e-Kafkas Journal of Educational Research e-KJER Research Article

Offloading Cognition to Artificial Intelligence: A Qualitative Study of Teachers' Experiences and Perceptions

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To cite this article:
Erden, Ş., & Döğer, M. F. (2026). Offloading cognition to artificial intelligence: a qualitative study of teachers' experiences and perceptions. *e-Kafkas Journal of Educational Research*, *13*(2), 388-406. doi: 10.30900/kafkasegt.1893159

Research article **Received:** 19.02.2026 **Accepted:** 13.08.2026

Abstract

This study investigates the role of artificial intelligence (AI) assistants in teachers' cognitive and metacognitive processes through the lens of cognitive offloading theory. Adopting a phenomenological research design, the study explores how, why, and with what consequences teachers delegate mental tasks to AI. Data were collected through semi-structured online interviews with 17 teachers from various disciplines and analyzed using thematic analysis. Findings reveal that participating teachers regularly use AI assistants for both professional tasks, such as lesson planning, material design, exam preparation, and daily life activities, including information seeking and content creation. Participants perceived AI tools as reducing mental effort and time pressure and increasing their sense of self-efficacy, while their views regarding the effects of AI use on creativity were mixed. However, participating teachers also demonstrated awareness of the risks associated with over-reliance on AI, particularly its potential to weaken critical thinking and self-evaluation skills, a phenomenon linked to "metacognitive laziness." To mitigate these risks, they employ deliberate strategies such as cross-checking AI outputs with other sources, validating them against prior knowledge, and personalizing content rather than accepting it uncritically. The study concludes that ,according to participants' accounts, AI assistants function not only as tools for efficiency, but also as resources that participants perceived as potentially influencing teachers' cognitive habits and perceptions of their professional practice. These findings suggest implications for reconceptualizing AI literacy in teacher education, moving beyond technical proficiency toward fostering metacognitive awareness and self-regulation that empower teachers to make informed decisions about when and how to offload cognition. Participants perceived AI assistants not only as tools for improving efficiency but also as resources that may shape their cognitive habits and perceptions of professional practice. These findings highlight the importance of reconceptualizing AI literacy in teacher education beyond technical proficiency to include metacognitive awareness, critical evaluation, and self-regulation in decisions about when and how to offload cognition.

Keywords: Cognitive offloading, Artificial intelligence in education, Metacognitive laziness, Teachers' perceptions, Phenomenology, Qualitative research

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Introduction

Artificial intelligence (AI) assistants have become important tools that help people access information and solve problems in daily life. Conceptually, AI refers to "a set of social and cognitive phenomena that enable a machine to perform competitive tasks requiring cognitive processes and to communicate with other entities in society through messages with high information content and shorter representations" (Abbass, 2021, p. 95). AI assistants use large datasets from books, articles, and websites to generate human-like responses based on ranking algorithms created by humans (Welsby & Cheung, 2023). More specifically, AI refers to intelligent technologies that perform tasks requiring human-like intelligence and can reason, learn, gather information, and communicate (Kamble & Shah, 2018, p. 179). Consequently, individuals employ these assistants across a broad spectrum of domains, encompassing language understanding, adaptive learning systems, problem-solving, perception, modeling, robotics, and gaming (Pannu, 2015).

Given these capabilities, AI technologies have permeated numerous fields, with education emerging as a particularly significant area of application. The rapid progress of AI has encouraged schools to adopt AI-supported technologies that promote student-centered learning (Ayanwale et al., 2024). For teachers who adopt these technologies, AI offers mechanisms to manage students' learning processes more efficiently (Seyrek et al., 2024). Empirical studies underscore the multifaceted utility of AI in educational contexts. For instance, research conducted with pre-service mathematics teachers revealed that participants utilized ChatGPT for diverse purposes, including information acquisition, assignment completion, and problem-solving (Acar & Peker, 2025). Similarly, another investigation found that pre-service teachers directed queries to ChatGPT concerning scientific, instructional, and professional knowledge domains (Tapan-Broutin, 2023). Bateman (2025) demonstrated that ChatGPT serves as a valuable pedagogical resource by conserving teachers' time, accelerating access to educational materials, assisting in lesson development, and supporting student learning processes. Furthermore, An et al. (2023) reported that teachers generally exhibit positive attitudes toward AI and maintain high aspirations for integrating technology into their instructional practices.

Alongside these positive views, researchers have raised concerns about how AI might affect higher-order cognitive skills. Specifically, scholars have examined the effects of adults' growing dependence on external cognitive supports, both in daily and professional tasks, on capacities such as critical thinking, analytical reasoning, and creative problem-solving. Researchers increasingly study the delegation of cognitive tasks to external tools as 'metacognitive laziness' (Gerlich, 2025; Fan et al., 2025). Fan et al. (2025) emphasized that generative AI technologies, including ChatGPT, may amplify students' technological dependency and potentially precipitate metacognitive laziness. In a study encompassing individuals across varying ages and educational levels, Gerlich (2025) identified a significant negative correlation between intensive AI assistant usage and critical thinking skills. Extending this line of inquiry, Ahmad et al. (2023) found that AI applications substantially contribute to students' diminished decision-making abilities and increased propensity toward laziness. Similarly, research conducted with medical and dental students revealed that heightened reliance on AI correlates positively with metacognitive laziness (Sabqat et al., 2025). Investigating AI addiction among university students, Huang and Wu (2025) identified its most prominent consequences as decreased capacity for independent thought, reduced innovative thinking, limited self-reflection, and constrained critical thinking ability. Moreover, scholars have suggested that excessive dependency on AI may impair individuals' professional performance in contexts demanding rapid decision-making and cognitive flexibility, thereby potentially elevating stress levels (Gocen & Aydemir, 2020). The concerns about artificial intelligence outlined above reflect broader anxieties about the potential consequences of delegating cognitive tasks to external tools.

Gerlich (2025) demonstrated that AI tools attenuate critical thinking precisely through cognitive offloading mechanisms. Complementing this finding, Kosmyna et al. (2025) revealed that although AI assistants effectively reduce cognitive load, this reduction concurrently diminishes active engagement and neural activity during learning processes. Such findings carry profound implications for the teaching profession, which inherently demands the simultaneous management of multiple cognitive tasks, including lesson planning, classroom management, student assessment, and creative content production. Within cognitive offloading theory, AI assistants emerge as potentially valuable tools that may help

teachers navigate this multifaceted cognitive landscape. However, the systematic offloading of higher-order cognitive functions, particularly pedagogical decision-making, analysis of student needs, and development of creative teaching strategies, may fundamentally transform the essence of the teaching profession (Özer et al., 2025).

With the proliferation of AI assistants in education, understanding their effects on teachers' cognitive and metacognitive processes is of great importance. While existing literature contains many studies focusing on the technical use and possibilities of AI, there is a paucity of research investigating how and for what cognitive purposes teachers use AI, and the effects of this use on their metacognitive awareness and critical thinking skills. This study addresses this gap by examining teachers' interactions with AI assistants within the framework of Cognitive Offloading Theory. By doing so, it aims to reveal the role AI plays beyond being a mere tool in pedagogical decision-making, creativity, and self-regulation processes. The study concretizes concepts such as metacognitive laziness within the teaching context and provides a framework for the sustainable and critical design of AI-supported teaching practices. Therefore, examining for which cognitive tasks, to what extent, and for what purposes teachers use AI assistants is critically important for understanding the effects of cognitive offloading on teachers' metacognitive processes.

Literature Review

To provide a conceptual foundation for examining teachers' interactions with AI assistants, this section reviews the theoretical perspective that guides the study. Given the study's focus on how teachers delegate cognitive tasks to AI, perceive the consequences of this delegation, and regulate their engagement with AI-generated outputs, Cognitive Offloading Theory provides the primary interpretive framework. The following section therefore outlines the central assumptions of cognitive offloading and its relevance to teachers' cognitive and metacognitive experiences with AI.

Cognitive Offloading Theory

Human cognition operates within finite mental boundaries. The amount of information that individuals can retain in memory is inherently limited, and this storage capacity fundamentally shapes their ability to execute cognitive tasks effectively (Cowan, 2010). Cognitive Offloading Theory elucidates individuals' propensity to delegate mental processes to external tools, ranging from calculators and notebooks to the internet and, more recently, artificial intelligence, as a means of alleviating mental effort (Carter, 2018; Risko & Gilbert, 2016). The teaching profession, characterized by its simultaneous and substantial cognitive demands encompassing planning, assessment, creative content production, and classroom management, exemplifies a domain where such offloading strategies hold particular relevance. Within this context, AI assistants are increasingly positioned as powerful offloading instruments for teachers, offering support for navigating the profession's multifaceted cognitive landscape.

Although cognitive offloading helps people complete tasks more efficiently, researchers have found that negative consequences may arise when it becomes frequent, continuous, or varied. Sparrow et al. (2011) found that easy access to digital information shifts people's focus from remembering the information itself to remembering where to find it, changing how they internalize information over time. In a similar vein, Carr (2010) contended that the habitual delegation of cognitive tasks to external tools may impose constraints upon individuals' capacities for deep thinking and sustained attention. More specifically, the systematic offloading of tasks requiring planning, evaluation, and higher-order reasoning to external instruments may precipitate a relative attenuation in individuals' abilities to monitor, regulate, and appraise their own thought processes. When examined through the lens of metacognitive monitoring and control as conceptualized by Flavell (1979), this phenomenon corresponds to a reduction in an individual's awareness of their own cognitive activities. Contemporary research by Fan et al. (2025) and Gerlich (2025) substantiates these concerns, demonstrating that intensive engagement with AI-supported systems may incline individuals toward more superficial strategies in critical evaluation and decision-making contexts.

Within the extant literature, metacognitive laziness is conceptualized as a potential risk shaped by the interplay of multiple variables, including an individual's relationship with technology, the nature of the

tasks undertaken, contextual demands, and the individual's capacity for self-regulation (Risko & Gilbert, 2016; Gerlich, 2025). For the purposes of this investigation, metacognitive laziness is operationally defined as the tendency to suspend one's capacity for monitoring, regulating, and evaluating their own thinking processes as a result of excessive reliance on technology, often accompanied by the uncritical acceptance of information from external sources (Fan et al., 2025; Gerlich, 2025). Self-efficacy, in the context of this study, refers to participants' perceived confidence in their ability to address problem-solving situations and complete professional tasks (Bandura, 1997). To assess this construct empirically, the study examined how participants evaluate AI-generated outputs, whether they consult alternative information sources, and the extent to which they engage their own reasoning faculties in decision-making processes.

To translate this theoretical framework into an actionable analytical structure, the present study operationalizes Cognitive Offloading Theory by examining four interrelated dimensions of teachers' interactions with AI assistants. These dimensions emerged from a synthesis of the core tenets of cognitive offloading (Risko & Gilbert, 2016), the metacognitive monitoring and control framework (Flavell, 1979), and the recent empirical literature on AI-induced metacognitive laziness (Fan et al., 2025; Gerlich, 2025). Specifically, the study investigates: (a) the purposes and contexts in which teachers deliberately offload cognitive tasks to AI assistants (Dimension 1); (b) the perceived cognitive effects of such offloading, including changes in mental effort, creative thinking, and self-efficacy (Dimension 2); (c) the critical evaluation strategies teachers employ to monitor, verify, and regulate AI-generated outputs (Dimension 3); and (d) the perceived risks and boundaries associated with excessive or uncritical offloading (Dimension 4), particularly the potential for metacognitive laziness and data security concerns. By organizing the findings around these four theoretically grounded dimensions, the study directed attention to theoretically relevant phenomena while remaining open to inductive refinement based on participant accounts. This organization moves beyond mere description to offer an analytically coherent account of how cognitive offloading to AI assistants shapes teachers' cognitive and metacognitive processes. This structure ensures that Cognitive Offloading Theory serves not merely as a background narrative but as the central interpretive lens throughout the analysis and discussion, thereby maintaining a single theoretical backbone without introducing extraneous frameworks such as cognitive load theory.

Aim of the Study

The aim of this study is to examine the perceptions of teachers who regularly use AI assistants regarding how their interactions with AI assistants are reflected in their cognitive and metacognitive processes within the context of cognitive offloading. This study, which investigates how AI tools shape teachers' cognitive processes through teachers' own experiences and views, is expected to contribute to discussions on teacher education, professional development policies, and the ethical and pedagogical use of AI in education. In this context, the study sought answers to the following research questions:

- Which professional and daily tasks prompt teachers to engage with AI assistants?
- How do teachers perceive the effects of AI assistant use on their mental effort in problem-solving, creative processes, and self-efficacy?
- What critical evaluation strategies do teachers employ when using AI assistants, and how do they perceive the phenomenon of metacognitive laziness?
- What are teachers' perspectives on the risks associated with AI assistant use, and what recommendations do they propose regarding their utilization?

Method

Research Design

In this study, a phenomenological research design was adopted in alignment with the research objectives (Merriam & Tisdell, 2016). Phenomenology focuses on exploring the essence of lived experiences and how individuals perceive a particular phenomenon. This design was appropriate because our aim was not to generalize findings across contexts but to understand in depth how teachers experience and make

sense of offloading cognitive tasks to AI assistants, specifically, how they perceive changes in mental effort, creativity, self-efficacy, and their critical evaluation strategies. By capturing teachers' subjective accounts, phenomenology allowed us to explore commonalities and variations in their cognitive offloading experiences while remaining open to meanings emerging from participants' accounts.

Participants

The study group was formed using purposive and criterion sampling methods. The inclusion criteria were: (a) having worked as a teacher for at least five years in a school affiliated with the Ministry of National Education; (b) having used an AI assistant for a professional or personal task (e.g., preparing lesson plans, creating materials, writing reports) at least three days a week over the previous three months; (c) representing diverse branches (e.g., classroom teaching, biology, Turkish, mathematics) and educational levels (primary, middle, and high school); and (d) being willing to participate in the study. Purposive sampling was employed to enable an in-depth examination of teachers with AI experience. To enhance sample diversity, different branches, educational levels, and years of experience were considered. Snowball sampling was also utilized to reach participants meeting the criteria. Sample size was guided by the concept of information power (Malterud et al., 2016), which posits that sample adequacy is determined by the richness of information provided by participants relative to the study's aim, specificity of the sample, theoretical background, and analytical approach. Given the study's focused aim of examining teachers' experiences with AI assistants, the relatively specific participant criteria, the strong theoretical framework of Cognitive Offloading Theory guiding the analysis, and the rich, detailed accounts provided by participants, the sample of 17 teachers was deemed to hold sufficient information power. The 15th interview marked a point at which participant accounts had been explored in sufficient depth and diversity to address the research questions; however, we continued to the 17th participant to ensure breadth of perspectives across disciplines and educational levels. To ensure confidentiality, participants are referred to as P1, P2, P3... (where "P" denotes "Participant"). The socio-demographic characteristics are presented in Table 1.

Table 1
Socio-Demographic Characteristics of Participants

	Age	Gender	Educational Background	Branch/Subject	Years of Experience
P1	40	Female	Bachelor's Degree	Special Education	17 years
P2	45	Male	Doctorate Degree	English	23 years
P3	41	Male	Bachelor's Degree	Mathematics	18 years
P4	42	Male	Bachelor's Degree	Technical Education	16 years
P5	55	Male	Bachelor's Degree	Chemistry	33 years
P6	42	Male	Bachelor's Degree	Geography	13 years
P7	42	Male	Bachelor's Degree	Mathematics	16 years
P8	33	Male	Master's Degree	English	7 years
P9	40	Male	Master's Degree	Physics	10 years
P10	43	Female	Bachelor's Degree	Classroom Teaching	20 years
P11	58	Female	Bachelor's Degree	Classroom Teaching	15 years
P12	35	Female	Bachelor's Degree	English	12 years
P13	45	Male	Master's Degree	Classroom Teaching	23 years
P14	63	Male	Bachelor's Degree	Theology	35 years
P15	41	Male	Bachelor's Degree	Turkish Language and Literature	15 years
P16	51	Female	Bachelor's Degree	Mathematics	29 years
P17	47	Female	Master's Degree	Turkish	18 years

Data Collection

To gather the empirical data for this study, the researchers developed a socio-demographic information form and a semi-structured interview protocol. The socio-demographic form elicited information pertaining to participants' age, gender, educational background, and professional experience. The semi-structured interview protocol comprised questions designed to explore teachers' patterns of AI assistant use, their critical evaluation of AI-generated information, and their perceptions of how AI use may be reflected in their problem-solving processes, creative thinking, and mental effort. To strengthen the

validity of the interview protocol, the semi-structured form was first shared with two experts, one specializing in artificial intelligence tools and the other in educational sciences. Their feedback guided a thorough revision of the questions. Thereafter, three pilot interviews were carried out with eligible teachers. These pilot runs confirmed the clarity and pertinence of each question, revealing no need for additional modifications.

All interviews were conducted online via platforms such as Zoom and Microsoft Teams, enabling participants to join from environments in which they felt most at ease, typically their own homes. The interviews ranged in duration from 25 to 42 minutes. The interview protocol was developed in alignment with the research questions and subsequently refined through pilot testing prior to formal data collection. Each interview was audio-recorded and later transcribed verbatim. To ensure accuracy, the transcripts were shared with participants for confirmation, a procedure known as member checking.

Prior to initiating data collection, ethical approval was secured from the Ankara University Faculty of Medicine Human Research Ethics Committee (Decision No: İ01-25-26). At the outset of each interview, participants were provided with comprehensive information regarding the purpose, scope, and procedures of the research. It was explicitly communicated that the interviews would be audio-recorded. Participating teachers were assured that all professional practice examples they shared would be presented in an anonymized format, thereby precluding any negative inferences about their institutions or students. Furthermore, teachers were informed that any information potentially revealing their identity would be excluded from the study and that they retained the right to withdraw from the research at any stage without consequence. Written informed consent was obtained from all participants prior to the commencement of each interview.

Data Analysis

Data collection and analysis proceeded in an iterative manner. All collected data were transcribed digitally. Data analysis followed Braun and Clarke's (2006, 2019) six-phase Reflexive Thematic Analysis using a theoretically informed, primarily inductive approach: (1) familiarization with the data through repeated reading; (2) generating initial codes by labeling meaningful segments; (3) developing candidate themes by collating codes into broader patterns; (4) reviewing themes to ensure coherence and distinctness; (5) defining and naming themes with clear definitions; and (6) reporting through analytic narrative and participant quotations. To honor the reflexive ethos of thematic analysis, two researchers engaged in collaborative, dialogic interpretation of the data. Rather than pursuing independent coding or inter-coder agreement—which would be epistemologically incongruent with Reflexive Thematic Analysis (RTA)—the researchers engaged in collaborative, dialogic interpretation. Each researcher brought distinct subjectivities, theoretical orientations, and experiential backgrounds to the interpretive process. The first author, who maintains a more cautious stance regarding AI in education, and the second author, who has extensive experience with AI tools and a positive orientation toward technology, engaged in ongoing reflexive discussions throughout the analysis. These discussions were not aimed at achieving consensus, but rather at critically examining how our respective positionalities shaped our interpretations, identifying areas of convergence and divergence, and enriching our understanding through the productive tension between different perspectives (Braun & Clarke, 2022). This collaborative reflexive approach honors the subjective, situated nature of interpretation while ensuring that thematic development was grounded in the data and subject to critical peer scrutiny. Consistent with reflexive thematic analysis, the researchers maintained that multiple valid interpretations of the data are possible (Braun & Clarke, 2022). To minimize researcher bias, continuous reflective notes were taken, and the validity of the findings was supported through member checking.

Additionally, the four theoretical dimensions derived from Cognitive Offloading Theory informed the initial coding structure. More specifically, they served as sensitizing concepts that guided attention to theoretically relevant phenomena. However, consistent with reflexive thematic analysis, codes and themes were not predetermined. Instead, they emerged inductively from the data while remaining attentive to the theoretical framework. For instance, although Dimension 2 anticipated 'perceived effects on creativity,' the divergent sub-themes of 'enhances creativity,' 'limits creativity,' and 'no effect on creativity' emerged inductively from participants' accounts. Similarly, the theme 'verification strategies' (Dimension 3) was anticipated theoretically but refined inductively as participants described specific

practices such as cross-checking with multiple sources, consulting experts, and evaluating information against prior knowledge.

Trustworthiness and Researcher Reflexivity

The current section addresses not only credibility, transferability, dependability, and confirmability, but also the researchers' positionalities, assumptions, and reflexive engagement with the data.

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To ensure qualitative rigor, this study addressed the four criteria proposed by Lincoln and Guba (1985). Credibility was achieved through multiple strategies. First, following each interview, verbatim transcripts were emailed to participants for member checking; all 17 participants confirmed the accuracy of their transcripts, and three suggested minor clarifications that were incorporated. Second, participant quotations were selected to represent the full range of responses across themes, including divergent perspectives on creativity. Third, the two researchers maintained detailed analytical memos throughout the coding process, documenting their interpretive decisions and rationales.

Transferability was enhanced by providing comprehensive contextual information about the sample, including participants' age, gender, educational background, subject area, and years of experience (Table 1). The purposive sampling criteria are explicitly described, enabling readers to assess the applicability of findings to similar contexts.

Dependability was established through a transparent audit trail comprising: (a) verbatim transcriptions of all 17 interviews; (b) documentation of the evolving coding process; (c) records of coding decisions and iterative theme development; (d) notes from collaborative reflexive analysis meetings; and (e) continuous reflective notes maintained throughout the analytical process.

Confirmability was supported by anchoring interpretations in participants' quotations and maintaining a reflexive journal to critically examine how researcher positionality, assumptions, and prior experiences shaped the interpretive process (Braun & Clarke, 2006, 2019). The second author, who has extensive experience with AI tools and a positive orientation toward technology, documented reflexive notes before and after each interview to critically examine how this positionality might shape interpretation. The first author, who maintains a more cautious stance regarding AI in education, served as a critical interlocutor during coding discussions, challenging interpretive assumptions and ensuring that findings reflected participant voices rather than researcher preconceptions.

Findings

This section presents teachers' patterns of AI assistant use, the perceived cognitive effects of using AI assistants, strategies developed for critical internalization and avoidance of metacognitive laziness, and recommendations regarding the daily and professional use of AI assistants.

Patterns of AI Assistant Use

The findings indicate that participants engage with AI assistants intensively, with such use having become a routine component of professional life for the majority. All teachers reported relying on AI assistants for various purposes, not only in their professional capacities but also in their daily activities. The examination of professional usage patterns reveals that participants employ AI assistants for tasks that support instructional processes, including preparing lesson plans, generating exam questions, designing in-class activities, drafting official correspondence, and writing projects. In their daily lives, teachers reported utilizing AI assistants for a range of purposes, such as seeking guidance in uncertain situations, planning and organizing, obtaining product recommendations while shopping, and accessing information quickly. The codes and themes related to participants' patterns of AI assistant use are presented in Table 2.

Table 2
Codes and Themes Related to Participants' Patterns of AI Assistant Use

Sub-Theme	Code	Participants (f)	Illustrative Quote
Professional Use	Preparing lesson plans	9 (P2, P5, P6, P7, P9, P12, P14, P16, P17)	*"In geography lessons, I usually use it for data, for exact results of numerical data like population size or statistical data."* (P6)
	Generating exam questions	10 (P3, P4, P6, P7, P8, P9, P10, P12, P14, P17)	*"I was sick over the weekend... I prepared my students' visual through AI, and it took very little time. Normally, if I were to do it myself, it would have required more effort."* (P10)
	Designing in-class activities	5 (P1, P11, P13, P16, P17)	*"We had a local product activity; I took photos related to it and created a different video with them. "* (P11)
	Preparing official correspondence	3 (P1, P5, P15)	*"To respond to official letters... I paste the text I wrote into ChatGPT or Gemini and ask it to write a response. "* (P5)
Daily Use	Information seeking	16 (P1, P2, P4, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17)	*"In daily use, I prefer it for quick access to information, designing visual or written content, and summarizing complex topics."* (P17)
	Trip planning	3 (P1, P4, P13)	*"For example, for designing and planning a trip... when you ask it about the most popular places in that city, it presents you with almost everything with a high accuracy rate. "* (P4)
	Doing repairs	4 (P3, P4, P5, P15)	*"...my dad had an electric heater. I took a photo of it. It told me to do this and that, I did it, and it worked. "* (P15)
	Creating visuals	8 (P2, P5, P8, P9, P10, P11, P12, P17)	*"The other day while browsing Instagram, I came across an AI that turns photos into animated form. I turned a few photos into animations there. "* (P5)
	Getting recommendations	8 (P1, P7, P9, P10, P13, P14, P15, P17)	*"Today I decided to buy blue light blocking glasses... What features should I look for in blue light glasses? I asked ChatGPT. "* (P1)
	Making music	2 (P9, P14)	*"While making music, it sometimes helps me with lyrics. "* (P14)
	Emotional support	4 (P1, P9, P14, P17)	*"...regarding the attitude I should adopt in a dialogue related to a relationship, I sometimes treat ChatGPT as an online therapist. "* (P9)

Note: Frequencies (f) indicate the number of participants who reported engaging in the specified practice. Codes are not mutually exclusive; participants often reported multiple practices across sub-themes.

It was observed that participants particularly resort directly to AI assistants for some tasks that they should professionally perform themselves, especially in situations where they feel intense time pressure to complete a task. The findings presented under this subheading indicate that AI assistants are widely used in teachers' professional and daily lives, and that this use is primarily shaped around purposes such as supporting instructional processes, using time more efficiently, and ensuring quick access to information.

Perceived Impact of AI Use on Mental Effort, Creativity, and Self-Efficacy

The findings revealed that participants perceive AI assistants as exerting discernible effects on three interrelated dimensions: the mental effort required to solve problems, their creative capacities, and their self-efficacy in confronting problem-solving situations. Notably, all teachers interviewed reported that utilizing AI assistants positively influences their mental effort by substantially reducing it. With respect to creativity, however, participants' perceptions diverged: while some teachers viewed AI as enhancing their creative processes, others perceived it as limiting, and a minority reported no discernible effect on their creativity whatsoever. Regarding self-efficacy, a unanimous consensus emerged: all teachers stated that the availability of AI assistants renders them more confident in their ability to address problems as they arise. This confidence seems to come from how easily and quickly they can get AI support. The codes and themes pertaining to participants' perceptions of mental effort, creativity, and self-efficacy are presented in Table 3.

Table 3
Codes and Themes Related to Participants' Perceptions of Mental Effort, Creativity, and Self-Efficacy

Sub-Theme	Code	Participants (f)	Illustrative Quote
Perception of Mental Effort	Reduces mental effort	17 (All participants)	*"It saves time and makes the job a little easier... it does what I would do and makes the job intellectually easier for me. "* (P7)
Perception of Creativity	Enhances creativity	11 (P2, P3, P4, P5, P6, P12, P13, P14, P15, P16, P17)	*"In terms of creativity, when I'm stuck, it's an incredible source of inspiration... it offered connections I wouldn't have thought of."* (P3)
	Limits creativity	5 (P1, P8, P9, P10, P11)	*"I think the more you get into it, it definitely kills thinking and that creativity. Because I don't want that, I try to use it only as a last resort."* (P10)
	No effect on creativity	2 (P4, P7)	*"I mean, regarding creativity... it wasn't very sufficient, I didn't find it very sufficient. "* (P7)
Perception of Self-Efficacy	Increases self-efficacy	17 (All participants)	*"...I'm someone who asks a lot of questions to my colleagues... it has created a space for me where I can always ask questions at my fingertips and further develop my own ideas. "* (P12)

Note: Frequencies (f) indicate the number of participants who reported the specified perception. Codes are not mutually exclusive.

The findings obtained under this subheading indicate that participants perceive AI assistant use in different ways in the contexts of mental effort, creativity, and self-efficacy. These results reveal that AI use is perceived by teachers as a tool that reduces mental effort and provides support in problem-solving processes; however, its effect on creativity varies depending on participants' experiences.

Critical Evaluation Strategies and Perceptions of Metacognitive Laziness

The findings revealed that teachers primarily utilize AI assistants to access information, generate ideas, and explore alternative approaches to problem-solving. Notably, all participants reported that they do not accept AI-generated outputs verbatim, particularly for matters they deem significant. Instead, they engage in critical evaluation by comparing these outputs with multiple information sources, their own prior knowledge, and past experiences. Participants said that they rarely fact-check simple or low-risk information from AI. Conversely, content that directly affects their personal or professional responsibilities is subjected to a more rigorous evaluation process. Although teachers acknowledged that AI tools reduce the cognitive effort required for problem-solving, they also expressed concern that reliance on AI could foster mental laziness in themselves and others. The codes and themes related to participants' critical evaluation strategies and their reflections on avoiding metacognitive laziness are presented in Table 4.

Table 4

Codes and Themes Related to Participants' Critical Evaluation Strategies and Thoughts on Metacognitive Laziness

Sub-Theme	Code	Participants (f)	Illustrative Quote
Critical Evaluation	Consulting an expert	1 (P10)	*"I mean, accepting it directly doesn't feel right; it seems more logical as I get opinions from experts. "* (P10)
	Checking with another AI tool	6 (P4, P5, P9, P11, P15, P17)	*"I want to verify the information... For instance, whether from Google or other AI tools, if the information matches, I approach it more favorably, but I still don't believe it is 100% reliable. "* (P4)
	Evaluating the suitability of the received answer	17 (All participants)	*"I update it again according to my own suitability, my lifestyle, my culture, and also depending on the context of the question asked."* (P1)
	Not verifying factual and low-risk information	3 (P8, P9, P13)	*"...for simple information... 'how many kilometers is the distance from Earth to the moon,' we can believe it without needing to research or check it. "* (P9)
Metacognitive Laziness	Risk of metacognitive laziness	10 (P1, P2, P3, P6, P8, P9, P11, P15, P16, P17)	*"...I get lazy when preparing my exams and quizzes. Normally, I could sit down and write a two-paragraph reading text myself, but there I have it prepare a text just with a prompt. This makes me a little lazy... mentally, I think it makes me lazy. "* (P8)

Note: Frequencies (f) indicate the number of participants who reported the specified strategy or concern. Codes are not mutually exclusive; participants often reported multiple strategies and concerns.

The findings obtained under this subheading indicate that teachers generally adopt a critical evaluation approach when utilizing AI assistants and are aware of the risk of metacognitive laziness.

Risks and Recommendations Regarding the Use of AI Assistants

Participants reported that AI assistants may occasionally generate inaccurate information, emphasizing that outputs should not be accepted uncritically. They stressed that the accuracy of scientific, medical,

or pedagogical content, in particular, requires verification through alternative sources. Beyond concerns about information reliability, teachers also drew attention to ethical issues and data security risks. The sharing of personal data, threats to privacy, and uncertainties surrounding data storage practices were identified as significant areas of concern.

In light of these risks, participants emphasized the need for users to exercise caution and for appropriate ethical safeguards to be implemented. Teachers further noted that unsupervised use of AI assistants, especially among children and adolescents, could entail psychosocial risks. Accordingly, eight participants highlighted the importance of establishing content-based and age-appropriate regulations, as well as measures to limit usage time for these technologies. Finally, teachers advocated for the integration of AI literacy training for both students and educators to promote the safe and responsible use of AI assistants. The codes and themes related to participants' perceptions of risks and their recommendations are presented in Table 5.

Table 5

Codes and Themes Related to Risks and Recommendations Regarding the Use of AI-Powered Assistants

Sub-Theme	Code	Participants (f)	Illustrative Quote
Risks	Unauthorized use of data	3 (P1, P11, P15)	*"...the information it presents... could have been collected from sources without permission. "* (P11)
	Addiction	4 (P1, P7, P9, P14)	*"I actually mentioned a possible threat for myself, it could be addiction. "* (P7)
	Presentation of incorrect information	6 (P3, P4, P9, P10, P13, P14)	*"I think the information obtained from there should never be used directly... the information it gives shouldn't be believed blindly. I think that's its biggest negative aspect right now. "* (P4)
	Inability to distinguish real from virtual	1 (P10)	*"Also, we can't really distinguish between real and virtual, that is actually a very dangerous situation. "* (P10)
	Security vulnerability	3 (P1, P5, P9)	*"...I take the statement and upload it to AI... But there's also the danger that my card information could be stolen there. "* (P9)
Recommendations	Evaluate outputs critically	5 (P3, P11, P12, P13, P16)	*"It should be used with control... it should be verified with other sources, research should be done. "* (P11)
	Impose limits on AI use	8 (P3, P5, P7, P8, P10, P11, P12, P13)	*"...at least a certain age range... I think there could be a filter like that. "* (P5)
	Ensure ethical use	6 (P2, P8, P9, P14, P16, P17)	*"...these uses should be within the framework of ethical rules and should not be shared with other parties. I think that's the most important measure to be taken. "* (P9)
	Promote AI literacy	9 (P2, P3, P6, P8, P12, P14, P15, P16, P17)	*"Everyone should learn at a basic level how AI works, its strengths and weaknesses, and the risks of bias. "* (P2)

Note: Frequencies (f) indicate the number of participants who reported the specified risk or recommendation. Codes are not mutually exclusive; participants often reported multiple risks and recommendations.

The findings obtained under this subheading show that participating teachers expressed awareness of risks related to accuracy, ethics, and data security concerning the use of AI assistants. Participants expressed that precautions related to verification, regulation, and AI literacy are necessary for safe and responsible use.

Discussion, Conclusion and Suggestions

Addressing Dimension 1 (purposes and contexts of offloading), the findings indicate that participants reported frequently resorting to AI assistants in both professional and daily contexts. In everyday contexts, teachers turn to AI for coping with uncertainties, planning and organizing activities, and accessing information expeditiously. Professionally, they employ AI assistants for tasks encompassing lesson plan preparation, examination question generation, in-class activity design, and project writing. These findings align closely with those of Önderöz and Karabay (2024), who reported that primary school teachers utilize AI technologies for text creation, visual generation and editing, and various classroom purposes, both for instructional delivery and their own professional learning. Similarly, ElSayary (2024) revealed that teachers employ ChatGPT in lesson planning, teaching, and learning processes. Notably, all teachers interviewed perceived that utilizing AI assistants positively influences their mental effort by substantially reducing it. This perception aligns with established conceptualizations of cognitive offloading practices (Risko & Gilbert, 2016; Storm & Stone, 2015), suggesting that participants experienced AI-assisted cognitive offloading, when deployed judiciously, as a mechanism that supports rather than undermines pedagogical decision-making capacity. However, as a phenomenological study of perceptions, we cannot claim objective changes in cognitive functioning; rather, these findings reflect participants' subjective experiences and interpretations.

The findings illuminate a theoretically significant distinction between productive and excessive cognitive offloading. In Cognitive Offloading Theory, Risko and Gilbert (2016) conceptualize strategic offloading as a goal-directed and task-appropriate allocation of cognitive resources that enhances efficiency without compromising cognitive capacity. This pattern was evident among participants who reported using AI for time-consuming but routine tasks such as lesson planning and material design, which enabled them to redirect mental energy toward higher-order pedagogical considerations. Conversely, participants also expressed awareness of the boundary between productive and excessive offloading. Several participants noted that reliance on AI for exam preparation or content generation could lead to reduced personal engagement with the subject matter. This awareness reflects what Carr (2010) terms "cognitive laziness, " which is a tendency to delegate thinking rather than engage in it. The present findings suggest that participants perceive productive offloading as a choice, meaning a deliberate decision to allocate resources strategically. In contrast, excessive offloading is experienced as a habit or dependency that may diminish cognitive engagement. This distinction has important implications for understanding the conditions under which AI assistants support professional cognition versus undermine it.

With respect to Dimension 2 (perceived cognitive effects), the findings reveal that teachers perceive AI assistants as exerting discernible effects on mental effort, creativity, and self-efficacy. Regarding creativity, teachers perceive AI assistants as simultaneously facilitating and limiting. Notably, the majority of participants reported that AI exerts a positive influence on their creative processes. This perception is corroborated by Çetinkaya and Taşkaya (2025), who similarly found that participants in their study reported that AI use positively affects creativity. However, a minority perceived AI as limiting their creativity, and two participants reported no discernible effect. These divergent perceptions suggest that the experienced relationship between AI use and creativity is not monolithic but depends on individual factors such as baseline creative ability and metacognitive strategy use.

The finding that participants diverged in their perceptions of AI's effects on creativity requires theoretical explanation. Recent empirical research offers a potential resolution. Doshi and Hauser (2024) found that AI support significantly enhanced creativity for individuals with low baseline creative ability, which suggests that AI may serve as a 'creative leveling tool.' Conversely, Sun et al. (2025) demonstrated that AI assistants increased creativity most markedly for participants who possessed high levels of metacognitive strategies, whereas those with low metacognitive strategies benefited less. These findings suggest that the divergent perceptions observed in our study may reflect individual differences in

baseline creative ability and metacognitive strategy use. Participants who perceived AI as enhancing creativity may have employed metacognitive strategies, such as using AI to generate ideas that they then refined and transformed. In contrast, those who perceived AI as limiting creativity may have engaged less critically with AI-generated outputs, potentially experiencing a sense of creative displacement. Conversely, Seyrek et al. (2024) found that teachers expressed concerns that AI use might negatively affect creativity and originality over time. Döğer and Göçen (2025) also caution that overreliance on AI may inhibit critical thinking and genuine learning if students accept AI-generated content without question. Taken together, these divergent findings suggest that participants' perceptions of the relationship between AI use and creativity depends on individual factors such as baseline creative ability and metacognitive strategy use. Teachers should therefore consider these risks when using AI. However, as a phenomenological study, we cannot confirm these mechanisms. Future research is needed to investigate the individual and contextual factors that mediate the relationship between AI use and perceived creativity.

With respect to self-efficacy, participants perceived that their ability to access AI assistants readily in challenging situations enhances their self-confidence. Rodríguez-Ruiz et al. (2025) found that low self-efficacy increases the likelihood of employing AI to accomplish academic tasks. In a complementary vein, Estrada-Araoz et al. (2025) concluded, based on a student sample, that an inverse and significant relationship exists between academic self-efficacy and dependence on AI. These perceptions suggest that for regular AI users, the technology may serve both to support perceived self-efficacy and, under certain conditions, to assume a compensatory function. This duality raises a critical question for future inquiry: whether the observed increase in perceived self-efficacy derives from the individual's own competence or from trust vested in the AI tool itself.

Turning to Dimension 3 (critical evaluation strategies), the findings revealed that participating teachers reported they do not accept AI-generated outputs verbatim but engage in deliberate verification practices that reflect their metacognitive monitoring. Additionally, the participants expressed concerns about the risk of metacognitive laziness, particularly when they relied on AI for routine tasks such as preparing exam questions. However, as a phenomenological study of perceptions, we cannot claim objective evidence of metacognitive decline or laziness. Rather, participants' accounts reflect their awareness of and concerns about potential cognitive risks associated with AI dependence. Corroborating this perspective, Georgiou (2025) found that AI tools may encourage students to become 'lazy thinkers,' thereby potentially diminishing their cognitive engagement when they become excessively dependent on applications such as ChatGPT. Further empirical evidence has similarly documented that overreliance on AI tools may amplify technological dependence and, in turn, trigger metacognitive laziness (Çam et al., 2021; Deng & Deng, 2025; Fan et al., 2025). However, these studies employ different designs and populations; the extent to which these findings apply to the teaching profession requires further investigation.

Importantly, it is crucial to distinguish between participants' expressed concerns, which are the focus of this phenomenological study, and objective evidence of metacognitive decline. The data do not permit claims about actual changes in participants' metacognitive functioning, critical thinking abilities, or cognitive capacities. Rather, what the data show is that participants are aware of, reflect upon, and sometimes experience ambivalence about their reliance on AI assistants. This metacognitive awareness itself is a significant finding. It suggests that participants are not passive consumers of AI but actively monitor their own cognitive engagement and make deliberate choices about when and how to offload. This awareness may serve as a protective factor against excessive or uncritical offloading. However, the question of whether sustained AI use leads to objective cognitive changes, and under what conditions, remains an empirical question requiring longitudinal and experimental investigation.

Participants' deliberate verification strategies provide compelling evidence of metacognitive monitoring in action. These strategies include cross-checking AI outputs with multiple sources, consulting experts, evaluating information against prior knowledge, and personalizing content. Flavell's (1979) metacognitive framework distinguishes between metacognitive knowledge, which is awareness of one's cognitive processes, and metacognitive control, which is regulation of these processes. Participants' critical evaluation practices reflect both dimensions. Their awareness that AI may generate inaccurate information demonstrates metacognitive knowledge, and their active regulation of AI-generated outputs

through systematic verification demonstrates metacognitive control. Notably, participants reported applying these verification strategies selectively. They engaged in more rigorous evaluation for information with pedagogical or professional consequences, whereas they accepted factual or low-risk information with limited scrutiny. This pattern aligns with the concept of 'situation-dependent metacognitive engagement' (Efklides, 2008), which suggests that participants' monitoring and control strategies are calibrated to perceived task demands and stakes. In relation to Dimension 4 (risks and boundaries), the study further revealed that participating teachers expressed concerns regarding data security when using AI assistants. Yaman and Başaran (2025) found that participants in their study similarly perceived AI as posing data security risks, expressing apprehension that data entered into systems could be compromised. These findings suggest that participating teachers perceive data security as an important concern in AI use. Rather than calling for legal sanctions, this concern points to a need for greater awareness of data privacy and may support broader professional and institutional discussions about appropriate safeguards.

Participants' concerns regarding children and adolescents suggest that teachers view AI use not only as a matter of efficiency but also as an issue carrying ethical and developmental responsibilities. AI usage may entail risks including students' impaired social skill development, superficial learning supplanting deep learning, and cognitive decline consequent to excessive AI dependence (Altun, 2024). Given that the impact of digital technologies is largely mediated by the quality of adult guidance (Third et al., 2017), the teacher's role in shaping AI usage assumes critical importance. Taken together, the findings suggest that participating teachers perceived AI use in teaching as involving more than technical proficiency alone and expressed views that greater emphasis on self-regulation and metacognitive awareness in teacher education would be beneficial. However, these conclusions are limited to the perceptions of the 17 participants and should not be read as causal or objective claims about cognitive change.

Given the concerns raised by participants, future policy discussions may benefit from clearer institutional and legal guidance regarding ethical AI use and data privacy protection. Based on participants' reported experiences and needs, the following recommendations are offered as implications for educational practice and policy:

- AI Literacy Curriculum: Participants expressed concerns about the accuracy and reliability of AI outputs, and they explicitly recommended AI literacy training. Therefore, teacher education programs should incorporate instruction on the ethical, pedagogical, and cognitive dimensions of AI tools. Such programs should address the limitations of AI, risks of bias, and strategies for critical evaluation. This recommendation responds directly to participants' expressed need for greater awareness and competence in using AI tools responsibly.
- Metacognitive Awareness Training: Participants' reported verification strategies reflected metacognitive monitoring, and they expressed concerns about metacognitive laziness. Consequently, pre-service teachers may benefit from instruction in metacognitive strategies designed to develop their capacities for monitoring, regulating, and evaluating their own thinking processes during AI engagement. Such training would help teachers maintain critical awareness of their cognitive offloading practices and make more informed decisions about when and how to rely on AI support.
- Pedagogical Integration Guidance: Participants reported both positive and limiting effects of AI on creativity, and they expressed the need for examples of appropriate pedagogical use. The findings therefore suggest a need for practical guidance on how AI can be used in pedagogically appropriate ways without displacing teachers' professional judgment. This guidance should illustrate how AI can complement rather than replace teachers' instructional expertise and creative decision-making.
- Critical Evaluation Strategies: Participants reported engaging in deliberate verification practices such as cross-checking AI outputs, validating information against prior knowledge, and personalizing content. Educators therefore need practical guidance on these strategies to support informed and critical AI use. Such guidance would help teachers develop systematic approaches to evaluating AI-generated information and maintaining their professional autonomy.

- Balanced Offloading: Participants expressed awareness of the boundary between productive and excessive offloading. Schools should therefore encourage reflective use of AI that reduces time pressure and mental effort without fostering metacognitive laziness. This recommendation emphasizes the importance of intentional and strategic AI use rather than habitual or uncritical reliance on AI tools.
- Ethical Guidelines, Data Security, and Privacy: Participants raised concerns about data security, ethical use, privacy, and appropriate use among children and adolescents. Educational institutions should therefore formulate policies defining ethical principles related to AI use, data privacy protocols, and age-appropriate usage limitations. Institutions should also promote clear data privacy practices and facilitate informed discussions about safeguarding personal and professional information. These recommendations are grounded in participants' expressed concerns and should be developed through ongoing dialogue among educators, administrators, and policymakers.

These recommendations are grounded in participants' expressed experiences and concerns. They should be developed through ongoing dialogue among educators, administrators, and policymakers to ensure that AI integration in education is both effective and ethically sound.

Limitations and Future Directions

The phenomenological design employed in this study prioritizes depth of understanding over breadth of generalizability. Accordingly, the findings reflect the subjective experiences of 17 teachers who regularly use AI assistants and should not be generalized to all teachers or educational contexts. The study's examination of teachers' AI assistant practices within the framework of Cognitive Offloading Theory constitutes a significant theoretical strength. This approach enabled investigation of AI-supported teacher cognition not merely in its functional or technological dimensions but also in relation to underlying cognitive and metacognitive processes. Future research employing qualitative, quantitative, or mixed methods with larger and more diverse teacher samples would contribute to deepening and refining the conceptual framework. Furthermore, longitudinal investigations are expected to illuminate how individuals' patterns of AI assistant usage and their perceptions thereof transform over time, thereby facilitating a more comprehensive assessment of the continuity and potential risks associated with cognitive offloading processes.

Acknowledgment

Ethics Statement: In this study, we declare that the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with and that we do not take any of the actions based on "Actions Against Scientific Research and Publication Ethics.

Institutional Review Board Statement: Ethical approval for the study was obtained from the Ankara University Faculty of Medicine Human Research Ethics Committee on 15 January 2026 (Decision No. I01-25-26).

Author contributions: Ş.E.: Project Administration, Methodology, Litarature, Data Curation, Analysis, Writing the Original Draft, Visualization, Validation. M.F.D.: Conceptualization, Methodology, Litarature, Investigation, Review and Editing, Translation, Validation

Funding: This research received no funding.

Data Availability Statement: The interview datasets generated and analyzed during the study are not publicly deposited to protect participant confidentiality. They may be made available from the corresponding author upon reasonable request, subject to institutional ethical guidelines and the original informed consent agreements

Conflict of Interest: Authors declare that there is no conflict of interest among authors.

Generative Artificial Intelligence Statement: During the preparation of this work, the authors used DeepSeek for language editing and grammar checking only. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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