

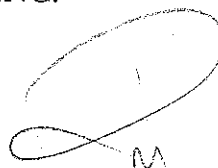
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# THE ORGANIZATION OF INFORMATION

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LIBRARIES UNLIMITED, INC.  
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## CHAPTER 1

# *ORGANIZATION IN HUMAN ENDEAVORS*

This chapter gives an overview of the field of the organization of recorded information. Terms used here that might not be readily familiar to the person new to the field of organizing information will be explained in later chapters. In the meantime the reader will find definitions of most unfamiliar terms in the glossary of this book.

### IS THERE A BASIC HUMAN NEED TO ORGANIZE?

There seems to be a basic drive in humans to organize. Psychologists tell us that babies' brains organize images into categories such as "faces" or "foods." Small children do a lot of organizing during play. With some individuals the need is much stronger than with others. Those who operate on the maxim that states, "A place for everything and everything in its place," cannot begin to work until the work surface is cleared and every stray object has been put in its place. That is, such a person has to be "organized" before beginning a new project. But even those whose work spaces appear to be cluttered or chaotic have some organization in their heads. Such persons usually have some idea, or perhaps certain knowledge, of what is in the various piles or collections of "stuff." Regardless of one's personal style, however, human learning is based upon the ability to analyze and organize data, information, and knowledge.

## WHY DO WE NEED TO ORGANIZE?

We need to organize because we need to retrieve. Kitchens are organized so that cooking equipment is easily accessible and foodstuffs and spices can be used as needed. Workplaces are organized so that appropriate records are retrievable and work can be done. Learning processes are organized so that relationships among ideas can be used to assist the learner in recalling the learned material.

## WHY DO WE NEED TO ORGANIZE INFORMATION?

Retrieval of information is dependent upon its having been organized. Information is needed in all aspects of life—for example, for health reasons, to understand each other, to learn about one's relationships, to fix things that are broken, or simply to expand our knowledge. Some of this information has already been assimilated and is in one's knowledge store, while other information has to be sought. If it is not organized, it is difficult, if not impossible, to find. So we have all kinds of tools that are organized to aid in the process of finding information that we need: telephone books, directories, dictionaries, encyclopedias, bibliographies, indexes, catalogs, museum registers, archival finding aids, and databases, among others.

Organization of information also allows us to keep a usable record of human endeavors for posterity. Libraries, archives, museums, and other types of institutions have been doing this for many years. (This book does not deal with organization in commercial enterprises that have put together collections for the purpose of sale, rather than collecting for posterity.)

## WHAT IS ORGANIZATION OF RECORDED INFORMATION?

As mentioned in the preface, this book addresses the organization of recorded information, as other means are necessary to "organize" information that has only been spoken, heard, or thought about. Recorded information, however, includes much more than text. Therefore, instead of using words such as *book* or *item* to refer to the organizable unit of information, terms such as *information-bearing entity* and *information package* are used.

Hagler has identified six functions of bibliographic control.<sup>1</sup> His listing reflects the purpose of his book, that is, the emphasis is upon the work of librarians. However, the list, with altered wording, reflects the major activities involved in all of organization of information.

1. *Identifying the existence of all types of information-bearing entities as they are made available—*

A book may be published or a web site may be established, but if no one knows of its existence except the person(s) involved in its creation, it will be of no informational use to anyone. Existence and identity can be made known in many ways: publishers' announcements, e-mail announcements, reviews, subject-related listings, to name a few. Most publishers create catalogs listing their products along with abstracts for them. Reference tools such as *Books in Print* are products of this activity.

2. *Identifying the works contained within those information-bearing entities or as parts of them—*

A collection of short stories or a grouping of artistic works may be considered to be an information-bearing entity as a whole; alternatively, each individual story or artistic work may be considered to be an information-bearing entity. A web site that is all about a famous person may have individual digitized works of the person, biographical material, accounts of the person written by contemporaries, accounts of events contemporary to the person's life span, and other parts. The writings about the person and the events may be important works in their own right and may need to be identified separately.

3. *Systematically pulling together these information-bearing entities into collections in libraries, archives, museums, Internet communication files, and other such depositories—*

The activity of creating collections traditionally has been thought of as the province of institutions such as libraries, archives, and museums. But collections have always been created in many other situations: personal collections made up because of an intense interest in a particular kind of information, office collections of internal information and information needed to carry out the work of the office, university departmental collections of materials needed for teaching in a particular discipline, etc. Now that it is easy to make these collections known publicly, lists are being provided at web sites.

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Collections often include electronic resources not held locally. Many institutions purchase the right to allow the users of their collections to search a resource online. Some resources are accessible only online. Others are also available in print. Part of the organizing process is determining whether such resources need to be added to one's collection in some permanent way.

4. *Producing lists of these information-bearing entities prepared according to standard rules for citation—*

Lists created in this activity include bibliographies, indexes, library catalogs, archival finding aids, and museum registers. These are important to the retrieval of individual information packages, because if one is looking for a known item, especially a tangible one that needs a physical location, it is necessary to find it listed somewhere. Such lists may be in print or electronic form.

5. *Providing name, title, subject, and other useful access to these information-bearing entities—*

This is the activity that adds the most value to the usefulness and retrieval potential of a collection. Keyword access can be provided more or less automatically and "on-the-fly," that is, any information in electronic form can be found by searching for a word that appears in the electronic information package. However, results of keyword searches become less and less satisfactory the larger the collection being searched. More satisfactory retrieval comes from being able to search for names, titles, and controlled vocabulary that have been created under authority control, usually by humans. If a person has been identified by different forms of name, and if that name is brought under authority control, then a search for one form of the name will retrieve information packages related to the person regardless of which form of name appears in a particular package. If a work has been given different titles in its different manifestations, a search for one of the titles will retrieve all. If a system uses controlled vocabulary, a search for a word with more than one meaning (which encompasses most English words) will allow differentiation among the various meanings and will direct one to broader, narrower, and related terms. It will also

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bring together under one term all the synonymous terms that may be used to express a concept.

Authority controlled access is of little use unless systems are designed to take advantage of it. Therefore, a major part of organizing information is designing systems for searching and display that will allow information-seekers to find easily what they need and want.

6. *Providing the means of locating each information-bearing entity or a copy of it—*

This has, for at least a century, been a value added by institutions with collections. The catalogs or other lists created in these institutions give information on the physical location of the entity, if it has not been taken out by a patron or is not being used by someone on the premises. In many library online catalogs, circulation information is available so that if an item has been taken out of the library, that information is available with the location information. Bibliographic utilities (e.g., OCLC, RLIN, WLN) allow one to find out which locations physically own a particular item. Many library, museum, and archival catalogs are available on the Internet. One can learn from these which locations own an item, whether it is on loan at a particular location (usually a library, as archives and museums generally do not circulate items from their collections), and often whether an item is on order and when it is expected to arrive.

Traditionally, bibliographies and indexes have not given location information. Bibliographies list what exists somewhere, but seldom tell where. Indexes give the larger work in which the smaller work being listed can be found (e.g., in which journal an article can be found), but do not give the physical location of the larger work. All of this is still true for tangible resources, but for electronic resources found on the Internet, it is becoming more common to give the location (e.g., URL) in any listing that includes the electronic resource. However, the instability of URLs makes it very difficult to keep them current.

## HOW IS THE ORGANIZATION OF INFORMATION APPROACHED IN DIFFERENT ENVIRONMENTS?

There are many environments in which there is a desire to organize information so that it will be retrievable for various purposes and so that at least some of it will be kept for posterity. The ones to be discussed here are libraries of all types, archives, museums and art galleries, the Internet, and data administration environments (including offices).

### *Libraries*

We consider libraries first because they have the longest tradition of organizing information for the purpose of retrieval and for posterity. As mentioned earlier the process begins with collections. Collections in libraries are created through the process called collection development. Collections are developed most often in three ways: 1) librarians learn about existence of new works through reviews, publishers' announcements, requests from users of the library, etc., and then order appropriate materials; 2) gifts are given to the library; and/or 3) approval plans, worked out with one or more vendors, bring in new items according to preselected profiles. In addition journal collections keep growing unless subscriptions are dropped.

When new materials arrive for addition to the collections, physical entities have to be arranged in some fashion. They may be placed on shelves in the order in which they come in, or they may be placed in some more meaningful order. They could be placed in alphabetical order, and this is the way that many fiction and biography sections are arranged. Most, however, are arranged by classification.

Classification of materials is part of the process of cataloging, which is usually the first activity following receipt of the materials. Cataloging of individual items involves creating a description of the physical item; choosing certain names and titles to serve as access points for getting to the description in the catalog; doing authority work on those names and titles; doing subject analysis of the content of the work in the item; choosing subject headings and classification numbers to represent the subject analysis; and creating call numbers (location devices), usually by adding a Cutter number to the classification number to make a unique set of letters and numbers to identify the particular physical item. Virtually all records thus created are coded with the MACHine Readable Cataloging (MARC) format so that they can be displayed in online systems.

Physical items then, finally, have to be "processed" so that they can be housed with the collections. This involves removing or adding book jackets, placing security strips in or on items, placing call number labels and barcodes

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The two major results of the cataloging process are arrangements of collections and the creation and maintenance of the catalog that provides the major access to the collections. The catalog is able to show what exists in the collection written by certain authors, having certain titles, or on certain subjects. It also brings together (i.e., collocates) all of the works of an author and all the editions of a work, even though they might not be brought together in the collections.<sup>2</sup>

Before online catalogs existed, the library's main card, book, or Computer Output Microform (COM) catalog typically was supplemented by other catalogs. Catalogs for departmental libraries, serial record holdings, and shelflists containing location information for specific copies of an item were the most common. All of these have been incorporated into one database in most online catalogs. In addition most online catalogs are part of integrated systems, which means that circulation information can accompany each catalog record. This adds to the power of the location information because one can be told if an item is temporarily unavailable due to its being charged out.

Until recently the online catalog continued to contain records only for items physically held by the library system. As libraries have entered into cooperative relationships, this principle of telling "what the library has" has eroded. In union catalogs that contain records from libraries of more than one institution, the concept was expanded to "what at least one of the cooperating libraries has." More recently, the addition of Internet records has meant that a number of catalogs now contain records for "what the library can give access to," including "what the library has."

Online catalogs also can be gateways to outside systems such as bibliographic utilities (e.g., OCLC, RLIN, WLN) that can tell where an item may be found if it is not in the local catalog. The item can then be requested through Interlibrary Loan (ILL). In addition bibliographic and text databases can be accessed from a catalog gateway. Many of these have become document delivery systems. A major addition to online catalogs has been access to the World Wide Web (WWW). Many libraries are cataloging Internet resources that seem to be important for the users of that catalog, and a URL in a catalog record can be hyperlinked to the WWW for immediate access to the information package represented by the catalog record. As mentioned earlier, a major difficulty has been keeping the URLs up-to-date.

Another major part of the organization process in libraries is found in the reference process. Libraries are organized so that information can be retrieved. In the reference process the success of the organization is tested. If it is found to be difficult to use, some of the organization process must be redone.

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Administrative services in libraries are also affected by organization of information. Administrators are responsible for technological decisions that are directly affected by the organization of the recorded information in that setting. Conversely, administrators' decisions affect the future, in which electronic chaos will result if organization of information is not supported.

### Archives

Although libraries have become more and more standardized throughout the twentieth century, and although many information resources in a library are duplicates of resources in another, neither of these is true in archives. Archives usually consist of unique items. Therefore, it once was thought that standardization was unnecessary. Archives could not take advantage of copy cataloging (i.e., using catalog records created by other agencies) because they were not cataloging materials that were also owned elsewhere. Although not nearly as standardized as libraries, archives have seen significant standardization movements.

Archives preserve records of enduring value that document organizational or personal activities accumulated in the course of daily life and work. Organizational records consist of such things as annual reports, correspondence, personnel records, etc. Personal records may consist of such things as correspondence, manuscripts, personal papers, etc., or could be a collection of memorabilia or a scrapbook. Even though materials in archives often are thought to be "old," this is not necessarily so. Further, archival materials can be in many different formats: paper, graphic images, sound recordings, moving image recordings, and recently, in digital formats.

Archival materials have been organized for centuries. Unlike library materials, archival materials are arranged and described in groups. Until the last few decades, each archives chose its own way to organize the information, particularly regarding level of control and depth of description. There have been several major schools of thought through the years as to how organization of archival information should be done. The one that seems to have prevailed states that the basic principles of organization are provenance and original order. *Provenance* is the originator (i.e., the corporate body or individual) that created, gathered, and maintained the collection before it was sent to the archives. The term *provenance* is also used to show the ownership history of a particular artifact or collection of archival information. *Original order* is the order in which the originator of an archival collection kept or created the collection. Most archives now keep the contents of individual collections within the archives as a whole in original order, and the collections are maintained according to provenance.

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Standardization and cooperation have come to the archival world in part because of the increased interest in research involving documents and archival collections housed all over the world. In addition interest has grown, especially in the academic community, in entering descriptions of archival collections into the same databases with library catalog records. It has now become possible to easily share knowledge of the existence of these collections on the Internet.

Descriptions of archival materials can take one or more different forms. An accession record summarizes information about the source of the collection, gives the circumstances of its acquisition (which are more fully treated in the donor file), and briefly describes the physical data and contents for a collection. A finding aid gives a detailed contents note of the historical and organizational context of the collection and continues by describing its context, perhaps providing an inventory outlining what is in each box. It may also contain physical details such as the presence of brittle or fragile materials. A catalog record is a much shortened version of a finding aid.

Archival materials generally are in closed stacks, accessible only to staff. There is no public browsing and so the arrangement does not need to be classified as is usually true in an open stacks library. Any classification given, in any case, would be so broad as to be almost useless, due to the varied nature of each collection.

When the archival world became interested in placing their catalog records into bibliographic databases in the 1980s, a MARC format was developed (MARC-AMC). (AMC stands for Archival and Manuscript Collections.) Despite some lingering problems, the format continues to be used to code archival catalog records (now with the name "Mixed materials" instead of AMC). In the last few years an SGML standard has been developed for the purpose of encoding finding aids so that they can be displayed on the WWW.

The organization of archival information is necessary for use, whether that use is for administrative, historical, or personal reasons. It is also useful for archives that wish to mount exhibits either in something like an academic setting or perhaps on the WWW. If collections are well organized and documented, an exhibitor can use this to find appropriate additions to the exhibit.

### *Museums and Art Galleries*

Museums and art galleries are combined here, because the kinds of art galleries that are being discussed (e.g., National Gallery of Art) operate in ways similar to museums. The kind of art galleries that display art for the purpose of sale are not covered in this book.

Although libraries and archives both contain some visual material, the vast majority of the collections of museums and art galleries consists of visual material in two- or three-dimensional form. These collections traditionally have been organized for internal use only, but recently research needs have been given attention. Even when the needs of distant researchers are taken into account, curators may be reluctant to contribute some data because it may represent data created by individuals in the course of their research and may not yet be published.

Museum/art gallery art works or artifacts are acquired through the institution's acquisitions department. As is done in archives, accession records are created, although the practice in natural history museums differs somewhat. In natural history museums, artifacts are acquired largely from field work, and a preliminary field record is made. If it is decided to keep the objects in the collection, accession records are created. In some cases groups of similar objects are described as a single lot that is given a single accession number. Curation of individual objects, which may not happen for some time, results in departmental level catalog records with their own numerical sequences.

In museums other than natural history, items are registered after being accessioned. Registration is a process much like cataloging in libraries and archives. The register serves as a catalog in that it establishes the organizational control over the art works and artifacts. A fairly recent development is the use of bibliographic utilities for the organizational control of art and artifacts, although records thus created are still not necessarily accepted in the museum community.

In museums, as in archives, provenance is important information and is essential in determining the name of the object. Both provenance and condition must appear with all other information about the object in the catalog or registration record. An aspect of creating records for museum objects and art that is very different from creating records for text is that the objects are often imperfectly known at the time of accessioning and registering. There will be an accumulation of conflicting information over time.

Description of visual material is often more difficult than description of textual material. There is more reliance on the perceptions of the person doing the describing. Often there are no words associated with items at all; it is necessary for the describers of such items to use their own words. A single record has many more fields than does the usual library catalog record. Some fields that might be needed for art objects that are not used in libraries are: Material content, Technique(s), Studio of origin, Type of equipment used, Color(s), Texture, Design symbolism, Provenance, Exhibition history, Installation considerations, Appraised value, etc. Even with additional fields, it is not possible to anticipate all the uses a researcher might find in art or artifacts. A street scene from a century ago may be useful to historians, architects, urban planners,

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cultural historians, medical researchers, sociologists, students of photography, or others. Systems are being developed that start with queries that use the text of the description; then query results allow the searcher to browse surrogate images.

Subject analysis is also more difficult for visual materials—an image does not tell in words what it is about. Additionally, the line between description and subject analysis is harder to draw. One might describe a work of art as being a painting of a woman in a blue dress holding and looking at a baby—this is a description. But if one gives the subject of the work as “Mary and Jesus,” one has crossed the line into interpretation (unless this is in the title of the work given by the artist). And if one uses a description like “love of a mother,” one is definitely interpreting.

A barrier to cooperative cataloging has been the firmly held notion that museums hold unique objects. This is perhaps less true of natural history collections than other museum and art collections. Although each specimen of a bug or bird is unique, each represents a class of organisms that can be identified to the genus and species level. There would have to be copy-specific notes, but this does not preclude the idea of cooperative cataloging for cooperative access. However, as was true of libraries when cooperative cataloging was first introduced, museum curators fear a loss of individual control and level of detail. They are unwilling to give up their local terminology and organization in order to participate in a bibliographic utility.

Besides its major collections the museum or art gallery can also have an archives, a records management program, and a library. The library may contain published materials that document or relate to the museum or art gallery collections.

As with archival materials the museum/art gallery collections are accessible only to staff. Much of the collection is stored behind the scenes while only some of it is on display at any one time. Behind the scenes, the items are numbered in a way so that they can be retrieved as needed. Persons responsible for the exhibits must make heavy use of the system of organizational control. In addition these collections are increasingly being used for research by persons with diverse research needs.

### *The Internet*

The Internet has been likened to a library where all the books have been dumped on the floor and there is no catalog. For several years efforts have been made to find a way to gain some control over the Internet; however, one cannot yet say that it is organized. There is so much change so fast that efforts begun are sadly out of date in a few months. It has been estimated by a

number of Internet specialists that a web year is six to nine weeks. In other words the amount of change that happens in society in a year happens on the WWW in six to nine weeks. With change occurring at such a rate, getting a handle on organization is quite a challenge.

Several different approaches are being taken in the attempt to organize the Internet. Libraries have attempted to use traditional means for the organization. One project collected Internet resources in particular subjects and made them available at gopher sites. Other librarians are compiling bibliographies of web sites. Librarians have been part of the team of people who have been working on a metadata standard called the Dublin Core. Digital libraries are also being developed. These vary greatly in content and methods of organization, but all have some kind of organization, although usually not traditional library organization. Only a few of the people working on digital libraries are librarians.

In fact, much work on organizing the Internet has been done by persons other than librarians. Search engines, for example, have been developed by computer and programming specialists. Most people appreciate search engines, even though they are frustrated that the search engines are not more selective and precise. Most programs (e.g., robots, spiders, etc.) sent out to find sites to add to the indexes of search engines recognize text only; in addition to that, those programs cannot analyze a site's purpose, history, policies, etc. In order to improve the situation, work on various kinds of metadata (i.e., information about information) is ongoing and important; appropriate information is being gleaned by robots from metadata that has been added to a site by its author or by someone trained in describing and analyzing information packages. Metadata can include information about nontextual parts of a site, information about the site's purpose and history, information about the contents of the site, etc.

There is software that automatically classifies and indexes electronic documents, but automated tools categorize information differently than people do. The search site called *Yahoo!* classifies by broad subject areas using human indexers. This approach has been popular, although not completely successful as a classification. Also a research project at OCLC is improving an approach to automatic classification using the Dewey Decimal Classification.

Although some believe that organizing the Internet will be impossible, the parts of it that are important for retrieval and for posterity will be brought under organizational control. It is human nature, and the principles learned over centuries of organizing print information can be used to speed the process of organizing electronic resources.

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### **Data Administration and Office Environments**

Data administration is the terminology applied to the control of the explosion of electronic information in offices and other administrative settings. It has its roots in the office filing systems that developed throughout the twentieth century. These systems have been highly affected by developments in technology: typewriters, photocopiers, and computers (starting with sorters and collators).

As was true in other parts of our society, data administration once involved the keeping, filing, and maintaining of paper records. It was a simpler time, but also a frustrating time, because, usually, only one copy of a record was filed in only one place. The file labels of one records manager were not necessarily logical to the next. As information began being entered and stored in electronic files, access points (the file labels) became invisible. This was not an immediate problem as long as the people who developed the electronic files documented what was contained in them. The situation became more complicated when powerful personal computers began to allow persons to store and file their own information on their desktops. A problem of continuity developed when these personal files were abandoned.

For many years various operations have been automated, each with its own system. For example, payroll, general ledger, accounts payable, inventories, and other such systems have been automated separately. Within the last decade integration of these systems has been taking place with the result that the systems have many redundant data fields with little documentation of their content. These fields seem to be meant to contain the same information, but what is actually there is often different (e.g., name given in full in the payroll file, but middle name shortened to an initial in the faculty file).

Data administrators are dealing with their information explosion by using principles of organization of information. The units that need to be organized in the administrative electronic environment are such things as directories, files, programs, and, at another level, such things as field values. Organization can be by system (e.g., payroll, budget) or by type of record (e.g., person names, registration records). Data administrators must keep track of information that crosses system boundaries (e.g., person names cross boundaries when the same names are entered into several different files). There must be methods for handling concepts that have the same names but different purposes (e.g., the concept of "part-time" in a university can have different definitions depending upon whether one is talking about payroll, faculty, graduate students, or undergraduate students).

Keeping all these things straight is often done through a process called "data modeling." It can either be used as a precursor to database design or as a way to integrate the myriad systems developed over time by persons who are no longer with the corporate body. Data modeling designs a system using a series of related models. The process is to develop a conceptual model of the records management activity in the particular setting; then a logical model is developed that includes more detail; and finally, the logical model is translated into a physical data model that can be implemented as a database management system. If the data model is updated and adjusted to fit changes in the conceptual model, it can serve for a long time as the basis for the organization of information in an organizational setting.

A person's individual office organization is another matter. A major factor in one's personal office organization seems to be the use to which particular information-bearing packages will be put or have been put. For example, if an item is to be referred to in order to write a letter in the immediate future, it will be located at hand; items that have just been finished with will be filed. Also, the form of the package can be a determining factor: books may be shelved, while papers relating to the books may be placed in file folders. In one's electronic information store, it is necessary to develop electronic folders, subfolders, etc., if one is to be able to find a particular file again in the future. An importance of office organization is that some such office collections will be deposited in archives for posterity.

## CONCLUSION

In this chapter we have discussed basic needs to organize, have defined organization of information, and have looked at an overview of the organizing environments that are covered in this book. The following chapters discuss in more detail the processes that have been developed for the organization of information, those that are being worked on, and the issues that affect their implementation.

## NOTES

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