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Building Digital Resilience through Metaliteracy: A Meme-Based Pedagogy to Counter AI-Driven Disinformation

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Abstract:

Generative artificial intelligence (GenAI) has unsettled how information is produced, circulated, and trusted. Deepfakes, synthetic text, algorithmic curation, and model hallucinations now interact in ways the retrieval-and-evaluation model of information literacy was never designed to handle. This paper argues that metaliteracy—an integrative, self-referential framework spanning the behavioural, cognitive, affective, and metacognitive domains—offers a stronger foundation, and that digital resilience is the capability metaliteracy yields when learners face AI-driven disinformation. We report on a meme-based pedagogy taught at the library of Northeast Normal University, a Chinese “Double First-Class” institution, which turns abstract metaliterate objectives into visual, memorable, shareable artefacts. Surveying 183 undergraduate participants, we find consistently high competence across all four domains (means 4.18–4.29 on a five-point scale), strong agreement that memes support recall and reflection, and robust verification behaviour in scenarios

involving an unsourced disaster image, a fabricated AI citation, and a deepfake video. We also examine the “dual transformation dilemma” facing Chinese university libraries—reconciling top-down digitalisation mandates with grassroots responses to AI disruption—and how the librarian’s role shifts toward proactive educational designer and steward of information integrity. We offer the model as a scalable, culturally adaptable contribution to information literacy in a disrupted ecosystem.

Keywords: metaliteracy; digital resilience; meme-based pedagogy; generative AI; AI-driven disinformation

1. Introduction

Since late 2022, generative AI has moved from novelty to infrastructure. Large language models draft and revise text, translation tools rework it across languages, and text-to-image and text-to-video systems lower the cost of producing convincing multimodal content to almost nothing. For students, these systems are no longer occasional aids; they have become part of the daily texture of studying, searching, and communicating. In the programme reported here, 78.7% of surveyed students used a generative AI tool almost every day, and the rest used one at least weekly. That degree of immersion changes the problem that information literacy education must address.

The difficulty is not simply that there is more information, or even more false information. It is that the boundary between authentic and fabricated content has become harder to locate, and that the cues people once relied on—fluency, formatting, the appearance of authority—are exactly the cues that GenAI reproduces most convincingly. A hallucinated reference can carry a plausible author, title, journal, and DOI. A deepfake can place words in a public figure’s mouth. Recommendation systems quietly narrow what a learner sees. Against this backdrop, the familiar checklist of “find the source, check the author, compare across sources” remains necessary but is no longer sufficient to trigger careful judgement at the moment it is needed.

This paper takes up the IFLA Information Literacy Section’s call to examine how libraries are adapting to AI-generated content, algorithmic mediation, and the erosion of information trust. We make three moves. First, we argue conceptually that metaliteracy provides a stronger basis than skills-based information literacy for this environment, and that digital resilience is best understood as metaliteracy enacted under conditions of AI-driven disinformation. Second, we describe a meme-based pedagogy used in the library instruction programme at Northeast Normal University and present survey evidence from 183 undergraduate participants. Third, we reflect on what this implies for the role of the academic library and the librarian in a Chinese institutional context marked by a dual transformation dilemma.

2. From Information Literacy to Metaliteracy

Mackey and Jacobson (2011) reframed information literacy as metaliteracy in response to participatory, social, and networked information environments in which learners do not merely locate and use information but continuously produce, share, remix, and circulate it. Rather than a list of discrete skills, metaliteracy positions the learner within an information ecology and foregrounds production, collaboration, ethics, and self-reflection. Their subsequent learner model (Mackey & Jacobson, 2014) organises metaliteracy into four domains: behavioural (how learners participate in and create information), cognitive (understanding, analysis, and evaluation), affective (attitudes, motivation, confidence, and openness), and metacognitive (monitoring and reflecting on one's own information behaviour and knowledge construction). The 2022 volume sharpens the emphasis on the learner as producer (Mackey & Jacobson, 2022), and the 2025 update to the metaliteracy goals and learning objectives responds directly to advances in AI and the growth of misinformation (Jacobson & Mackey, 2025).

The ACRL Framework for Information Literacy for Higher Education (2015) marked a parallel institutional shift, replacing performance standards with threshold concepts such as “authority is constructed and contextual” and “information creation as a process.” This conceptual turn is complementary to metaliteracy: where the Framework foregrounds the scholarly and social situatedness of information, metaliteracy adds the learner's reflexive and productive role. Critical information literacy (Tewell, 2015) further reminds us that information work is bound up with power, value, and legitimacy rather than with technical procedure alone—a point that becomes sharper as information production is increasingly algorithmic and commercial.

3. Digital Resilience as Metaliteracy Enacted

Digital resilience was first used to describe how individuals recognise, manage, and recover from online risks and threats (Sun et al., 2022). In that literature it denotes more than fluent device use; it includes the capacity to cope with and learn from adversity in digital settings. GenAI extends the relevant risks from familiar concerns such as cyberbullying or privacy exposure toward knowledge risks and risks to learner autonomy: students may be misled by synthetic content, may over-trust fluent AI output, or may quietly outsource judgement, summarisation, and reasoning to a model.

We therefore treat digital resilience not as a separate variable but as the observable expression of metaliteracy under AI-driven disinformation. In this framing it comprises five intertwined capacities: risk recognition (identifying hallucination, deepfakes, algorithmic bias, and emotional manipulation); verification (actively checking sources, evidence, and context); affective regulation (remaining steady amid uncertainty); metacognitive reflection (noticing one's own bias, familiarity effects, and dependence on AI); and ethical participation (taking responsibility when producing and sharing information).

The contribution of meme-based pedagogy, set out below, is to make each of these capacities concrete and teachable.

3.1 Mapping the Four Domains to Survey Constructs

The survey instrument was organised so that each metaliteracy domain corresponds to one or more measured constructs, allowing the framework to be examined empirically rather than asserted. Table 1 sets out the mapping and the observed dimension means.

Metaliteracy domain	Survey construct	Mean (1–5)
Cognitive	A. AI-disinformation risk awareness	4.29
Cognitive	B. Information evaluation and judgement	4.19
Behavioural	C. Verification behaviour and ethical production	4.26
Affective	D. Affective regulation and self-efficacy	4.21
Metacognitive	E. Metacognitive reflection	4.25
Integrated outcome	F. Digital resilience performance	4.19
Pedagogical pathway	G. Meme-based pedagogy perceived effect	4.18
Institutional setting	H. Library course acceptance	4.26

Table 1. Mapping of metaliteracy domains to survey constructs (N = 183).

4. Why Memes, and Why Now

Dawkins (1976) introduced the meme as a unit of culture that replicates, varies, and spreads. In digital culture the term has come to mean something more specific: Shifman (2014) defines internet memes as groups of digital items that share characteristics of content, form, or stance, and that are created, imitated, and circulated by many users with awareness of one another. Memes are at once visual and social texts; their surface humour rests on shared knowledge, cultural context, and emotional stance. Research in higher education has begun to treat meme-making as a legitimate method and learning activity—as a visual research method that captures student experience and emotion (Tidy et al., 2024a) and as a way to deepen engagement and reflection in discipline-specific teaching (Tidy et al., 2024b). Bettin et al. (2023) show that comprehending memes draws on abstract reasoning and shared context rather than mere amusement, while Harbo (2022) treats memes as a knowledge practice within social movements.

Within library-based metaliteracy education, Shao (2023) studied how academic libraries can use memes to cultivate students’ metaliteracy in the post-truth era, proposing meme types geared to fake-news recognition—including types addressing the nature of fake news, information evaluation, source evaluation, and reader self-awareness. Shao’s study reported that 78% of participants could identify disinformation through memes, providing an early empirical warrant for the approach and, notably, bringing “self-awareness” into the set of pedagogical goals. The fit with AI-driven disinformation is close: AI-generated images, deepfakes, and platform-borne falsehoods are themselves visual, affective, and fast-moving, so countering them with a visual, affective, fast-moving form is a strategy of meeting digital culture on its own ground.

This fit should not be romanticised. Memes can reproduce stereotypes, flatten complexity, and themselves carry falsehood; Ayalon et al. (2025) found that even memes intended to challenge ageism could reproduce negative stereotypes. Memes are not inherently critical. They become metaliteracy tools only when placed within explicit objectives, a reflective frame, and ethical discussion—which is precisely why librarian facilitation is integral to the model rather than incidental to it.

5. The Programme and Its Pedagogy

The programme was delivered through the library's AI-literacy offerings at Northeast Normal University during the spring 2026 semester, spanning general-education electives, subject-specific electives, and routine AI-literacy training sessions. It follows a recurring cycle: a triggering case (an AI hallucination or a deepfake) is presented; students decode the meme and its image, text, and stance; they distil an information-evaluation principle; they create an anti-disinformation meme of their own; they review one another's work; they reflect metacognitively on their own biases and judgement processes; and they apply the principle to a fresh, real-world setting. Prompt literacy is woven in using the CLEAR framework (Lo, 2023), which treats interaction with a language model as a reflective rather than merely instrumental act, and the ethical dimensions of algorithmic systems are addressed in the spirit of Archambault et al. (2024).

Each phase carries a metaliterate purpose. Decoding builds cognitive evaluation; principle-distillation supports transfer; creation enacts the learner-as-producer; peer review introduces the ethics of circulation; and reflection develops metacognition. The meme is not there to make the class entertaining; it is there to give an abstract objective a form that students can see, discuss, make, and recall.

5.1 Participants

The survey covered all 183 undergraduate participants in the spring 2026 cohort. Women made up 69.4% of respondents and men 30.6%. All four undergraduate years were represented, with second-year students the largest group (36.6%). Disciplinary background was mixed: humanities and social sciences (28.4%), arts and physical education (27.9%), science, engineering, agriculture and medicine (21.9%), education (18.0%), and other (3.8%). The cohort was experienced with both relevant technologies: 92.3% had previously taken part in information-literacy, AI-literacy, or library-instruction activities, and 62.3% encountered memes daily or in large volumes. This is, in other words, a population already immersed in the very environment the programme addresses.

6. Findings

6.1 Balanced Competence across the Four Domains

Across the eight Likert constructs, dimension means ranged narrowly from 4.18 to 4.29 on a five-point scale, indicating consistently high self-reported

competence rather than strength in one domain at the expense of others. Cognitive risk awareness was highest (4.29), and the strongest single item in the whole instrument was the recognition that fluent AI output is not the same as reliable content (mean 4.41), which speaks directly to the central challenge of GenAI. Verification and ethical production (4.26), metacognitive reflection (4.25), and affective regulation (4.21) followed closely. Figure 1 displays the full profile. The evenness of the radar profile is itself the finding: it is consistent with a framework that develops the four domains together rather than treating information literacy as a set of separable skills.

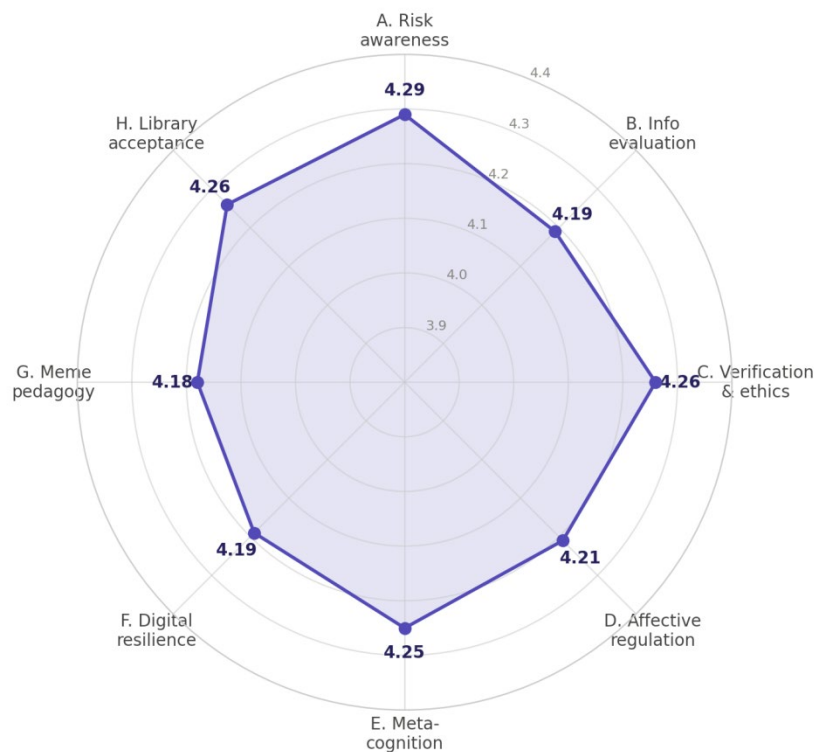


Figure 1. Competency profile across the four metaliteracy domains (N = 183).

6.2 How Students Experience the Meme-Based Approach

Agreement with the meme-pedagogy statements was high but informatively uneven. The clearest result concerned cognitive recall: 94.5% of students agreed or strongly agreed that when they encounter suspected disinformation, a relevant meme or visual cue would be among the first things to come to mind. We read this as a claim about anticipated salience rather than a measured behavioural outcome, but it is striking nonetheless, and it aligns with the pedagogical aim of leaving a durable, retrievable trace. Equally telling, 90.7% agreed that meme teaching needs guidance from a teacher or librarian, since memes can otherwise spread bias or error—students themselves locate the librarian at the centre of the method. The same proportion (90.7%) reported that the approach raised their interest in information- and AI-literacy courses, and 85.8% said it prompted reflection on their responsibility as producers of information. Agreement was comparatively lower, though still substantial, on whether memes help reveal stance and bias (78.7%) and aid understanding of AI

risk (76.0%), suggesting that analytic depth is harder to achieve through memes than memorability and engagement. Figure 2 presents the full set.

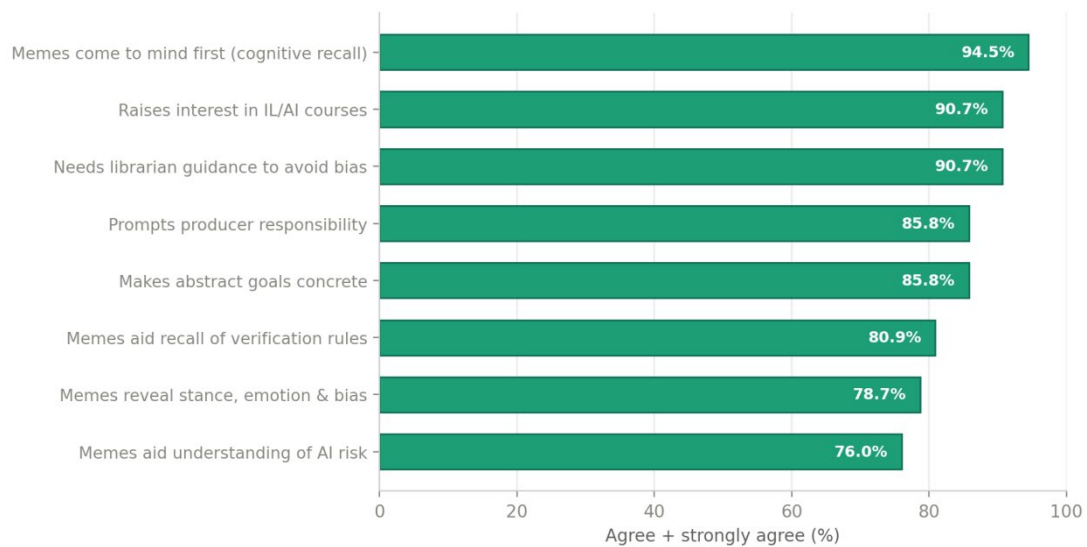


Figure 2. Agreement with meme-based pedagogy statements (N = 183).

6.3 Behaviour in Realistic Scenarios

Because self-reported attitudes can outrun actual practice, the instrument included four situational-judgement items. The pattern was consistent. Faced with a realistic but unsourced disaster image, 83.1% would withhold sharing and seek authoritative confirmation, while only 9.3% would judge authenticity by how convincing the image looked. Given an AI-supplied citation with a complete-looking DOI, 83.1% would verify it against a database or journal site and 59.6% would decline to rely on it if the original could not be found; just 7.1% would cite it directly because the formatting was complete. Confronted with a deepfake video of a public figure, 76.0% would look for corroboration from authoritative media and 64.5% would scrutinise lip-sync, audio, and background anomalies. Asked to create an anti-disinformation meme, 78.7% prioritised accuracy and 68.9% attended to avoiding stereotyping or targeting groups, against 19.1% who foregrounded humour and shareability. Across all four scenarios, robust verification behaviours far outweighed weak heuristic shortcuts, as Figure 3 shows. The scenario data matter because they move beyond “students say they value checking” toward “students choose to check” when presented with the kinds of artefact GenAI now produces.

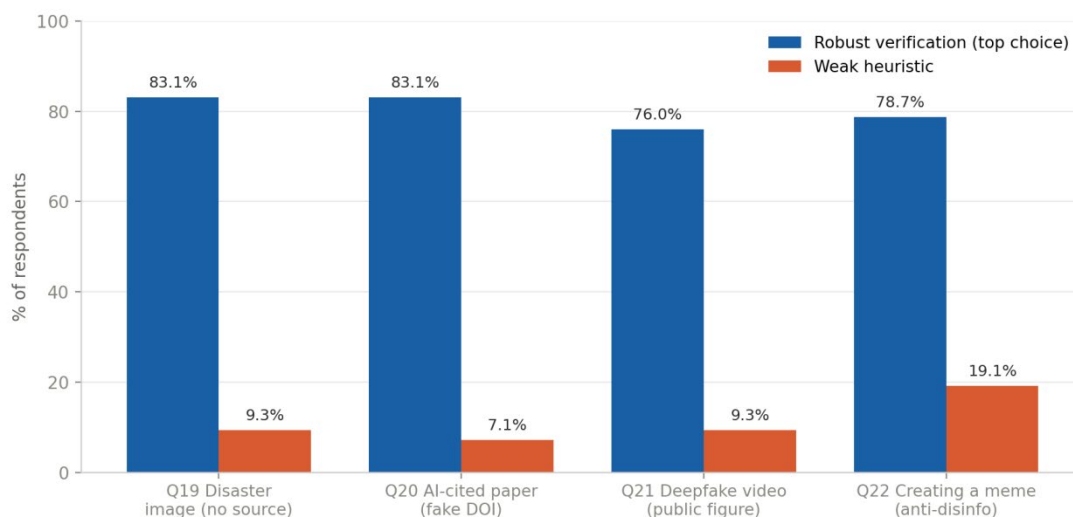


Figure 3. Robust verification versus weak heuristics across four scenarios ($N = 183$).

6.4 Acceptance of the Library's Role

Acceptance of the library as a site for this work was strong (dimension mean 4.26). Students were willing to continue with meme-based activities (4.29), wished to carry the methods into their own study and social-media use (4.32), agreed that the library should offer courses on AI-disinformation recognition and prompt literacy (4.22), and saw librarians as important educators for understanding AI-related information risk (4.21). Read alongside the finding that students themselves call for librarian guidance, this points to an appetite for the library to act, not merely to host.

7. The Dual Transformation Dilemma and the Librarian's Role

Chinese university libraries face a twofold pressure. From above, national digitalisation and smart-education agendas require libraries to upgrade digital services and capacity. From below, GenAI is reshaping how students learn, write, judge information, and produce knowledge, often faster than formal curricula can respond. Existing surveys of Chinese university libraries find that metaliteracy education is under way but remains uneven in systematic design, curricular integration, and assessment (Yang & Liu, 2024), and that domestic practice still lags international peers in depth and innovation (Zhang & Chen, 2024). Meme-based pedagogy offers one workable, low-cost response that meets students where their digital culture already lives.

This repositions the librarian. The role shifts from navigator of resources and trainer in database search toward interpreter of the information ecosystem, guide to AI and prompt literacy, and proactive designer of learning. Our proposal earlier characterised this as the librarian acting as an “academic gatekeeper” and “proactive educational designer.” We retain the second phrase but qualify the first: in an international setting “gatekeeper” can suggest control over access, which sits awkwardly with the open and participatory spirit of metaliteracy. We therefore prefer to speak of the librarian as a steward of

information integrity—someone who safeguards the reliability and public value of knowledge while empowering learners as producers in their own right.

8. Limitations

Three limitations should temper the reading of these results. First, the design is a single-cohort, post-intervention survey without a control group or pre-test, so it documents the state of participants after the programme rather than establishing causal effect; the consistently high means may also reflect a cohort already engaged with information literacy, as the participation figures suggest. Second, most constructs rest on self-report, which can diverge from behaviour and is subject to social-desirability and metacognitive bias of the kind noted in the AI-literacy literature (Bewersdorff et al., 2025); the situational-judgement items mitigate but do not remove this concern. Third, the study is set in one Chinese “Double First-Class” university, and transfer to other institutional or national contexts should be made with care. Future work should add pre-/post-comparison and a control condition, incorporate analysis of the memes students actually produce and of their reflective writing, and follow participants over time to see whether the approach’s salience persists.

9. Conclusion

Information literacy in a disrupted information ecosystem calls for more than better checklists. It calls for learners who can keep their judgement, composure, and sense of responsibility when the surface signals of credibility can be manufactured at will. Metaliteracy supplies the framework, AI literacy clarifies the technological terrain, digital resilience names the capability we are trying to build, and meme-based pedagogy offers a practical route from one to the others. The evidence from 183 undergraduates at Northeast Normal University is necessarily modest in design, but it is encouraging: balanced competence across the four metaliteracy domains, strong recall and engagement, and—most importantly—a clear tendency to verify rather than to trust at a glance when confronted with the artefacts GenAI now makes so easy to produce. For libraries willing to move from hosting instruction to designing it, the approach is inexpensive, culturally adaptable, and, on this evidence, welcomed by the students it is meant to serve.

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