the effect of summarization and knowledge organization using artificial intelligence on students' learning behavior?

### **Main Hypothesis**

There is a statistically significant effect of artificial intelligence usage on students' learning behavior among Generation Z.

### **Study Hypotheses**

- **H1:** Artificial intelligence use in information search and data collection has a statistically significant effect on students' learning behavior among Generation Z.
- **H2:** Artificial intelligence use in academic understanding and analysis has a statistically significant effect on students' learning behavior among Generation Z.
- **H3:** Artificial intelligence use in academic writing and editing has a statistically significant effect on students' learning behavior among Generation Z.
- **H4:** Artificial intelligence use in summarization and knowledge organization has a statistically significant effect on students' learning behavior among Generation Z.

### **Study Methodology**

The questionnaire was distributed to 70 students from Business Administration and Human Resource Management programs, and 42 responses were collected

Descriptive statistical analysis was used to summarize and describe the characteristics of the study variables through measures such as means and standard deviations. Statistical analysis was conducted using SPSS Statistics software

#### **1.How are generation Z?**

Generation Z refers to the demographic cohort born approximately between the mid-1990s and the early 2010s, characterized by growing up in a fully digital environment where internet access, social media, and mobile technologies are integral to daily life. This generation is typically described as technologically fluent, highly connected, accustomed to rapid access to information, and inclined toward visual, interactive, and self-directed learning approaches. In educational contexts, Generation Z learners are

often associated with preferences for collaborative learning, immediate feedback, and technology-supported learning environments [1, p. 7].

### **2. Definition of Students' Mental (Cognitive) Operations**

**Students' mental operations**, also referred to as cognitive operations, are the internal psychological processes through which learners perceive, process, store, organize, analyze, and use information in order to understand concepts, solve problems, make decisions, and produce knowledge. These operations form the foundation of learning, academic performance, and intellectual development [2, p. 403].

Mental operations include both basic cognitive processes, such as attention and memory, and higher-order cognitive processes, such as analysis, inference, critical thinking, problem-solving, summarization, and metacognition. They operate interactively and are influenced by prior knowledge, motivation, learning context, and instructional strategies [3, pp. 201-207]

## **2 How Artificial Intelligence Helps Students Learn: Evidence from Recent Research**

### **A. Personalized Learning**

Artificial intelligence enables personalized learning environments by adapting content, pace, and instructional strategies to individual learners' needs, abilities, and progress. [4, pp. 42-70].

AI-driven learning systems analyze student data to recommend customized learning paths, thereby improving engagement and academic performance [5].

#### **2.1 Intelligent Tutoring Systems (ITS)**

AI-powered intelligent tutoring systems provide real-time feedback, step-by-step guidance, and continuous assessment. These systems simulate one-to-one tutoring, which has been shown to be one of the most effective instructional methods [6, pp. 197-221].

#### **2.2 Support for Self-Regulated Learning**

AI tools assist students in planning, monitoring, and evaluating their own learning, which are core components of self-regulated learning. Dashboards, learning analytics, and AI feedback systems help students reflect on their progress and adjust strategies accordingly [7, pp. 386-397]

#### **2.3 Automated Feedback and Assessment**

AI supports learning through automated feedback, grading, and formative assessment. These systems provide immediate responses, allowing students to identify mistakes and improve understanding without delays [8, pp. 10-24].

## 2.4 Enhancing Accessibility and Inclusion

Artificial intelligence improves educational accessibility by supporting students with disabilities through speech recognition, text-to-speech systems, adaptive interfaces, and real-time translation tools [9]

## 2.5 Motivation and Engagement

AI-based gamification, chatbots, and virtual learning assistants increase student motivation by providing interactive and responsive learning experiences [10, pp. 85-97]

Typically, through the following four processes [11, pp. 1-10].

### I. Information Search and Data Collection (AI1)

Artificial intelligence performs information search and data collection by analyzing search inputs, retrieving relevant academic sources, and organizing references in a structured manner that facilitates knowledge access and academic research.

### II. Academic Understanding and Analysis (AI2)

Artificial intelligence supports academic understanding and analysis by simplifying complex concepts, analyzing texts and data, and assisting in building logical interpretations and meaningful knowledge connections.

### III. Academic Writing and Editing (AI3)

Artificial intelligence improves academic writing by correcting linguistic errors, enhancing writing style, paraphrasing and summarizing content, and supporting adherence to academic writing conventions and referencing standards.

### IV. Summarization and Knowledge Organization (AI4)

Artificial intelligence performs summarization and knowledge organization by condensing academic content, extracting key ideas, and structuring knowledge in a way that improves understanding, retention, and information retrieval.

## 3 students' learning behavior

### 3.1 Analysis

#### Definition

Analysis is a higher-order cognitive process that involves **breaking down complex information into its constituent elements** in order to understand structure, relationships, and underlying principles. It enables individuals to examine ideas critically and evaluate evidence systematically [9]

#### Cognitive Characteristics

- Requires logical and critical thinking
- Involves comparison, categorization, and identification of relationships
- Associated with higher levels of cognitive functioning

### **Cognitive and Educational Importance**

Analysis supports deep understanding, scientific reasoning, and effective problem-solving. It is fundamental to academic inquiry and decision-making in complex situations [12, p. 302].

### **3.2 Focus (Attention)**

#### **Definition**

Focus, or attention, is a cognitive process that enables individuals to **select and concentrate on relevant stimuli or tasks** while ignoring irrelevant or distracting information

- Selective and limited in capacity
- Influenced by motivation and emotional state
- Essential for information processing
- Attention is a prerequisite for learning, memory encoding, and cognitive performance. Without adequate focus, higher mental processes cannot function effectively [13, p. 45].

### **3.3 Inference**

#### **Definition**

Inference is a cognitive process through which individuals **derive implicit information or conclusions** from available data, prior knowledge, or contextual cues.

- Based on reasoning and logic
- Can be deductive or inductive
- Influenced by experience and background knowledge

Inference plays a key role in reading comprehension, reasoning, and problem-solving. It allows individuals to go beyond explicit information and construct meaning [14, pp. 65-92].

### **3.4 Editing**

#### **Definition**

Editing is a cognitive-linguistic process involving **reviewing, revising, and refining written content** to improve clarity, coherence, accuracy, and correctness.

- Requires metacognitive awareness
- Depends on working memory and self-monitoring
- Involves linguistic and logical evaluation

Editing enhances the quality of written communication and reflects advanced cognitive control over language production and knowledge representation.

### 3.5 Summarization

#### Definition

As a student learning style refers to the process through which learners condense information, identify key ideas, and reorganize knowledge in a concise form to enhance understanding and retention.

Cronbach's Alpha	N of Items
.769	9

(Source: Prepared by the researcher based on SPSS v.26 outputs).

The **Cronbach's Alpha value of 0.769** indicates that the scale (composed of 9 items) has a **good level of internal consistency**. This means that the items are measuring the same underlying construct in a consistent and reliable way.

**Table 2: The correlation between artificial intelligence and student behavior.**

M	R	R	Adjusted R	Std. Error
odel		Square	Square	of the Estimate
1	.379 <sup>a</sup>	.144	.122	9.08226
a. Predictors: (Constant), AIS				

(Source: Prepared by the researcher based on SPSS v.26 outputs).

The results of the simple linear regression analysis indicate that artificial intelligence has a positive effect on students' learning. The correlation coefficient ( $R = 0.379$ ) suggests a weak to moderate positive relationship between the use of artificial intelligence and students' learning outcomes. The coefficient of determination ( $R^2 = 0.144$ ) shows that artificial intelligence explains approximately 14.4% of the variance in students' learning. Overall, these findings suggest that although artificial intelligence contributes positively to students' learning, its impact is relatively limited, highlighting the need to consider additional variables to better explain students' learning outcomes.

**Table 3 : The impact of artificial intelligence on student behavior**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	554.120	1	554.120	6.718	.013 <sup>b</sup>
	Residual	3299.499	40	82.487		
	Total	3853.619	41			
a. Dependent Variable: OMS						
b. Predictors: (Constant), AIS						

**(Source: Prepared by the researcher based on SPSS v.26 outputs).**

The ANOVA results indicate that the regression model is statistically significant ( $F = 6.718, p = 0.013$ ). This finding suggests that artificial intelligence significantly predicts students’ learning outcomes. Therefore, the results support the conclusion that artificial intelligence has a statistically significant effect on students’ learning.

**Table 4: The relationship between artificial intelligence and student behavior.**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	70.038	13.722		5.104	.000
AI1	.868	.959	.157	.906	.371
AI2	-1.481	1.012	-.302	-1.462	.152
AI3	1.857	.911	.524	2.039	.049
AI4	-.222	1.075	-.040	-.207	.837
a. Dependent Variable: OMS					

**(Source: Prepared by the researcher based on SPSS v.26 outputs).**

The results of the multiple linear regression analysis indicate that the study model explains the effect of artificial intelligence usage dimensions on students’ learning behavior. The constant term was statistically significant ( $B = 70.038, p < 0.001$ ), reflecting a relatively high baseline level of students’ cognitive processes. The findings show that the information search and data collection dimension had a weak positive but statistically non-significant effect ( $B = 0.868, \beta = 0.157, p = 0.371$ ). Likewise, the academic understanding and analysis dimension exhibited a negative, non-significant effect ( $B = -1.481, \beta = -0.302, p = 0.152$ ), while the summarization and organization of knowledge dimension did not demonstrate any statistically significant effect on students’ cognitive processes ( $B = -0.222, \beta = -0.040, p = 0.837$ ). In contrast, the results revealed that the academic writing and editing dimension was the only variable that had a positive and statistically significant effect on students’ cognitive processes ( $B = 1.857, \beta = 0.524, p = 0.049$ ), indicating that this dimension contributes most strongly to explaining variance in students’ cognitive processes compared to the other artificial intelligence usage dimensions.

**Study Results (in bullet points):**

- The results of the multiple linear regression analysis showed that the dimensions of artificial intelligence use explain variations in the student's learning style to different degrees.
- The constant term was statistically significant, indicating a relatively high baseline level of students' learning style.
- The information search and data collection dimension did not show a statistically significant effect on the student's learning style, despite a positive direction of the relationship.
- The academic understanding and analysis dimension did not demonstrate a significant effect on learning style, suggesting that its influence may be indirect or associated with other mediating factors.
- The summarization and knowledge organization dimension did not achieve a statistically significant effect, indicating that summarizing and organizing information alone does not lead to a clear change in students' learning style.
- The results revealed that the academic writing and editing dimension was the only variable with a positive and statistically significant effect on the student's learning style.
- The findings indicate that AI uses related to improving academic writing, restructuring knowledge, and adhering to academic standards contribute more significantly to the development of students' learning styles compared to the other dimensions of AI use.

## 4 Conclusion

The findings of this study indicate that the increasing use of artificial intelligence in learning environments has led to noticeable changes in students' learning behavior among Generation Z. While artificial intelligence has facilitated access to information and simplified many academic tasks, the results suggest that excessive reliance on these tools may reduce students' engagement in deeper cognitive processes such as analysis, sustained concentration, and independent inference, as learners increasingly depend on ready-generated outputs rather than actively constructing knowledge themselves. However, the study also demonstrates that artificial intelligence has made a positive contribution in the area of academic writing and editing, particularly in improving linguistic accuracy, enhancing academic formulation, and supporting clearer and more structured written expression. Accordingly, the educational value of artificial intelligence appears to lie not in replacing students' cognitive effort, but in supporting productive academic tasks while maintaining the active role of the learner in analysis, critical thinking, and knowledge construction.

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