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Extending Bawden's Digital Literacy Framework for the Generative AI Era: A Contextual Approach for Higher Education Learners

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Abstract. This study critically revisits Bawden's digital literacy framework in light of the rapid integration of generative AI into higher education. Originally designed to address linear human–technology interactions, Bawden's four-domain model—comprising technical ICT skills, basic literacy, background knowledge, and cognitive-ethical perspective—now encounters limitations in guiding students who engage with tools like ChatGPT. Drawing on conceptual analysis and literature synthesis, this paper identifies specific gaps within the original framework and formulates enhancements for each domain. These enhancements include AI tool navigation, prompt design and output evaluation, algorithmic and epistemic awareness, and generative AI ethics. The study also maps observed student behaviors—such as uncritical acceptance of AI-generated text or lack of attribution—to these framework deficiencies. The findings propose a revised model that treats digital literacy as a dynamic, context-sensitive competency. By aligning foundational literacy with the realities of human–AI collaboration, the enhanced framework offers a more robust pedagogical guide for fostering responsible and critical engagement with generative systems in academic contexts.

Keywords: Generative AI; Higher education; Prompt engineering; AI ethics.

1 Introduction

The digital literacy framework proposed by Bawden provides a structured and comprehensive approach, progressing from technical competence to reflective judgment. This framework comprises four main domains: technical ICT skills, basic literacy skills, background knowledge, and cognitive-ethical perspective. Technical ICT skills refer to the ability to operate hardware and software, as well as fundamental digital operations. Basic literacy skills encompass reading, writing, and understanding information in digital formats. Background knowledge involves an understanding of disciplinary contexts, academic fields, and epistemological foundations (Hwang et al., 2023), (Nedungadi et al., 2018). The cognitive-ethical perspective includes critical reflection, ethical awareness, and a sense of responsibility in digital interaction.

With the emergence of generative AI technologies such as ChatGPT, all four domains of Bawden's framework have undergone disruption and transformation. AI has evolved beyond its role as a mere technical tool and now functions as a cognitive agent that shapes students' thought processes (Yang, 2023). The act of accessing information has become simultaneous with content production, as AI-generated outputs are often readily structured in the form of essays, arguments, or academic reports. This phenomenon blurs the boundary between information consumption and production, expanding the scope of digital literacy into interactive and synthetic domains.

In this context, students face new challenges within each of Bawden's domains. In the area of technical ICT skills, natural language interfaces have reduced barriers to entry; however, they have also increased the risk of over-reliance on systems that users do not fully understand. Students may operate AI tools fluently, yet lack insight into the generative logic, probabilistic structure, or internal mechanisms of these systems. Within basic literacy skills, AI often generates coherent responses to vague or poorly constructed prompts, leading students to accept content without critical assessment of its logical coherence or academic validity. In terms of background knowledge, students may lack the disciplinary grounding needed to evaluate the truthfulness, context, or potential bias of AI-generated answers. Finally, in the domain of cognitive-ethical perspective, many students employ AI outputs without proper disclosure or reflection, often perceiving the tool as a neutral assistant. Simultaneously, institutions and educators have yet to establish clear ethical guidelines for AI usage in academic settings.

Bawden's framework, conceived prior to the rise of generative AI, does not explicitly address the skills and awareness that have now become essential. It does not account for collaborative human–AI practices, natural language prompting, or the epistemic influence of algorithmic structures (LEE & Fanea-Ivanovici, 2023). Consequently, an enhancement of each domain is necessary to ensure that the framework remains relevant and applicable in the context of Large Language Models (LLMs) and their integration into academic life. To date, no digital literacy framework has comprehensively integrated these emerging competencies into a coherent, established structure such as Bawden's. This paper proposes an enhancement to each of Bawden's four domains: incorporating AI tool navigation into technical ICT skills; integrating prompt construction and evaluation into basic literacy skills; embedding awareness of AI systems and bias into background knowledge; and extending academic ethical responsibility into the cognitive-ethical domain in light of AI-assisted work.

2 Research Methodology

Research Design

This study adopts a conceptual-critical approach aimed at reinterpreting and expanding Bawden's digital literacy framework in light of generative AI technologies. The research is qualitative and exploratory, focusing on the theoretical synthesis of emerging competencies required for students navigating AI-assisted academic environments (Biagini, 2024; , (Ng et al., 2021).

Analytical Framework

The study employs framework analysis to systematically examine the structure of Bawden's model, which consists of four core domains: technical ICT skills, basic literacy skills, background knowledge, and cognitive-ethical perspective. Each domain is analyzed for its applicability and limitations in the context of generative AI. This structured approach allows for targeted identification of conceptual gaps and the formulation of appropriate enhancements.

Sources of Data and Analytical Materials

The primary data sources comprise theoretical and conceptual literature on digital literacy, generative AI, and AI-assisted learning. Materials include peer-reviewed journal articles, higher education policy documents, and academic discussions surrounding the use of AI tools such as ChatGPT in academic settings. These sources were selected based on their relevance to each domain of Bawden's framework and their insights into the shifting nature of digital practices among university students.

Analytical Procedure

The analytical procedure in this study followed a structured conceptual mapping process designed to assess and expand Bawden's digital literacy framework. The first step involved delineating the definitions, scope, and intended function of each of the four original domains: technical ICT skills, basic literacy, background knowledge, and cognitive-ethical perspective. This provided a foundational understanding of the framework's internal coherence and its initial assumptions about digital engagement. The second step consisted of identifying emerging patterns and practices in students' interaction with generative AI tools—particularly those related to academic tasks such as writing, researching, and responding to prompts. These phenomena were then critically examined in the third step by aligning them with the structural elements of Bawden's framework in order to reveal conceptual gaps and outdated assumptions. The final step synthesized these insights into proposed enhancements for each domain, ensuring that the updated framework responds meaningfully to the realities of AI-assisted learning. Through this process, the study maintains a rigorous yet

flexible approach to adapting classical digital literacy models to contemporary technological contexts.

3 Result and Discussion

3.1 Identification of Conceptual Gaps within Bawden's Framework

The first major finding of this study is the identification of structural and conceptual gaps in Bawden's digital literacy framework when applied to the academic realities shaped by generative AI. While Bawden's four domains—technical ICT skills, basic literacy, background knowledge, and cognitive-ethical perspective—were initially designed to address the digital challenges of the early 21st century, they now encounter limitations when confronted with the increasingly complex role of AI in student learning. In their original form, these domains presuppose a relatively linear relationship between user and technology: one in which the user operates, interprets, and evaluates digital tools that are largely passive in nature. However, generative AI—particularly large language models (LLMs) like ChatGPT—functions not merely as a tool, but as a semi-autonomous agent capable of producing, organizing, and presenting knowledge. This shift transforms the digital environment from one of interaction to one of co-production, where information is not merely retrieved but algorithmically generated in response to open-ended or imprecise prompts.

As a result, each domain in Bawden's framework reveals points of misalignment. The technical ICT skills domain, for example, is no longer sufficient if confined to operating software and hardware; it must now encompass the ability to navigate AI tools that rely on natural language processing, probabilistic reasoning, and contextual modelling (Ng et al., 2021; , Pratiwi et al., 2025, Mega et al., 2022). Similarly, basic literacy is no longer limited to reading and writing in digital formats but must account for the construction and interpretation of AI-generated texts. The background knowledge domain lacks provisions for understanding how algorithmic systems source, assemble, and distort knowledge, leaving students unprepared to critique or verify AI outputs. Finally, the ethical dimension—originally focused on responsible digital behavior—has yet to incorporate the nuanced considerations surrounding authorship, disclosure, and academic accountability in the context of human–AI collaboration. These gaps underscore the need for a targeted and informed enhancement of Bawden's model, preserving its foundational logic while extending its applicability to the realities of AI-mediated learning environments.

3.2 Formulation of Four Specific Enhancements

The second key result of this study is the formulation of four targeted enhancements to Bawden's digital literacy framework, each corresponding to one of its original domains. Rather than replacing the framework, these enhancements aim to preserve

its foundational structure while expanding its capacity to accommodate the demands of AI-assisted academic work. The enhancements are not intended to serve as isolated additions but as embedded competencies that update the internal logic of each domain in response to how generative AI transforms the learning landscape. The process of enhancement was guided by empirical observations of student behavior and theoretical insights from contemporary literature on digital education and artificial intelligence.

1. Ehancement in Technical ICT Skills

This domain is expanded from its traditional focus on device and software operation to include the ability to navigate AI tools with intention and awareness. In the context of generative AI, students must not only open and use an application but also understand interface logic, adjust parameters (e.g., length, model version), and recognize the affordances and limits of AI platforms ((Biagini, 2024; , Chen, 2024, Mega et al., 2022).

2. Ehancement in Basic Literacy

Here, the enhancement addresses the dual skill of composing prompts that are clear, purposeful, and context-sensitive, as well as critically evaluating the responses generated by the AI. This shift reframes literacy from reading static texts to engaging in iterative and dialogic interactions with a generative system. It also requires students to judge coherence, factuality, tone, and disciplinary appropriateness (Otero et al., 2023; Caena & Redecker, 2019).

3. Ehancement in Background Knowledge

The enhancement to this domain introduces a new layer of epistemic literacy: students must learn how AI systems generate knowledge, what kinds of data they are trained on, and where epistemological distortions might occur. This includes recognizing statistical hallucination, inherited bias, and the absence of source transparency—challenges that are structurally embedded in the generative process (Reddy et al., 2020; , Stordy, 2015)..

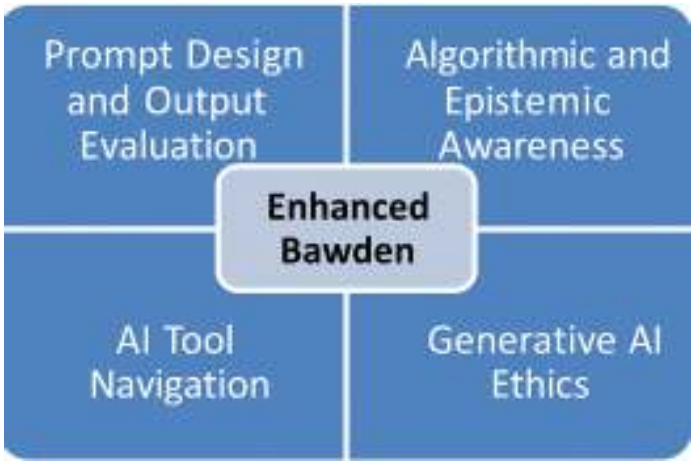
4. Ehancement in Cognitive-Ethical Perspective

This enhancement extends ethical reflection to cover questions of authorship, attribution, and accountability when AI contributes to academic work. Students must be encouraged to reflect on the boundary between acceptable assistance and academic dishonesty, and to develop a framework for responsible disclosure, including citing the role of AI tools in their processes (Zhang & Sidik, 2024; , Mukaromah & Wardoyo, 2022).

Together, these four enhancements offer a coherent update to Bawden's original model. They reposition digital literacy not as a static skillset but as an adaptive, context-sensitive framework capable of evolving alongside new technological paradigms—particularly those introduced by generative AI.

3.3 Mapping Student-AI Interaction to Framework Deficiencies

The third key result of this study is the mapping of observable student behaviors when using generative AI to the specific gaps identified within Bawden's original digital literacy framework. This analytical alignment reveals that many of the issues emerging in contemporary academic practices—such as uncritical reliance on AI-generated responses, vague or incoherent prompt construction, failure to evaluate source reliability, or the omission of attribution—can be traced directly to inadequacies in one or more domains of the framework. For instance, students who copy AI outputs verbatim without critical reflection often demonstrate a lack of basic literacy in evaluating argument quality and factual integrity. Similarly, those who submit AI-assisted work without disclosure typically lack ethical awareness and metacognitive reflection, pointing to a gap in the cognitive-ethical domain. These patterns of interaction suggest that the limitations of student practice are not random, but systematically linked to the conceptual blind spots of the framework itself.



This mapping process not only confirms the relevance of Bawden's original domains but also underscores the urgency of their enhancement. Without intentional adaptation, the framework risks becoming misaligned with actual student experiences in AI-mediated environments. More importantly, the framework—when left unmodified—may fail to guide students toward responsible, critical, and context-sensitive use of AI. By tracing student behavior back to specific literacy domains, the study reinforces the idea that digital literacy must be treated as a dynamic and

adaptive construct. It cannot remain confined to static skill sets designed for passive interaction with information; instead, it must evolve to accommodate the co-productive and participatory nature of AI-based learning tools. This diagnostic alignment between behavior and framework reveals not only what students lack but also where educators and institutions must direct intervention efforts to support digital fluency in the age of generative systems.

4 Conclusion

The integration of generative AI into everyday information practices demands a fundamental rethinking of established literacy frameworks. The SCONUL Seven Pillars, while still valuable, were formulated for a pre-AI world characterized by source stability, authorial traceability, and human-centric synthesis. As this paper has argued, each pillar must now accommodate a new layer of competencies that reflect the realities of AI-mediated environments—where prompts replace queries, synthesis is co-authored, and information lacks fixed provenance.

By clustering the reinterpreted pillars into three actionable domains—Asking the Right Questions, Working with Information, and Managing and Sharing Responsibly—this paper provides an adaptive roadmap that retains pedagogical continuity while introducing critical updates. The enhanced framework encourages users to not only perform informational tasks, but also to reflect on the epistemological and ethical dimensions introduced by algorithmic systems. Awareness of algorithmic influence, skills in prompt management, ability to detect hallucinations, and practices of transparent attribution are no longer optional—they are essential.

This conceptual reformulation is not meant to be definitive. Rather, it serves as an invitation for further empirical research, curriculum experimentation, and ethical debate. As AI systems evolve, so too must our literacies. A future-ready model of information literacy must be agile, reflexive, and co-evolutionary—bridging human judgment and machine intelligence in responsible and transparent ways.

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