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The Origin of Data Information Knowledge Wisdom (DIKW) Hierarchy

Nikhil Sharma

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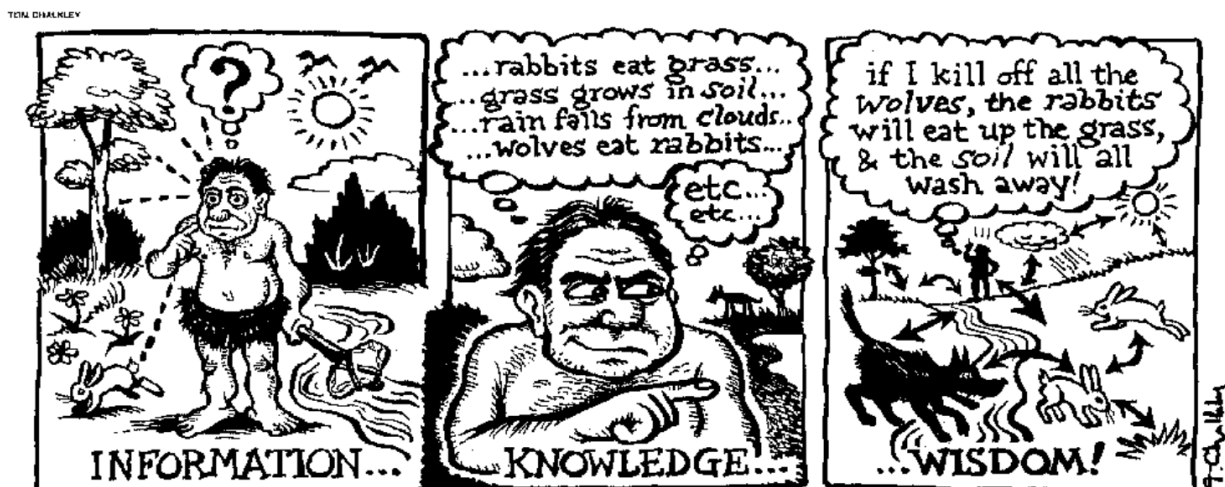


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The Hierarchy

The Data Information Knowledge and Wisdom Hierarchy (DIKW) has been gaining popularity in many domains. In most Knowledge Management literature the hierarchy is often referred to as the “Knowledge Hierarchy” or the “Knowledge Pyramid”, while the “Information Science” domain refers to the same hierarchy as “Information Hierarchy” or “Information Pyramid” for obvious reasons. Often the choice between “Information” and “Knowledge” is based on what the particular profession believes to be manageable.

While there has been a lot of articulation of the hierarchy itself, the origins of this ubiquitous and frequently used hierarchy are largely unexplored. In this short piece we trace the trails of this hierarchy. Like an urban legend, it’s everywhere yet few know where it came from.

The Domains

While the domains of Information Science and Knowledge Management both refer to the DIKW hierarchy, they do not cross-reference. Thus there are two separate threads that lead to the origin of the hierarchy.

In Knowledge Management, Russell Ackoff is often cited as the initiator of the DIKW hierarchy. His 1988 Presidential Address to ISGSR is considered by many to be the earliest mention of the hierarchy. Ackoff's presidential address was printed in a 1989 article "From Data to Wisdom" [1] and it does not cite any earlier sources of the hierarchy.

Searching for the origins of the hierarchy in the Knowledge management domain, we find Milan Zeleny to be an earlier proponent of the hierarchy. In his article on "Management Support Systems" [2], Zeleny details out the DIKW hierarchy in 1987. Zeleny builds the knowledge hierarchy by equating Data, Information, Knowledge and Wisdom to various knowledge forms: "know-nothing", "know-what", "know-how" and "know-why" respectively. Yet, the trail stops again, Zeleny's 1987 mention of the hierarchy is earlier than Ackoff's 1989 address, but he also does not cite any earlier sources of the hierarchy. It can thus be argued that Zeleny was the first to mention the hierarchy in the field of Knowledge Management.

The domain of design has also drawn on and referred to the DIKW hierarchy. Almost at the same time as Milan Zeleny's article, Michael Cooley's book published in 1987: "Architecture or Bee?" [3], builds the DIKW hierarchy during his discussion of tacit knowledge and common sense. Once again no earlier work is cited or referred to by Cooley and trail of the origin has an abrupt ending.

It is in Information Science domain that the trail can be picked up again. Here the hierarchy is mentioned as early as 1982, when Harlan Cleveland [4] wrote about it in a Futurist article. Cleveland's article mentions the Information-Knowledge-Wisdom hierarchy in detail giving an example. What is different about this article from the ones mentioned above is that Cleveland points to the surprising origin of the hierarchy itself.

The Origin

Interestingly the first ever mention of the hierarchy is neither in the Knowledge Management field, nor the Information Science domain, but in an unexpected place: poetry. In his Futurist article, Cleveland cites T.S. Eliot as the person who suggested the hierarchy in the first place. Cleveland names it "the T.S. Eliot hierarchy". The poet T.S. Eliot was the first to mention the "DIKW hierarchy" without even calling it by that name. In 1934 Eliot wrote in "The Rock"[5]:

Where is the Life we have lost in living?

Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information?

This is the first vague mention of the hierarchy that was expanded by Cleveland. Though this is the first mention of the hierarchy in the arts, it is not the only one. Before management and information science caught on, Frank Zappa alluded to the hierarchy in 1979 [6]:

*Information is not knowledge,
Knowledge is not wisdom,
Wisdom is not truth,
Truth is not beauty,
Beauty is not love,
Love is not music,
and Music is THE BEST.*

Beyond Eliot's hierarchy

In his Futurist article [4], Harlan Cleveland concedes that information scientists are “still struggling with the definitions of basic terms” of the hierarchy. He uses Elliot's hierarchy as a starting point to explain the basic terms. Cleveland also agrees that there are many ways in which the elements of the hierarchy may be defined, yet universal agreement on them need not be a goal in itself. While Cleveland himself doesn't add 'Data' to Eliot's hierarchy he mentions Yi-Fu Tuan's and Daniel Bell's versions of the hierarchy in the article which includes “data” [4].

Russell Ackoff's version of the DIKW hierarchy has another “layer” of “understanding” built in. Thus Ackoff's hierarchy is Data-Information-Knowledge-Understanding & Wisdom. “Understanding” requires diagnosis and prescription, which Ackoff considers to be beyond “knowledge” but below “wisdom”. Discussing the temporal dimension of his version of the hierarchy, Ackoff points out that while information ages rapidly, knowledge has a longer life-span and understanding has only an aura of permanence. It is wisdom that he considers to be “permanent” in the true sense.

Zeleny also proposes additions to the DIKW hierarchy. According to him “enlightenment” should be on the top of the familiar DIKW framework [2]. Enlightenment, according to Zeleny (personal communication, October 29, 2004) “is not only answering or understanding why (wisdom), but attaining the sense of truth, the sense of right and wrong, and having it socially accepted, respected and sanctioned.”

Acknowledgements

George Furnas suggested this essay. Milan Zeleny, Adam Keen and Paul Link provided important feedback, pointers and references.

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