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## Impact of Artificial Intelligence and Digital Tools on Cognitive Offloading among Young Adults

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### Abstract

Artificial Intelligence (AI) tools and digital technologies have become an integral part of modern life, particularly among young adults. These technologies often encourage cognitive offloading, a process in which individuals rely on external systems such as digital devices and AI applications to store and retrieve information. The present study examines the impact of artificial intelligence and digital tools on cognitive offloading among young adults aged 18–25 years. A descriptive research design was adopted, and data were collected from 125 participants using a Cognitive Offloading Questionnaire. Statistical analysis was carried out using descriptive statistics, independent sample t-test, and one-way ANOVA. The results revealed significant differences in cognitive offloading based on working status, AI usage, and note-taking methods. Participants who frequently used AI tools and digital note-taking methods demonstrated higher levels of cognitive offloading compared to others. The findings highlight the increasing reliance of young adults on digital technologies for managing cognitive tasks and storing information.

**Keywords:** Artificial Intelligence, Cognitive Offloading, Digital Tools, Technology Use, Young Adults.

### Introduction

Digital technologies have significantly transformed the way individual's store, access, and manage information. With the rapid advancement of Artificial Intelligence (AI), tools such as search engines, AI chat bots, digital assistants, note-taking applications, and reminder systems have become an integral part of everyday activities.

These technologies encourage the practice of cognitive offloading, which refers to the process of transferring cognitive tasks to external tools or systems. Instead of relying entirely on internal memory or mental processing, individuals increasingly depend on digital devices to store information, schedule tasks, and retrieve knowledge when needed.

Cognitive offloading plays an important role in reducing mental effort and helping individuals manage large amounts of information efficiently. For example, people commonly use smartphones to set reminders, store contacts, manage schedules, and access online information. Such practices allow individuals to focus on other tasks while relying on external systems to handle certain cognitive functions.

Young adults are among the most frequent users of digital technologies. They rely heavily on smartphones, computers, and AI-based platforms for academic work, communication, and everyday decision-making. The widespread availability of digital tools has made information easily accessible, but it has also increased individuals' reliance on external systems for

managing cognitive tasks.

As the use of artificial intelligence continues to expand, it becomes important to understand how these technologies influence cognitive behaviors such as cognitive offloading. Therefore, the present study aims to examine the level of cognitive offloading among young adults and to identify whether differences exist based on factors such as working status, AI usage frequency, and note-taking methods.

### Review of Literature

Recent studies have explored how digital technologies and artificial intelligence influence cognitive behavior and information management. Cognitive offloading has emerged as an important concept in understanding how individuals interact with external technological systems to support memory and task management.

Benjamin Wahn and colleagues (2023) examined how individuals delegate cognitive tasks to technological systems. Their research highlighted that people frequently rely on external tools such as digital devices and algorithms to store and retrieve information. The study suggested that cognitive offloading helps individuals manage complex tasks efficiently by reducing mental workload.

J. Burnett and T. Richmond (2023) investigated the relationship between cognitive offloading and memory performance. Their findings indicated that individuals often

depend on digital tools such as smartphones and online platforms to remember important information, appointments, and tasks. This reliance allows individuals to free up mental resources for other activities.

M. Gerlich (2025) explored the increasing use of artificial intelligence technologies in everyday learning and information processing. The study found that AI tools such as chatbots, search engines, and recommendation systems are frequently used by young adults for academic tasks, problem solving, and information retrieval.

Similarly, M. Georgiou (2025) examined the role of AI-assisted learning environments. The study reported that digital platforms and AI-based applications help students organize information and manage learning activities more effectively through digital storage, reminders, and automated suggestions.

A. Barcaui (2025) discussed how artificial intelligence tools influence knowledge retention and information management. The study suggested that while digital tools improve accessibility and efficiency, they may also encourage individuals to rely heavily on external systems for storing and retrieving information.

Overall, previous research indicates that the widespread availability of digital technologies and AI tools has significantly increased the tendency for cognitive offloading. However, there is still a need to examine how frequently young adults rely on these tools and how such reliance varies across different contexts such as work status, AI usage, and note-taking methods. The present study attempts to address this gap by examining cognitive offloading behavior among young adults.

## Methodology

**Research Design:** The present study adopted a descriptive research design to examine the level of cognitive offloading among young adults. This design was chosen because it allows the researcher to describe and analyze existing conditions without manipulating any variables. The study focuses on identifying differences in cognitive offloading based on selected demographic and behavioral variables.

**Population:** The population of the study consisted of young adults aged 18–25 years who are actively engaged with digital technologies such as smartphones, computers, online learning platforms, and artificial intelligence tools. These individuals represent a generation that frequently interacts with external cognitive aids in academic, professional, and everyday contexts.

**Sample and Sampling Techniques:** The study used a convenience sampling technique to select the participants. This method was used because the respondents were easily available in educational institutions and workplaces. The sample consisted of 125 young adults aged 18 to 25 years. The participants included both working and non-working individuals from different educational and occupational backgrounds.

## Variables of the Study

- **Independent Variable:** Working status, AI usage, and note-taking methods
- **Dependent Variable:** Cognitive offloading

## Tool Used

**Cognitive Offloading Questionnaire:** The Cognitive Offloading Questionnaire consists of 30 items divided into four dimensions, namely Memory Offloading (6 items),

Problem-Solving Offloading (6 items), AI Dependence (8 items), and Task Management Offloading (10 items).

**Validity of the Tool:** The research instruments were validated through expert review. Experts in the field of education and psychology examined the questionnaire and logical thinking test to ensure that the items were relevant, clear, and appropriate for measuring the intended constructs. Necessary modifications were made based on their suggestions to improve the quality of the instruments.

**Reliability of the Tool:** The reliability of the Cognitive Offloading Questionnaire was established using Cronbach's Alpha method. The reliability coefficient obtained was 0.932, which indicates a high level of internal consistency. This suggests that the items in the questionnaire reliably measure the concept of cognitive offloading.

**Data Collection Procedure:** Data were collected using self-administered questionnaires. Participants were informed about the purpose of the study and assured that their responses would remain confidential. Participation in the study was voluntary. The questionnaires were distributed through both online and offline modes. After collecting the responses, the data were coded and prepared for statistical analysis.

## Hypotheses

The following Null hypotheses were formulated for the study:

**HO<sub>1</sub>:** There is no significant difference in cognitive offloading with respect to working status among young adults.

**HO<sub>2</sub>:** There is no significant difference in cognitive offloading with respect to AI usage frequency among young adults.

**HO<sub>3</sub>:** There is no significant difference in cognitive offloading with respect to note-taking methods among young adults.

## Statistical used in the study

The collected data were analyzed using SPSS (Statistical Package for Social Sciences). The following statistical techniques were used:

Independent sample t-test was used to identify differences in cognitive offloading based on working status, AI usage frequency, and note-taking methods.

## Analysis

**Table 1:** Difference in Cognitive Offloading with Respect to Working Status

Working Status	N	Mean	SD	t-value	Significance
Working	58	89.07	17.94	2.0515	0.0423<0.05
Not Working	67	82.04	20.06		

Table 1 shows the difference in cognitive offloading scores between working and non-working young adults. The mean score of working participants (M = 89.07, SD = 17.94) is higher than that of non-working participants (M = 82.04, SD = 20.06).

The obtained t-value (2.0515) is statistically significant at the 0.05 level ( $p = 0.0423 < 0.05$ ). This indicates that there is a significant difference in cognitive offloading between the two groups.

Therefore, the null hypothesis HO<sub>1</sub> is rejected. The results suggest that working young adults tend to rely more on external digital tools and technologies for managing information and tasks compared to non-working individuals.

This may be due to the greater cognitive demands and responsibilities associated with work environments.

**Table 2:** Difference in Cognitive Offloading with Respect to AI Usage

AI Usage	N	Mean	SD	t value	Significance
Always	47	91.18	19.32	3.249	0.002 < 0.05
Sometimes	78	79.93	18.4		

Table 2 shows the difference in cognitive offloading scores based on the frequency of AI usage among participants. The mean score of participants who always use AI tools (M = 91.18, SD = 19.32) is higher than that of participants who sometimes use AI tools (M = 79.93, SD = 18.40).

The obtained t-value (t = 3.249) is statistically significant at the 0.05 level (p = 0.002 < 0.05). This indicates that there is a significant difference in cognitive offloading based on AI usage frequency.

Therefore, the null hypothesis HO<sub>2</sub> is rejected. The results suggest that individuals who frequently use AI tools tend to demonstrate higher levels of cognitive offloading compared to those who use AI tools less frequently. Frequent interaction with AI systems may encourage individuals to rely more on external digital technologies for managing information and cognitive tasks.

**Table 3:** Difference in Cognitive Offloading with Respect to Note-Taking Method

Note Taking Method	N	Mean	SD	t-value	Significance
Digital	33	91.21	17.16	2.955	0.004 < 0.05
Handwritten	92	79.90	19.43		

Table 3 shows the difference in cognitive offloading scores between participants who prefer digital note-taking and those who prefer handwritten note-taking methods. The mean score of participants who use digital note-taking (M = 91.21, SD = 17.16) is higher than that of those who prefer handwritten notes (M = 79.90, SD = 19.43).

The calculated t-value (t = 2.955) is statistically significant at the 0.05 level (p = 0.004 < 0.05). This indicates that there is a significant difference in cognitive offloading based on note-taking method.

Therefore, the null hypothesis HO<sub>3</sub> is rejected. The findings suggest that individuals who use digital note-taking methods tend to rely more on external digital tools for storing and retrieving information compared to those who prefer handwritten notes.

**Results**

The major findings of the study are summarized below:

- Working young adults showed significantly higher cognitive offloading compared to non-working individuals.
- Participants who frequently used AI tools exhibited higher cognitive offloading tendencies.
- Individuals who preferred digital note-taking methods showed greater cognitive offloading than those using handwritten notes.

These findings indicate that increased exposure to digital technologies encourages individuals to rely more on external tools for managing cognitive tasks.

**Educational Implications**

The findings of the study suggest that digital technologies play a significant role in shaping the cognitive habits of young adults. Educational institutions should create awareness about the responsible and balanced use of digital tools.

While AI technologies and digital platforms provide convenience and efficiency, it is important for individuals to develop effective strategies for managing information without excessive reliance on external systems.

Educators may encourage students to combine digital tools with traditional learning methods in order to maintain balanced cognitive engagement.

**Conclusion**

Artificial Intelligence and digital technologies have become essential components of everyday life for young adults. The present study examined the level of cognitive offloading among young adults and identified differences based on working status, AI usage frequency, and note-taking methods. The findings revealed that individuals who frequently use AI tools and digital note-taking methods tend to demonstrate higher levels of cognitive offloading. Similarly, working young adults showed greater reliance on external digital systems for managing information and tasks.

The study highlights the growing dependence on digital technologies for cognitive support and emphasizes the importance of understanding how such reliance shapes modern cognitive behavior.

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