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A. Bennett Wilson, Jr. Library Project:

**An Overview of the Technical and Organizational Principles Characteristic
of Good Digital Collections**

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ABSTRACT

The initiative to digitize the *A. Bennett Wilson, Jr. Library* has the potential to significantly increase the body of knowledge available for students, practitioners, and researchers of orthotics and prosthetics. Securing grant funding for the project is one of the first steps necessary to complete this project. This report discusses the 22 principles that must be addressed in any grant proposal of this nature and how they relate to the *A. Bennett Wilson, Jr. Library Project*. The intention of this report is to guide those involved in the project as they begin the funding application process.

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GENERAL OVERVIEW OF LIBRARY PROJECT

A. Bennett Wilson, Jr. was a pioneer in the profession of Orthotics and Prosthetics. He devoted his life to the pursuit of scholarly learning, the innovation of new technology, and the dissemination of information. He is responsible in part for establishing the nomenclature regarding amputations and prosthetics accepted by the medical professions worldwide. Over the course of his lifetime, he published research prolifically and contributed to the innovation of improved amputation techniques. (O&P Business News, 2001)

Following his death in July 2001, the contents of his personal library were permanently loaned by his widow to O&P Digital Technologies with the expressed wish that the materials be transformed from a physical library into an living digital resource for Orthotics and Prosthetics. (Prusakowski, P, personal communication, August 25, 2002).

The Digital Resource Foundation for Orthotics and Prosthetics, a non-profit organization, was established in 2002 to carry out this mission. The Board of Directors is composed of individuals established in Internet technology, orthotics and prosthetics, and consumer advocacy/education. The Digital Resource Foundation for Orthotics and Prosthetics is currently beginning the initial phases of the project and preparing to apply for funding from various agencies.

It was from this beginning that the *A. Bennett Wilson, Jr. Library Project* was established. The library is one of largest privately held collections of Orthotics and Prosthetics information in the world. It is comprised of several hundred textbooks, reference materials,

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journals, periodicals, free papers, seminar papers, consensus conference reports and other media. The library is currently housed at O&P Digital Technologies in Gainesville, Florida.

The Digital Resource Foundation for Orthotics and Prosthetics shares a close working relationship with O&P Digital Technologies, creators of *oandp.com*. O&P Digital Technologies was founded in 1995 by Paul Prusakowski, CPO, a practicing orthotics and prosthetics professional with a great deal of interest in Internet technology. Over the past seven years the company has grown continuously and has never wavered from its mission of providing digital information technology to the profession, particularly through the Internet. A list of the major accomplishments of O&P Digital Technologies that relate to this project and attest to the fitness of O&P Digital Technologies as a partner in this endeavor has been included as Appendix A.

It is through this partnership that the *A. Bennett Wilson, Jr. Library Project* will be completed. The ultimate goal of the project is to provide students, practitioners, and researchers with fully searchable texts of all the materials contained in the library. The contents of the library will be available online at no cost to individuals worldwide for use in research applications and education.

The current plan is to complete the project in two distinct but related phases. In the first phase, the entire bibliographical index of the *A. Bennett Wilson, Jr. Library* will be created and made available online. This will allow researchers, practitioners and members of educational institutions to view the resources available in the library. It will also provide an opportunity for the staff of the Digital Resource Foundation for Orthotics and Prosthetics to assess which resources users have the greatest need for.

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The second phase of the project will involve the actual digitization of the library itself, along with the creation of the necessary supplementary information, which will be discussed in more detail later.

Appendix B lists the proposed elements of each phase of the project in greater detail.

The goal of this report is to provide the Board of Directors and project managers in charge of the *A. Bennett Wilson, Jr. Library Project* with a comprehensive literature review on existing international standards governing the digitization of libraries. This will guide the staff in preparing grant proposals and ensure that the resources invested in the project result in the most effective online library. This report will serve as a guide of things to consider and will point out the most likely obstacles based on the available publications about this topic.

A great deal of time, energy, and money has been invested over the past decade to create international standards that govern digitization projects. There are several outstanding resources available to guide organizations and institutions as they endeavor to digitize a collection. For the purposes of this report, *A Framework for Guidance for Building Good Digital Collections*, published by the Institute of Museum and Library Services (IMLS), has been selected as the most appropriate approach for building the *A. Bennett Wilson, Jr.* digital collection. This decision was made for the following reasons:

The IMLS *Framework for Guidance* was created by internationally recognized experts in Library Science.

The IMLS *Framework for Guidance* was funded by one of the major grant sources for this type of project and was intended to address all the aspects of digital projects

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significant to grant applicants and to funding agencies. (Digital Library Forum, 2001)

This is important because the project will be grant-funded.

To understand the approach selected, some background information is needed. The IMLS *Framework for Guidance* sets forth many individual criteria found in all “good” digital collections. As noted in the report, these indicators of “goodness” cover four major topic areas: collections, objects, metadata, and projects.

Collections are defined as “a selected and organized set of digital materials (objects) along with the metadata that describes them and at least one interface that gives access to them”. (Digital Library Forum, 2001)

Objects, thereby, are all the individual entities that together comprise a collection. They are “conceptually equivalent to the items that may be found amongst library holdings (books), museum collections (artifacts), and archival fonds (papers)”. (Digital Library Forum, 2001)

Metadata is the information about the object and/or the collection that is essential for verifying authenticity, maintaining structural and technical integrity, and linking the information to the greater network of available information, among other uses. (Digital Library Forum, 2001) All metadata is information about either the content of the objects, the context of the objects, or the structure of the objects. (Gilleland-Swetland, 2000).

In the context of this report, “projects are initiatives of finite duration, designed to accomplish a specific goal”. (Digital Library Forum, 2001)

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The IMLS' *Digital Library Forum* has identified all the issues that must be addressed in order to have “good” digital collections, objects, metadata, and projects. This research paper is intended to explore this framework in the context of the *A. Bennett Wilson Library Project*.

COLLECTIONS PRINCIPLES

Each of the Collections Principles established by the IMLS are printed in italics in this section. The important concepts and ideas that must be considered before embarking on a digitization project are then explained in the paragraphs that follow the Collections Principles.

Collections Principle 1: A good digital collection is created according to an explicit collection development policy that has been agreed upon and documented before digitization begins (Digital Library Forum, 2001)

The first step in addressing *Collections Principle 1* is to identify the mission of the organization undertaking the project, and ensure that the project furthers the goals of the organization in some concrete manner. (Digital Library Forum, 2001) In this case, that organization is the Digital Resource Foundation for Orthotics and Prosthetics. The mission statement of the organization is: “A nonprofit organization that develops computer-based resources to benefit the worldwide orthotics and prosthetics community”.

As discussed previously, the Foundation was created with the express purpose and intention of creating this digital library. As such, the completion of the library clearly furthers the mission and goals of the organization. Specifically, *the A. Bennett Wilson, Jr. Library Project* furthers the goals of the organization by making a wealth of information about orthotics and prosthetics that is not readily available anywhere freely accessible to individuals worldwide.

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Once it is clear that the digitization project supports the goals of the mission, an explicit collection development policy must be determined. In defining the collection development policy for a good digital project, a number of issues have to be addressed. These include, but are not limited to: copyright issues; the intellectual nature of the source materials; current and potential users; actual and anticipated nature of use; the format and nature of the digital project; describing, delivering, and retaining the digital project; relationships to other digital efforts; and costs and benefits. (Hazen, et al. 1998) Each of these factors must be considered when deciding to digitize an object.

Hazen, et al., created a very functional flowchart to address which items should be selected for digitization out of a collection. (1998) For the purpose of this project, the chart will serve as the selection process to be followed for each object. The chart is printed for reference in Appendix C. As the Library Project proceeds, the selection committee will use the flowchart to guide decisions about which works should be digitized.

The collection development policy must also identify the primary end-users of the resource. In this case, the primary expected users fall into two of the five categories defined by The Colorado Digitization Project in a paper published online in 1999. These user groups are “Information Seekers” and “Scholar/Researcher”. The tables outlining the definition, content interests, design considerations, and retrieval considerations appropriate for each of these groups of users are printed in Appendix D.

There are several other factors specific to the *A. Bennett Wilson, Jr. Library Project* that influence the digital publication of the material, which should be touched on here. Several journals are currently available online (in whole or in part) and have been used extensively by

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the profession. The *Journal of Prosthetics and Orthotics* was launched in March 1998. During the first five years, the usage has increased steadily. Comprehensive statistics detailing the increase in use of the *JPO* are included as APPENDIX E. The following statistics illustrate this increase. The following Visitor Sessions (defined as one user visiting one or more page in the *JPO* site with no period of inactivity greater than thirty minutes) are the monthly totals for July in each year the *JPO* has been available.

July 2002: 25,453

July 2001: 19,220

July 2000: 11,280

July 1999: 7,802

July 1998: 1,855

This fact indicates that there currently exists a well-documented need for the widespread availability of the type of information contained in the *A. Bennett Wilson, Jr. Library*. Knowing this is a luxury that few digital collection project managers have at the inception of their endeavor.

In addition, there are external circumstances that apply to many objects in the collection that create added value to the object when it is digitized. Specifically, many of the objects are out of print or have never been previously printed. Most of the objects are not available in any form commercially and so have been effectively removed from the body of knowledge that

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informs most research projects. It is inherently valuable to make these types of objects available, because it will avoid reproducing research that has already been completed.

Further, many of the items in the physical collection are fragile and would not sustain extended physical lending if they were available to the public.

Finally, most of the objects contained in the collection are not available in any easily searchable form. The reproduction of these items in a digital collection would greatly facilitate the comprehensive literature review essential to any scientifically sound research project.

Collections Principle 2: Collections should be described so that a user can discover important characteristics of the collection, including scope, format, restrictions on access, ownership, and any information significant for determining the collection's authenticity, integrity and interpretation. (Digital Library Forum, 2001)

Collections Principle 2 also deals with the ever-increasing importance for the fractionalized world of the Internet to be connected in a coherent manner that enables users to access information and verify its authenticity. In order to accomplish this, several collection-level databases have been established to link digital collections. To meet the specifications of *Collections Principle 2*, the *A. Bennett Wilson, Jr. Library Project* will have to register with one or more of these cataloging systems. Based on the research reviewed for this report, the Online Computer Library Center's (OCLC) *WorldCat* and *Healthweb* are the two most appropriate cataloging systems with which to register the project.

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The OCLC's *WorldCat* is an online bibliographical database with over 47 million bibliographic records. It is currently the largest cooperative catalog in the world. (OCLC WorldCat 2002) Registration with this database ensures that the work completed is available in a reputable catalog.

HealthWeb is a cooperative undertaking of the National Library of Medicine, the Health Science Libraries of the Greater Midwest Region, The National Network of Libraries of Medicine, and the Committees for Institutional Cooperation. (HealthWeb 2002)

It was designed as:

an interface which will provide organized access to evaluated non-commercial, health-related, Internet-accessible resources. The resources will include those currently available as well as new resources developed in collaboration with other organizations. The interface will integrate educational information so the user has a one-stop entry point to learn skills and use material relevant to their discipline. (HealthWeb 2002)

At this point, there is no category for Prosthetics and Orthotics available on *HealthWeb*. Registering the database with *HealthWeb* will ensure that the information is disseminated to those to whom the topics are relevant.

Because there are new databases and cataloging systems developing each day, this topic must be revisited frequently in the future to ensure that the *A. Bennett Wilson, Jr. Library Project* remains registered with the most current systems.

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Many of the conditions required to satisfy *Collections Principle 2* pertain to the collection-level and object-level metadata. These topics will be discussed in much greater detail under the “Metadata Collections Principles” presented later in this report.

The materials that comprise the collection, including the rationale for selection, will be included in the metadata as well as the report at the conclusion of the *A. Bennett Wilson, Jr. Library Project*. This information will be readily available to the user.

The creators of the collection, the terms and conditions of use, the restrictions on access, any special software required, copyright statuses, and contact information for questions or permissions will also be contained within the metadata. It becomes apparent quickly that the construction of good metadata schemes is integral to the user’s ability to ascertain the veracity of the information contained in the library.

Collections Principle 3: A collection should be sustainable over time. In particular, digital collections built with special funding should have a plan for their continued usability beyond the funded period. (Digital Library Forum, 2001)

In order to ensure that the *A. Bennett Wilson, Jr. Library Project* satisfies this Collections Principle, it is important to understand the significance of the eXtensible Mark-up Language (XML) in today’s information technology landscape.

XML is a tool used for storing and transmitting information. The data in an XML document is stored as a hierarchy of elements that are organized in a logical, predefined way. A simple program can be written to access any or all of these elements and perform useful

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functions with them. For instance, the data taken from an XML document can be combined with HTML codes to create a web page for display. (Walsh, 2001)

XML is flexible in that you can define your own document structure, but once you define the structure through an XML schema, you can validate individual documents to ensure that they conform exactly to that structure. This means that you can define a structure that meets your needs exactly, and then be certain that every document that you create conforms to that structure. (W3Schools.com, 2002) A program that is using your data to perform a function (such as displaying a web page) doesn't have to worry about checking to make sure that the correct data is there and that it is structured correctly, because the XML schema has already validated it. If the XML structure that you use for your data isn't the same as the one used by someone trying to access the data, a simple "crosswalking" program can be created to convert your documents to the new structure, so long as you have chosen an intelligent structure that adequately separates the data into usable elements. (W3Schools.com, 2002)

Because XML is a text-only format, it is cross-platform and both software and hardware independent, meaning that it can be accessed very easily by anyone. Furthermore, because it has become the industry standard, it is widely recognized and used. (W3Schools.com, 2002)

Therefore, storing the library information in an intelligently designed XML format ensures that it will be as widely accessible as possible, both now and far into the future. As new display methods become available and new functions become desirable, new programs can be written to access the XML data and present it in whole new ways.

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So, by using XML, we can assure that the data *can* be sustained over time. The second component of fulfilling the requirements of this principle involves ensuring that someone is *available and responsible* for the administration of the data over time.

Because the *Digital Resource Foundation for Orthotics and Prosthetics* works cooperatively with O&P Digital Technologies, responsibility for the technical aspects of the library, as well as the continued maintenance of the database will fall on the staff of O&P Digital Technologies. Similar to the existing JPO and JACPOC Libraries, the *A. Bennett Wilson, Jr. Library* will become one of the featured resources available through *oandp.com*. Because the O&P Digital Technologies business model revolves around the continued success of *oandp.com*, the library is guaranteed to stay in existence as long as the company remains a viable entity. Furthermore, the resources available through *oandp.com*, and particularly the online reference material, have become so important to the profession that they would not be allowed to disappear even if O&P Digital Technologies was not around to support them. There are a number of organizations and institutions in the profession that would eagerly accept the responsibility of maintaining the online libraries if O&P Digital Technologies were unable to do so. The technologies and documentation methods used in the development of the library will ensure that this is possible.

A contract must be in place at the beginning of this project that specifies O&P Digital Technologies' responsibility for end-user support, upgrades to server hardware/operating system software, maintenance of server security, ensuring search systems and other access applications remain usable, and restoring applications and data from backups as necessary. Provisions must

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be made in the grant proposals to transfer these responsibilities to another suitable organization or institution should O&P Digital Technologies fail to exist as an entity at any time in the future.

Strategies are currently employed by O&P Digital Technologies to ensure the existing information on their site is accessible. Many of these same strategies will be employed to ensure that the *A. Bennett Wilson, Jr. Library Project* fulfills the requirements of Collection Principle 3. (J. Shinn, personal communication, August 25, 2002)

For instance, locations will be maintained by choosing one permanent domain name to house all material from the library. If in the future any content must be moved from that domain name, permanent scripts will be put in place to redirect visitors to the new addresses. Server side redirects will be used so that the user doesn't experience any delay or confusion (J. Shinn, personal communication, August 25, 2002).

Also, web server logs will automatically track usage. Webtrends *Log Analyzer* software will be used to generate reports from these logs. Real-time usage tracking mechanisms will also be built in, to provide a more accessible means of tracking individual object usage. (J. Shinn, personal communication, August 25, 2002)

Collections Principle 4: A good collection is broadly available and avoids unnecessary impediments to use. Collections should be accessible to persons with disabilities, and usable effectively in conjunction with adaptive technologies.

(Digital Library Forum, 2001)

The conditions of *Collections Principle 4* will also be satisfied in large part because of the existing relationship between The Digital Resource Foundation for Orthotics and Prosthetics

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and O&P Digital Technologies. *oandp.com*, the website operated by O&P Digital Technologies, is currently the most widely used online portal for prosthetics and orthotics information. The visibility afforded by the working relationship with O&P Digital Technologies, in addition to registration with the aforementioned cataloging systems, ensures the collection will be “broadly available”.

At the time the *Library* becomes available for public use, the most current web browser market-share statistics will be reviewed. The formatting and display of the information in the *A. Bennett Wilson, Jr. Library Project* will be tested in the different web browsers to ensure that there are no impediments to use for at least 99% of the population of online users. (J. Shinn, personal communication, August 25, 2002)

The content of the *A. Bennett Wilson, Jr. Library Project* must be equally accessible to all members of society. This requires adhering to the most current standards in web content accessibility for individuals with disabilities. The World Wide Web Consortium (W3C) published an updated report in 1999 that details how to ensure “web content is accessible to people with disabilities.” These guidelines will be incorporated into the design of the *A. Bennett Wilson, Jr. Library Project*.

Collections Principle 5: A good collection respects intellectual property rights.

Collection managers should maintain a consistent record of rightsholders and permissions granted for all applicable materials. (Digital Library Forum, 2001)

This Collections Principle is undoubtedly the most difficult to ensure. In the case of most of the information contained in the *A. Bennett Wilson, Jr. Library*, the material is not currently in

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the public domain. Copyrighted works are not given absolute protection, however. Uses of the works that do not infringe on the “owner’s exclusive rights” are acceptable. These exclusive rights include: making a copy of the work, using the work as the basis for a new work, distributing a work, publicly performing a work, or publicly displaying a work. (Harper 2001)

Even if a work does infringe on one of these rights, copyright protection may be suspended if the use of the work qualifies as “fair use”. Unfortunately, there is no clear list of which uses are “fair” and which are “unfair”. Rather, the courts in the United States have used the “Four-Factor Fair Use” principle to determine if in fact damages may be awarded in a copyright infringement suit. (Harper, 2001)

This “Fair Use” principle examines four factors: “What is the character of the use? What is the nature of the work to be used? How much of the work will you use? What effect would this use have on the market for the original or for permissions if the use were widespread?” (Harper, 2001)

The answers to each of these questions tilt the balance towards or away from “fair use”. Since the answers to the questions are relatively subjective, however, there remains a great deal of ambiguity in what constitutes the “fair use” of a copyrighted work.

For the majority of the objects to be digitized in the *A. Bennett Wilson, Jr. Library Project*, the questions might be addressed as follows:

1. What is the character of the use?

In the present case, the use of the work is clearly non-profit and educational (as opposed to commercial) in character. This tilts the balance towards “fair use”. (Harper, 2001)

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2. *What is the nature of the work to be used?*

In the present case, the majority of the objects are published, factual (as opposed to unpublished or creative) works. These factors also tilt towards “fair use” of the objects. (Harper, 2001)

In some cases, the works are unpublished. In these cases, this factor tilts towards “unfair use”. (Harper, 2001)

3. *How much of the work will you use?*

In this case, “more than a little “ (as opposed to a little) of the object will be used. In fact, the work will be reproduced in its entirety. This tilts the balance towards “unfair use”. (Harper, 2001)

4. *What effect would this use have on the market for the original or for permissions if the use were widespread?*

Since a good deal of the work in the collection is no longer in print and there is not an active permissions market for the work, this factor tips the balance towards “fair use”. (Harper, 2001)

In the cases when the materials are commercially available, the balance is tipped towards “unfair use”. (Harper, 2001)

It is easy to begin to appreciate the complexities of copyright law with this brief introduction. Determining whether the Digital Resource Foundation for Orthotics and Prosthetics’ uses of the materials donated by A. Bennett Wilson are “fair” and, thus, do not require permission is a very difficult task.

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For this reason, it is the recommendation of this researcher that the Digital Resource Foundation for Orthotics and Prosthetics attempt to obtain permission from each copyright holder whose work will be included in the *A. Bennett Wilson, Jr. Library Project*.

There are many resources available to facilitate individuals seeking permission for use of copyrighted material. The Copyright Clearance Center, for instance, represents “9,600 publishers and hundreds of thousands of authors and other creators” and serves as a clearinghouse for licensing the copyrighted works of its members. (Copyright Clearance Center, 2002).

After researching this issue, it seems apparent that an attorney competent in Copyright Law must be retained to counsel the Board on Copyright and Intellectual Property Issues as the pertain to the *A. Bennett Wilson, Jr. Library Project*.

Collections Principle 6: A good collection provides some measurement of use.

Counts should be aggregated by period and maintained over time so that comparison can be made. (Digital Library Forum, 2001)

As discussed in Collections Principle 3, the statistical reports generated from the web server logs and the real-time usage tracking mechanisms will effectively measure use and present the data in a format that lends itself to making comparisons over time.

Collections Principle 7: A good collection fits into the larger context of significant related national and international digital library initiatives. For example, collections of content useful for education in science, math and/or engineering should be usable in the NSDL. (Digital Library Forum, 2001)

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This Collections Principle deals primarily with interoperability. It is of crucial importance that the *A. Bennett Wilson, Jr. Library Project* is compatible with the recognized standards in digitized collections. The key component to ensuring interoperability is the use of an intelligent, XML-based organizational structure for the foundation of *the Library Project*.

The XML schema must be developed with a well-planned structure for the local application. A program that translates the local schema to the standardized formats used in other, broader initiatives must then be created to link the resources. This process of translating one schema to another is known as “crosswalking”. (J. Shinn, personal communication, August 25, 2002)

As far as this researcher has been able to determine, there are currently no other initiatives overlapping the scope of the *A. Bennett Wilson, Jr. Library Project*. However, fulfilling this Collections Principle ensures that the *A. Bennett Wilson, Jr. Library Project* can be included as a component of broader collections and future projects. (J. Shinn, personal communication, August 25, 2002)

In addition, the metadata and objects must conform, or be crosswalked to, a standard format that supports harvesting from the Open Archives Initiative (OAI). The OAI has developed a protocol that allows harvesters to cull metadata from online applications and analyze the metadata to ensure optimal exposure. (Open Archives Initiative, 2002)

To ensure quality of content, recognized members of the profession will be asked to sit on the selection committee. In addition to their input, the data collected from tracking usage of

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the bibliographical index will be used to ensure the most appropriate and needed objects are included in the *Library*.

To ensure the quality of the metadata, current standards for the creation of metadata will be followed. This will be discussed in more detail in the following section on Metadata Principles.

OBJECT PRINCIPLES

Each of the Object Principles established by the IMLS are printed in italics in this section. The important concepts and ideas that must be considered before embarking on a digitization project are then explained in the paragraphs that follow the Object Principles. The Object Principles discussed below pertain not only to the individual objects (i.e., texts), but also to the metadata that describes the objects.

Object Principle 1: A good digital object will be produced in a way that ensures it supports collection priorities. (Digital Library Forum, 2001)

This Object Principle refers specifically to the goals of the organization and the collection policy discussed in *Collections Principle 1*. As the mission of the organization is fairly straightforward, the criteria for this principle will be fulfilled by ensuring that the image quality is sufficient for all projected uses and by ensuring that the XML structure organizes the data in discrete units that will be suitable for all projected uses.

Ensuring that image quality is sufficient for all anticipated uses will be accomplished by storing a high resolution TIFF file that can be downloaded separately by the user. On the web,

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images will be presented in JPG or GIF format to provide the best balance of image quality and download speed. (J. Shinn, personal communication, August 25, 2002)

Ensuring that the XML structure organizes data in a manner suitable for all projected uses will be accomplished by storing all relevant data in discreet elements, in such a way that it can be readily accessed and made compatible with standard formats through crosswalking. (J. Shinn, personal communication, August 25, 2002)

Object Principle 2: A good object is persistent. That is, it will be the intention of some known individual or institution that the good object will persist; that it will remain accessible over time despite changing technologies. (Digital Library Forum, 2001)

This Object Principle applies more to projects that are not using XML as the data storage format. Using an intelligently organized XML structure as the data storage format assures easy migration of the data to any new standards that may arise. This is discussed in more detail in Collections Principal 1. (J. Shinn, personal communication, August 25, 2002)

As discussed previously, O&P Digital Technologies will be responsible for ensuring persistence of the objects in the *A. Bennett Wilson, Jr. Library Project*. Before securing funding for this project, provisions will be made to pass this responsibility to another qualified institution or organization in the event that O&P Digital Technologies ceases to exist at any point in the future.

Object Principle 3: A good object is digitized in a format that supports intended current and likely future use or that support the development of access copies that

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support those uses. Consequently, a good object is exchangeable across platforms, broadly accessible, and will either be digitized according to a recognized standard or best practice or deviate from standards and practices only for well documented reasons. (Digital Library Forum, 2001)

Ensuring that the XML format is intelligently designed to anticipate future uses satisfies this Object Principle. (J. Shinn, personal communication, August 25, 2002) Digital Masters of the text that meet the current “Benchmarks” for image quality will be maintained and accessible to end users. The most comprehensive “Benchmarks” of this nature are currently those endorsed by the National Library Federation. A table summarizing these benchmarks is provided in APPENDIX F. (Digital Library Federation, 2002)

Object Principle 5 [sic]: A good object will be named with a persistent, unique identifier that conforms to a well-documented scheme. It will not be named with reference to its absolute filename or address (e.g. as with URLs and other Internet addresses) as filenames and addresses have a tendency to change. Rather, the filename's location will be resolvable with reference to its identifier. (Digital Library Forum, 2001)

Using a system of identifiers that can be adapted to multiple source types is essential to satisfy this Object Principle. The components used in these identifiers (e.g. Journal name, Journal Source, Volume, Page number, etc...) will be used in organizing the location where the object can be found, so that the URL will be derived from the components of the identifier in a simple and well-documented way. It will be the full intention of the project to make the resulting URL for each item a permanent location, and to provide server-side redirecting scripts that will

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immediately take the user to the new location if any items ever have to be moved. As an additional safeguard in case of difficulty in locating an object, a tool will be provided to end-users to direct them to the current location of an object given its identifier. (J. Shinn, personal communication, August 25, 2002)

Object Principle 6: A good object can be authenticated in at least two senses.

First, a user should be able to determine the object's origins, structure, and developmental history (version, etc.). Second, a user should be able to determine that the object is what it purports to be. (Digital Library Forum, 2001)

Origin, structure and developmental history will be stored in descriptive metadata and accessible to the end-user. All policies regarding the physical attributes of the copies will also be stored and accessible in technical and administrative metadata. Physical copies of the objects will be maintained at O&P Digital Technologies and will be available for authentication. (J. Shinn, personal communication, August 25, 2002)

Object Principle 7: A good object will have and be associated with metadata. All good objects will have descriptive and administrative metadata. Some will have metadata that supplies information about their external relationships to other objects (e.g. the structural metadata that determines how page images from a digitally reformatted book relate to one another in some sequence). (Digital Library Forum, 2001)

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All metadata for text must be stored in XML and structured according to standards and guidelines established for metadata. These standards and guidelines will be discussed in greater detail in the “Metadata Principles” Section of this report.

Image metadata must also be stored in XML and must be linked through an image identifier to the filename of the image to ensure that the image and metadata retain their relationship.

METADATA PRINCIPLES

Each of the Metadata Principles established by the IMLS are printed in italics in this section. The important concepts and ideas that must be considered before embarking on a digitization project are then explained in the paragraphs that follow the Metadata Principles.

Metadata Principle 1: Good metadata should be appropriate to the materials in the collection, users of the collection, and intended, current and likely use of the digital object. (Digital Library Forum, 2001)

All metadata describing objects and the collection must adhere to the most current comprehensive, internationally recognized standards for metadata.

Currently, the Metadata Encoding and Transmission Standard (METS) dictates the types of metadata that should be included in a digital collection of any kind. This group works with other initiatives to develop platforms or standard schemas for each type of metadata.

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It is important to ensure that the metadata elements used are broken down sufficiently to be accessed for all intended uses as well as the anticipated future uses. If the XML structure is designed intelligently, the data will be easily accessible for use in current and future applications.

The metadata schema must include metadata for all five categories included in a METS document and may include any other information particularly useful to Orthotics and Prosthetics and the specific collection being digitized.

Currently, there are several initiatives underway to develop schemas for the five types of metadata included in a METS document. Appendix G lists and defines the five types of metadata required by the METS initiative.

The most complete standard to date falls under the “Descriptive Metadata” category of the METS initiative. It is the Dublin Core Metadata Initiative (DCMI). This metadata initiative has developed a very specific XML structure that incorporates fifteen “core elements” that must be included in descriptive metadata. These elements include: Title, Creator, Subject, Description, Publisher, Contributor, Date, Type, Format, Identifier, Source, Language, Relation, Coverage, and Rights. (Dublin Core Metadata Initiative ^a, 2002)

The qualified modifiers for each element (to date) include:

Name - The label assigned to the data element

Identifier - The unique identifier assigned to the data element

Version - The version of the data element

Registration Authority - The entity authorized to register the data element

Language - The language in which the data element is specified

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Definition - A statement that clearly represents the concept and essential nature of the data element

Obligation - Indicates if the data element is required to always or sometimes be present (contain a value)

Datatype - Indicates the type of data that can be represented in the value of the data element

Maximum Occurrence - Indicates any limit to the repeatability of the data element

Comment - A remark concerning the application of the data element

(Dublin Core Metadata Initiative a, 2002)

It is possible to modify the elements in ways other than using qualified modifiers to adapt the scheme to specific uses, but all elements of a locally defined schema should be crosswalked with the Dublin Core schema to ensure interoperability. (Dublin Core Metadata Initiative, 2002)

Further, the Dublin Core schema is easily crosswalked with alternative descriptive metadata schemas including MODS and MARCXML. (Guenther, 2002)

As standards for the other categories of metadata included in the METS Initiative are established, local schemas should be crosswalked to ensure the broadest exposure and maximal interoperability.

Metadata Principle 2: Good metadata supports interoperability. (Digital Library Forum, 2001)

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Using a standardized format (like the Dublin Core Element Set) inherently supports interoperability. (Canadian Heritage Information Network, 2002)

As mentioned above, to further ensure interoperability, the local metadata scheme, once finalized, will be “crosswalked” with several other popular metadata schemes to facilitate interoperability between The *A. Bennett Wilson, Jr. Library Project* and broader initiatives.

In addition, the metadata will support the Open Archives Initiative, which allows the metadata to be harvested by external searches and included in metadata databases. This ensures maximum exposure for the data contained in the site. (Digital Library Federation, 2001).

Metadata Principle 3: Good metadata uses standard controlled vocabularies to reflect the what, where, when and who of the content. (Digital Library Forum, 2001)

This Metadata Principle is fairly simple to address for the *A. Bennett Wilson, Jr. Library Project*. The *Medical Subject Headings List (MeSH)*, maintained by the National Library of Medicine, is a standardized vocabulary designed specifically for use in organizing and identifying medical literature. (National Library of Health, 2002) It is the vocabulary used by *MedLine* and *PubMed* as well as other reputable databases. There is a well-documented set of Medical Subject Headings as well as modifiers for those headings available online. (National Library of Health, 2002)

The task of indexing the data with the appropriate Medical Subject Headings is a more difficult challenge. This type of skilled labor may require outside contracting. There is currently

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a very active market for individuals who freelance their indexing skills. (American Society of Indexers, 2002)

Metadata Principle 4: Good metadata includes a clear statement on the conditions and terms of use for the digital object. (Digital Library Forum, 2001)

It is unrealistic to predict precisely what the conditions and terms for use of the objects in the *A. Bennett Wilson, Jr. Library Project* will actually be at this time, as they will be dictated by the license agreements secured for each object. It is reasonable to assume that a disclaimer must be incorporated into the metadata specifying that all objects may be used for research and educational objectives only. This information should be presented at the object level as well as at the collection level.

Any other uses require obtaining permission from the copyright holders. All information about contact information for the copyright holders must be included in the metadata to facilitate the process of seeking permission. This information should be presented at the object level as well as at the collection level.

Metadata Principle 5: Good metadata records are objects themselves and therefore should have the qualities of good objects, including archivability, persistence, unique identification, etc. Good metadata should be authoritative and verifiable. (Digital Library Forum, 2001)

Achieving the standards set in this Metadata Principle involves using a comprehensive metadata scheme. Ensuring that a METS document is embedded for each object addresses all the issues of *Metadata Principle 5*. These include: identifying the creating institution,

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identifying standards of completeness and quality used, identifying method of creation (automated vs. manually created); identifying standards/schemes used for metadata; and identifying vocabulary used. These issues will all need to be addressed at the collection level and as necessary at the object level.

Metadata Principle 6: Good metadata supports the long-term management of objects in collections. (Digital Library Forum, 2001)

Again, this metadata principle requires us to err on the side of too much information when designing the metadata schemes. A good deal of thought needs to be invested into creating a high-quality metadata scheme. The scheme must be based on the established standards for schemes and must be translated (crosswalked) to alternative standard metadata schemes.

Using established schemes and documenting metadata of all possible types (descriptive, administrative, file groups, structural, behavioral, as described in Appendix G) is the only way to ensure continued availability over time.

PROJECTS PRINCIPLES

Project Principal 1: A good project has a substantial design component. (Digital Library Forum, 2001)

Project design must incorporate a significant planning period. To ensure the best use of the funds and to ensure that the project fulfills all the intended goals, this planning period should be comprehensive in nature. The Northeast Document Conservation Center has published an outstanding resource for guiding project managers in the development process. The book,

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entitled *Handbook for Digital Projects: A Management Tool for Preservation and Access*, provides insight on a broad spectrum of issues in the digitization process. Among them are the “Considerations for Project Management”. This resource divides the planning portion into three components:

1. Setting Goals
2. Creating a Plan of Work and Budget
3. Managing Workflow

(Chapman, 2000)

The task of setting goals should be approached for three separate categories: goals for the collection; goals for the digital reproductions; and goals for the benefits to the institutions. All Board members and project managers should be involved in setting these goals. (Chapman, 2000)

In setting goals, many factors must be considered. Regarding goals for the collection, it is important to explore what effects the process of digitization will have on the original articles. When the digitization project is completed, will the original materials be retained in good condition? What is the intended use of the physical collection once the project is complete? (Chapman, 2000) A more comprehensive list is available in the *Handbook for Digital Projects* and should be reviewed frequently during this process.

Regarding goals for the digital reproductions, a consensus must be reached regarding which standards are appropriate for the resources available to the project. The ultimate conclusions should be based on evaluations of the end-user’s functional requirements for the

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Library. The minimum standard for the reproductions and the metadata must be able to fulfill the needs of the end-users. (Chapman, 2000)

Finally, a set of goals for how the collection will benefit the institution should be established. The benefits to the institution may be as simple as gaining experience in the digitizing process or may be more concrete and tangible. (Chapman, 2000)

In all cases, however, setting goals is an imperative first step. To ensure that the project fulfills everyone's expectations, the goals must be clearly laid out and agreed upon before beginning. (Chapman, 2000)

The next phase of project planning involves creating a work plan and a budget. The work plan and budget will vary for each project. In the case of the *A. Bennett Wilson, Jr. Library Project*, this phase of planning will likely include (but is not limited to):

1. Funding/Grant Applications
2. Information/Proposal Requests from subcontractors
3. Development of procedures for selection, handling scanning, metadata creation, and quality control
4. Development of workflow diagrams
5. Development of Data element lists
6. Development of Work Plan and Project Budget

(Chapman, 2000)

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The sixth item on the list, “Development of Work Plan and Project Budget” warrants further attention even at this earliest phase of exploration.

The individuals or positions responsible for completing the work must be identified in the work plan. These positions may include: Project manager, Selector, Source Material Analyst, Cataloguer, Scanning Technician, Quality control Technician, Metadata analyst, Data Entry Technician, Programmer, Systems administrator, Network Administrator, and Developer/designer of the user interface. One individual may fill several roles or several departments may collaborate to fulfill the requirements of the positions. Whatever the case may be, a clear outline of who will be responsible for each duty required to complete the project should be created during the planning phase. (Chapman, 2000)

In addition, an accurate assessment of what equipment will be needed to complete the project should be completed at this time. This will be based in part on the technical specifications established for the data collected. (Chapman, 2000)

Ownership and management of the objects produced by the project should also be addressed at this stage to avoid confusion and ensure care and maintenance responsibilities are understood. (Chapman, 2000)

All of these factors together influence the ultimate cost of the project. The projected costs of the complete project should be estimated as accurately as possible. It is important not to underestimate these costs – they are substantial. In the cost benefit analysis of putting bibliographic records online, one group reported a cost of \$3.63 per record. (Roderick, 1998) Another project found the total expenditure at the completion of their project to be nearly \$7.00

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per “indexed page image accessible on the internet. This estimate of expenditure does not take into account the costs of the contribution of the IT and library infrastructures of the four institutions.” (Internet Library of Early Journals, 1999)

The third phase of project planning involves diagramming the anticipated project workflow. Chapman (1999) suggests creating workflow diagrams that overlap in some aspects or that run parallel to each other, rather than proposing a straight linear workflow progression.

The different processes that need to have a workflow articulated for this project may include:

- i. Initial Selection process
- ii. Creation of the XML format for metadata
- iii. Creation of the Bibliographical Index of all materials that may be digitized
- iv. Final Selection of Materials to be digitized
- v. Creation of the XML format for content
- vi. Copyright clearance or other research regarding rights and permissions; creation of rights and permissions metadata
- vii. Preparation including conservation assessment and/or treatment if necessary
- viii. Creating catalog records, finding aids, or other pointers to a digital object or collection (descriptive metadata)
- ix. Digital imaging: Scanning materials; creating digital masters and associated technical metadata; processing masters to create actual objects for library
- x. Quality control for source materials and digital images; rehousing source materials upon completion

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- xi. Development of structural metadata
- xii. Creation of full text, including mark-up
- xiii. Loading data to online storage area
- xiv. Integration of images (pictures, tables, etc.) and metadata into an image database; enabling access points to images
- xv. Delivery: development of end-user interface
- xvi. Publicizing the Library
- xvii. Evaluation of outcomes

(Chapman, 1999)

This list of processes should serve as a starting point in developing plans for managing workflow. It will need to be evaluated and amended once the goals for the project have been finalized.

Project Principal 2: A good project has an evaluation plan. (Digital Library Forum, 2001)

This project principal represents a fundamental shift in the evaluation of federally funded programs. In 1993, the *Government Performance and Results Act* required greater accountability for all government agencies. One of the corollary results of this act was the mandate for greater accountability of grant-funded projects. Until 1995, most federally funded initiatives were evaluated either by an external evaluation of the soundness of the proposal or by an “output based” evaluation program. These evaluation methods focused on the providers of the service. (Rudd, 2000) When the United Way, one of the largest non-profit entities in the world shifted

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from the traditional system of evaluation to an outcomes-based evaluation system for all of its programs, government agencies and private funding sources followed suit. (Rudd, 2000)

The current standard of evaluation is an “outcomes based” evaluation system. This method of evaluation shifts the focus from the provider to the recipient of the service. Rather than tracking, for instance, how many “hits” a website records (an output based measure of effectiveness), the developers might include a random survey that asks how useful the site is to the individual using it, or how the site has improved their ability to provide care/research literature/etc... (Weil, 2000)

These types of “outcomes based” evaluation systems shift the focus of the assessment from “what did we do?” to “how have we impacted people’s lives?” (Weil, 2000)

The *A. Bennett Wilson, Jr. Library Project* must include this type of outcomes based assessment in order to be considered a viable candidate for grant funding. The specific details of the evaluation plan should be established prior to beginning the project.

The measures used to evaluate the effectiveness of the project should be formulated to minimize the investment of resources while still providing adequate assessment of outcomes. The United Way’s manual *Measuring Program Outcomes: A Practical Approach* will serve as an invaluable resource for this phase of development.

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Project Principal 3: A good project produces a project report. (Digital Library Forum, 2001)

The rationale behind this principal is that a great deal is learned each time an organization completes a digitization process. (Digital Library Forum, 2001) The knowledge gained must be presented in a manner that will preserve it and make it accessible to organizations undertaking similar projects in the future. Just as valuable information was gleaned from reports of other Digital Library initiatives in compiling this report, others will inevitably benefit from the challenges and obstacles we face during the course of this project.

Reports about the project should be posted to an established site (with the appropriate metadata), on a quarterly basis. These reports should follow the format laid out by the grant funding source and should be representative of all phases of the project.

CONCLUSIONS

The *A. Bennett Wilson, Jr. Library Project* is an initiative that could change the landscape of how research is conducted in the field of Orthotics and Prosthetics. It has the potential to make a profound difference in the lives of students, researchers, practitioners, and ultimately, patients. The initial effort that has been made in this report to review the current standards and principals that characterize “Good Digital Collections” will serve as an outstanding guide for the Staff of the Digital Resource Foundation for Orthotics and Prosthetics as they begin their mammoth endeavor.

The use of this framework in combination with diligent efforts to maintain current standards of practice as the endeavor progresses will ensure that the *A. Bennett Wilson, Jr.*

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Library is as transformative to the field of Orthotics and Prosthetics in this century as its namesake was in the last.

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APPENDICES

APPENDIX A: O&P Digital Technologies Major Accomplishments Pertaining to the A. Bennett Wilson, Jr. Library Project.

Major accomplishments of O&P Digital Technologies include:

The founding in 1995 of OANDP-L, the orthotics and prosthetics listserver, which currently connects about 3000 professionals worldwide who engage in clinical discussions through e-mail.

The 1996 launch of oandp.com, the only true web portal serving the O&P profession. The maintenance and growth of oandp.com has been the primary focus of the company since then, resulting in a site that now has over a thousand visitors each day and is well recognized as the Internet hub of the profession.

The addition in 1998 of the Journal of Prosthetics and Orthotics (JPO) Online Library (owned by the American Academy of Orthotists and Prosthetists), which includes all issues of the quarterly journal dating back to its inception in 1989. The JPO Online has consistently been the most popular feature available through oandp.com over the years. In 2000, it was joined by the Journal of the Association of Children's Prosthetic & Orthotic Clinics (JACPOC) Online Library, further expanding the amount of research material available through oandp.com.

The 2001 launch of the OPIE (Orthotics & Prosthetics Information Expert) search engine, which provides keyword search capabilities across all of the resources available through oandp.com, including the JPO and JACPOC Online Libraries, the archives of OANDP-L, original content provided by oandp.com, and hundreds of O&P-related web sites from publications, associations, institutions, suppliers and other organizations within the field. Although many of these resources could already be searched individually, the OPIE search was the first, and still the only, O&P specific search engine to allow access to such a wide range of resources from one place.

The information in this appendix was compiled based on conversations with members of the O&P Digital Technologies and the Digital Resource Foundation for Orthotics and Prosthetics.

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APPENDIX B: Scope of Two Phases for the A. Bennett Wilson, Jr. Library Project

a. Scope of Phase I

The first phase of the project includes an assessment of what will be involved in the entire project.

Includes application for grant funding

Includes selection of material to be digitized

Includes digitization of bibliographical index of all selected materials

Includes making the index fully searchable by author and subject

Includes establishing the XML formats and schemas necessary to digitize the entire library

Includes a protocol for making full-text digital versions of objects listed in the bibliographical index available by request within a reasonable time period.

b. Scope of Phase II

Includes obtaining required copyright permissions

Includes OCR scanning of all text

Includes image reproduction

Includes formatting of data in XML

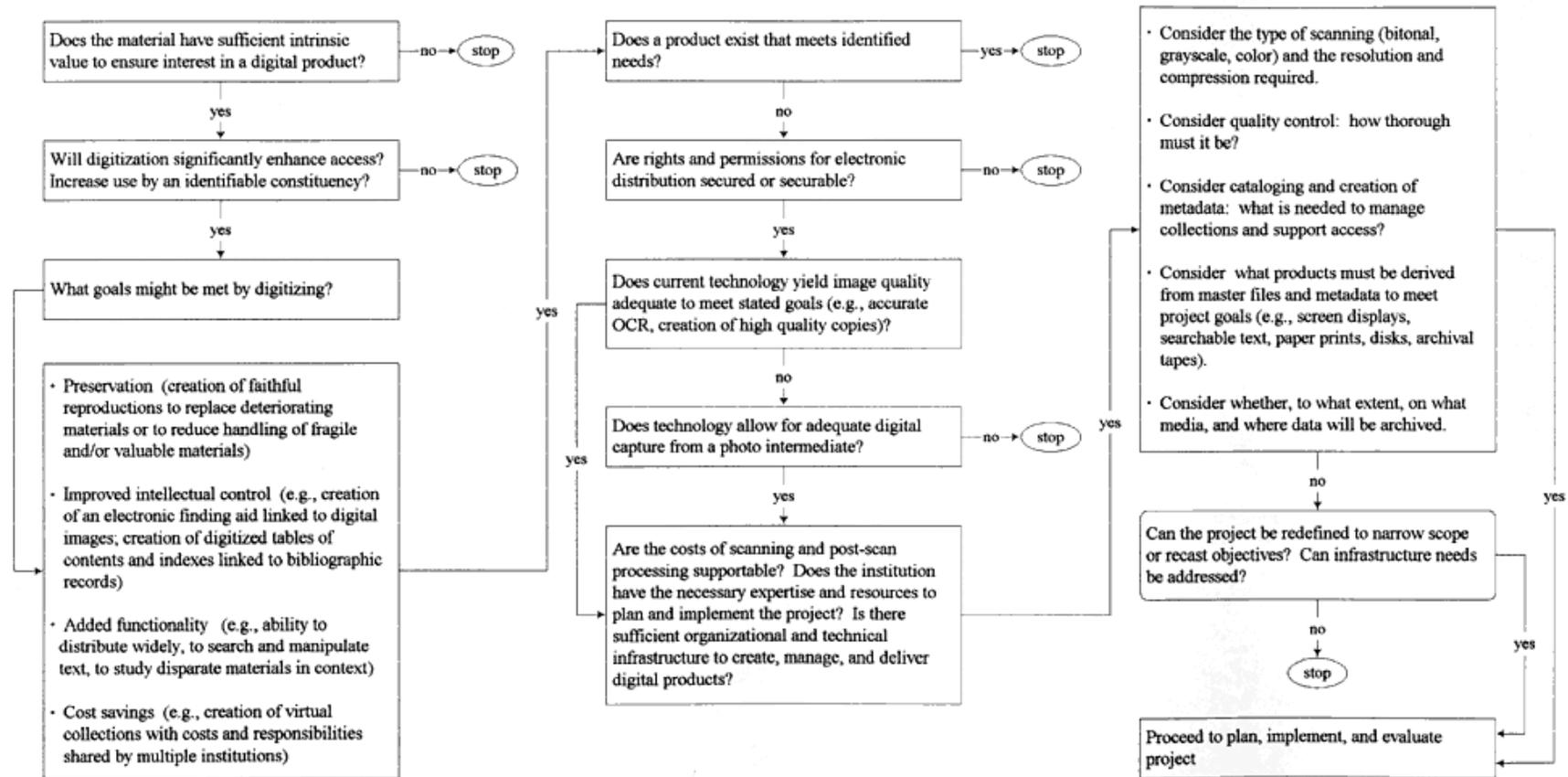
Includes developing long-term plans for maintenance

Includes formulation of metadata at the object level as well as the collection level

The information in this appendix was compiled based on conversations with members of the O&P Digital Technologies and the Digital Resource Foundation for Orthotics and Prosthetics.

APPENDIX C: Selection for Digitizing: A Decision-making Matrix (Chapman, 2000)

SELECTION FOR DIGITIZING:
A Decision-Making Matrix



APPENDIX D: Market Segments and Their Information Needs (*Colorado Digitization Project*)

| INFORMATION SEEKER/HOBBYIST | | | |
|--|--|----------------------|--|
| DEFINITION: | CONTENT INTERESTS: | DESIGN: | RETRIEVAL: |
| The hobbyist or information seeker is an individual who desires more in-depth information on a particular topic. This may be an undergraduate or granduate [sic] student, a docent, etc. | Less depth than scholar Specific educational goal Focused, less interest in broad, general information Detailed Wants "an answer" | High-quality display | Retrieval tools for specific areas Comprehensive and simple retrieval tools Multi-level Browsing mechanism Multi-media support |

| SCHOLAR/RESEARCHER | | | |
|--|--|--|---|
| DEFINITION: | CONTENT INTERESTS: | DESIGN: | RETRIEVAL: |
| The scholar or researcher is an individual who desires in-depth information to support their research. | Non-interpretative information--wants "raw" or primary source information Thorough and high-quality content Context broad, include connective information (citations...) | High-quality display High-resolution detail Comprehensive, but simple, interface Non-pointables More interest in access, discovery, and retrieval than display | Access and retrieval tools for specific data Links and discovery related to information Comprehensive but simple retrieval and navigational tools Browsing mechanism for serendipitous discovery of resources Multi-media support |

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APPENDIX E: Usage Reports for the Journal of Prosthetics & Orthotics Online Library for the month of July in each of the past five years.

| July 2002 | | Report Range: 06/30/2002 20:00:01 - 07/31/2002 19:59:29 |
|-------------------------|-------------------------------------|---|
| Hits | Entire Site (Successful) | 264,858 |
| | Average Per Day | 8,543 |
| | Home Page | 8,497 |
| Page Views | Page Views (Impressions) | 81,561 |
| | Average Per Day | 2,631 |
| | Document Views | 81,561 |
| Visitor Sessions | Visitor Sessions | 25,453 |
| | Average Per Day | 821 |
| | Average Visitor Session Length | 00:09:15 |
| | International Visitor Sessions | 13.09% |
| | Visitor Sessions of Unknown Origin | 28.61% |
| | Visitor Sessions from United States | 58.28% |
| Visitors | Unique Visitors | 13,776 |
| | Visitors Who Visited Once | 11,330 |
| | Visitors Who Visited More Than Once | 2,443 |

| July 2001 | | Report Range: 06/30/2001 20:07:11 - 07/31/2001 19:59:53 |
|-------------------------|-------------------------------------|---|
| Hits | Entire Site (Successful) | 205,399 |
| | Average Per Day | 6,625 |
| | Home Page | 2,592 |
| Page Views | Page Views (Impressions) | 76,564 |
| | Average Per Day | 2,469 |
| | Document Views | 76,564 |
| Visitor Sessions | Visitor Sessions | 19,220 |
| | Average Per Day | 620 |
| | Average Visitor Session Length | 00:08:30 |
| | International Visitor Sessions | 14.43% |
| | Visitor Sessions of Unknown Origin | 19.83% |
| | Visitor Sessions from United States | 65.73% |
| Visitors | Unique Visitors | 8,494 |
| | Visitors Who Visited Once | 6,772 |
| | Visitors Who Visited More Than Once | 1,721 |

APPENDIX F: Digital Library Foundation - Benchmark for digital reproductions of monographs and serials as endorsed by the DLF.
 (Digital Library Foundation, 2000)

| Black and white (may include simple line drawings, de-screened halftones) | Grayscale | Color |
|--|--|--|
| <p>600 dpi, 1-bit or bitonal TIFF images.</p> <p>Images must be sized and saved at 1:1 scale to the dimensions of the original page.</p> <p>Images must be saved uncompressed or with lossless compression (e.g. ITU-T6, LZW, CPC). Where images are compressed they must be made available in the Group-4 format. The images may be dithered up from 400 optical dpi 1-bit images</p> | <p>300 dpi, 8-bit grayscale uncompressed TIFF, or lossless compressed image (e.g. JPEG2000).</p> <p>Images must be sized and saved at 1:1 scale to the dimensions of the original page.</p> <p>The dpi specification will relate directly to the font-size and page dimensions of the original source document, and to local definitions of legibility and fidelity. In many cases, 400 dpi will be preferred. Where larger pages are concerned (for example, those exceeding 7 inches in the long dimension), the lower dpi specification may be required).</p> | <p>300 dpi, 24-bit color uncompressed TIFF, or lossless compressed images (e.g. JPEG2000).</p> <p>Allowed color spaces include RGB, sRGB, PhotoYCC, YCC, CIELab, and CMYK, with RGB and YCC being recommended as preferred for digital masters. Images must be sized and saved at 1:1 scale to the dimensions of the original page.</p> <p>The dpi specification will relate directly to the font-size and page dimensions of the original source document, and to local definitions of legibility and fidelity. It may also relate to the perceived artifactual value of the source object or the extent to which its physical characteristics such as foxing, etc., are perceived of as conveying some important information or meaning.</p> |

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APPENDIX G (CONTINUED) : Usage Reports for the Journal of Prosthetics & Orthotics Online Library for the month of July in each of the past five years.

| July 2000 | | Report Range: 06/30/2002 20:00:01 - 07/31/2002 19:59:29 |
|-------------------------|-------------------------------------|---|
| Hits | Entire Site (Successful) | 212,000 |
| | Average Per Day | 6,838 |
| | Home Page | 3,211 |
| Page Views | Page Views (Impressions) | 113,050 |
| | Average Per Day | 3,646 |
| | Document Views | 113,050 |
| Visitor Sessions | Visitor Sessions | 11,280 |
| | Average Per Day | 363 |
| | Average Visitor Session Length | 00:11:53 |
| | International Visitor Sessions | 16.29% |
| | Visitor Sessions of Unknown Origin | 18.07% |
| | Visitor Sessions from United States | 65.62% |
| Visitors | Unique Visitors | 6,901 |
| | Visitors Who Visited Once | 5,762 |
| | Visitors Who Visited More Than Once | 1,137 |

| July 1999 | |
|---------------------------------------|---------------------------------------|
| Date & Time this report was generated | Friday September 10, 1999 - 11:31:14 |
| Timeframe | 07/01/99 00:00:48 - 07/31/99 23:59:39 |
| Total Hits for home page | 1190 |
| Total Hits for entire site | 75122 |
| Total User Sessions | 7802 |
| User Sessions from United States | 80.23% |
| International User Sessions | 11.62% |
| Origin Unknown User Sessions | 8.13% |
| Average Hits per Day | 2423 |
| Average User Sessions per Day | 251 |
| Average User Session Length | 00:14:08 |

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APPENDIX G (CONTINUED) : Usage Reports for the Journal of Prosthetics & Orthotics Online Library for the month of July in each of the past five years.

| July 1998 | |
|---------------------------------------|--|
| Date & Time this report was generated | Monday August 03, 1998 - 19:50:51 |
| Timeframe | 07/01/98 00:00:03 - 07/31/98 23:59:04 |
| Number of Hits for home page | 3050 |
| Total No. of Successful Hits | 51342 |
| Total No. of User Sessions | 1855 |
| User Sessions from (United States) | 57.68% |
| International User Sessions | 17.46% |
| Origin Unknown User Sessions | 24.85% |
| Average Hits per Day | 1656 |
| Average User Sessions per Day | 59 |
| Average User Session Length | 00:15:14 |

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APPENDIX G: Types of Metadata Required in a Metadata Encoding and Transmission Seminar (METS) Document

Descriptive: contains information about the object necessary for indexing, locating, discovering, and identifying a digital resource. (Colorado Digitization Project, 1999)

Administrative: “includes the management information for an item, which may include information the user may need to access and display the resource, as well as rights management information. Administrative metadata might include the resolution the image was scanned at, the hardware and software used in producing the image, compression information, pixel dimensions, etc.” (Colorado Digitization Project, 1999)

File groups: The file group section lists all files comprising all electronic versions of the digital object. (National Library of Congress, 2002)

Structural map: “information used to display and navigate digital resources; also includes information on the internal organization of the digital resource. Structural metadata might include information such as the structural divisions of a resource (i.e., chapters in a book) or sub-object relationships (such as individual diary entries in a diary section).” (Colorado Digitization Project, 1999)

Behavioral: associates executable files (applications) that modify data with the object(s) being modified. These ensure that any data that is manipulated by an automated process is associated with the code for the automated process. (National Library of Congress, 2002)