

Beyond the Hype: A Four-Layer Framework for Understanding AI's Role in Academic Work

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The integration of generative AI in higher education poses a central paradox: the very activities that develop critical thinking –literature searching, reading and writing itself –are precisely those being transformed by AI integration. This talk introduces a comprehensive four-layer framework developed from an information sciences and writing sciences perspective, which serves as the theoretical foundation for the online course “Writing and Information Retrieval with Generative AI” (<https://llm-literacy.de/ki-at-helpbw/>). This framework enables educators to systematically understand and address AI's impact on academic work while maintaining educational integrity.

The framework distinguishes four levels where AI can substitute academic work:

1. Form Layer: Language mechanics including grammar, style, and linguistic correctness. AI excels here, having been trained on vast datasets to produce grammatically correct sentences across languages.
2. Content Layer: Knowledge and meaning beyond linguistic form. AI operates indirectly at this level, generating synthetic text without genuine understanding or intentionality. While AI can reproduce knowledge, humans must recognize and validate the meaning within AI-generated content.
3. Process Layer: The complex cognitive processes of research, writing, and learning. AI simulates these processes through role-playing interactions but cannot genuinely experience critical thinking or knowledge construction.
4. Procedural Layer: AI deployment within research methodologies, either as support tools (e.g., laboratory documentation) or as research methods themselves. This layer is highly discipline-specific and requires context-dependent evaluation.

The talk demonstrates how each layer is taught and applied in different educational settings through concrete examples from the online course. This practical implementation of the framework enables students to navigate AI assistance across all four layers while sharpening critical evaluation skills for AI-generated content. Additionally, the framework functions as a guideline for developing appropriate examination formats and assessment strategies that account for AI integration in academic work.

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