
Introduction

MIRANDA L. PAO AND AMY J. WARNER

THE IDEA FOR THIS ISSUE of *Library Trends*, devoted to the topic of "The Depreciation of Knowledge," was originally proposed by the Editor, Professor F. W. Lancaster, to the late Manfred Kochen, professor at the University of Michigan. After Kochen's death in 1989, the guest editorship was taken over by us, his two colleagues at the University of Michigan School of Information and Library Studies. We have tried to reflect the original ideas of Lancaster and Kochen in soliciting contributions dealing with both practical and theoretical issues of knowledge depreciation.

Kochen had a long and illustrious career and was associated with many institutions, among them Harvard University, the U.S. Senate, the Library of Congress, IBM, and the University of Michigan. In their article, Lancaster, Bushur, and Low trace Kochen's career through a bibliometric analysis of his writings, showing that he earned 456 citations between 1956 and 1990. More important than the number of citations he earned, however, was the extent of his influence both inside and outside the field of library and information science. Within information science, he was cited widely in literature on theoretical and professional aspects of information science; scientometrics and bibliometrics; information-seeking behavior; information systems design; and information retrieval. Outside of this already very broad area, his work was influential in computer

science (including artificial intelligence); political science; psychology; education; management science; economics; engineering; the health sciences; and even archaeology.

Thus Kochen was a very interdisciplinary scholar as demonstrated by the subject matter of his writings and their influence. It is therefore appropriate that the authors of the remaining articles in this volume come from a diverse set of backgrounds, including economics (Mattessich), management (Daniel), information science (Line, Wilson, Swanson, Rothenberg), and preservation (Cloonan). Together, they take on the fundamental themes of this issue, which we discuss in the remainder of this introduction. Our goal is to clarify the complex term "depreciation of knowledge" and to provide a unifying framework through which to view the articles.

The terms "information" and "knowledge" are fundamental to the field of information science, and many definitions have been proposed for them over the years. They are abstract and complex phenomena, as evidenced by the variety of perspectives to them which are put forth in this volume. The most basic distinction between them is advanced by Mattessich, who distinguishes information and knowledge as "compared to that between raw material or component [information], on one side, and a larger system containing this component [knowledge], on the other." Beyond this general definition, there are fundamental differences among the other authors about what the "raw material" and "system" actually consist of. For Wilson, knowledge is the active cognitive system of knowledge workers, such as information professionals. For Daniel, Line, Swanson, and Rothenberg, it is the intellectual content of published documents. And finally, for Cloonan, it is primarily the physical documents themselves.

Another inherent theme in the articles is the notion that knowledge has a "life cycle." The standard view of the life cycle of scientific knowledge is that it is analogous to that of a living organism. Thus, Cloonan discusses both traditional (paper) and electronic media from the standpoint of their creation (birth), sources of physical deterioration (life span), and disposal (death), addressing a crucial question for preservation managers—"content or format—which are we to preserve?" In articles by Line and Rothenberg, the central issue taken up is "obsolescence," or whether or not the scientific literature declines in use (usually measured by citation frequency) with age. Narin and Olivastro also examine life cycle and aging factors but as they specifically pertain to the patent literature; they show that citation cycle times vary widely, from five to six years in fast moving technological fields, to twelve to fifteen years in slower moving areas. Furthermore, they demonstrate that citation frequencies

to patents peak at three to five years old, which is similar to findings for the scientific periodical literature.

The notion of a knowledge life cycle is central in the article by Swanson, who proposes a view of the growth of scientific knowledge which is different from the usual one of a single life as it grows, becomes increasingly fragmented and specialized, and that bringing together previously unconnected but complementary literatures may in fact rejuvenate one or more of them and hence result in more than one life cycle.

Inherent in the idea that knowledge deteriorates or becomes obsolete is the notion that it has an intrinsic "value." Articles in this volume deal with the two ways in which the value of knowledge is measured—in terms of currency and quality. Wilson explains that the principal asset of subject specialists is their specialized knowledge, which must be kept current. However, he notes that there is a price to be paid for keeping current, mostly in time expended. Furthermore, currency requirements vary tremendously—in terms of extent or size (i.e., what is the scope of the subject area); scale (i.e., should one be current in all details of the subject area or simply know the major issues?); and depth of understanding (shallow or deep). Therefore, since the notion of currency is vague, it is usually not possible to measure the value of individual inputs (e.g., reading an article).

Daniel explores the value of documents further in her article, which describes the quality problems in databases caused by documents which contain incorrect information or which are not useful because they are too old, duplicate other information, or are simply trivial. As with currency, there are several ways to look at document quality, including its actual or perceived value or relevance to the user and the validity of the information it contains. She proposes that usage should act as a quality filter in databases, and that information professionals should evaluate the intellectual content of documents for users.

Finally, the issue of "depreciation" is explored in various ways by the contributors to this volume. Mattessich describes it in its economic sense—a decrease in value because of wear or age, with an actual allowance made for this age in accounting practice. He further states that, "library materials do contain information and knowledge, and since their value usually declines, there seems to be justification for depreciating them."

The phenomenon in information science which is closest to depreciation is obsolescence, or declining use of literature as it ages. Both Line and Rothenberg cover the complex set of factors which must be considered in performing and evaluating research on obsolescence. A number of important factors affect results, including

the subject area being studied; the document types analyzed (e.g., books, periodical articles); size and growth of the literature; time period studied; sources used to gather references; users of the materials; and uses for which the materials were sought, cited, or used. Given that such complex sets of variables exist in any given study, it is not surprising that results vary from study to study; that results are usually not comparable across studies; and that much of the obsolescence research is poorly done.

Line sums up the status of our knowledge in theory and practice in stating that the phenomenon of obsolescence is still not proven and remains a hypothesis, calling into question the value of these studies for library practices such as weeding and collection development.

Taken as a whole, the diverse set of articles in this volume on the depreciation of knowledge deals with fundamental and complex issues in the field of library and information science. In fact, one of the most important points to be made about the contributions presented here is that they demonstrate how multifaceted many of these phenomena are: knowledge (physical documents, citations, or cognitive system); life cycle (one or many for a given knowledge area); value (what does it mean for a person to be current or for a document to be of a given quality?); and depreciation or obsolescence (does literature become less valuable—i.e., less used or useful with age, and, if so, what factors make that happen?).