

Seeing the Invisible: Detecting Knowledge Gaps in Science and Society

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Abstract

The ability to recognize what is missing has long driven discovery. This paper examines what it describes as the paradox of knowing absence—the meta-cognitive challenge of recognizing when knowledge itself is incomplete—through epistemological, historical, and organizational perspectives. Drawing from both classical and contemporary theories of knowing and from principles of knowledge management, the study reframes absence not as ignorance but as an active signal within systems of meaning. Historical examples, from germ theory to the social recognition of domestic violence, illustrate how unrecognized phenomena move from invisibility to acceptance through shifts in belief and evidence. The paper also introduces a Tri-Lens Framework that clarifies how epistemological assumptions, historical conditions, and organizational structures shape the recognition of knowledge gaps. Together these insights suggest that, in the age of artificial intelligence, the mechanisms of knowledge creation are increasingly replicated in machines—raising urgent questions about how, and how quickly, humans recognize and accept knowledge generated through automated systems.

Keywords: knowledge management (KM); epistemology; knowledge gaps; DIKW continuum; epistemic uncertainty; artificial intelligence (AI); innovation