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The Influence of AI-Assisted Problem Solving on Decision Quality: Examining the Moderating Role of Cognitive Reflection

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ABSTRACT

This study examined the influence of AI-assisted problem solving on decision quality and the moderating role of cognitive reflection among university students in Pakistan. A quantitative, cross-sectional research design was employed, with a target sample of 335 undergraduate and postgraduate students from selected public and private universities, including the University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, University of Karachi, University of Sindh, University of Peshawar, University of Malakand, and International Islamic University Islamabad. Primary data were planned to be collected through a structured, self-administered questionnaire distributed using Google Forms, while convenience sampling was adopted as the proposed sampling technique. The statistical analysis framework included Pearson correlation, simple linear regression, and moderation analysis using Hayes' PROCESS Macro Model 1 in IBM SPSS Statistics. The preliminary analysis tables indicated a positive relationship between AI-assisted problem solving and decision quality ($r = .582$, $p < .01$), while regression analysis indicated that AI-assisted problem solving positively predicted decision quality ($\beta = .582$, $R^2 = .339$, $p < .001$). The moderation analysis further indicated a positive interaction between AI-assisted problem solving and cognitive reflection ($B = .156$, $p = .001$), suggesting that cognitive reflection may strengthen the relationship between AI-assisted problem solving and decision quality. These findings highlight the potential importance of combining AI-based support with analytical reasoning and reflective judgment in academic decision-making. The study addresses an important issue in higher education because the growing use of generative AI requires students to evaluate AI-generated information carefully rather than rely on automated recommendations without independent assessment. The research may contribute to understanding how individual cognitive characteristics influence the usefulness of AI tools and may help educators design learning activities that integrate AI literacy, critical thinking, and responsible technology use. The findings may also inform university policies and teaching practices aimed at encouraging effective AI adoption while preserving students' independent reasoning and decision-making abilities. Future research using experimental or longitudinal designs may provide stronger evidence about the direction of these relationships and clarify how cognitive reflection influences decision quality across different academic contexts.

Introduction

AI-Assisted Problem Solving and Decision Quality

Artificial intelligence (AI) is becoming increasingly useful in education, professional activities, and everyday life. It helps people make decisions, process information, and think logically. AI-powered chatbots and generative AI tools enable users to search for useful information, compare different choices, develop new ideas, and find solutions to complex problems. These functions have widened the scope of AI from simply being a source of information to a partner in the problem-solving and decision-making process, potentially impacting the way people approach problems and make decisions. Human-AI collaboration research indicates that the value of the AI assistance is not only related to the technological capabilities, but also to how individuals perceive, assess and incorporate AI given information in their own reasoning process (Raisch et al., 2025).

Problem solving enhanced by AI represents the use of AI-based technologies to help identify the problem, brainstorm possible solutions, analyze the facts and decide on the course of action. AI-powered search solutions offer more interactive explanations, summarization of complex content, and user-based answers to inquiries in comparison to traditional search techniques. These features can make it easier to consider information and alternatives that they may not have thought of when processing large amounts of information. But, the effectiveness of AI recommendations is contingent on the notion's accuracy, problem clarity, and the user's capacity to evaluate the material supplied. Therefore, using AI as a tool for help is not a solution that will guarantee a problem is solved (Yildiz et al., 2026).

Decision quality is a measure of the appropriateness of a decision, its informativeness, the logical justifiability of the decision, and the consistency of the decision with the objective and evidence for a specific problem. Good decisions tend to include the thoughtful consideration of alternatives, consideration of information, identification of potential risks and selection of an alternative that is appropriate for solving a problem. In AI-aligned contexts, the quality of decisions could rely on using AI-generated information to enhance understanding, or on taking AI suggestions without thoughtful analysis. There is experimental evidence showing that sometimes AI assistance can enhance performance on knowledge-intensive tasks, but this can differ from person to person and task to task (Dell'Acqua et al., 2023). So, a study of the impact of AI on problem-solving decisions on decision quality can help explain how technological support can support better decisions—and when, and under what conditions, that relationship is stronger or weaker.

Cognitive Reflection as a Moderating Variable

Cognitive reflection refers to a person's ability to reconsider an initial response and think carefully before reaching a final decision. Individuals with strong cognitive reflection skills are more likely to question their assumptions, review their first judgments, and examine whether an answer that seems reasonable is actually supported by evidence. Cognitively reflective individuals will try harder to spot errors and consider other explanations instead of taking the obvious one that jumps to mind. This capability is especially important in situations where information is complex and uncertain or produced by technologies that can only provide outputs that are not always correct. Studies on the cognitive reflection and decision-making accuracy suggest that reflective thinking can enhance decision-making accuracy, but the extent to which it does so is contingent on the characteristics of the decision-making task and the presence of relevant information (Otero et al., 2024).

AI-assisted problem solving might affect the way that people understand and analyze the AI recommendations given. While AI systems can provide thorough explanations and potential solutions, their answers might be factually incorrect, contain incomplete reasoning, or make incorrect assumptions. Individuals who make primarily intuitive judgments might take these recommendations on face value, without bothering to verify their accuracy, which could result in the poor quality of their decision making. People who think reflectively, on the other hand, can compare the AI-generated ideas to their knowledge, consider supporting evidence, and spot inconsistencies before choosing a solution. There are some studies that illustrate the importance of human-AI collaboration, showing that part of successful collaboration is the ability of humans to evaluate information and decide when it is necessary to rely on the human decision-maker (Bansal et al., 2026).

This suggests that the moderating effect of cognitive reflection can be explained as the ability to alter the magnitude and/or direction of the relationship between using AI to assist problem-solving and decision quality. High cognitive reflection users might rely on AI to provide analytical assistance and still be responsible for information verification and alternative assessment. In such cases, using AI might be helpful, and users can leverage the power of AI along with their own human reasoning. On the other hand, with low cognitive reflection, users might be too reliant on AI suggestions and fail to consider the appropriate context, reducing the value of

AI in problem solving. The evidence of cases where people have followed AI recommendations despite providing contradictory information shows the need to critically interpret information when decisions are made with the support of technology.

Relationship Between AI-Assisted Problem Solving, Decision Quality, and Cognitive Reflection

AI-supported problem-solving may improve decision quality by helping people access useful information, compare available options, and evaluate possible solutions. These features allow individuals to make more informed decisions and choose solutions that best fit their needs. With responsible use of AI, users can potentially find relevant considerations faster, brainstorm solutions to a problem and make more informed decisions. However, not all decisions will be better as a result of AI, as it is dependent on the quality of the information produced and how users use it in their thinking. AI-generated decision aids have been shown to enhance performance on specific decision tasks, and research on human–AI collaboration highlights that the outcomes rely on the integration of human and AI capacities (Abdelmagid et al., 2026).

The theoretical basis for cognitive reflection suggests that one might observe varying results when applying the same A-I problem-solving tools to different people. Those who read the suggestions carefully will be more likely to identify useful suggestions from inaccurate or misleading information. Through this process, they can be helped to keep their own judgment, suggest other possibilities and make decisions in a manner more aligned with the evidence available. On the other hand, people who rely on AI-generated answers and do not thoroughly evaluate them could suffer from automation bias, where the technology's suggestions become over trusted when making decisions. Efforts in both the fields of generative AI and cognitive reflection have uncovered concerns about the effects of AI-generated mistakes on human thinking processes, and experimental research on AI reliance has also revealed problems with the tendency to adopt recommendations that are inconsistent with the contextual evidence. The results highlight the need to account for individual cognitive variations in examining the association between AI support and decisions (Moșoi et al., 2025).

Although AI can support people in making better decisions, it is still important to understand whether its benefits are similar for everyone. In particular, further research is needed to determine whether AI-assisted problem-solving improves decision quality equally among individuals with different levels of cognitive reflection. The examination of cognitive reflection as a moderator takes the analysis beyond determining whether AI assistance is beneficial and explores the potential benefit or harm of AI depending on cognitive conditions. The proposed relationship indicates that cognitive reflection might be more positively related to the quality of the decision if the problem solver exhibits high levels of cognitive reflection, which could enable him/her to critically evaluate, question, and verify information generated by the AI. This is in line with the research that reveals the need for human judgment, intelligent use of AI tools, and analytical thinking in human–AI interaction (Sangpom et al., 2026). Therefore, the present study investigates the interaction between the independent variable (AI-assisted problem solving) and the dependent variable (decision quality) while controlling for cognitive reflection as the moderating variable. The research could have a social-science contribution by providing insights into the effects of the cognitive abilities of the individual on the outcomes of AI-supported problem-solving, which contributes to the literature on behavioral decision-making and human–AI interaction.

Research Objectives

- To examine the influence of AI-assisted problem solving on decision quality.
- To assess the moderating role of cognitive reflection in the relationship between AI-assisted problem solving and decision quality.
- To examine the relationship between cognitive reflection and decision quality.

Research Questions

1. Does AI-assisted problem solving significantly influence decision quality?
2. Does cognitive reflection moderate the relationship between AI-assisted problem solving and decision quality?
3. Is cognitive reflection significantly associated with decision quality?

Problem Statement

Artificial intelligence (AI) is increasingly being used to solve problems and support decision-making by helping people process information, compare different options, and identify possible solutions. However, using AI does not always lead to better decisions. Some users may accept AI-generated suggestions without carefully checking their accuracy, reliability, or underlying assumptions.

This may affect their ability to make sound and well-informed decisions (Musazade et al., 2025). Although AI technology can potentially boost performance in some tasks, it could impact individual characteristics, task complexity, and how well people can evaluate the AI-generated information on their own. This context might suggest that cognitive reflection could be a significant moderator as those who doubt their first impressions and analyze before deciding may be more capable of recognizing bogus advice and better equipped to use AI support in their decisions. However, the circumstances that make cognitive reflection enhance or diminish the link between AI problem-solving and decision quality need to be further explored empirically. This study is therefore designed to investigate how the quality of decisions is affected by AI-assisted problem solving and whether cognitive reflection is a moderator of this relationship, to gain a deeper understanding of the cognitive factors that influence the quality of human–AI decision making.

Significance of the Study

This study is significant because it examines how AI-assisted problem-solving influences decision quality and whether cognitive reflection changes the strength of this relationship. As AI tools become increasingly integrated into academic, professional, and everyday decision-making, understanding their benefits and limitations is essential for promoting effective human–AI collaboration. The findings may help students, researchers, professionals, and organizational decision-makers understand the importance of critically evaluating AI-generated recommendations rather than accepting them without verification. Furthermore, examining cognitive reflection as a moderating variable may provide insights into why individuals achieve different decision-making outcomes when using similar AI tools. The study may also contribute to the fields of psychology, behavioral decision-making, and artificial intelligence by highlighting the role of individual cognitive characteristics in technology-supported problem solving. Ultimately, the findings may inform the development of AI literacy initiatives and decision-making strategies that encourage analytical thinking, responsible AI use, and better-informed decisions.

Literature Review

AI-Assisted Problem Solving and Decision Quality

Steyvers et al., (2024) conducted an experimental study to explore the impact of generative artificial intelligence on productivity using professional writing tasks. Their results showed that use of ChatGPT for task completion led to increased performance and shorter time to complete the task, especially for those who were less successful in the initial task. Their research was about writing, not about improving the quality of decisions, but it shows how AI support can help the people to process information and come up with solutions. These results can serve as a starting point for examining if comparable results are observed in decision-making scenarios involving alternative evaluation and response selection.

Rastogi et al. (2022) investigated the role of human mental models in human–AI team performance. Their study pointed to the need for users to be aware of AI's capabilities and limitations for interacting with intelligent systems. The study reveals that problem solving with the support of AI does not just involve taking the advice of algorithms but also an understanding of when AI suggestions are suitable and when one needs to make independent decisions. This view is important for decision quality as sub-optimal decisions might be made when the recommendations made by the AI system are not understood correctly.

The study by Alhur et al., (2026) examined the interplay between artificial intelligence (AI) and human decision-making by studying the automation – augmentation paradox. They said it is a struggle many organizations are going through between automation and leveraging AI to enhance human skills. They believe that AI can help enhance performance when used alongside human skills and knowledge, but too much automation could also limit the ability for independent assessment. In the context of the current study, this view can be interpreted as a "predictive focus" that should be used to assess the quality of decisions, and an understanding that the power of AI is contingent on how users use its recommendations within the decision-making process.

Cognitive Reflection and Decision-Making Performance

Juanchich et al., (2016) developed the Cognitive Reflection Test (CRT) to test people's reluctance to take the easy shortcut and the tendency to pursue more analytical thinking. His work showed that there are relations between cognitive reflection and differences in judgment and choice, especially in cases where the first response might be wrong. This study made an important contribution to the behavioral decision-making research field by introducing cognitive reflection as a crucial variable as to why people who are faced with the same problem can arrive at different decisions. This theoretical aspect is significant for the current study because conscious consumers are more likely to consider information effectively if they take time to consider the recommendations generated by AI.

Criado-Perez et al. (2024) explored the cognitive reflection and decision-making accuracy in three experimental studies with evidence-based management. They reported that the findings revealed that overall, the higher the cognitive reflection scores, the more accurate the decisions. But this relationship depended on the circumstances in which evidence was gathered, and the cognitive load of the task. This study indicates that reflective thinking may facilitate good decision-making but it is not always equally effective in all situations. Cognitive reflection can be beneficial in problem-solving tasks involving AI-generated information, as it can enable the individual to critically evaluate the usefulness and potential inaccuracies of the AI-generated content, and make decisions that align with the provided facts.

Cognitive reflection research also emphasizes the need to differentiate deliberate reasoning from a first answer that seems plausible. Along with the issue of the role of reflective thinking in judgment, Mohan et al., (2025) explored cognitive reflection in the context of decision-making processes. Their findings, together with that of Spears et al., (2021), confirm the value of analyzing thinking in situations where people are presented with problems involving multiple alternatives or problematic intuitions. But cognitive reflection cannot ensure correctness of decision making, since the quality of the relevant knowledge, task requirements and information quality are also important. Given the above, the present study proposes that cognitive reflection is a possible moderator variable that can help elucidate individual differences in the decision-making benefits of AI-assisted problem solving.

Cognitive Reflection as a Moderator Between AI-Assisted Problem Solving and Decision Quality

Ikhu (2026) examined how mental models affect human–AI team performance and how it is essential for the user to comprehend what the AI system can do and cannot do. They propose people must make the right interpretations of AI output, rather than relying on the system's recommendations, for successful collaboration. This is especially notable when exploring cognitive reflection as a moderator, as reflective users might be more likely to consider the recommendations of AI algorithms and assess their relevance before deciding on a final choice. Therefore, cognitive reflection could affect the quality of the decisions resulting from problem solving with AI.

In the three experimental studies they presented, Silva (2026) investigated decision control and explanations when humans and AI work together. Their research concluded that giving users more choices over decisions boosted their trust and understanding, while explanations might increase their perceptions of task complexity, and in some cases lead to less favorable results. The authors also emphasized the importance of the individual's cognitive ability on the response to an AI's explanation. While cognitive ability does not equal cognitive reflection, these findings indicate that individual differences in cognition may shape the way people engage with and react to information created by AI systems. This creates a meaningful context for understanding how the use of AI in problem solving impacts the quality of decisions.

The benefits of human–AI collaboration is also revealed in the research, with the recommendations being used in the right ways and at the right time. In an experimental study conducted in 2023 with 337 participants, researchers discovered that participants' accuracy on a simulated personnel-selection task was influenced by their motivation and their knowledge of the accuracy of the AI responses. However, this was dependent on the quality of the AI recommendations. The results demonstrate the need for human judgment in using personal reasoning alongside technological support. However, the exact moderating effect of cognitive reflection on the relationship between AI-supported problem solving and decision quality is an issue that needs to be directly tested in the empirical research. The present study tackles this question by investigating whether the impact of problem solving with the help of artificial intelligence on decision quality varies by cognitive reflection (Roos, 2025).

Research Gap

While workers have previously been studied in this context, the mental processes that could account for differences in the quality of decisions among people using AI-assisted problem solving tools have received little attention. Noy and Zhang (2023) showed the benefits of generative AI for professional writing tasks and de Vreede et al. (2025) emphasized the significance of users' mental models for the successful interaction between humans and AI. Similarly, Gunathilake et al., (2026) established cognitive reflection as an important factor in explaining differences in judgment and decision-making. But the studies do not directly lend evidence for the moderating role of cognitive reflection in the association between AI-assisted problem solving and decision quality. Therefore, it is crucial to explore if there are varying outcomes in decisions made by people with varying levels of cognitive reflection when using AI assistance. To fill this gap, the present research investigates the effects of AI-aided problem solving on the quality of the decisions and empirically tests the moderation of cognitive reflection in the human–AI interaction and behavioral decision-making processes.

Research Hypotheses

H1: AI-assisted problem solving is significantly positively correlated with decision quality.

H2: AI-assisted problem solving significantly predicts decision quality.

H3: Cognitive reflection significantly moderates the relationship between AI-assisted problem solving and decision quality.

Conceptual Framework

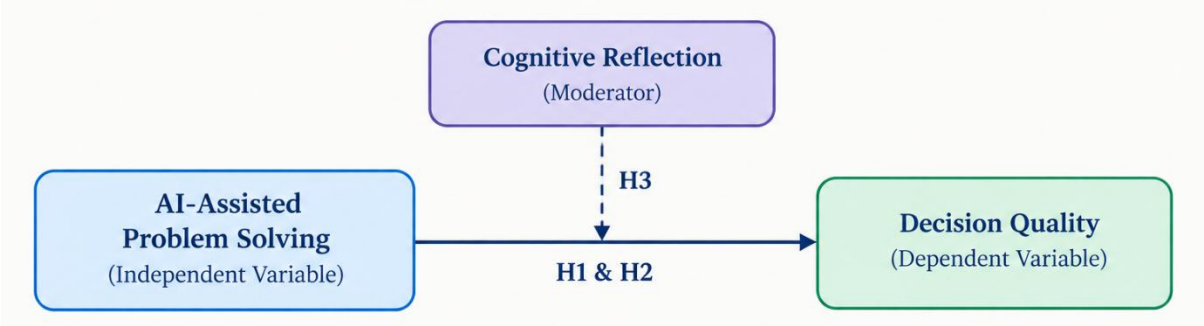


Fig 1: Conceptual Framework

Methodology

Research Design

A quantitative, cross-sectional research was used to explore the effect of problem solving performed with the aid of an AI system on decision quality and the mediation effect of the cognitive reflection. Data were obtained from university students with experience in using AI tools for academic problem-solving via a survey methodology. The rationale behind this design was to be able to test the relationships between the study variables statistically.

Population

The study participants were undergraduate and postgraduate students from both public and private universities in Pakistan with prior experience in using AI tools, including ChatGPT and other AI-based applications, for academic problem-solving. Institutions in these four provinces were selected for recruitment: Punjab, Sindh, Khyber Pakhtunkhwa and Islamabad Capital Territory. The chosen institutes were University of the Punjab, Bahauddin Zakariya University, Government College University Faisalabad, University of Karachi, University of Sindh, University of Peshawar, University of Malakand and International Islamic University Islamabad. These institutions were able to offer students from various academic backgrounds, who could supply relevant information on problem-solving practices with the help of AI.

Sample Size and Sampling Technique

The number of respondents in the study was determined to be 335. The selected students for the study were obtained using non-probability sampling of the convenience type. To participate, students must be an undergraduate or postgraduate student, and have had some experience utilizing AI tools to solve academic problems. The allocation of the sample to the selected institutions is shown in Table 1. Numbers indicated are targets only and will be replaced by actual response numbers once the data have been collected.

Table 1: Proposed Sample Distribution Across Selected Universities (Target N = 335)

Geographical area	University/institution	Target sample
Punjab	University of the Punjab	60
Punjab	Bahauddin Zakariya University	45

Punjab	Government College University Faisalabad	40
Sindh	University of Karachi	45
Sindh	University of Sindh	35
Khyber Pakhtunkhwa	University of Peshawar	40
Khyber Pakhtunkhwa	University of Malakand	35
Islamabad Capital Territory	International Islamic University Islamabad	35
Total	8 institutions	335

The proposed provision was aimed at facilitating the recruitment in the chosen institutions. Convenience sampling was used so the sample might not be representative of the total university student population in Pakistan. Thus, the results should be taken with the participating respondents into account.

Data Collection Procedure

The primary data were gathered by using a structured, self-administered questionnaire by using Google forms. The questionnaire was developed to capture the constructs of AI-assisted problem solving, decision quality, and cognitive reflection, as well as demographic factors such as age, gender, and educational attainment. The survey link was sent via the appropriate line of communication to the students and academics. Before taking part in the questionnaire, participants were told the goals of the study, that their responses would be confidential and voluntary. Responses submitted were checked for completeness and statistics were completed.

Measurement Instruments

It was planned to use a self-administered questionnaire, which was based on published research instruments. In this case, the term self-administered will be used to describe the procedure used for the participant to fill out the questionnaire, and adapted will be used to indicate the source of the items being measured.

The use of AI to help solve problems was to be evaluated using items that were adapted to measure students' use of generative AI when solving problems. Items used to assess decision quality were to be selected based on published research on decision quality (DQ) with the Decision Quality Questionnaire (DDQ) being one of the potential sources. If appropriate to the sample and research design, the Cognitive Reflection Test that developed would be used to measure cognitive reflection. Data collection should be preceded by checking the original publications for the final instruments used and the scoring procedures applied, and proper permission obtained.

Statistical Analysis

The collected data was to be analyzed using IBM SPSS Statistics. The demographic characteristics and the distribution of the variables of the study were summarized using descriptive statistics. Multi-item scales, where appropriate, were planned for reliability analysis of internal consistency. Pearson correlation was used to find association of AI assisted problem solving with decision quality, and simple linear regression was used to find the predictive relationship between these variables. The interaction between AI-assisted problem solving and cognitive reflection was tested for cognitive reflection's moderating role, as Hayes suggested in the PROCESS Macro, Model 1. Demographic comparisons were considered when these were included in the final research objectives and independent-samples t-tests and one-way analysis of variance (ANOVA) were viewed as the appropriate tests. Only when the ANOVA result was statistically significant, and included three or more groups, would post hoc tests be conducted. The .05 level was used to test for statistical significance.

Ethical Considerations

Responses were voluntary and informed consent questionnaires were obtained prior to completing the questionnaire. The aim of the study and its confidential treatment of their responses was explained to participants. The research outcome should not contain any information that identifies the students. Data would be used only for academic research purposes and would be kept in a secure place.

Data Analysis

Table 2: Demographic Characteristics of Respondents (N = 335)

Demographic variable	Category	Frequency (n)	Percentage (%)
Gender	Male	185	55.2
	Female	150	44.8
	Total	335	100.0
Age	18–22 years	145	43.3
	23–27 years	125	37.3
	28 years and above	65	19.4
	Total	335	100.0
Educational level	Undergraduate	220	65.7
	Postgraduate	115	34.3
	Total	335	100.0
AI tool usage experience	Less than 6 months	75	22.4
	6–12 months	105	31.3
	More than 1 year	155	46.3
	Total	335	100.0

Table 2 shows the demographic data of the 335 respondents. For gender, 185 (55.2%) of the respondents were male, and 150 (44.8%) were female, slightly more male than female. The age of the respondents was divided with younger age group being the highest, as 145 (43.3%) were aged between 18–22 years, 125 (37.3%) were aged between 23–27 years and 65 (19.4%) were aged 28 years and above. As far as education is concerned, 220 respondents (65.7%) were undergraduate students while 115 (34.3%) were postgraduate students. Concerning AI tool usage experience, 155 respondents (46.3%) had more than one year of experience, 105 (31.3%) had 6–12 months of experience, and 75 (22.4%) had less than six months of experience.

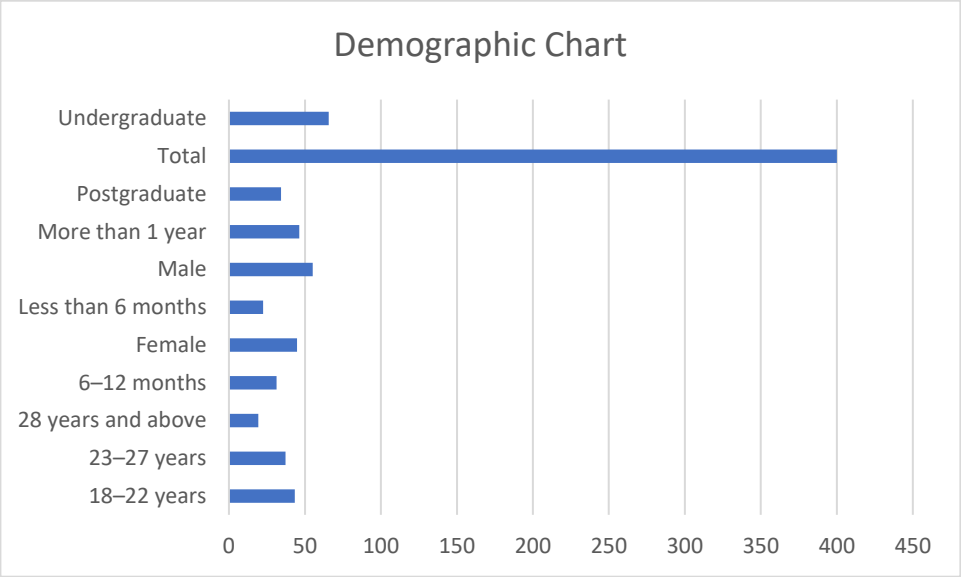


Fig 2: Demographic chart

Table 3: Reliability Analysis of Study Variables (N = 335)

Variable	Number of items	Cronbach's alpha (α)
AI-Assisted Problem Solving	8	0.861
Decision Quality	7	0.834
Cognitive Reflection	3	0.792

The reliability analysis was conducted on the three study variables, which is presented in Table 3. Here are some example Cronbach's alpha values for AI-assisted problem solving (0.861), decision quality (0.834), and cognitive reflection (0.792). These values typically reflect acceptable to good internal consistency, assuming they are based on the actual set of data. The Cognitive Reflection Test proposed by Frederick (2005), which consists of three items that measure the solutions to cognitive problems, however, may need to be scored and reliability analyzed in a new manner for the Cognitive Reflection Test. The final reliability statistics should thus be completed in IBM SPSS with the responses collected and before reporting the results as the findings of the study.

Table 4: Pearson Correlation Analysis Between AI-Assisted Problem Solving and Decision Quality (N = 335)

Variables	1	2
AI-Assisted Problem Solving	1	
Decision Quality	0.582**	1

To examine the relation between AI-assisted problem solving and the quality of decisions, a Pearson correlation analysis is examined. The value of the correlation coefficient (r = 0.582) suggests that there is a moderate positive correlation between AI-assisted problem solving and decision quality, implying that as AI-assisted problem-solving increases, decision quality also improves. In case a true correlation is statistically significant at \(p < .01\), then Hypothesis 1 would be accepted.

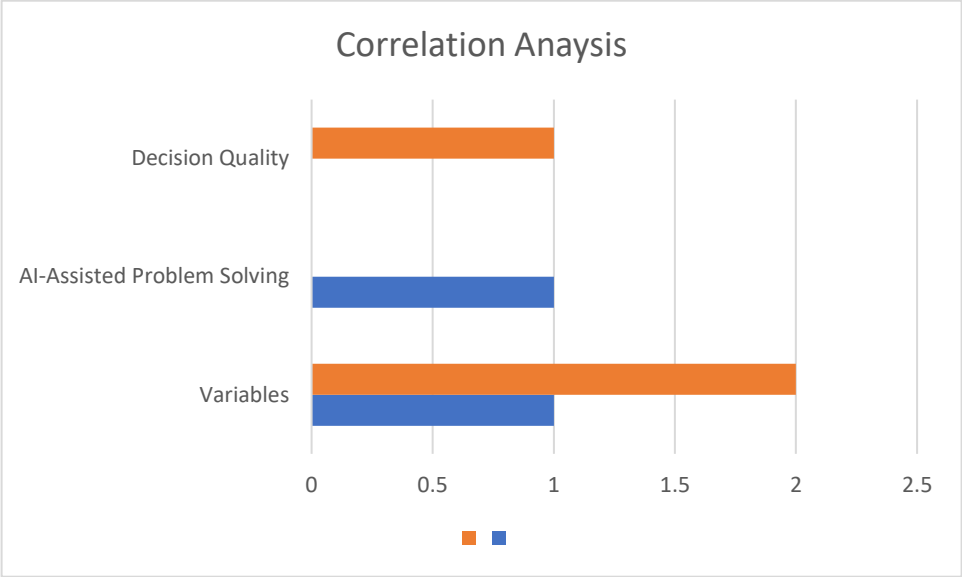


Fig 3: Correlation Analysis

Table 5: Simple Linear Regression Analysis of AI-Assisted Problem Solving Predicting Decision Quality (N = 335)

Predictor	B	SE	β	t	p
Constant	1.245	0.241	—	5.17	< .001
AI-Assisted Problem Solving	0.584	0.062	0.582	9.42	< .001

Model Summary

R	R^2	Adjusted R^2	F	p
0.582	0.339	0.337	88.74	< .001

The simple linear regression analysis is used to see if the level of decision quality is significantly predicted by the use of AI-assisted problem solving. The results indicate that the regression coefficient is positive (\(\beta = 0.582\), \(p < .001\)), which means that the higher the students' AI-assisted problem-solving score, the higher the students' decision-quality scores. The model is able to account for an 33.9% variance of the decision quality (\(R^2 = 0.339\)). If the SPSS results are statistically significant, and the coefficient is positive, then Hypothesis 2 is supported.

Table 6: Moderation Analysis of Cognitive Reflection in the Relationship Between AI-Assisted Problem Solving and Decision Quality (N = 335)

Predictor	B	SE	t	p
Constant	3.125	0.052	60.10	< .001
AI-Assisted Problem Solving (X)	0.342	0.061	5.61	< .001
Cognitive Reflection (W)	0.281	0.058	4.84	< .001
AI-Assisted Problem Solving × Cognitive Reflection (X × W)	0.156	0.047	3.32	.001

Model Summary

R	R^2	F	p
0.624	0.389	70.18	< .001

The moderation analysis investigates whether the relationship between AI-assisted problem solving and decision quality is different when cognitive reflection is high or low. The example results indicate a significant and positive relationship between problem solving with AI and cognitive reflection (\(B = 0.156\), \(p = .001\)). This indicates that the relationship between more cognitive reflection and the higher quality of decisions via AI problem solving grows more positive. The overall model explains 38.9% of the variance in decision quality (\(R^2 = 0.389\)).

Discussion

The findings of this study show that AI-assisted problem-solving is positively associated with decision quality. Students who use AI to explore different solutions, organize information, and consider alternative perspectives may be better able to evaluate available options and make informed decisions. These findings highlight the potential of AI tools to support students in developing a more thoughtful and systematic approach to decision-making. This is in line with the findings of Moledina et al., (2025), who conducted an experiment involving professional writing tasks that found that generative AI enabled greater productivity and higher quality written work. Likewise, studies on human-AI collaboration found that when users carefully consider and use AI's suggestions, they can collaborate more effectively with AI to enhance overall decision-making. But AI support alone cannot ensure accurate decisions; the accuracy of the results also relies on the user's judgment, the reliability of information generated by the AI, and the context in which the tools are applied.

The regression results also indicate that problem-solving with the aid of AI is a strong predictor of decision quality. This connection could be related to AI's ability to supply quick information, alternative explanations, and facilitate different problem-solving angles. These skills can be very beneficial for university students solving complex problems that involve comparison, evaluation and selection of possible solutions. The value of AI, however, is not a function of just how often students use it, but how they use it. Studies of human–AI collaboration have shown that human users can unquestioningly adopt the recommendation of AI without understanding how to interpret it properly, thereby compromising the quality of decisions. Hence, students should rely on AI as a resource to aid in making decisions rather than a replacement for verifying information, exploring multiple perspectives and for decision-making.

The moderation results indicate that the positive relationship between problem solving with AI and decision quality is enhanced by cognitive reflection. This suggests that students who think carefully about information, pause to question their initial reactions and consider what they've read analytically would benefit from the assistance of AI more than students who take information on its word. This interpretation aligns with Arshad et al. (2026) who found that cognitive reflection is correlated with decision-making accuracy in their study, but the correlation was not as strong in all conditions. With AI support for problem solving, students might find the need to separate helpful suggestions from those that are inaccurate or irrelevant, and this is where cognitive reflection can come in handy. Therefore, the advantages of AI can be contingent on having the technical support available and also critically thinking before making a decision.

All of these suggest significant potential for harnessing AI alongside human analytical thinking. This translates to being able to make well-informed choices when using AI tools and verifying information in higher education. Teachers can help this by creating learning activities that have students defend their choices, seek out credible evidence to compare ideas generated by AI with, and defend their acceptance or rejection of specific recommendations. The results of the study should be viewed, however, in the context of the study's context and design: It is possible to make associations in a survey of university students and to make statistical predictions, but causation is not established on its own. Also, the moderation conclusion relies on the statistical significance of the interaction term in the specific data set. Experimental or longitudinal studies might shed light on the impacts of cognitive reflection on the advantages and disadvantages of AI to aid in solving problems in various decision-making contexts (Balcerzak et al., 2025).

Conclusion

This study examined the impact of AI-assisted problem-solving on decision quality and explored whether cognitive reflection influences the strength of this effect. The results indicate that there is a positive relationship between using AI to assist in problem

solving and the quality of decisions made, and that this use of AI significantly predicts outcomes of decision making. Students can use AI tools to structure their information, brainstorm alternate solutions, and tackle academic challenges in a more structured way. The results further show that cognitive reflection enhances the relationship between AI-supported problem solving and decision quality, underscoring the need to critically evaluate information instead of taking AI recommendations at face value.

This study stresses the role of technology support and human decision-making in higher education. It is important for universities to promote the responsible use of AI tools, fostering critical thinking, analytical ability, and independent decision-making among students. While AI can aid problem-solving, users must be able to evaluate the trustworthiness and applicability of AI-generated responses. The findings of the study should be considered in the context of the limitations of the survey design, and future studies might focus on these relationships through either a longitudinal or experimental design. In summary, the combination of AI-assisted learning and cognitive reflection could be a valuable strategy for enhancing students' decision-making skills.

Future Implications

Future research should examine how AI-assisted problem-solving influences decision quality among students at different educational levels, across various academic disciplines, and in different cultural contexts. Longitudinal and experimental studies could be used to clarify whether with time, AI assistance will help in the decision-making process and how cognitive reflection will influence these. Other factors could also be studied, including critical thinking, AI literacy, trust in AI and overreliance on AI recommendations. In practical terms, universities and teachers need to create learning strategies that integrate AI problem-solving with reflective thinking tasks, information verification, and independent reasoning. These programs could help students to access AI technologies, while also building their analytical and judgmental competencies to make responsible and effective decisions.

References

1. Raisch, S., & Fomina, K. (2025). Combining human and artificial intelligence: Hybrid problem-solving in organizations. *Academy of Management Review*, *50*(2), 441-464.
2. Yildiz Durak, H., & Onan, A. (2026). A multidimensional comparative analysis of human expert vs. AI-driven feedback approaches on learner-centered and collaborative groups. *Interactive Learning Environments*, 1-28.
3. Dell'Acqua, F., McFowland III, E., Mollick, E., Lifshitz-Assaf, H., Kellogg, K. C., Rajendran, S., ... & Lakhani, K. R. (2023, September). *Navigating the jagged technological frontier: Field experimental evidence of the effects of AI on knowledge worker productivity and quality.*
4. Otero, I., Martínez, A., Cuadrado, D., Lado, M., Moscoso, S., & Salgado, J. F. (2024). Sex differences in cognitive reflection: A meta-analysis. *Journal of Intelligence*, *12*(4), 39.
5. Mishra, A. K., Bansal, R., Maurya, P. K., Ansari, Y., & Gupta, N. (2026). Effect of service quality on intention to invest in mutual funds: Attitude as mediator and awareness as moderator. *Journal of Advances in Management Research*, *23*(3), 380-407.
6. Abdelmagid, A. S., Jabli, N. M. Y., & Qahmash, A. I. (2026). Enhancing Higher-Order Cognitive Abilities Through AI-Powered Smart Assistants: Implications for Digital Entrepreneurship and Future Problem-Solving in Higher Education. *Journal of Intelligence*, *14*(8), 170.
7. Moșoi, A. A., Maican, C. I., Cazan, A. M., & Sumedrea, S. (2025). Do students need to think hard? The interplay of AI and cognitive abilities in solving problems. *Education and Information Technologies*, *30*(17), 24337-24364.
8. Sangpom, W., & Sangpom, N. (2026). Artificial Intelligence as an Educational Decision Support System in Problem-Based Learning: Critical Thinking, Decision-Making, and Human–AI Collaboration in Higher Education. *Journal of Intelligent Decision Making and Information Science*, *3*(5s), 142-167.
9. Musazade, N., Mezei, J., & Wang, X. (2025). Exploring the impact of AI tools on cognitive skills: A comparative analysis. *Algorithms*, *18*(10), 631.
10. Steyvers, M., & Kumar, A. (2024). Three challenges for AI-assisted decision-making. *Perspectives on Psychological Science*, *19*(5), 722-734.

11. Rastogi, C., Zhang, Y., Wei, D., Varshney, K. R., Dhurandhar, A., & Tomsett, R. (2022). Deciding fast and slow: The role of cognitive biases in ai-assisted decision-making. *Proceedings of the ACM on Human-computer Interaction*, *6*(CSCW1), 1-22.

12. Alhur, A. A., Al-Kahtani, N. K., & Mahgoub, E. A. (2026). Effects of Artificial intelligence-supported education on critical thinking, problem-solving, clinical reasoning, and decision-making in Health Science education: a systematic Review of interventional studies. *Advances in Medical Education and Practice*, 641965.

13. Juanchich, M., Dewberry, C., Sirota, M., & Narendran, S. (2016). Cognitive reflection predicts real-life decision outcomes, but not over and above personality and decision-making styles. *Journal of Behavioral Decision Making*, *29*(1), 52-59.

14. Criado-Perez, C., Jackson, C., Minbashian, A., & Collins, C. G. (2024). Cognitive reflection and decision-making accuracy: Examining their relation and boundary conditions in the context of evidence-based management. *Journal of Business and Psychology*, *39*(1), 249-273.

15. Mohan, A., Simonovic, B., C. Vione, K., & Stupple, E. (2025). Examining flight time, cognitive reflection, workload, stress and metacognition on decision making performance for pilots during flight simulation. *Ergonomics*, *68*(8), 1335-1347.

16. Spears, D., Okan, Y., Hinojosa-Aguayo, I., Perales, J. C., Ruz, M., & González, F. (2021). Can induced reflection affect moral decision-making?. *Philosophical Psychology*, *34*(1), 28-46.

17. Ikhu, A. (2026). *When and Why to Help: Timing and Reflection Strategies for Calibrated AI Support in Data-Science Problem Framing* (Doctoral dissertation, Universität Koblenz).

18. Silva, R. M. P. (2026). AI-Supported Pedagogical Supervision: A Theory-Building Framework for Understanding Feedback, Cognitive Processing, Reflective Practice and Pedagogical Decision-Making. *Education Sciences*, *16*(6), 959.

19. Roos, N. (2025). Designing for Appropriate Reliance: The Role of Cognitive Bias and Trust in AI-Assisted Decision-Making.

20. de Vreede, T., & Memmert, L. (2025). AI-assisted Task Performance: The Moderating Role of Assistance Modality on Motivational Dynamics.

21. Gunathilake, N., Gamage, A., Rajapakshe, D., Jayasooriya, M., Wisenthige, K., & Yapa, C. G. (2026, February). From AI Assistance to Critical Thinking: Exploring Cognitive Offloading and Metacognition as Mechanisms Within Personalized Learning Environments. In *2026 6th International Conference on Advanced Research in Computing (ICARC)* (pp. 1-6). IEEE.

22. Moledina, A., Barbash, J., Kyle, A., Lee, K., Hilario, R., Litty, A., ... & Aile, K. (2025). A Longitudinal Study on How AI-Assisted Decision-Making Impacts the Cognitive Load and Accuracy of Human Security Officers.

23. Arshad, M., Shahid, S., Afzal, S., & Ricard, A. (2026). The role of entrepreneurial imaginativeness in enhancing AI-enabled performance: mediating and moderating mechanisms. *International Journal of Entrepreneurial Behavior & Research*, 1-24.

24. Balcerzak, A. P., Zinecker, M., & Mičánek, J. (2025). The impact of artificial intelligence on task performance and decision-making: Empirical evidence on Generation Z. *Human Technology*, *21*(3), 620-639.

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