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Exploring AI Role in Enhancing or Limiting Academic Problem-Solving

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ABSTRACT

Generative AI tools such as ChatGPT and Gemini have become part of daily academic life, but little is known about how pre-service teachers use them to deal with academic problems or how teachers perceive their influence on students' problem-solving. This qualitative, phenomenologically oriented study investigated (a) how final-semester B.Ed. students apply generative AI tools to their academic problems, and (b) how university teachers perceive the influence of AI tools on students' problem-solving skills and what guidance they offer for productive AI use. Semi-structured interviews was conducted with twenty-three students and thirteen teachers from five public universities in Lahore, Pakistan, and the data was analyzed using thematic analysis. Two student themes were developed: patterns and purposes of AI use in academic work, and deciding between AI and independent effort. Two teacher themes were developed: teachers' observations of AI use and its perceived influence on problem-solving, and teachers' guidance, difficulties, and advice for productive AI use. Students reported regular use of AI for assignments, presentations, research, and lesson planning; thirteen tried problems independently first, while nine turned to AI first. All thirteen teachers observed regular and growing use of AI and agreed that it helps students understand concepts and explore approaches, but all thirteen also feared that heavy dependence could weaken critical thinking and independence. Teachers advised students to attempt tasks first, verify AI output, and write final work in their own words. Because the findings rest on participants' reported views, they describe perceptions and not measured effects on problem-solving ability.

1. Introduction

AI programs such as ChatGPT and Gemini can now provide university students with an instant response regarding any academic assignment. According to Chan and Hu (2023), university students in Hong Kong took advantage of generative AI rapidly and used it in their learning process, writing, and brainstorming despite concerns about accuracy, ethical issues, and personal development. The current review of the emerging body of knowledge warns against direct generalizations from one setting to another because the area of generative AI in higher education is still developing (Bond et al., 2024; Lo et al., 2024). In terms of the teaching-learning process, the more relevant issue is not whether students use AI, but rather how they utilize AI when encountering problems during the academic process. The difference between a student that asks the AI to clarify an ambiguous topic and then solves the problem independently, and a student who submits an AI-generated solution is substantial. A recently conducted three-wave study has found that the way students use AI, and not the mere use, is linked to different results (Zhu et

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al., 2026). Nonetheless, excessive use of AI is correlated with low critical thinking skills, reduced effort, and poor independent reasoning (Gerlich, 2025; Stadler et al., 2024; Zhai et al., 2024). That is why the experiences of the students and the views of the educators who see them in action are crucial pieces of evidence.

These issues are particularly pertinent to students in their final semester of a four-year B.Ed. degree program in Pakistan. During their final semesters, students face assignments, presentations, research, and lesson planning for teaching practice, which demand that they solve problems, generate ideas, evaluate information, and make decisions, often without much direct supervision. In terms of Pakistani research on ChatGPT in higher education, existing studies have mostly adopted the survey methodology to study the issue of ChatGPT usage, its impact on academic achievement and ramifications of its usage (Abbas et al., 2024; Ashraf et al., 2025; Shahzad et al., 2025). These studies are indeed important, but scores alone cannot tell how a student solved a particular problem with AI.

Evidence regarding how generative AI finds its way into the real process of solving academic problems is rather weak, especially in the context of teacher education programs in Pakistan. Works that focus on the perspective of what students claim to be doing while facing an academic problem and comparing it with the teachers' perspective in terms of observation are less numerous. The absence of such evidence makes it impossible for universities to distinguish cases where AI usage helps students develop their own reasoning from those where it silently replaces it. At the same time, teachers lack evidence-based understanding to provide relevant advice. This paper describes a qualitative study filling the gap.

1.1. Research Objectives

The study was guided by two objectives.

- To examine how final-semester B.Ed. students apply AI tools while dealing with academic problems.
- To examine the perceptions of university teachers about the influence of AI tools on the problem-solving skills of students, and the guidance they offer for productive AI use.

1.2. Research Questions

- How do the final-semester B.Ed. students describe their experience of using AI tools when solving academic problems?
- What are the views of the university teachers regarding the influence of AI tools on the students' problem-solving skills, and what guidance do they offer for productive AI use?

2. Literature Review

There has been an increasing interest in using AI within the university context since the emergence of conversation-based AI tools. A meta-systematic review on the use of AI within higher education has noted the need for more research into ethics, collaboration, and rigorous methodology, since the evidence was inconsistent within different settings (Bond et al., 2024). Another systematic review of ChatGPT and students' engagement concluded that there is still ongoing effort toward understanding the influence of such tools on the engagement of students (Lo et al., 2024). Evidence regarding problem-solving in particular, on the other hand, is rather scarce. According to Urban et al. (2024), in an experimental study, university students utilizing ChatGPT were found to have performed better in a task requiring creativity in problem-solving and to have perceived the task as relatively easier. These results suggest that AI can be useful in helping generate and hone solutions; however, questions about how the use of AI is experienced and handled by the students during problem-solving remain open. In Pakistan, in an empirical survey study, Ashraf et al. (2025) surveyed three hundred fifty-two university students and found a correlation between the use of ChatGPT and academic performance, while Shahzad et al. (2025) used the technology acceptance model in explaining the adoption of ChatGPT by Pakistani university students.

There is a considerable amount of recent research connecting the use of AI with problems related to independent thinking. Specifically, Gerlich (2025) identified a negative relationship between the frequent use of AI technology and critical thinking, where the process of cognitive offloading played an essential role. According to Fan et al. (2025), there was "metacognitive laziness" in the experiment when the students, who were assisted by ChatGPT, managed to enhance their written work but failed to increase their knowledge and achieve transfer. Stadler et al. (2024) discovered that the cognitive load among the university students working on a scientific issue with the help of a large language model was lower compared to those, who used a regular search engine. The systematic review by Zhai et al. (2024) suggested that the overuse of AI dialogue system could have an impact on decision making, critical thinking, and analytical reasoning. In Pakistan, Abbas et al. (2024) conducted a survey of university students on three occasions and discovered that the more often they used ChatGPT, the higher procrastination and memory loss they experienced. However, most of these studies only assess associations or task performance. Zhu et al. (2026) provided a helpful differentiation. In a three-wave study involving five hundred eighty-nine

university students and beginning-of-career knowledge workers, they distinguished between dependent offloading, where core reasoning processes are outsourced to an AI, and autonomous offloading, where the AI is used as a scaffold, but the individual retains cognitive control. Dependent offloading correlated with reduced intrinsic motivation and negative perceptions of outcomes, while autonomous offloading correlated with positive perceptions of outcomes. Given that the outcomes were subjective, the results reflect perceived connections and do not represent any actual benefits or detriments to learning (Zhu et al., 2026).

That assistance is constructive if it leads the student to engage in the fundamental process of thought is a long-standing idea. Vygotsky (1978) believed that learning progresses in the form of guidance within the range between what a student can perform alone and what the student can perform with assistance, while Wood et al. (1976) defined tutoring as the assistance offered only in performing the parts of the activity that the student cannot yet handle. This provides a framework rather than a measure for understanding how AI's explanation of a concept leads the student to proceed further.

As teachers witness the output of students' efforts, they must assess how much knowledge the learners have acquired. Therefore, their perspectives are an essential source of evidence on the impact of AI. According to the results of the analysis of forty-eight studies dedicated to stakeholders' opinions on generative AI in education, students usually demonstrate pragmatic interest in the utility of this technology, while teachers stress possible risks associated with academic dishonesty, workload, and curricula alteration (Vijithasena & Saarela, 2026). Longitudinal evidence is rare. For instance, Vivas-Urias et al. (2026) assessed the attitudes of one hundred eighty university teachers in Spain twice, in 2023-2024 and 2024-2025, referring to their research as one of the first longitudinal investigations of institutional attitudes to generative AI. This study focused on the awareness and beliefs of teachers rather than students' problem-solving.

It can be concluded from the above discussion that AI could be used to support students in their learning; however, its application matters. Moreover, qualitative evidence on teachers' perceptions of the impact of AI on students' problem-solving is lacking, especially within the Pakistani context.

2.1. Research Design and Approach

The study was situated in an interpretivist paradigm, which holds that knowledge of social phenomena is built through understanding the meanings people give to their experiences (Lincoln & Guba, 1985). This paradigm suited the purpose of the study, which was to understand what students and teachers said AI meant for academic problem-solving: when it helped, when it got in the way, and how they judged its role. In this paradigm, participants are the main source of understanding, and the researcher interprets their accounts.

A qualitative approach was adopted because the study investigated experiences, perceptions, and views that numerical scores could not capture. A phenomenological design was chosen because it aims to describe the meaning of a lived experience as the participants themselves understand it (Moustakas, 1994). The phenomenon explored was the use of AI in academic problem-solving: students described their own use, and teachers described what they observed of students' use in their work with B.Ed. students. The study focused on participants' own descriptions of using, or observing the use of, AI when students deal with academic problems, such as understanding material, generating ideas, and beginning tasks. It did not aim to measure students' problem-solving performance objectively.

Phenomenology informed the study's interest in how participants described and made sense of their experiences, while thematic analysis was used to analyze the interview data. These approaches can be combined when phenomenology is treated as an orientation toward lived experience rather than as a requirement to follow one fixed analytic procedure (Neubauer et al., 2019). Phenomenological traditions differ: transcendental approaches, such as Moustakas (1994), aim to describe the essence of an experience, whereas hermeneutic approaches place greater emphasis on interpretation (Neubauer et al., 2019). This study used thematic analysis to identify and interpret patterns of meaning across participants' accounts, following Braun and Clarke (2006, 2021). The analysis remained focused on participants' descriptions of using, or observing the use of, AI in academic problem-solving. No formal bracketing procedure is reported; therefore, no claim is made that researcher assumptions were systematically bracketed.

Two consequences of this choice should be stated. First, the study is better described as phenomenologically oriented than as a strict application of a single phenomenological method, and its themes describe patterns across participants' accounts and not the essence of any one person's experience. Second, the interviews were short (approximately fifteen to thirty minutes) and the sampling was purposive at the level of universities and convenience-based at the level of participants, so the findings describe these participants' reported experiences and perceptions and are not claimed to be generalizable.

2.2. Data Collection

Data was collected from final-semester B.Ed. Elementary students and university teachers of five public universities in Lahore, Central Punjab. The universities were selected purposively, and participants within them were selected through convenience sampling based on their availability and willingness to participate, which resulted in a final sample of thirty-six participants (twenty-three students and thirteen teachers), as described in the Sample and Population section below.

Data was collected through semi-structured interviews, which consisted of open-ended questions and allowed the researcher to ask follow-up questions to explore participants' experiences in greater depth. The interview protocol was developed in accordance with the research objectives and questions. Before the main data collection, the interview protocol was pilot-tested with five participants from the target population at the University of Education, Lahore, Bank Road Campus, to assess the clarity, sequence, and suitability of the questions. These pilot participants were separate from, and were not included in, the final sample of thirty-six participants.

Data was collected through face-to-face interviews. Participants responded in either Urdu or English, depending on their preference. Quotations from interviews conducted in Urdu were translated into English by the researcher for reporting, with the aim of preserving the meaning of participants' words rather than their exact phrasing. During the interviews, the researcher recorded participants' responses in writing, while audio recordings were also made for some participants. The interviews were conducted individually and lasted approximately fifteen to thirty minutes, depending on the depth and length of participants' responses.

2.3. Sample and Population

The population of this study comprised final-semester students enrolled in the four-year B.Ed. Elementary program and university teachers who taught B.Ed. students at public universities in Lahore, Central Punjab. Participants were recruited from five universities: the University of Education, Lahore; the University of the Punjab, Lahore; Lahore College for Women University; Government College University, Lahore; and the University of Home Economics, Lahore. All participants had experience using AI tools, such as ChatGPT and Gemini, for academic tasks. The universities were selected purposively because they provided a relevant context for exploring the use of AI in teacher education. Within these universities, participants were selected through convenience sampling based on their availability and willingness to participate. The final sample consisted of thirty-six participants, including twenty-three final-semester B.Ed. Elementary students and thirteen university teachers.

The data from the interviews was analyzed using thematic analysis based on the six-stage process described by Braun and Clarke (2021; cf. Braun & Clarke, 2006). The six stages included familiarization with the data, generation of initial codes, generation of initial themes, development and review of themes, refinement, definition, and naming of themes, and write-up of the analysis. The researcher carefully examined and reexamined the interview records (written notes and, where available, audio recordings), coded relevant passages, and categorized them into possible themes. The themes thus generated were further examined in light of the codes and the complete dataset. The six stages were considered iterative, not strictly sequential, so the researcher proceeded back and forth between interview records, codes, and emerging themes. As suggested by the phenomenological perspective, codes were kept close to the participants' descriptions of using or observing AI, while the themes were constructed in order to answer both research questions.

It was important that both the students' and teachers' data sets be kept separate because of the fact that students talked about themselves while teachers talked about their observations and judgments. In this paper, the themes addressing the two research objectives outlined above are reported. The whole data set was analyzed within a wider master's thesis. Frequencies are presented only in those cases when they were identified during the analysis. These numbers do not represent how strong a certain view is or how widespread it is.

2.4. Findings

The results are grouped according to their objectives. The first group of themes is based on the interviews conducted with the twenty-three final-semester B.Ed. students and it focuses on Research Question 1. The second group of themes is based on the interviews conducted with the thirteen university lecturers and it focuses on Research Question 2. All themes are explained using participants' views and quotes. Quotes are identified using participant codes (SP for students and TP for teachers); where a code was not recorded, the speaker's role is given.

> The first objective of this study was to examine how final-semester B.Ed. students apply AI tools while dealing with academic problems. The responses of the twenty-three students were organized into two overarching themes. The first describes what students used AI for and how they used it; the second describes how they decided between turning to AI and relying on their own effort.

Theme 1 Patterns and Purposes of AI Use in Academic Work: The first theme answers Research Question 1 by describing the kind of experience students had. Taken together, the accounts show that AI had become an ordinary part of academic life for these students rather than an occasional aid. The theme comprises three sub-themes: routine, multi-purpose academic use; tool choice and prompting practices; and the application of AI to specific academic problems.

Students described using AI for assignments, presentations, research work, lesson planning, and teaching materials. Other examples in the interviews included examination preparation, mathematics, and programming. The accounts also indicated that use could be frequent. One student said, "I use AI tools almost every day for my academic work" (SP21), and another student described academic work as "almost completely based on AI." SP17 summarized the range of purposes: "I use ChatGPT for making assignments, getting ideas for presentations, lesson planning, and research."

Students named ChatGPT and Gemini, and also mentioned Claude and design-oriented tools. Their accounts suggested that the usefulness of AI depended partly on how they framed their requests. As SP3 put it, "If we give a good prompt, we can get more benefit from AI." These accounts indicate that students described making choices about how to use the tools rather than simply receiving their output.

Twenty-one of the twenty-three students could describe a specific occasion on which AI helped with an academic problem, while two could not recall a particular instance. The most frequent examples came from the professional side of the B.Ed. program: preparing lesson plans during teaching practice, understanding teaching methods, and understanding educational psychology. SP15 explained, "I asked ChatGPT for ideas about activities and teaching methods," and SP6 said, "I learned about teaching methodology with the help of AI." Other examples included solving mathematics problems, completing programming tasks, organizing research information, and preparing a presentation. In most of these cases the problem was one of understanding or getting started, and AI was used to resolve it. One student described the process: "I asked AI several questions until I understood the concept."

Overall, this theme shows that students applied AI across a wide range of final-semester tasks, most often to understand material, generate ideas, and begin tasks. Use was frequent and wide-ranging, which sets the context for the second theme, in which students describe how they combined AI with their own effort.

Theme 2: Deciding Between AI and Independent Effort: The second theme also answers Research Question 1, but it concerns the order and conditions of use: how students decided when to use AI and when to solve a problem on their own. The responses reveal two broad orientations and several conditions that shifted students from one to the other. Twenty-two of the twenty-three students are described below under one of these two orientations; one student was not classified under either. The theme comprises four sub-themes: the independent-first pattern, the AI-first pattern, triggers for turning to AI, and conditions that required independent effort.

Thirteen of the twenty-three students described an independent-first strategy, a conditional pattern in which they first tried to understand or solve the problem and turned to AI only when they were confused or short of ideas. SP12 explained, "I first try to understand it and solve it on my own. If I find it difficult, I use AI to get a simple explanation." Some of these students added a checking step, comparing the AI explanation with textbooks or lecture notes, or asking AI for related practice questions to test their own understanding. SP22 expressed the underlying view: "I think AI should be used as a support." For these students, AI worked as a second step in the problem-solving process and not as a replacement for it.

Nine students described the opposite pattern, in which AI was the default response to a problem. For them, independent attempts had become rare, and the first reaction to an academic difficulty was to open an AI tool. SP9 said, "Whenever I face a problem in my academic work or research, my first thought is to ask ChatGPT for help," and SP13 said, "If nothing comes to my mind, I open AI in the next second." Another student remarked that "the option of solving something completely by myself is almost not there anymore." These accounts are students' own descriptions of their habits. They show how these students said they approached problems, not how well they solved them.

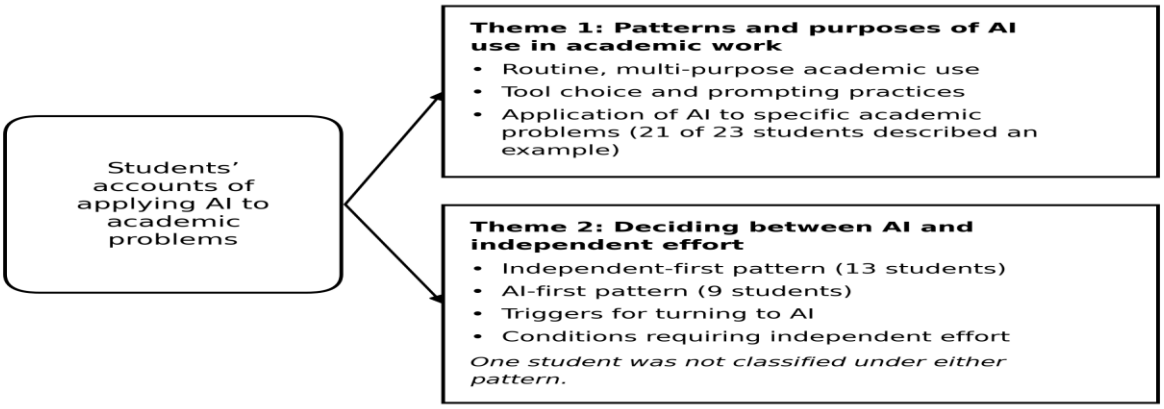
Students identified difficulty, confusion, limited time, and the perceived importance of a task as reasons for turning to AI. SP21 combined difficulty and time pressure: "If I am confused or short of time, I use AI." SP11 stated, "The decision depends on how important the task is for us." Some accounts suggested that students approached tasks they considered relevant to their future profession differently from routine university tasks. However, counts for these triggers were not recorded during analysis, and the data is insufficient to conclude that uncritical use was more common for routine assignments.

Students also described relying on their own effort when circumstances required it, including examinations, instructions from a professor or supervisor, and restrictions on mobile-phone use. SP6 noted, "when I am at school where mobile phones are not allowed, I have to solve the problem myself." These accounts indicate that external conditions, as well as personal choice, could prompt independent problem-solving.

Collectively, this theme indicates that thirteen of the twenty-three students described using AI conditionally, after an attempt of their own, whereas nine described making AI their first response. In students' own descriptions, the order in which they combined AI with their own effort was central to how they experienced problem-solving with AI.

Figure 1 presents the two student themes, their sub-themes, and the counts reported in the findings above.

Figure 1: Student Themes Related to AI Application in Academic Problem-Solving (N = 23)



The second objective was to examine the perceptions of university teachers about the influence of AI tools on students' problem-solving skills and the guidance they offer for productive AI use. The interviews with the thirteen teachers were organized into two overarching themes (Figure 2). These findings represent teachers' reported observations and judgments. They are not independent measurements of students' problem-solving skills and should be read in that light. Ten of the thirteen teachers gave closely similar accounts on several questions, and three gave more individual responses, so the analysis reports the shared pattern first and then notes individual contributions.

Theme 1: Teachers' Observations of AI Use and Its Perceived Influence on Problem-Solving: The first theme answers Research Question 2 by presenting what teachers observed about students' use of AI and what they perceived its influence on problem-solving to be. It comprises four sub-themes: widespread and growing use, perceived benefits for problem-solving, concerns about thinking and independence, and variation among students.

All thirteen teachers described regular student use of AI for academic assignments. Teachers described students using it to understand difficult topics, obtain ideas, brainstorm, and summarize information. TP1 noted, "Students are using AI quite often for academic assignments." Five teachers used wording that implied growth over time. TP8 observed, "I have noticed a clear increase in students using AI for academic assignments," and another teacher said that "students are becoming more comfortable with AI." No teacher described how students' problem-solving skills themselves had changed over time, and the interview questions did not ask about this directly. Evidence of change over time is therefore limited to teachers' perceptions that AI use had increased.

All thirteen teachers acknowledged benefits of AI for students' problem-solving, mainly because it provides explanations, hints, and different ways to approach a problem. Every teacher also gave an example of AI helping a student, most often by explaining a difficult concept in simple words with examples. Some teachers described more specific benefits: AI acting as a personal tutor that allows learning at one's own pace, step-by-step solutions in mathematics and science, extra practice questions after mistakes, and quick revision through summaries. TP6 said, "Some students use AI as a personal tutor for difficult subjects," and TP12 described a case in which AI "gave the student extra practice and helped improve understanding." Another teacher recalled that "the student then used the idea to complete the assignment independently."

The same teachers were also concerned. All thirteen said that overuse or heavy dependence could affect students' critical thinking and independence, and ten gave almost the same explanation. TP1 said, "If students copy answers directly, they may stop analyzing, questioning, and trying by themselves." Individual teachers added specific concerns: that students might struggle with similar questions when working alone, might forget to attempt problems themselves, might stop exploring alternative answers, or might miss details by relying on summaries. TP13 warned, "Students may stop exploring different answers if they always accept the first AI response." One teacher distinguished speed from learning, saying that "speed is not the same as learning." These statements are teachers' perceptions of risk and not verified effects on students' skills.

Teachers stressed that students differed in how they used AI. TP4 observed, “Some students verify the answers, while others accept them directly,” and TP13 said, “Many students use it positively for understanding and improving their work, while a smaller number rely on it for ready-made answers.” Ten teachers stated explicitly that the influence of AI lies in the way it is used and not in the tool itself. One teacher put it this way: “The problem is not AI itself, but using it without personal effort.”

Overall, this theme shows that teachers regarded AI as a conditional influence: helpful for understanding and exploring approaches, but harmful to critical thinking and independence when it replaced the student’s own effort. Their reports on change over time concerned the growth of use.

Theme 2 Teachers’ Guidance, Difficulties, and Advice for Productive AI Use: The second theme also answers Research Question 2. It concerns how teachers responded to students’ use of AI in their own practice, the difficulties they faced as educators, and the advice they gave to prevent dependence. These responses show what teachers took to be the conditions under which AI helps or harms students’ problem-solving. The theme comprises three sub-themes: guidance on responsible use, difficulties faced by teachers, and advice for students.

All thirteen teachers described guiding students toward responsible use. Their guidance followed a common sequence: students should attempt the task themselves first, use AI when they need help, check the information it gives, and write the final answer in their own words. TP12 summarized it as “Think first, use AI when necessary, verify the response, and then complete the assignment in your own words.” Two teachers added specific strategies, asking students to use AI for explanations, examples, feedback, or practice questions instead of full assignments, and treating AI like a tutor. TP13 suggested “using AI like a tutor rather than a person who does the assignment.” Another teacher said, “I encourage them to use AI for learning, not simply for copying.”

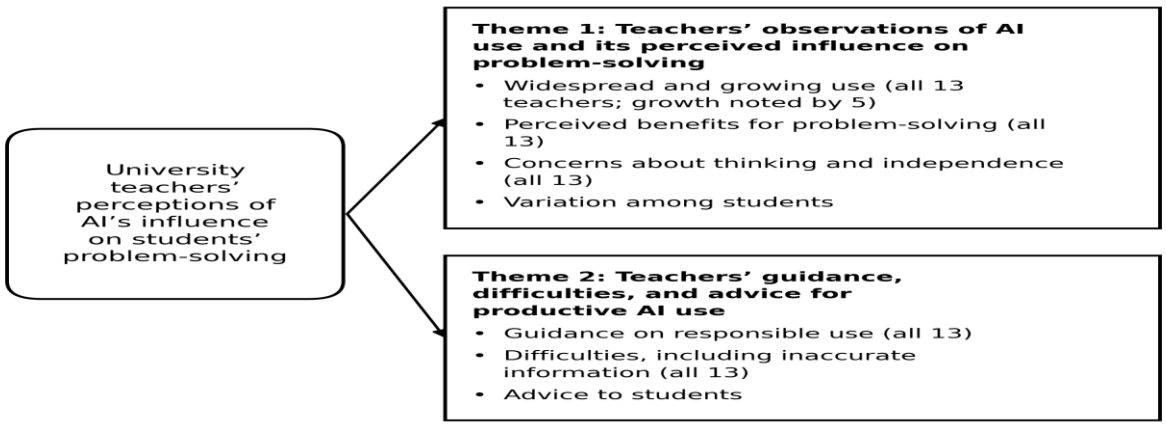
The difficulties teachers reported concerned both the quality of learning and the validity of assessment. All thirteen teachers mentioned inaccurate information. Teachers also raised concerns about copied work and students’ difficulty explaining submitted assignments. TP3 stated, “Another problem is that some students submit work that they cannot explain themselves.” Two teachers reported difficulty determining how much of a submitted assignment reflected the student’s own understanding, and TP13 highlighted the “difficulty in assessing genuine student understanding.” One teacher noted that “sometimes AI gives an answer that sounds correct but is actually wrong,” while another reported that AI-generated answers were sometimes too general or beyond students’ actual levels.

The advice teachers offered was varied. They recommended using AI only as a helping tool, solving problems independently before asking AI, reading books and doing research, questioning and checking AI information, generating ideas before using AI, discussing difficulties with teachers and classmates, and keeping a balance between AI and traditional learning methods. TP12 advised students to “maintain a balance between using AI and traditional learning methods,” and TP10 said, “They should not allow it to limit their imagination or originality.” Another teacher described AI as “a tool for learning, not a replacement for their own intelligence and effort.”

Collectively, this theme shows that teachers took an active guiding role and shared a consistent message: AI should follow the student’s own attempt, its output should be checked, and the final work should reflect the student’s own understanding.

Figure 2 presents the two teacher themes and their sub-themes, including the perceived growth in students’ AI use.

Figure 2: Teacher Themes Related to Perceived Influence of AI



3. Discussion

This study set out to describe how final-semester B.Ed. students apply AI tools to academic problems and how university teachers perceive the influence of AI on students' problem-solving skills and what guidance they offer for productive AI use. Throughout, the discussion separates students' descriptions of their own practice from teachers' perceptions, and participants' reported views from any verified effect on problem-solving ability. Because the study did not measure problem-solving performance, the findings cannot show that AI improves or damages students' skills.

In answer to Research Question 1, students described routine, wide-ranging, and tool-conscious use of AI, applied most often to understanding material, generating ideas, and beginning tasks. This agrees with international accounts of rapid uptake and varied use (Chan & Hu, 2023) and with Pakistani survey studies that document the adoption of ChatGPT in higher education (Ashraf et al., 2025; Shahzad et al., 2025). The present findings add a descriptive layer to those studies: students' examples show what they actually asked AI to do, such as planning lessons, understanding teaching methods, and organizing research information. That students typically used AI to resolve difficulties of understanding or starting is compatible with an experimental finding that ChatGPT can ease creative problem-solving (Urban et al., 2024). That task differs, however, from the academic work described here, and the present data records students' perceptions and not their performance.

The finding that thirteen students described an independent-first pattern and nine an AI-first pattern is the most analytically important in the student data. The two patterns resemble the distinction that Zhu et al. (2026) drew between autonomous offloading, in which AI is a scaffold and the person retains agency, and dependent offloading, in which core thinking is delegated. They also echo the scaffolding principle that support is productive when the learner still does the essential work (Vygotsky, 1978; Wood et al., 1976). These parallels are conceptual only. The present study cannot show that AI-first students experienced the outcomes that Zhu et al. associated with dependent offloading, and interview data can neither confirm nor refute the survey-based associations reported in that study and others (Abbas et al., 2024; Gerlich, 2025). What the findings do show is that students described the difference between the two orders of use, and that external constraints such as examinations, supervisor instructions, and restrictions on phones prompted independent effort for some of them. This suggests that assessment and supervision arrangements may influence how much independent problem-solving students do, although the present data cannot confirm this.

In answer to Research Question 2, teachers perceived AI as a conditional influence. All thirteen acknowledged benefits such as explanations, hints, and alternative approaches, and all thirteen feared that heavy dependence could weaken critical thinking and independence. Their concerns resemble those reported in studies linking heavy AI use with reduced critical thinking, reduced mental effort, and weaker reasoning (Fan et al., 2025; Gerlich, 2025; Stadler et al., 2024; Zhai et al., 2024). Their emphasis on whether students verified AI output or accepted it directly, and on work that students could not explain, is also consistent with a review finding that teachers emphasize risks related to academic integrity (Vijithasena & Saarela, 2026). Teachers in the present study, however, reported these concerns as perceptions based on what they saw in students' work, and no independent test of students' skills was made. The recurring view that the influence lies in the way AI is used, and not in the tool itself, matches the manner-of-use argument in the literature (Zhu et al., 2026).

Teachers' comments on change over time were limited. Five teachers described students' use of AI as growing, but no teacher described a change in problem-solving skills, and the interview questions did not ask about this directly. These comments are therefore treated as perceived growth in use and not as evidence of change over time in students' skills: whether problem-solving skills have strengthened, weakened, or stayed the same is unknown. This contrasts with the longitudinal design of Vivas-Urias et al. (2026), who measured teachers' attitudes on two occasions. Claims about change in problem-solving skills would require repeated observation, assessment of students' work, or interview questions that ask teachers explicitly to compare cohorts or periods.

Students' accounts and teachers' perceptions complement each other without verifying one another. Students described what they do, including the independent-first and AI-first patterns, whereas teachers described what they see in submitted work and what they advise. Teachers' guidance to attempt the task first, check the AI output, and write the final answer in one's own words describes the same sequence that thirteen students said they followed. Teachers' difficulty in judging genuine understanding, however, concerns assessment validity, a theme that sits outside what students' accounts of their own practice addressed.

4. Recommendations

These recommendations follow from the findings. They are suggestions for practice and further inquiry, not proven interventions.

For students: Students who described an independent-first pattern treated AI as a second step, and teachers advised the same sequence. Students should attempt a problem before consulting AI, ask AI for explanations, examples, feedback, or practice questions instead of complete answers, verify important information against books or other trusted sources, and be able to explain any work they submit in their own words.

For university teachers: Teachers should state clearly when AI use is permitted and expected, and should teach students to use it as a tutor and not as a substitute. Because teachers reported difficulty judging genuine understanding, they may use short oral explanations, in-class tasks, or reflective notes on how AI was used to check that submitted work reflects the student's own understanding. Teachers should also encourage discussion with peers and teachers as an alternative source of ideas.

For universities: Universities should provide clear guidelines on responsible AI use in coursework and assessment, and professional development that helps teachers guide and assess AI-supported work. Because some students reported working independently when external rules required it, universities should also consider assessment arrangements that sometimes require unassisted problem-solving. In addition, they should monitor, through repeated and systematic observation, how students' AI use and problem-solving change over time.

For future research: Future studies should combine interviews with observation or assessment of students' problem-solving, include repeated measurement over time, and ask teachers explicitly to compare cohorts or periods, so that perceived changes can be examined against evidence.

5. Conclusion

This study examined how final-semester B.Ed. students apply AI tools to academic problems and how university teachers perceive the influence of AI on students' problem-solving skills and what guidance they offer for productive AI use. The findings perceived by students showed that AI had become a routine part of academic work, applied to assignments, presentations, research, and lesson planning, and that students differed in whether they turned to AI after their own attempt or as their first response. The findings perceived by teacher that they observed widespread and growing use, acknowledged benefits for understanding and exploring approaches, and feared that dependence could weaken critical thinking and independence. They responded with guidance centred on trying first, verifying output, and owning the final work. Teachers' comments on change over time were limited to perceived growth in students' AI use. Because these findings rest on participants' reported views, they describe how AI use is experienced and perceived and not what it does to problem-solving ability, a question that requires evidence beyond interviews.

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