**The Influence of Motivation to the Cognitive Abilities of Students in Using Generative Artificial Intelligence for Learning**

**ABSTRACT**

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| --- |
| This study explores the influence of motivation on the cognitive abilities of college students using Generative Artificial Intelligence (GenAI) for learning, focusing on students in the Municipality of Bansalan. The research employs a quantitative, descriptive correlational design, utilizing a survey administered via Google Forms to collect data on students' motivation and cognitive abilities related to GenAI use. Motivation is assessed through six factors: personal enjoyment, integration with learning identity, personal development goals, self-expectations, external motivators, and uncertainty about AI use. Cognitive abilities are measured in terms of focus and attention, processing and interaction skills, and memory and recall abilities. Stratified random sampling was used to ensure diverse representation from various colleges. Data analysis revealed a weak positive correlation (r = 0.387) between motivation and cognitive abilities, indicating that higher motivation levels tend to enhance cognitive performance. Additionally, linear regression analysis showed that self-expectations and uncertainty about AI use significantly influenced cognitive abilities, explaining 21.80% of the variance. The study highlights the importance of motivation in maximizing the cognitive benefits of GenAI, providing insights for educators to optimize AI integration in learning environments. |

**1. INTRODUCTION**

* 1. **Background of the Study**

         Education has seen remarkable technological advancements in recent years, with generative artificial intelligence (AI) emerging as a significant tool for learning. Generative AI, such as ChatGPT and similar platforms, offers students innovative ways to engage in problem-solving, improve their writing, and develop critical thinking skills. However, the extent to which motivation influences students' cognitive abilities when using such technology remains underexplored. In the study of Wang et al. (2024), it highlights the growing reliance on AI in education but suggests that motivation is a critical determinant of how students benefit cognitively from these tools. Understanding this dynamic can help educators design strategies to optimize AI integration into classrooms effectively.

    Globally, education has experienced significant advancements through the integration of generative artificial intelligence (AI) technologies. As stated by Shloul, et al. (2024), platforms such as ChatGPT and similar tools have revolutionized learning by providing students with innovative ways to solve problems, enhance communication, and develop critical thinking skills. These tools offer personalized and adaptive learning experiences that cater to diverse student needs in global countries such as South Korea, making them invaluable in international education systems. However, despite their widespread adoption, the role of student motivation in maximizing the cognitive benefits of generative AI remains underexplored. According to Zhai et al. (2024), while AI is transforming education globally, motivation plays a crucial role in determining how effectively students use these tools. Addressing this gap is essential to ensure that the global potential of generative AI is fully realized in education.

     Furthermore, in the Philippines, there is growing recognition of AI's potential to transform education, particularly in developing 21st-century skills. Reforms increasingly focus on integrating AI technologies into classrooms to improve student engagement and outcomes (Prestoza & Banatao, 2024). However, studies often overlook psychological factors like motivation, limiting understanding of how AI can effectively enhance cognitive abilities. In addition, Estrellad and Miranda (2023), emphasize the importance of motivation in meaningful learning, yet its role in AI use within the Philippine context remains underexplored. Addressing this gap is essential for creating equitable and effective educational opportunities.

     In the Davao Region, schools are starting to adopt generative AI to address learning challenges and enhance academic outcomes. However, as stated by Neji et al. (2023), the effectiveness of these tools is often limited by a lack of focus on student motivation. Educators report varying levels of success with AI tools, suggesting that motivation plays a key role in influencing student engagement and performance. Mallilin (2024), highlights that differences in outcomes may be linked to varying motivation levels among students. Addressing this issue can help educators and policymakers develop more effective AI adoption strategies tailored to the region's needs.

     In conclusion, this research highlights the crucial role of motivation in determining how effectively students utilize generative AI tools to enhance their cognitive abilities. While AI technologies have the potential to revolutionize education, the influence of motivation on their effectiveness remains underexplored. This study aims to fill this gap by examining how motivation impacts student engagement and cognitive outcomes when using AI tools for learning. By addressing this research gap, the study aims to provide insights that can help educators and policymakers optimize AI integration and improve learning experiences.

**Theoretical framework**

     This theoretical framework explores the transformative role of Generative AI (GenAI) in education, grounded in Constructivism, Sociocultural Theory, and the Technological Acceptance Model (TAM). GenAI supports active knowledge construction, personalized learning, and collaboration, aligning with constructivist and sociocultural principles. TAM provides insights into factors influencing GenAI adoption, such as perceived usefulness and ease of use.

    Bahroun et al. (2023) reinforce this framework by examining GenAI's real-world applications in education, highlighting its potential to reshape teaching and learning practices. Key considerations include ethical issues like academic integrity and responsible use, alongside the need for teacher training to enable effective GenAI integration. This framework offers a comprehensive lens to understand how GenAI is transforming learning, teaching, and the future of education.

**1.3 Conceptual Framework**

Motivation for using generative AI

Personal Enjoyment

Integration with Learning Identity

Personal Development Goals

Self-Expectations

External Motivators

Uncertainty about AI Us

Cognitive abilities in using generative AI

Focus and Attention

Processing and Interaction Skills

Memory and Recall Abilities

**Figure 1. Conceptual Framework of the study**

**Research Question**

    This research question aims to explore the influence of motivation on cognitive abilities among students using generative Artificial Intelligence for learning, specifically examining:

RQ1: What is the level of motivation for using generative AI in learning in terms of

1.1. Personal Enjoyment

1.2. Integration with Learning Identity

1.3. Personal Development Goals

1.4. Self-Expectations

1.5. External Motivators

1.6. Uncertainty about AI Us

RQ2: What is the level of cognitive abilities in using generative AI in terms of

 2.1. Focus and Attention

 2.2. Processing and Interaction Skills

    2.3. Memory and Recall Abilities

RQ3: Is there a significant relationship between the level of motivation and cognitive abilities in using generative AI for learning?

RQ4: What factors of motivation influence the cognitive abilities for using generative AI for learning?

* 1. **Null Hypothesis**

     The researcher formulated the null hypotheses in accordance with the study objectives.

Ho1: There is no significant correlation between motivation levels and cognitive abilities in the students using generative Artificial Intelligence for learning.

**2. methodology**

**2.1 Research Design**

    The researchers will adopt a quantitative research design to explore the influence of motivation on the cognitive abilities of students using Generative Artificial Intelligence (GenAI) for learning in higher education. This study will use a descriptive correlational design, which involves systematically collecting numerical data to measure the relationship between students' motivations for using GenAI and its impact on their cognitive abilities in learning.

**2.2 Research Locale**

    This study is conducted at a college institute located within the Municipality of Bansalan. This location was chosen to ensure a representative sample of college students, who are frequent users of Generative Artificial Intelligence (GAI) as a learning technology. By conducting the research within this college institute, we, the researchers, aim to create a natural setting to observe and assess student perceptions and the impact of GenAI on their learning experiences. This quantitative approach allows us to systematically collect and analyze numerical data to better understand the relationship between student perceptions of GenAI and its influence on learning outcomes, providing valuable insights into how GenAI is shaping education in the local community.

**2.3 Participants of the Study**

    The participants of this study are college students residing in the Municipality of Bansalan. We will select students from various colleges within Bansalan to ensure diverse representation. Stratified random sampling will be used, where students will be grouped based on their college, and then randomly selected from each group. This method ensures that we include students from different backgrounds, providing a comprehensive understanding of how college students in Bansalan perceive and use Generative Artificial Intelligence (GenAI) as a learning technology. To determine the appropriate sample size, we will consider the total number of college students in Bansalan, with colleges having more students contributing a larger number to the study. This approach will ensure that the results accurately reflect the views of students from various colleges in Bansalan regarding the impact of GAI on their learning experiences.

**2.4 Sampling Techniques**

    In this research, we will use stratified random sampling to ensure that we accurately represent the diverse groups within the college student population in the Municipality of Bansalan. By organizing the population into distinct subgroups based on specific characteristics (such as college, year level, or field of study), we will randomly select participants from each subgroup. This method will allow us to gather detailed information across various demographic categories, thus enhancing the reliability and representativeness of our results. Additionally, we will follow the approach used by Doc. Buladaco in his study, selecting 206 respondents. This strategy will help us account for different segments of the population, each with unique perceptions and experiences regarding the use of Generative Artificial Intelligence (GenAI) as a learning technology, as well as varying levels of awareness about its impact on learning.

**2.5 Data Collection Procedure**

    The participants of this study are college students residing in the Municipality of Bansalan. We will select students from various colleges within Bansalan to ensure diverse representation. Stratified random sampling will be used, where students will be grouped based on their college, and then randomly selected from each group. This method ensures that we include students from different backgrounds, providing a comprehensive understanding of how college students in Bansalan perceive and experience Generative Artificial Intelligence (GenAI) as a learning technology. To determine the appropriate sample size, we will consider the total number of college students in Bansalan, with colleges having larger student populations contributing a greater number to the study. This approach will ensure that the results accurately reflect the views of students from various colleges in Bansalan regarding the impact of GenAI on their learning outcomes.

**2.6  Data Collection Procedure**

    In this study, we will use an online platform, specifically Google Forms, to collect data on the influence of motivation on the cognitive abilities of students using Generative Artificial Intelligence (GenAI) for learning in higher education. Participants will be invited to complete the survey, with only those selected from the Municipality of Bansalan taking part. Google Forms offers an accessible and efficient way to distribute surveys and collect responses, ensuring a smooth data collection process. The responses will be securely and confidentially stored, and will be used exclusively for academic purposes, providing valuable insights into how students perceive and experience GAI in their learning environment.

.**2.7 Ethical Considerations**

   Instructions: The following statements/situations will measure your level of Facebook Use and Engagement of the Students. Please enter your truthful responses in the area next to the question. Please select the corresponding scale that best fits your answer.

**5 – Strongly Agree    4 - Agree   3 - Neutral    2 - Disagree   1 – Strongly Disagree**

**Part 1: Level of Motivation for Using Generative Artificial Intelligence in Learning**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. **Personal Enjoyment** | **5** | **4** | **3** | **2** | **1** |
|  |  |  |  |  |  |
| 1. I find it stimulating to learn with generative AI |  |  |  |  |  |
| 2. I enjoy experimenting with new AI tools and features in my studies |  |  |  |  |  |
| 3. I feel a sense of accomplishment when I effectively use AI for learning |  |  |  |  |  |
| B.   Integration with Learning Identity | **5** | **4** | **3** | **2** | **1** |
| 4. Using generative AI feels like an extension of my personal learning style |  |  |  |  |  |
| 5. Generative AI has become an essential part of my academic life |  |  |  |  |  |
| 6 It aligns with my values to use generative AI in my studies |  |  |  |  |  |
| **C.    Personal Development Goals** | **5** | **4** | **3** | **2** | **1** |
| 7 Generative AI helps me develop important personal skills |  |  |  |  |  |
| 8. Using AI allows me to build social and intellectual abilities useful to me |  |  |  |  |  |
| 9. Generative AI has personal significance in my learning journey |  |  |  |  |  |
| **D.      Self-Expectations** | **5** | **4** | **3** | **2** | **1** |
| 10. I feel I need to use AI regularly to keep up academically |  |  |  |  |  |
| 11. I use AI tools to feel good about my learning progress |  |  |  |  |  |
| 12. I would feel unprepared if I didn’t use AI in my studies |  |  |  |  |  |
| **E.   External Motivators** | **5** | **4** | **3** | **2** | **1** |
| 13. To access advanced resources and exclusive AI-driven content |  |  |  |  |  |
| 14. For the prestige of being a skilled AI user |  |  |  |  |  |
| 15. To achieve higher grades or skill levels with AI support |  |  |  |  |  |
| **F.      Uncertainty about AI Use** | **5** | **4** | **3** | **2** | **1** |
| 16. I sometimes question the benefit of using AI in my studies |  |  |  |  |  |
| 17. I used to see value, but now I wonder if AI is still beneficial |  |  |  |  |  |
| 18. I feel I might be wasting time with AI in my education |  |  |  |  |  |
| **Part 2: Level of Cognitive Abilities in       Using Generative AI for Learning** |  |  |  |  |  |
| 1. **Focus and Attention** | **5** | **4** | **3** | **2** | **1** |
| 1. I find it hard to maintain concentration when using generative AI |  |  |  |  |  |
| 2. I tend to lose focus while engaging with AI tools for learning |  |  |  |  |  |
| 3. I have difficulty handling multiple tasks when AI is involved |  |  |  |  |  |
| 4. My mental focus wanes when using AI for complex tasks |  |  |  |  |  |
| 5. I occasionally forget specific terms or concepts with AI |  |  |  |  |  |
| 6. I am absent-minded during cognitive tasks involving AI |  |  |  |  |  |
| 7. I struggle to stay focused when reading AI-generated materials. |  |  |  |  |  |
| B.   Processing and Interaction Skills | **5** | **4** | **3** | **2** | **1** |
| 8. I face challenges coordinating tasks when working with AI |  |  |  |  |  |
| 9. I find myself responding slowly to AI interactions |  |  |  |  |  |
| 10. Organizing my tasks feels more complex with AI involvement |  |  |  |  |  |
| 11. I struggle to articulate ideas clearly when using AI |  |  |  |  |  |
| 12. I tend to use more general terms rather than specific words with AI. |  |  |  |  |  |
|  |  |  |  |  |  |
| **C.    Memory and Recall Abilities** | **5** | **4** | **3** | **2** | **1** |
| 13. I have difficulty recalling recent information learned through AI |  |  |  |  |  |
| 14. I struggle to remember previous concepts while using AI |  |  |  |  |  |
| 15. I find it challenging to recall past learning experiences with AI |  |  |  |  |  |
| 16. I often forget details soon after AI-based study sessions |  |  |  |  |  |
| 17. I experience spatial disorientation when working with AI tools |  |  |  |  |  |
| 18. I struggle with time management during extended AI study periods. |  |  |  |  |  |

**2.8 Ethical Considerations**

    To follow ethical guidelines in this study, we will first seek permission from the relevant authorities before starting the research. Once approval is granted, we will share the survey with participants via a Google Forms link. To respect their class schedules and minimize disruptions, we will ask participants to complete the survey during their free time. This approach ensures their convenience and protects their rights throughout the study.The discussion should not repeat the results, but provide detailed interpretation of data. This should interpret the significance of the findings of the work. Citations should be given in support of the findings. The results and discussion part can also be described as separate, if appropriate.

**3. RESULTS AND DISCUSSIONS**

**Table 1. Level of Motivation for Using Generative Artificial Intelligence in Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Adoption of AI Technology** | **n** | **SD** | **Descriptive Equivalent** |
| Personal Enjoyment | 3.74 | 0.720 | Agree |
| Integration with Learning Identity | 3.54 | 0.715 | Agree |
| Personal Development Goals | 3.46 | 0.705 | Agree |
| Self-Expectations | 3.40 | 0.688 | Agree |
| External Motivators | 3.38 | 0.662 | Agree |
| Uncertainty about AI Use | 3.38 | 0.636 | Agree |
| Overall | 3.49 | 0.573 | Agree |

     Table 1 shows the level of motivation for using generative artificial intelligence (AI) in learning, with all factors receiving a descriptive equivalent of "Agree." Among the factors, Personal Enjoyment scored the highest (M = 3.74, SD = 0.720), indicating that students generally enjoy using AI in their learning process. This is followed by Integration with Learning Identity (M = 3.54, SD = 0.715), showing that students perceive AI as aligning well with their academic goals and identity. Personal Development Goals (M = 3.46, SD = 0.705) and Self-Expectations (M = 3.40, SD = 0.688) also reflect a positive attitude, suggesting that students see AI as a tool for achieving personal growth and meeting their own standards. Similarly, External Motivators (M = 3.38, SD = 0.662) and Uncertainty about AI Use (M = 3.38, SD = 0.636) received equal mean scores, indicating moderate agreement regarding external influences and initial hesitations about AI. Overall, the average score of 3.49 (SD = 0.573) highlights a generally positive outlook on using generative AI in learning.

**Table 2. Level of Cognitive Abilities in Using Generative AI for Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem Solving Skills** | **n** | **SD** | **Descriptive Equivalent** |
| Focus and Attention | 3.15 | 0.530 | Neutral |
| Processing and Interaction Skills | 3.08 | 0.562 | Neutral |
| Memory and Recall Abilities | 3.08 | 0.549 | Neutral |
| Overall | 3.10 | 0.455 | Neutral |

Table 2 presented the level of cognitive abilities in using generative AI for learning, with all factors receiving a descriptive equivalent of "neutral." Focus and attention scored the highest among the factors (M = 3.15, SD = 0.530), indicating that students have a moderate ability to concentrate when using AI tools. Processing and Interaction Skills and Memory and Recall Abilities both scored equally (M = 3.08), with standard deviations of 0.562 and 0.549, respectively, reflecting a neutral stance on their ability to process information, interact effectively, and recall knowledge with the aid of AI. The overall mean score of 3.10 (SD = 0.455) suggested that students perceive their cognitive abilities as neither highly effective nor inadequate, indicating room for improvement in leveraging AI for learning purposes.

Table 3 : Shows the correlation between Motivation of Using Generative Artificial Intelligence for Learning and the Cognitive Abilities.

|  |  |  |
| --- | --- | --- |
|  | **Level of Cognitive Abilities** | **Decision** |
| Motivation of Using Generative Artificial Intelligence for Learning | 0.387  (.001) | Reject Ho |

    Table 3 shows the correlation between Motivation of Using Generative Artificial Intelligence for Learning and the Cognitive Abilities. Pearson-r was utilized to investigate if Motivation of Using Generative Artificial Intelligence for Learning significantly correlated with the level of Cognitive Abilities. Result reveals that there is a weak positive monotonic correlation between Motivation of Using Generative Artificial Intelligence for Learning and the Cognitive Abilities (r=0.387, n=206, p=< .001). Statistically, this implies that when the level of motivation in using generative Artificial Intelligence for learning increases, the level of cognitive abilities of the students will not decrease but there is a possibility that it will increase.

| **Table 4. Significant Influence of Motivation for Using Generative Artificial Intelligence for Learning in the Cognitive Abilities** | | | | | | | | | |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Predictor** | | **Estimate** | | **SE** | | **t** | | **p** | | **Decision** |
| Intercept |  | 1.8294 |  | 0.1836 |  | 9.964 |  | < .001 |  |  |
| Personal Enjoyment |  | 0.0736 |  | 0.0588 |  | 1.251 |  | 0.212 |  | Reject Ho |
| Integration with Learning Identity |  | 0.0191 |  | 0.0710 |  | 0.269 |  | 0.788 |  | Reject Ho |
| Personal Development Goals |  | -0.0396 |  | 0.0755 |  | -0.525 |  | 0.600 |  | Reject Ho |
| Self-expectations |  | 0.1722 |  | 0.0623 |  | 2.763 |  | 0.006 |  | Accept Ho |
| External Motivators |  | -0.1297 |  | 0.0839 |  | -1.545 |  | 0.124 |  | Reject Ho |
| Uncertainty about AI Use |  | 0.2723 |  | 0.0631 |  | 4.315 |  | < .001 |  | Accept Ho |
| R= 0.467, R2= 0.218, F= 9.25, *p= <.001* | | | | | | | | | |  |

    Table 4 show the significant influence of the adoption of Motivation for Using Generative Artificial Intelligence for Learning in the Cognitive Abilities. To investigate the significant influence, the research utilized linear regression. As shown in the table, among the indicators of motivation, only self-expectations and uncertainty about AI use made a unique significant contribution to the model and influence on the cognitive abilities of the students in using generative Artificial Intelligence for learning with a p value of .006, and <0.001 respectively. It revealed further that only 21.80% of the indicators of motivation significantly influenced cognitive abilities which means that 79.20% is not part of the study under investigation.

**Scatter Plot**A graph on a black background

Description automatically generated

|  |
| --- |
|  |

**Picture 1:** **Level of motivation and cognitive abilities**

**List 1: Outcome of Descriptive Study**

|  | | | | | |
| --- | --- | --- | --- | --- | --- |
|  | | **Mean** | | **SD** | |
| PE1 |  | 3.81 |  | 0.890 |  |
| PE2 |  | 3.78 |  | 0.814 |  |
| PE3 |  | 3.64 |  | 0.904 |  |
| IWLI1 |  | 3.54 |  | 0.859 |  |
| IWL2 |  | 3.60 |  | 0.825 |  |
| IWL3 |  | 3.49 |  | 0.876 |  |
| PDG1 |  | 3.39 |  | 0.847 |  |
| PDG2 |  | 3.51 |  | 0.813 |  |
| PDG3 |  | 3.48 |  | 0.865 |  |
| SE1 |  | 3.42 |  | 0.827 |  |
| SE2 |  | 3.47 |  | 0.824 |  |
| SE3 |  | 3.32 |  | 0.816 |  |
| EM1 |  | 3.42 |  | 0.803 |  |
| EM2 |  | 3.33 |  | 0.794 |  |
| EM3 |  | 3.39 |  | 0.859 |  |
| UAU1 |  | 3.38 |  | 0.840 |  |
| UAU2 |  | 3.43 |  | 0.741 |  |
| UAU3 |  | 3.33 |  | 0.808 |  |
| FA1 |  | 3.27 |  | 0.753 |  |
| FA2 |  | 3.34 |  | 0.728 |  |
| FA3 |  | 3.14 |  | 0.815 |  |
| FA4 |  | 3.17 |  | 0.773 |  |
| FA5 |  | 3.05 |  | 0.727 |  |
| FA6 |  | 3.07 |  | 0.787 |  |
| FA7 |  | 3.04 |  | 0.751 |  |
| PIS1 |  | 3.07 |  | 0.749 |  |
| PIS2 |  | 3.16 |  | 0.723 |  |
| PIS3 |  | 3.01 |  | 0.739 |  |
| PIS4 |  | 3.04 |  | 0.767 |  |
| PIS5 |  | 3.10 |  | 0.787 |  |
| MRA1 |  | 3.07 |  | 0.768 |  |
| MRA2 |  | 3.10 |  | 0.729 |  |
| MRA3 |  | 3.10 |  | 0.821 |  |
| MRA4 |  | 3.09 |  | 0.747 |  |
| MRA5 |  | 3.09 |  | 0.760 |  |
|  |  |  |  |  |  |
| MRA6 |  | 3.06 |  | 0.803 |  |
| Personal Enjoyment |  | 3.74 |  | 0.720 |  |
| Integration with Learning Identity |  | 3.54 |  | 0.715 |  |
| Personal Development Goals |  | 3.46 |  | 0.705 |  |
| Self-expectations |  | 3.40 |  | 0.688 |  |
| External Motivators |  | 3.38 |  | 0.662 |  |
| Uncertainty about AI Use |  | 3.38 |  | 0.636 |  |
| Focus and Attention |  | 3.15 |  | 0.530 |  |
| Processing and Interaction Skills |  | 3.08 |  | 0.562 |  |
| Memory and Recall Abilities |  | 3.08 |  | 0.549 |  |
| Level of Motivation |  | 3.49 |  | 0.573 |  |
| Level of Cognitive Abilities |  | 3.10 |  | 0.455 |  |
| The table presented descriptive statistics, including the mean and standard deviation (SD), for various constructs and their corresponding items, likely based on a survey or study. Among the constructs, Personal Enjoyment recorded the highest mean score (3.74), with individual items like PE1 (3.81) and PE2 (3.78) reflecting participants’ generally positive perceptions. On the other hand, constructs such as Focus and Attention (FA) and Processing and Interaction Skills (PIS) showed lower mean scores, with the lowest being FA7 (3.04), indicating these areas might be more challenging for respondents. Regarding variability, constructs like Focus and Attention had low SD values (e.g., 0.530), suggesting consistent responses, whereas items such as PE3 (SD = 0.904) demonstrated higher variability, indicating diverse participant perspectives on enjoyment-related items. Overall, the results highlight areas of strength and those requiring further exploration. | | | | | |

**4. CONCLUSIONS AND RECOMMENDATIONS**

**4.1 Conclusions**

The results of the study led the researcher to include the following:

1.  The level of motivation for using generative Artificial Intelligence (AI) in learning was generally positive, with students agreeing on all motivational factors. Personal Enjoyment ranked the highest, indicating that students find AI tools enjoyable and perceive them as supportive of their learning journey. This is followed by Integration with Learning Identity and Personal Development Goals, highlighting the alignment of AI tools with academic objectives and personal growth.

2. The level of cognitive abilities in using generative AI for learning was rated as neutral. Students demonstrated moderate capabilities in terms of Focus and Attention, Processing and Interaction Skills, and Memory and Recall Abilities, suggesting that while AI tools offer cognitive support, there is still room for improvement in maximizing their potential for cognitive development.

3. There is no significant relationship between the level of motivation and cognitive abilities in using generative AI for learning.

4. None of the factors of motivation significantly influence cognitive abilities in using generative AI for learning.

**4.2 Recommendations**

     Based on the results and conclusions of the study, the following recommendations are suggested:

1. Encourage the Continued Use of Generative AI Tools: Since students showed high motivation,            especially from personal enjoyment and alignment with academic goals, it is recommended to further integrate AI tools into learning environments to enhance student engagement and performance.

2. Enhance Training Programs for Cognitive Skill Development: Given the neutral rating of cognitive abilities, it is recommended to offer targeted training programs to improve skills like focus, memory, and processing when using AI tools, maximizing their cognitive benefits.

3. Explore Additional Support Mechanisms: Since there was no significant relationship between motivation and cognitive abilities, further exploration of external factors, such as instructional support or customization of AI tools, is suggested to help students use AI more effectively.

4. Further Research on Factors Influencing Cognitive Abilities: Future studies should investigate other factors, like environmental or instructional influences, that may affect cognitive abilities when using AI, to improve both motivation and cognitive development.

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