

and among the crewmembers. Each crewmember took on a distinct, but coordinated, role. Critical information was posted at just the right locations for use. Likewise, navigation practices required that not one, but two crewmembers have certain crucial pieces information at the same time to reduce the likelihood of error. Posting of critical information at the right locations for use, redundancy of information in the crew's knowledge and in the materials they worked with, and a variety of other information factors in the situation promoted the effective coordinated response. Even the format design of the forms the crew filled out made it easier for them to complete their work successfully.

Though Hutchins was studying collective cognition, he also produced groundbreaking work relevant to information studies, because he incorporated *all* the forms of information that were supporting the crew's performance, not just the forms that we conventionally label "information" (see, for example, Hutchins, 1995, pp. 263–285). People get information not just from paper sources, not just from other people, but also from the physical layout of their workspaces, from the design, not just the content, of informational genres, and above all, from the interaction of these various factors in a real situation. All the patterns of organization of matter and energy—cognitive, physical, architectural, social, linguistic—are informative. Therefore, to understand fully this information seeking and use situation requires the identification of the roles of all these forms of information.

The terms defined in this article can be seen as an initial effort to identify the various information forms needed for the study of people in their information milieus. In the example of the ship's crew, it would be possible to distinguish the nature and role of *experienced information*—what the crew were perceiving and thinking about, *enacted information*—what they did, and observed others doing, at each step of the process, *expressed information*—what they said and understood from their own and others' verbal and body language, *embedded information*—how the architectural layout and design of instruments and documents affected their information use, and *recorded information*—the documentary resources used.

Information Genres

Distinguishing genres of information has been a long-standing necessity for library catalogers, who wish to include information type within their descriptions of various kinds of documents (Wilson & Robinson, 1990). However, while much work has gone into the making of definitions for practical cataloging, there has been no larger established theory of genre types within library and information science. Recently, the advent of new informational forms on the World Wide Web has provoked another round of interest in genre in information studies (Bates & Lu, 1997; Crowston & Williams, 2000; Vaughan & Dillon, 1998, among others). In a completely different realm, genre has also been a focus of interest in literary studies, the arts, and other fields, where a given genre can be seen to be an expression of, and a vehicle

for, a particular kind of communication (Ingarden, 1989; Trosborg, 2000).

Perhaps the information types described in this article can provide the basis for a more theoretically grounded understanding of genre. For example, within the humanities we can see the performing arts (dance, theater, music) as the disciplines of expressed and enacted information, the plastic arts (painting, sculpture) as the disciplines of embedded information, literary studies as the disciplines of recorded information, and so on. Starting with a consideration of these fundamental differences and distinctions in the *object of study* by the practitioners of these disciplines, perhaps we can develop a taxonomy of the material culture of the arts and humanities that has a novel basis. This taxonomy may also be useful for grounding the development of a suitable classification of genres for library work as well.

The Information and Curatorial Sciences

Of late, there has been much interest in the relationship between library and information science, archives, and museum studies. In the digital era, all of these disciplines are involved in digitizing parts of their collections, and the challenges facing these fields appear to be converging. Museum collections management databases are being revamped and made available to the public online, just as library catalogs have been for some years now.

I believe that the distinctions made in this article among types of information can help clarify just what the relationship is and should be among these disciplines. They are all what might be called *collections disciplines*, as their primary purpose is to create collections of objects, that is, to bring together objects of social interest for research, learning, and entertainment, and make them available to an audience. All these disciplines create some sort of organized access to their collections, and house those collections in institutions of a certain type and organizational design.

Those institutions, the library, the archive, and the museum, arose for different purposes, however, and have different traditions. The different purposes arose around the collecting of distinct types of objects. In other words, *collections sciences are distinguished one from another by the kinds of objects of social interest that they collect*. Though digitization makes for some similarities in the challenges these disciplines face, it should also be kept in mind that each discipline arose around, and is designed to meet the needs of, the underlying social objects collected.

Libraries house published recorded information, archives house unpublished recorded information, and museums house various kinds of embedded information, from works of art to archeological artifacts. Natural history museums house embodied genetic information, that is, partial or whole (and no longer living) phenotypes. Still other museum-like institutions, specifically, zoos, aquariums, arboretums, and gardens, collect and house living phenotypes, also embodied genetic information.

The distinctions among types of information detailed here may be used as a basis for analyzing and distinguishing