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Disseminating, Archiving, and Retrieving New Knowledge in Industrial Technology: Implications for the Discipline and NAIT

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Abstract

It is incumbent upon those who conduct research and otherwise pursue creative activities in industrial technology to share their findings. Disseminating, archiving, and the ability to retrieve new knowledge is significant to the discipline in that it contributes to the vitality of the discipline and those it serves, business and industry. It is also from research findings and the outcome of creative activities that direction is established for the creation of new knowledge and the application of that knowledge.

The *Journal of Industrial Technology*, the NAIT (National Association of Industrial Technology) Annual Convention, and the *Journal of Technology Studies* are among the core mediums in industrial technology for sharing findings that result from research and other creative activities. However, the means for accessing new knowledge is rather limited. As a consequence, researchers and those who otherwise pursue creative activities in industrial technology have a difficult time retrieving new knowledge archived by the discipline. NAIT, however, can significantly improve the discipline's ability to disseminate, archive, and retrieve new knowledge. The result will be a discipline that will mature and advance at a greater rate, and a discipline that can have a positive influence on the manner in which business and industry conducts its affairs, accomplishes its mission, and achieves their goals and objectives.

Introduction

The goal of research, the scientific method of inquiry, and other creative activities is to improve human endeavors. This goal of improved human endeavors is achieved through the creation of new knowledge. The pursuit of new knowledge, however, is dependent on the dissemination and archiving of research findings and the results of creative activities, and ready access to that new knowledge. Ready access, or the ability to retrieve new knowledge, cannot be overemphasized; timely access and ease of access are essential to sustaining the process of creating new knowledge and improving human endeavors.

The purpose of this article is to emphasize the importance of disseminating research findings and the outcome of other creative activities, the importance of disseminating works in progress, and the importance of ensuring that new knowledge is accessible by the discipline and by business and industry. Thus the objective of this article is four-fold. First, the intent of this article is to encourage those who continue to conduct research and to pursue other creative activities, and who share their finding, to continue sharing their findings. Second, the intent is to encourage those who have not shared their findings to being doing so. Third, the intent is to share with the discipline (NAIT in particular) why accessibility to new knowledge created and disseminated by the discipline is so significance to others, especially our colleagues and business and industry. Finally, the intent of this article is to offer solutions that will improve the discipline's capability to disseminate, archive, and retrieve the new knowledge created by the discipline.

The Significance of Writing

At the onset of any research effort or creative activity, the researcher normally conducts a thorough review and evaluation of previous works in the literature (or works in progress). This helps acquaint the researcher with the discipline as a whole and establishes whether ideas are truly new and significant.

Writing itself results in an understanding of the discipline that cannot be achieved by any other means. Orne (as cited in American Psychological Association, 1994) notes that researchers "will get to really know a field only if [they] become sufficiently involved to contribute to it" (p. 1-2). Furthermore, most researchers would agree that there is no better way to clarify and organize one's thoughts than by sharing them with others through the written medium.

Most important though, writing for one's discipline contributes to the vitality of the discipline, in particular if the writing is done well. It is only by disseminating research findings and the results of other creative activities that a discipline can advance.

Beyond Writing

According to Katz (1997), the sharing of new knowledge can be accomplished by a variety formal, semiformal, and informal means, facilitated by traditional communication mediums and the Internet. The informal may include face-to-face discussions, telephone conversations, drafts of manuscripts circulated among friends and colleagues, discussions at meetings and seminars, and private correspondence. Reports on the current status of projects or other works in progress, dissemination of ideas through formal outlets such as a series in a journal that reports on works in progress, copies of speeches delivered at conferences, or summaries of studies are examples of semiformal means of disseminating findings. Works offered for general circulation through mediums such as journals and other periodicals and books complete the formal process.

Redmond, Sinclair, and Brown's (1972) rationalization curve, shown in Figure 1, illustrates the research process and the manner in which new knowledge is disseminated and archived. While the intent of their illustration is to depict the dissemination process with implications for decisions libraries must make on collecting information and to whom that information is to be offered, it nevertheless offers a perspective on the dissemination and consumption of new knowledge.

They suggest that much of what takes place in the informal phase, which includes what Katz (1997) would include in both the informal and semi-formal phases, actually occurs among those who comprise the "invisible college." Price (1971) characterizes the invisible college as a group of people working in a similar field, such as industrial technology, in some informal fashion behind the backs of the conventional journals. Katz (1997) characterizes the invisible college as those personal contacts that possess a certain expertise or have access to those possessing that expertise. This personal contact may include friends and colleagues; the researcher's personal library of books, periodicals, newspaper clippings, hardcopy products downloaded from CD-ROMs; and the like. This may also include the likes of Internet-based communication--e-mail, LISTSERVs, and USENET discussion groups.

Redmond, Sinclair, and Brown's rationalization curve also depicts the relationship between writing, archiving in primary publications (not to be confused with primary sources), abstracting and indexing in secondary publications, and their integration and re-publication in tertiary publications.

The Encyclopedia of Library and Information Science (Kent, Lancour, and Daily, 1980) offers a similar diagram (see Figure 2). Like Katz and Redmond, Sinclair, and Brown, this diagram also incorporates three different means of disseminating new knowledge--nonformal, preliminary, and formal. In addition, and like Redmond, Sinclair, and Brown, it suggests that dissemination occurs through primary literature--that is, through nonformal, preliminary, and formal means; its surrogation by secondary services and its eventual integration and compaction in reviews, textbooks, and encyclopedias; and its secondary surrogation by tertiary services.

Primary Literature

Dissemination by nonformal means--oral communications, informal notes and memos, and other correspondence regardless of the medium--within the invisible college frequently starts when the investigation begins to yield data. The data are archived in laboratory notebooks, diaries, or journals, and serve as the basis for formal primary publication. But even before conclusions are drawn, preliminary communication may take place to establish priorities and to keep the discipline abreast of current developments. This communication may occur as letters or short articles in primary journals. The conference (e.g., the Annual NAIT Convention) is another possible phase in the evolution of new knowledge. Here conference literature is produced as preprints of papers, published proceedings (e.g., the NAIT Convention Proceedings) containing the edited version of the papers, and reprints of papers to be distributed after the conference (e.g., the publication of selected papers presented at the Annual NAIT Convention). The development of research reports constitutes another phase. Master's theses, doctoral dissertations, interim reports, and final reports are included in this phase of dissemination and archiving. Research articles published in refereed primary journals, such as the *Journal of*

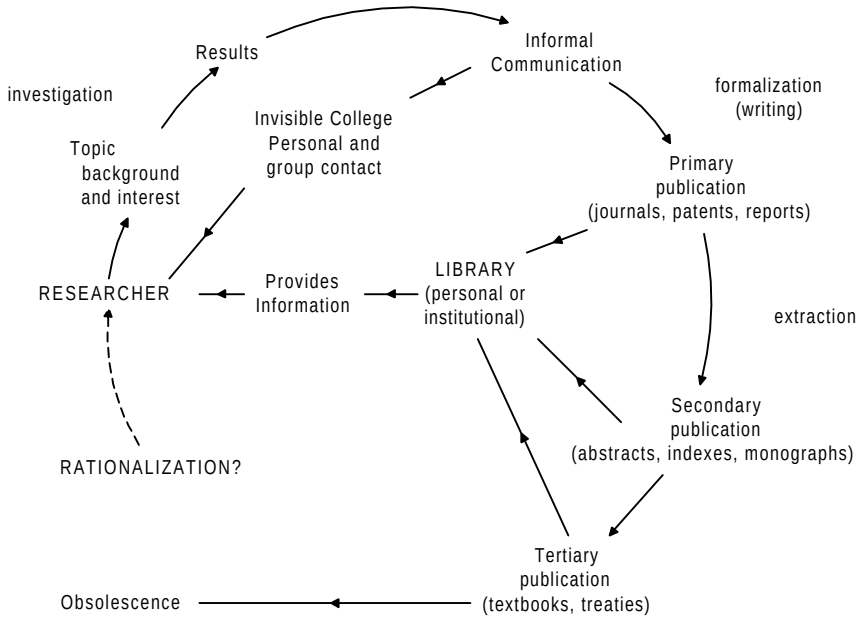

Figure 1. The Rationalization Curve (Redmond, Sinclair, and Brown, 1972)

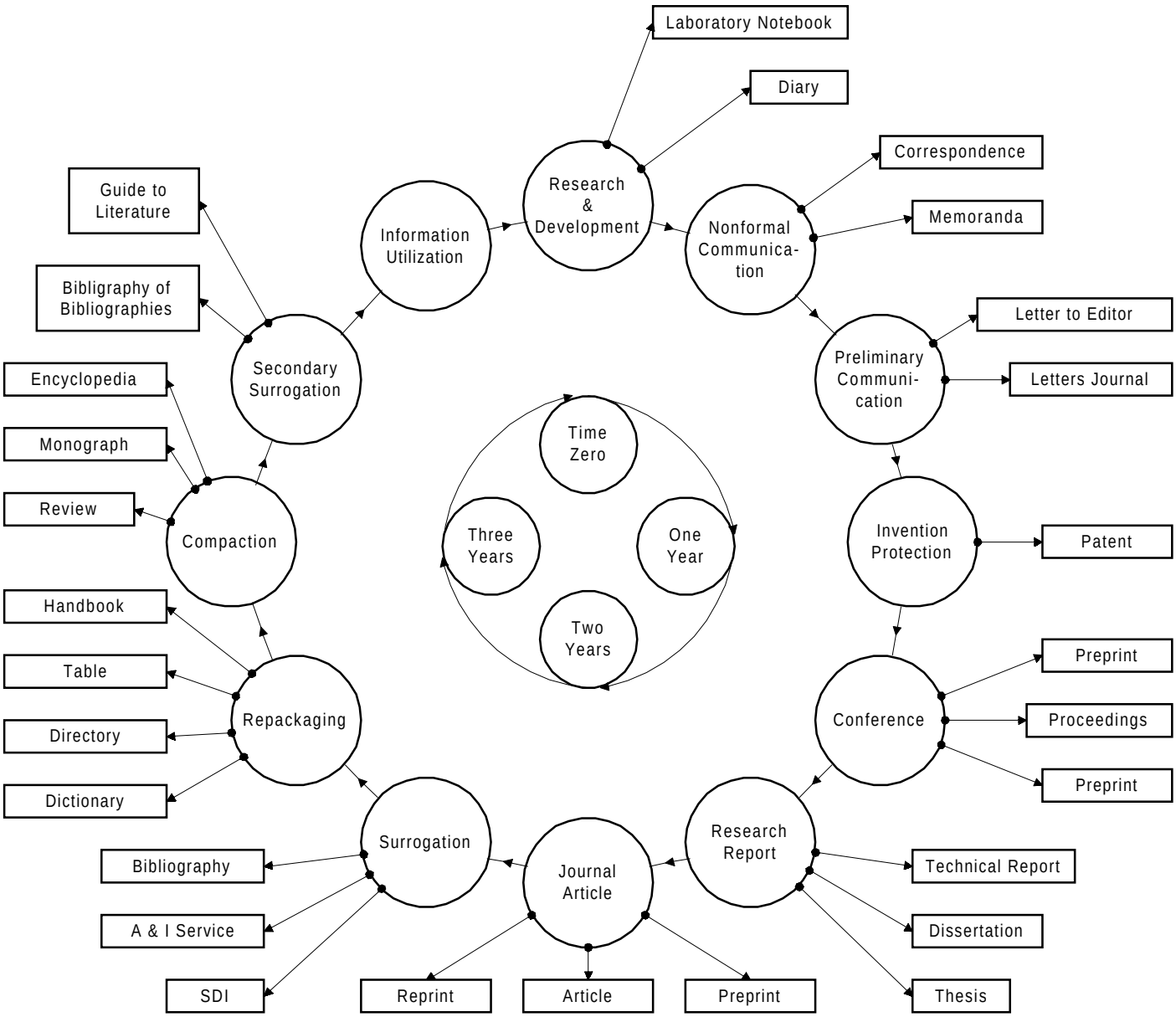

Figure 2. Evolution of Scientific Information (Kent, Lancour, and Daily, 1980)

Industrial Technology and the *Journal of Technology Studies*, constitute the bulk of the primary literature. And like conference literature, journal articles can be disseminated as preprints, as the paper published in the journal itself, or as a reprint disseminated or distributed by either the author(s) or publisher, facilitated by traditional mediums and the Internet.

Secondary Services

Timely and effortless access to research findings and reports of other creative activities is essential to sustaining the process of creating new knowledge. The role of secondary services, such as the CIJE (*Current Index to Journals in Education*), is to identify, select, and digest pertinent information from the mass of literature scattered throughout the diverse variety of sources of primary documents. The creation of current awareness services, bibliographies, indexes, abstracts, and catalogs help researchers identify and select pertinent documents. And repackaging of contents of primary documents into directories, handbooks, yearbooks, and the like help to access desired pieces of information with greater ease and in less time. The process of surrogation, repackaging, and compaction is summarized in Figure 3.

The *Journal of Technology Studies* is the only principle medium for sharing findings in industrial technology that has been repackaged. Articles that appear in the *Journal of Industrial Technology* and those products associated with the NAIT Annual Convention--the oral presentations, the proceedings, and the selected papers published by NAIT--are not.

Tertiary Services

The development of secondary services occurred in response to the growth of primary literature. Tertiary services evolved in response to the growth of secondary services. Because of the quantity, diversity, and proliferation of secondary sources, additional alternate and alternative means for accessing information such as bibliographies of bibliographies, lists of indexing and abstracting services, directories of directories, and guides to literature such as the *Guide to Reference Books* and *Gale Directory of Databases* are now an essential part of accessing information. The newest source includes the various search engines associated with the World Wide Web.

Figure 3 illustrates how primary literature is surrogated, repackaged, and compacted into secondary sources, and how tertiary sources are derived.

Access to the Literature

The significance of disseminating and archiving new knowledge can be illustrated best by depicting how it is sought. Figure 4 traces the search process for acquiring information to meet the needs of the user, in particular if an information professional is providing assistance. First, tertiary sources, such as the search engines, are used to narrow down the search to the relevant abstracts, directories, encyclopedias, and other secondary sources. Then secondary sources, such as ERIC in hardcopy, on CD-ROM, or through a website, are examined to identify appropriate primary publications. Finally, primary publications are acquired and studied to obtain the relevant information desired.

But what about the wealth of literature not yet available through primary publications or that appears in primary publications, such as the *Journal of Industrial Technology*, but not yet cited by secondary services? How does one access information not yet available through or even in the most well stocked libraries? Access can only be gained to that literature by means of the invisible college. Through the invisible college, new knowledge can be acquired by means

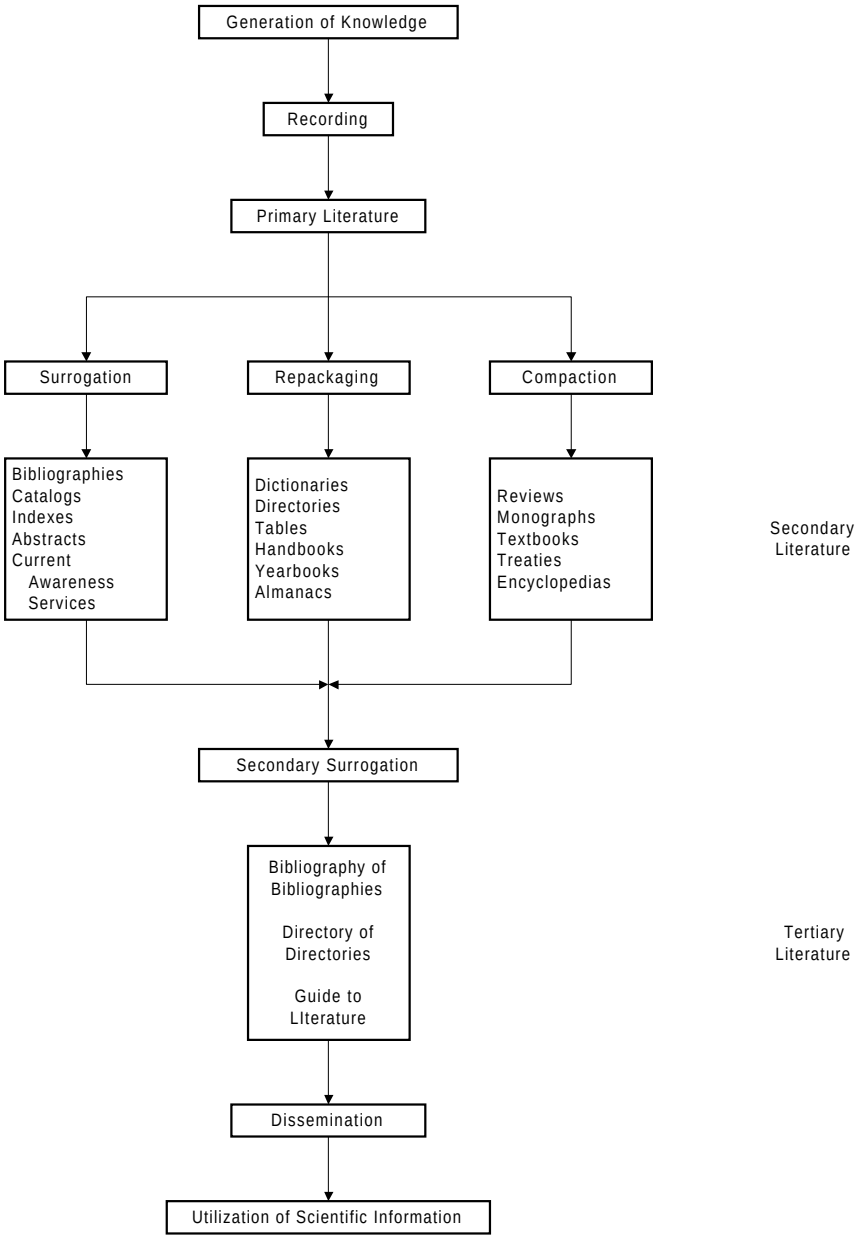

Figure 3. The Structure of Scientific Literature (Kent, Lancour, and Daily, 1980)

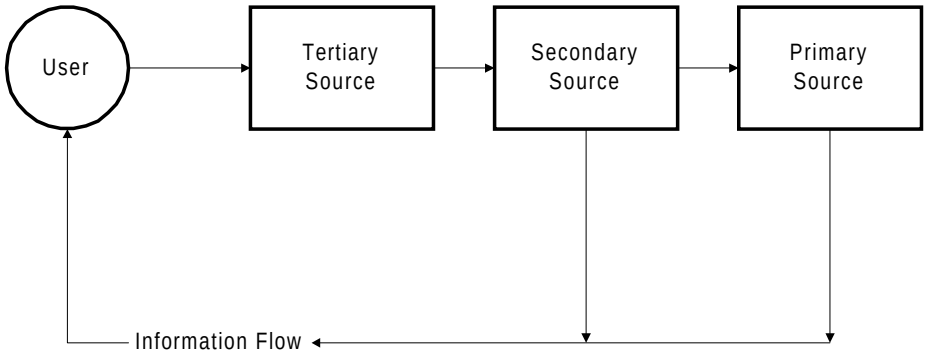

Figure 4. Direction of the Search Process and Information Flow (Kent, Lancour, and Daily, 1980)

of unpublished documents, preliminary communication, conference literature, research reports, and the like. It may involve face-to-face discussions; discussion by phone, the Internet, or private correspondence; the sharing of draft reports or other manuscripts; or discussions at meetings, such as the Annual NAIT Convention; and seminars.

Conclusion

The continued growth and vitality of any discipline, including industrial technology, is depended upon the creation of new knowledge. Thus, it is incumbent upon those who conduct research in industrial technology and otherwise pursue creative activities to disseminate their findings. As well, it is incumbent upon a discipline's professional hierarchy to ensure that new knowledge is archived and can be easily retrieved.

Numerous mediums exist for disseminating and archiving new knowledge in industrial technology. They include the *Journal of Industrial Technology*, the *Journal of Technology Studies*, the NAIT Annual Convention and its associated convention activities--oral presentations, the proceedings, and the publication of selected papers to name a few. The vast majority of that new knowledge, though, is not readily accessible by business and industry, nor even by the discipline itself. Business, industry, and the discipline, then, must depend on a less-than-thorough system--the indivisible college--for accessing the discipline's research findings and the results of its creative activities.

Recommendations

A quantum step forward in the growth, viability, and visibility of industrial technology can be achieved by subjecting its publications to secondary servicing. That is, NAIT should make its publications available for identification, selection, and digestion. NAIT should also take advantage of current awareness services, bibliographies, indexes, abstracts, and catalogs that help business, industry, those in the discipline, and other researchers identify, select, and retrieve pertinent documents. Finally, NAIT should be encouraged to take advantage of the various information storage and retrieval services to repackage its publications into directories, handbooks, yearbooks, and the like to help business, industry, the discipline, and other researcher to access desired pieces of information with greater ease.

Program administrators--deans, chairs, heads, and the like--should encourage their faculty to disseminate reports of research and creative activities that are in progress. That is, faculty should be encouraged to maintain a dialogue with others in the discipline as their research and creative activities progress. Acknowledgment should include the full spectrum of dissemination mediums, not just referred journals. As has been noted, if a journal's content cannot be retrieved, the value of its content is quite limited. Program administrator should also develop mechanisms for incrementally acknowledging the progress made in the creation of that new knowledge. As an example, successful solicitation of support from a funding agency, in particular those who make use of reviewers to recommend awards, should be acknowledged. The review process is one means by which the potential of the research or creative activity being proposed for support is validated. Finally, the ease of dissemination, retrieval, and use by others should be acknowledged. The manner in which research findings and the outcome of creative activities are archived will determine their value to the discipline and business and industry. Those findings and outcomes are of considerably more value if they can be easily retrieved.

Industrial technologists should make every effort to disseminate progress made in the research they are conducting and the creative activities they are pursuing. It is not enough to ensure that progress is disseminated from "cradle to grave", and findings and outcomes are shared. New knowledge must be available for "reincarnation."

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