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UTILIZING ARTIFICIAL INTELLIGENCE AS EXTENDED COGNITION: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS OF LIS GRADUATE STUDENTS

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Abstract
This study examines how graduate students in Library and Information Science (LIS) in Indonesia experience generative artificial intelligence (AI) in their academic work and how disciplinary and professional backgrounds shape that experience. Using Interpretative Phenomenological Analysis (IPA), six LIS master's students who regularly used AI for academic purposes took part in semi-structured interviews. Analysis involved initial noting, case-level theme development, within-case interpretation, and cross-case comparison. Four themes were developed: AI as epistemic infrastructure; efforts to preserve cognitive autonomy amid dependency; AI as both a cognitive and affective space; and the uneven influence of LIS-related professional dispositions. Two recurring patterns were also identified. Epistemic hierarchy reversal describes participants' tendency to consult AI before conventional sources, while evaluative offloading refers to cases in which AI became a reference point for judging one's own ideas. The interviews were consistent with cognitive offloading and, in some cases, possible cognitive coupling, but participants also described deliberate efforts to protect authorship, independent judgment, and cognitive boundaries. LIS-related habits appeared in verification, citation, information organization, and ethical reflection, although not uniformly. The study adds an idiographic account of how generative AI can become woven into academic thinking without assuming that routine use is equivalent to extended cognition. It also points to practical questions for LIS education around information evaluation, authorship, and ethical use of AI

Keywords: artificial intelligence; extended cognition; cognitive offloading; interpretative phenomenological analysis; library and information science

INTRODUCTION

Generative AI systems are changing how academic knowledge work is carried out. These systems can generate, compare, summarize, and transform text, while recent scholarship has raised questions about how AI may influence users' belief revision and epistemic agency

(Coeckelbergh, 2026), how the agency displayed by large language models differs from human intelligence (Floridi, 2023), and how AI-based cognitive extenders may become part of hybrid forms of human agency (Telakivi et al., 2026). These questions are especially important in higher education, where independent reasoning is both part of the learning process and one of its intended outcomes. The extended cognition framework offers one way to understand this change (Clark & Chalmers, 1998). It holds that cognition need not be confined to the brain: when an external resource is reliably integrated into a person's cognitive routines and performs functions that would otherwise be handled internally, it may become part of the cognitive process itself. The idea has been applied to notebooks, calculators, smartphones, and other forms of cognitive offloading (Risko & Gilbert, 2016). Generative AI presents a particularly significant case because it can contribute actively to processes of generation, comparison, and evaluation. Such collaboration can be situated within humans' broader tendency to build hybrid thinking systems that incorporate non-biological resources (Clark, 2025).

Library and Information Science (LIS) is a useful setting for examining these questions. The field has long been concerned with how information is organized, evaluated, accessed, and mediated, and recent work has examined the growing use of AI in library operations, information services, search, and discovery (Jha, 2023; Lund & Wang, 2023). LIS graduate students occupy two positions at once: they use generative AI for academic work, while also preparing for or already working in roles where judgments about sources, authority, citation, and information quality matter. This makes their experience especially relevant for examining how AI enters everyday academic routines and how those routines are judged from within a professional information culture.

The issue also intersects with personal knowledge management (PKM), understood as the practices through which individuals organize, integrate, retrieve, and use knowledge in their personal and professional lives (Nazeer et al., 2025). Generative AI can participate in these practices by supporting the retrieval, synthesis, and reorganization of information on demand. In this study, PKM is used only as a sensitizing concept for attending to how participants organize and make use of knowledge generated through AI interaction; it is not treated as a separate analytical framework.

Research on AI in education has grown quickly, but much of the literature has focused on broad questions of opportunity, risk, adoption, or competence. Generative AI, for example, has been discussed as a student-driven innovation in higher education (Dai et al., 2023), while other studies consider the opportunities and risks associated with large language models (Kasneci et al., 2023). Less is known about how graduate students themselves make sense of AI when it becomes part of the way they search, compare, draft, and evaluate ideas. There is also limited attention to how they distinguish their own thinking from AI-generated suggestions or how disciplinary habits enter that process. These questions are particularly relevant in LIS because source evaluation, authority, citation, and information organization are part of the field's professional formation. A first-person account can therefore show how recurrent AI use is experienced from within academic practice rather than treating it only as adoption of a new tool.

Interpretative Phenomenological Analysis (IPA) was chosen because the study is concerned with how participants understand an experience that has become meaningful in their academic lives (Smith et al., 2009). IPA's double hermeneutic is useful here: participants interpret their encounters with AI, and the researcher in turn interprets those accounts. Its idiographic emphasis also keeps differences between cases visible before looking for patterns

across the group. This is important because recurrent AI use should not be treated in advance as evidence of extended cognition; the question is how participants experience and make sense of that integration.

The study therefore asks: how do LIS graduate students in Indonesia experience generative AI as part of their academic cognitive practices, and how do their disciplinary and professional backgrounds shape those experiences? The study uses extended cognition as an interpretive framework while paying particular attention to verification, information organization, authorship, and ethical reflection in participants' accounts.

RESEARCH METHOD

This study adopted Interpretative Phenomenological Analysis (IPA) as its primary methodological approach. IPA is a qualitative method concerned with how individuals make sense of significant experiences in their personal and social worlds (Smith et al., 2009). Its foundations draw on phenomenology, including Husserl's ideas of bracketing and epoche and Heidegger's emphasis on being-in-the-world, as well as on hermeneutics. The method's double hermeneutic - the researcher making sense of a participant who is, in turn, making sense of an experience - is particularly appropriate for a phenomenon that involves reflection on cognition, authorship, identity, and the use of AI.

Participants were recruited through purposive sampling using three criteria: (1) current enrollment in a graduate LIS program, particularly at the master's level; (2) regular use of AI tools for academic purposes, defined as at least three sessions per week; and (3) willingness to take part in an extended reflective interview. Six participants (P01-P06) were recruited, a sample size consistent with IPA recommendations for postgraduate research (Smith et al., 2009). Four participants were female and two were male, with ages ranging from 30 to 33 years. All were employed in library or information-related positions while pursuing graduate study. Because participants were simultaneously engaged in LIS graduate education and library- or information-related professional work, the study treats professional identity as a situated formation shaped by both disciplinary training and ongoing professional experience. The analysis does not attempt to isolate the causal contribution of formal education from workplace experience; instead, it examines how participants themselves attributed particular AI practices, values, and judgments to their LIS background. Participant identities were anonymized in accordance with the study's ethical procedures.

Table 1. Participant Profiles

Code	Age	Gender	Library Type	Primary AI Tools	Use Frequency
P01	32	F	Public/Government Library	ChatGPT, Gemini, Elicit, NotebookLM	Daily
P02	32	F	Academic Library	ChatGPT Plus, Gemini, Perplexity, SciSpace	Daily
P03	30	M	Public/Government Library	ChatGPT, Claude (paid)	4–5×/week
P04	30	M	Public/Government Library	Claude (paid), Gemini, ChatGPT	Daily (>5×)

Code	Age	Gender	Library Type	Primary AI Tools	Use Frequency
P05	30+	F	Academic Library	Gemini, ChatGPT (free)	Daily
P06	33	F	Public/Government Library	ChatGPT Plus, NotebookLM, Gemini	Daily

Data were collected through individual, semi-structured in-depth interviews conducted by video conference. Each interview lasted approximately 55 to 80 minutes. The interview guide covered four broad areas: (a) participants' history and context of AI adoption; (b) their experience of AI-assisted cognitive processes during academic tasks; (c) how they managed and organized knowledge produced through AI interaction; and (d) their reflections on cognitive autonomy, dependency, and professional identity. All interviews were audio-recorded and transcribed verbatim. Interviews conducted in Indonesian were translated into English by the researcher during manuscript preparation, with the language-support tools described below used to assist linguistic accuracy while the researcher retained responsibility for meaning and contextual interpretation.

Analysis followed four stages of IPA (Smith et al., 2009). First, each transcript was examined through initial noting, including descriptive, linguistic, and conceptual comments. Second, these notes were developed into emergent themes at the case level. Third, relationships, tensions, and connections among themes were explored within each case. Finally, patterns of convergence and divergence were examined across all six cases to develop the superordinate and main themes reported below. PKM informed the researcher's attention to participants' knowledge-organizing practices, but themes were developed through the IPA process rather than derived from predefined PKM categories. Analytical rigor was further supported through a reflective research journal, member checking, and peer debriefing.

During manuscript preparation, Anthropic Claude Sonnet 4.6 and OpenAI GPT-5.6 Sol were used as language-support tools for translation from Indonesian into English, including translation of interview excerpts and parts of the manuscript. Their use was limited to improving linguistic accuracy while retaining the original meaning and context. Coding was carried out manually by the researcher using a spreadsheet-based system. All interpretive work—including initial noting, development of emergent themes, cross-case analysis, and formulation of the four superordinate themes—was undertaken by the researcher. The authors remain fully responsible for the accuracy, validity, and originality of the study.

RESULT AND DISCUSSION

Four main themes were developed across the six cases. They capture a shared change in how participants approached academic information, while retaining important differences in how each person used and understood AI. The discussion moves from changes in knowledge seeking to cognitive autonomy, affective experience, and professional identity. Two expressions, cognitive gap and anti-plek, come directly from participants. By contrast, epistemic hierarchy reversal, evaluative offloading, and paradox of efficiency are labels used by the researchers to describe recurring patterns in the interviews.

AI as Epistemic Infrastructure

Across all six cases, participants described a marked change in the way they approached academic information and problem solving. Activities that had previously begun with books, databases, search engines, or consultation with other people now often began with an AI system. Although this shift was shared, the way participants incorporated AI into their routines differed substantially, ranging from simple use of one or two familiar tools to deliberately designed multi-tool workflows.

P01 described the most elaborate multi-tool arrangement in the sample. She assigned different systems to different tasks: Elicit for locating references, ChatGPT for comparing concepts, Gemini for cross-checking, and NotebookLM for visualization and synthesis. Rather than treating these tools as interchangeable, she positioned each one within a larger workflow. Her account emphasized active coordination rather than reliance on a single system:

"I don't use just one AI. When I need to execute a task, I usually use several types of AI. It depends on what the context needs at that moment. (P01)"

P04 used a different and more explicitly engineered strategy. He developed what he called a prompt-generator system: one AI interaction was used specifically to create personas and prompts for a second AI that would carry out the substantive academic task. His workflow therefore involved a sequence linking his own judgment, a prompt-generating AI, and a task-execution AI.

P05 sat at the other end of the spectrum. She relied mainly on Gemini and ChatGPT and chose between them largely on the basis of familiarity. P02 occupied a middle position, moving among Perplexity, ChatGPT Plus, Gemini, and SciSpace according to the task. She also returned to earlier AI conversations when she needed information discussed previously, treating her conversation history as a retrievable archive.

Despite these differences in tool choice, one pattern was consistent: AI had moved to the beginning of participants' information-seeking routines. P02 put the shift plainly: 'For the first step, I look for it there, AI, first, not to Google anymore.' P04 described a similar inversion: 'The way of thinking has reversed. Before, we took from primary sources first; now we go to AI first, then to the primary sources.' We use the analytical label epistemic hierarchy reversal to describe this recurring reordering of the sequence through which participants approached information sources.

Participants also used AI to assess the adequacy of their own ideas. P01, for example, described needing to 'verify' or 'validate' an idea through AI before feeling confident in it. Similar accounts indicated that AI was not used only to retrieve or generate information; for some participants, it also became a point of reference for judging whether their own reasoning was acceptable. We use the analytical label evaluative offloading for this pattern, distinguishing it from participants' own terminology.

Cognitive Autonomy in the Face of AI Dependency

Deep integration did not mean that participants accepted AI use without reservation. All six described some attempt to protect their ability to think independently, although the form and intensity of these efforts varied. These strategies were developed through personal experience rather than formal instruction.

P01 followed a habitual sequence before using AI: she first made a handwritten mind map so that her own ideas were visible before she consulted a system. She described this as a

way of protecting her 'pemikiran asliku' (original thinking). Writing on paper felt more natural and more personally owned than beginning directly in a digital environment.

P03 used a different form of separation. He deliberately left what he called a 'cognitive gap' between consulting AI and beginning to write so that he could recover a sense of his own reasoning and avoid carrying AI-generated phrasing directly into his text:

> *"Sometimes when I've discussed too much with it, when I start writing, I think: 'Was this purely my thinking or mixed with the AI's thinking?' That's why I always try to give a gap or pause. After asking, I don't write immediately. So that it gets filtered again by my own brain. (P03)"*

P04 described the most explicit self-regulation framework in the group. At its center was what he called the anti-plek principle: he would not reproduce AI output verbatim, but would revise, assess, and rework it before use. He also separated domains in which he was willing to rely heavily on AI from forms of human interaction that he wanted to preserve without AI mediation.

P05's strategy was less structured. She mainly cross-checked references when an AI response seemed questionable, a habit that developed after encountering inaccurate or fabricated citations. Her approach was therefore reactive rather than preventive.

A concern that appeared repeatedly was the possibility of cognitive atrophy. Participants worried that sustained reliance on AI might gradually reduce their ability to reason without it. P01 expressed this fear directly:

> *"There is a fear that one day I am asked to think but without AI, I suddenly go blank. Although when we use AI we are still thinking, the fear is that AI has made my thinking capacity decline. (P01)."*

P01 understood this concern by comparing her present experience with her undergraduate years, when she had been able to build arguments, find sources, and write without generative AI. She now experienced the same work as heavier, slower, and more uncertain when AI was absent. P06 expressed a similar concern through the concept of cognitive sovereignty encountered in her coursework, stating that 'if cognitive sovereignty is taken away, one is no longer fully human.'

Participants also described a tension between efficiency and the experience of learning. AI made academic work faster, but speed sometimes reduced the satisfaction they once associated with the difficult process of developing an idea. P01 summarized this change: 'Before, getting one paragraph felt amazing, wow. But now, getting one paragraph feels like: why is this all?' We refer to this researcher-developed analytical pattern as the paradox of efficiency.

AI as Both Cognitive and Affective Space

Participants did not experience AI only as an instrument for completing cognitive tasks. They also described it in affective and relational terms. The metaphors they used included mentor, teacher, friend, companion, confidant, consultant, discussion partner, and close friend, indicating that AI occupied different relational positions in their everyday academic lives.

P01 referred to AI as a mentor (pembimbing), emphasizing its role in pointing out weaknesses and directing revision. P02 used a broader vocabulary: depending on the situation, AI could be a 'teacher, friend, companion, even a partner when one is lonely.' P03 called it a teman curhat, or confidant, and described discussing both academic issues and everyday

concerns. P05 used the term sahabat dekat ('close friend'), while P06 preferred more distanced terms such as 'consultant' and 'discussion partner.'

AI also functioned as a low-risk place to ask questions, particularly for P02 and P06. Both described situations in which embarrassment or fear of being judged made it difficult to ask another person a question that might seem basic. P02 explained: 'Because I'm an introvert, I'm sometimes embarrassed to ask people directly. So I look it up in GPT first.' P06 described the same dynamic in greater detail:

> *"Whatever the question, we can express it there without feeling awkward, unlike with friends or lecturers, where there's still a sense of embarrassment, fearing our question will seem trivial. (P06)"*

Participants' reactions to the possibility of losing access to AI also varied in intensity. P03 anticipated disappointment but mainly as an inconvenience. P01 said that life without AI would feel 'tidak berwarna' ('without color'). P02 recalled feeling emptiness (kosong) when a shared account was suspended for about a month. P05 said she would be 'enggak seneng' (not happy) and linked that feeling to dependency. P06 described the strongest response:

> *"Honestly, it would be frightening, especially right now. It would become very obstructive, because it is truly a private mentor. So if AI is not there, I'd be confused about how to do the assignments. I'd be in a panic. (P06)"*

LIS Professional Identity in AI Engagement

LIS training influenced AI use in all six cases, but the effect was uneven and was not always consciously recognized by participants. The strongest explicit influence appeared in the accounts of P01 and P04, while other participants described more selective, implicit, or contested connections between disciplinary background and AI practice.

P01 routinely asked AI systems for sources, checked those sources against databases she could access, and became more cautious after encountering inaccurate AI-generated information. She described these habits as something 'indoctrinated' through LIS training, indicating that source verification had become a strongly internalized professional practice.

P04 articulated the clearest ethical framework in the sample. In addition to his anti-plek principle, he emphasized limits in what AI could provide, especially in relation to tacit, experiential, and heritage knowledge. He explained:

> *"Tacit knowledge and experiential knowledge are not documented by AI. So we will become distant from those things. Our interactions with other humans will also decrease, I think. Because everything we need is already in AI. (P04)"*

P04 also identified what he regarded as a curricular gap: 'What's lacking is a course related to ethics in AI use: how do we ensure the information provided by AI is truly valid and does not produce many controversies?' His account connected information validation, ethical judgment, and the social consequences of inaccurate information.

For P03, the influence of LIS identity was more selective. He connected his training with a strong preference for paraphrasing rather than copying AI output and contrasted this practice with non-LIS peers whom he had seen copy and paste directly from AI. His cognitive-gap strategy, however, appeared to arise more from personal reflection than from explicit disciplinary instruction.

The connection was less explicit for P02 and P05. P02 organized AI conversations into folders for individual courses and maintained topical boundaries between them, but she did not attribute this practice directly to LIS training. P05 cross-checked AI-generated references, yet the only practice she consciously linked to her LIS background was the importance of citation. P06 most directly challenged the assumption that LIS education necessarily produces stronger information-management practices:

"It depends on the person. If someone is naturally organized by character, they might be even more organized than me, a library science graduate. (P06)"

Across the six cases, LIS-related dispositions were visible but unevenly articulated. For P01 and P04, disciplinary and professional values functioned as explicit guides for verification, evaluation, and ethical judgment; for P03, their influence was selective; for P02 and P05, related practices were present but were not always consciously attributed to LIS training; and P06 actively questioned whether disciplinary education alone conferred a consistent advantage. The findings therefore indicate variation in how LIS-related dispositions were enacted rather than a uniform effect of disciplinary training.

Table 2. Cross-Case Patterns: Convergence and Divergence Across the Four Themes

Dimension	**Convergence (All 6 Participants)**	**Key Idiographic Divergences**
Epistemic entry point	All report AI as primary first step, displacing traditional sources	P01: complex multi-tool ecosystem; P04: meta-prompting architecture; P05: minimalist, familiarity-driven
Dependency level	All acknowledge significant dependency	P04: 9/10, accepted with equanimity; P06: high, experienced as threat; P03: moderate, actively monitored
Preservation strategy	All develop some form of cognitive self-protection	P01: handwritten mind map ritual; P03: cognitive gap (temporal pause); P04: anti-plek + domain partitioning; P05: reactive reference cross-check only
Relational metaphor for AI	All personify AI in relational terms	P02: most intimate (partner when lonely); P03: confidant for non-academic topics; P04: most distanced (work colleague); P05: close friend
Response to AI unavailability	All report disruption or discomfort	P06: acute panic; P01: 'without color'; P02: emptiness (kosong); P03: mild disappointment
LIS identity influence	Present in all cases, moderating AI practices	P01 & P04: strong, explicit, consciously articulated; P03: selective and moderate; P02 & P05: implicit, unrecognized; P06: critically interrogated and contested

Dimension	Convergence (All 6 Participants)	Key Idiographic Divergences
Primary concern about AI	All concerned about AI's cognitive implications	P01/P03: cognitive atrophy; P06: cognitive sovereignty; P04: social isolation and loss of tacit knowledge; P02: academic originality and AI detection; P05: pragmatic detection risk

The cross-case pattern shows both convergence and idiographic variation. All participants positioned AI as an important epistemic resource, acknowledged some degree of dependency, developed at least one form of cognitive self-protection, used relational language to describe AI, and identified cognitive implications of their AI use. At the same time, the form and intensity of these experiences differed considerably across cases.

Discussion

Two points stand out across the cases. Generative AI had become part of the routine through which participants searched for information, tested ideas, wrote, and dealt with academic uncertainty. LIS-related habits and professional values also mattered, but not in the same way for everyone. The discussion draws on extended cognition and cognitive offloading to interpret these experiences, while treating professional identity and information-literacy practices as parts of the context in which participants regulated their use of AI.

AI as Epistemic Infrastructure and the Reordering of Knowledge Seeking

The movement of AI to the beginning of participants' knowledge-seeking routines is consistent with extended-cognition accounts in which external resources can become integrated into ongoing cognitive activity. Generative-AI uses can complement cognition or substitute for parts of it (Rivera-Novoa & Duarte Arias, 2026). P01's multi-tool workflow illustrates a strongly complementary configuration: different systems were deliberately coordinated within a broader academic thinking process rather than used as a single replacement for her own activity. These accounts indicate recurrent integration into cognitive routines, but interview data alone do not establish that AI objectively constituted part of participants' cognitive systems. P04's prompt-generator workflow and P02's use of conversation history also show how cognitive work can be distributed across external systems. Cognitive offloading can be understood as the use of external resources to reduce internal processing demands (Risko & Gilbert, 2016). The participants' accounts extend beyond simple storage or memory support: AI was used to generate, compare, organize, and in some cases evaluate academic material. These practices can therefore be described with greater confidence as forms of cognitive offloading; whether they amount to extended cognition depends on the degree and character of integration rather than on tool use alone.

The epistemic hierarchy reversal identified in the results is especially significant as an analytical description of participants' reported routines. The extended-mind account holds that an external resource may become part of cognition when it is reliably integrated into a person's cognitive routines (Clark & Chalmers, 1998), and generative AI can be situated within a broader class of hybrid thinking systems (Clark, 2025). In the present cases, participants often consulted AI first and conventional sources afterward, changing the sequence through which epistemic authority was approached. The evaluative-offloading pattern adds another layer because some

participants sought AI confirmation before trusting their own ideas. These findings are consistent with concerns that AI can shape belief revision and epistemic agency (Coeckelbergh, 2026), while remaining evidence of experienced practice rather than proof of cognitive extension in a strong ontological sense.

For LIS education, the cases raise a familiar issue in a new setting. Source criticism and information evaluation still matter, but students are now working with systems that can generate summaries, arguments, references, and judgments of their own. Research with LIS students has likewise highlighted critical evaluation and ethical awareness as important AI-related competencies (Hossain et al., 2025), while work in academic librarianship places evaluation and ethics beyond basic awareness and use (LaFlamme, 2025). In these interviews, the recurring concerns were practical: checking AI-generated information, handling citations responsibly, deciding what counted as one's own work, and noticing growing dependence on AI. These are areas worth addressing in LIS education, but the present study does not show that existing curricula are inadequate.

Dependency, Cognitive Autonomy, and the Paradox of Efficiency

Participants' efforts to preserve autonomy show that AI-mediated cognitive integration was not experienced as a simple expansion of capacity. It was accompanied by concern about authorship, cognitive boundaries, and the possible weakening of unaided reasoning. P01's handwritten mind map illustrates an embodied and material strategy: paper served as a deliberate space for establishing an initial position before AI entered the process.

P03's cognitive gap—a participant-generated term—addresses the difficulty of distinguishing one's own thinking from formulations that emerge through AI interaction. Extended-mind accounts question where cognitive boundaries should be drawn between internal and external resources (Clark & Chalmers, 1998). AI-enhanced education likewise raises a tension between intensive AI coupling and the preservation of cognitive and metacognitive autonomy (Hernández-Orallo, 2025). P03's pause can therefore be interpreted as a self-developed way of temporarily interrupting AI-mediated cognitive coupling so that authorship and judgment can be reasserted.

P04's anti-plek principle—also a participant-generated term—and his domain boundaries similarly show that users can regulate not only how much AI they use but also the kinds of activities they are willing to delegate. These boundaries indicate that participants were not simply accepting AI mediation; they were actively deciding which forms of delegation were acceptable and which forms of human interaction or judgment they wanted to preserve.

The concern about cognitive atrophy should be treated as an experienced risk rather than as evidence that decline had objectively occurred. One relevant study found that frequent AI use was negatively associated with critical-thinking performance, with cognitive offloading acting as a mediating factor (Gerlich, 2025). The present data do not demonstrate the same causal relationship, but they show that participants themselves were alert to the possibility that efficiency could come with cognitive costs. Their concern with inaccurate or fabricated references also aligns with library-instruction research emphasizing fact-checking, source analysis, and reference verification when working with generative AI outputs (Johnson et al., 2024), as well as documented cases of fabricated or distorted AI-generated citations (Watson, 2024).

The paradox of efficiency further complicates the assumption that faster academic production is necessarily better learning. Extended executive cognition emphasizes strategic

allocation of cognitive effort, coordination of AI-assisted tasks, and preservation of human capacities within hybrid problem solving (Sidorkin, 2025). P01's account adds an experiential dimension: reducing the effort involved in producing a paragraph also changed the satisfaction and sense of accomplishment associated with intellectual work. The educational question is therefore not simply whether AI makes tasks easier, but which forms of effort remain important for learning and intellectual development.

AI as a Cognitive and Affective Space

The relational language used by participants suggests that recurrent AI use cannot be explained only by functional usefulness. AI also provided a low-risk setting for asking questions, exposing uncertainty, and continuing an inquiry without anticipating embarrassment or social judgment. Viewed through self-determination theory, this experience may be relevant to the basic psychological need for competence (Deci & Ryan, 2000). The data do not show that AI itself satisfies this need; rather, they suggest that a non-evaluative interaction can make it easier for students to reveal what they do not know and remain engaged in problem solving.

Participants' reactions to AI unavailability reinforce the importance of this affective dimension. The extended-mind thesis proposes that an external resource may become sufficiently integrated into cognitive routines that its loss disrupts the larger cognitive system (Clark & Chalmers, 1998). The present findings do not establish such integration objectively, but they show that participants experienced varying degrees of practical and emotional disruption when imagining or encountering AI unavailability. For some, the loss meant inconvenience; for others it was described as emptiness, loss of color, confusion, or panic. These accounts suggest that affective attachment can accompany recurrent cognitive reliance on AI in everyday academic life.

LIS Professional Identity as a Situated Influence on AI Engagement

The second part of the research question concerns disciplinary and professional background. Across the cases, LIS-related habits were visible, but they did not operate as a fixed rule. Bourdieu's concept of habitus is useful here because professional values can become part of practice without being consciously invoked each time (Bourdieu, 1990). P01's routine verification is the clearest example: what she described as having been 'indoctrinated' through LIS education had become something she did almost automatically. Since all participants also worked in library or information-related roles, these habits are better understood as products of both education and professional experience rather than of formal training alone.

P04's concern with tacit and experiential knowledge adds a distinctively knowledge-oriented dimension to this professional identity. Some forms of knowing cannot be fully reduced to explicit statements (Polanyi, 1966). This perspective clarifies why P04 resisted the assumption that information available to AI is equivalent to the full range of knowledge relevant to professional and social life. Broader technological, organizational, and ethical challenges have also been identified in the integration of AI into knowledge-management processes (Rezaei, 2025).

P04's call for formal AI ethics education also connects professional identity with responsibility. AI ethics has been discussed through questions of moral agency and responsibility (Sabu & Asmiyanto, 2026), while separate philosophical work examines the criteria under which artificial systems might qualify as moral agents (Tollon, 2021). In the context of these cases, the more immediate educational implication concerns information

quality, accountability, citation responsibility, authorship judgment, and ethical reflection. Recent AI-literacy work in academic librarianship likewise emphasizes critical evaluation and ethical engagement (LaFlamme, 2025). These are directions for curricular consideration, not evidence that current LIS education is deficient.

At the same time, P06's critique prevents professional identity from being treated as an automatic guarantee of superior information practice. The variation across cases supports a more situated interpretation: LIS-related dispositions were visible, but their enactment depended on the individual, the task, professional experience, and the participant's degree of reflection on his or her own practice. The present study therefore does not assess participants' AI-literacy levels or the effectiveness of LIS curricula.

Contributions to Understanding AI-Mediated Extended Cognition

Taken as a whole, the four themes add an empirical perspective to discussions of AI-mediated extended cognition. The clearest change was procedural: participants often started with AI and turned to conventional sources afterward, which we describe as epistemic hierarchy reversal. Their accounts also show that cognitive and affective uses of AI were difficult to separate; the same system could be a research aid, a place to test an idea, and a low-risk conversational partner. Professional identity added another layer, shaping how some participants verified, cited, or questioned AI output. None of this establishes that generative AI had become part of their cognitive systems in a strict ontological sense. It does show how recurrent AI use can become woven into academic thinking while still being questioned, regulated, and sometimes resisted.

CONCLUSION

This study examined how six LIS graduate students experienced generative AI in their academic work. Four themes ran across the cases: AI as epistemic infrastructure; attempts to preserve cognitive autonomy amid dependency; AI as both a cognitive and affective space; and the uneven influence of LIS-related professional dispositions. The interviews do not show that AI had objectively become part of participants' cognitive systems. They do, however, describe practices consistent with cognitive offloading and, in some cases, a stronger form of cognitive coupling. Epistemic hierarchy reversal and evaluative offloading capture two recurring patterns: participants often went to AI before conventional sources, and some used AI to judge the adequacy of their own ideas.

LIS-related habits were also visible in verification, citation, information organization, and ethical reflection, although participants did not always attribute these practices directly to their training. For LIS education, the findings draw attention to source verification, citation responsibility, authorship, and the management of dependence on AI. The study is deliberately idiographic. With six participants from a limited institutional and disciplinary context, it does not support statistical generalization. Further work could follow these practices over time, compare them across disciplines and professional settings, and combine first-person accounts with behavioral or multimodal evidence.

SUGGESTION

Future research could follow AI use over time to see how dependence, verification, authorship, and self-regulation change as these tools become more familiar. Comparative work

across disciplines and professional settings would also help show which patterns are specific to LIS and which are more general. Combining interviews with behavioral, observational, or multimodal evidence would make it easier to distinguish experienced cognitive extension from routine tool use or cognitive offloading. In LIS education, further research could examine how verification, citation responsibility, authorship, and ethical reflection are actually taught and practiced in AI-mediated learning

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