A Training Programme

Automating
Records Services

AUTOMATING RECORDS SERVICES

MANAGING PUBLIC SECTOR RECORDS

A STUDY PROGRAMME

General Editor, Michael Roper; Managing Editor, Laura Millar

AUTOMATING RECORDS SERVICES

INTERNATIONAL RECORDS
MANAGEMENT TRUST

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MANAGING PUBLIC SECTOR RECORDS: A STUDY PROGRAMME

Automating Records Services

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MPSR Project Personnel

Project Director

Anne Thurston has been working to define international solutions for the management of public sector records for nearly three decades. Between 1970 and 1980 she lived in Kenya, initially conducting research and then as an employee of the Kenya National Archives. She joined the staff of the School of Library, Archive and Information Studies at University College London in 1980, where she developed the MA course in Records and Archives Management (International) and a post-graduate research programme. Between 1984 and 1988 she undertook an onsite survey of record-keeping systems in the Commonwealth. This study led to the foundation of the International Records Management Trust to support the development of records management through technical and capacity-building projects and through research and education projects.

General Editor

Michael Roper has had a wide range of experience in the management of records and archives. He served for thirty-three years in the Public Record Office of the United Kingdom, from which he retired as Keeper of Public Records in 1992. He has also taught on the archives courses at University College London and the University of British Columbia, Canada. From 1988 to 1992 he was Secretary General of the International Council on Archives and since 1996 he has been Honorary Secretary of the Association of Commonwealth Archivists and Records Managers (ACARM). He has undertaken consultancy missions and participated in the delivery of training programmes in many countries and has written extensively on all aspects of records and archives management.

Managing Editor

Laura Millar has worked extensively not only as a records and archives management consultant but also in publishing and distance education, as an editor, production manager and instructional designer. She received her MAS degree in archival studies from the University of British Columbia, Canada, in 1984 and her PhD in archival studies from the University of London in 1996. She has developed and taught archival education courses both in Canada and internationally, including at the University of British Columbia, Simon Fraser University and the University of Alberta. She is the author of a number of books and articles on various aspects of archival management, including *A Manual for Small Archives* (1988), *Archival Gold: Managing and Preserving Publishers' Records* (1989) and *A Handbook for Records Management and College Archives in British Columbia* (1989).

Project Steering Group

Additional members of the Project Steering Group include

Association of Records Managers and Administrators (ARMA International):	Hella Jean Bartolo
International Council on Archives:	George MacKenzie
Project Management Consultant:	Tony Williams
University College London:	Elizabeth Shepherd
Video Production Co-ordinator:	Janet Rogers

Educational Advisers

Moi University:	Justus Wamukoya
Universiti Teknologi Mara:	Rusnah Johare
University of Botswana:	Nathan Mnjama
University of Ghana:	Harry Akussah, Pino Akotia
University of New South Wales:	Ann Pederson
University of West Indies:	Victoria Lemieux

Project Managers

Lynn Coleman (1994-6)
Laura Millar (1996-7)
Elizabeth Box (1997-8)
Dawn Routledge (1999)

Production Team

Additional members of the production team include

Jane Cowan
Nicki Hall
Greg Holoboff
Barbara Lange
Jennifer Leijten
Leanne Nash

Donors

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United Nations Development Program

Automating Records Services

Principal Author

ELIZABETH YAKEL

Elizabeth Yakel holds a PhD from the University of Michigan and is an assistant professor at the University of Pittsburgh, School of Information Sciences. She has over 15 years experience in archives and records management. Prior to coming to the University of Pittsburgh in the fall of 1997, she worked as Research Assistant for the Medical Collaboratory Project and lecturer at the University of Michigan, School of Information. Her previous positions include Director of Archives for the Maryknoll Missioners, and the consultant for the NHPRC - funded Technical Assistance Project in New York City where she helped non-profit organizations make decisions concerning their archival and records management programs. Her primary areas of research are electronic recordkeeping systems and the evaluation of use and user needs. Dr Yakel is the author of *Starting an Archives,* a contributor to *Vatican Archives: An Inventory and Guide to the Historical Documentation of the Holy See,* and several articles on the administrative use of archives. She is active professionally and has been a Council member of the Society of American Archivists.

Contributors

Elizabeth Box
Laura Millar
Rosemary Murray-Lachapelle
Laura Simmermon

Reviewers

Ron Archer, International Development Research Centre
Christiane Desautels, National Archives of Canada
Catherine Hare, University of Northumbria at Newcastle, UK
David Lafranchise, National Archives of Canada
Terry Gavin, International Development Research Centre
Ian Moir, Northwest Territories Archives, Canada
Chris Seifried, National Archives of Canada

Testers

Universiti Teknologi MARA

CONTENTS

FIGURES

INTRODUCTION TO *AUTOMATING RECORDS SERVICES*

Automating Records Services outlines the issues involved with using information technologies to manage records and archives services. The information provided in the module applies most directly to records management systems in organisational settings, but the guidelines offered are also applicable to the automation of systems in an archival institution, including the computerisation of administrative records, accession documentation and finding aids. The module applies to individuals responsible for the administration of records in the originating office or after transfer to a records management operation. The information provided in this module applies equally to records offices, records centres or archival institutions, depending on their particular needs.

This module explores the advantages that computerisation brings to record-keeping work and how various actions are critical to efficient automation, including business systems analysis, advance planning and cost-benefit analysis, assessment of automation options prior to selection, implementation and evaluation of computer technologies. The lessons focus on identifying the best application of technology to accomplish records and archives management objectives, not simply to automate existing functions.

This module is composed of six lessons that systematically follow the steps to be taken in an automation project. Lesson 1 discusses the need to conduct a systems analysis of current records and archives functions to evaluate the feasibility of automation. It also examines the importance of good planning in advance of the implementation of automated systems. Lesson 2 outlines the establishment of requirements and the purchase of any automated system.

Lesson 3 discusses implementation issues, including staff training and evaluation. Lesson 4 examines data structures, standards and values and explains the importance of in data entry for efficient operations. Lesson 5 examines processes and problems surrounding digitisation as a means of preservation and access. Lesson 6 set priorities for automating records systems and identifies sources for additional information on the topic of automation.

The lesson titles are as follows:

Lesson 1:   Planning an Automation Programme

Lesson 2:   Identifying Technical Requirements and Selecting Computer Equipment

Lesson 3:   Implementing and Maintaining the Automated Records Management Programme

Lesson 4:   Developing Standards and Procedures for Data Entry

Lesson 5:   Digitisation

Lesson 6:   What to Do Next?

Automating Records Services should be read in conjunction with several other modules in this study programme. This module is not an introduction to the concepts, principals and applications of records management, although these are referred to throughout the lessons. An introduction to these principles can be found in the core modules in this study programme.

Understanding Computers: An Overview for Records and Archives Staff also provides definitions of key terminology and explanations of basic concepts that are referred to throughout this module. *Analysing Business Systems* will be essential background for Lesson 1 of this module.

Many of the project management guidelines offered in Lesson 1 are discussed in more detail in *Strategic Planning for Records and Archives Services*. *Organising and Controlling Current Records* is a good introduction to concepts in Lesson 3: Implementing and Maintaining an Automated Records Programme and Lesson 4: Developing Standards and Procedures for Data Entry.

Users are encouraged to study these modules, particularly *Organising and Controlling Current Records* prior to commencing any automation process. *Automating Records Services* focuses on the automation of existing paper or manual systems.

The automation of records systems is only one step in the overall automation of work processes that support the organisation's functions. The management of electronic records is a complementary automation activity. Users of this module are encouraged to consult the companion module, *Managing Electronic Records*, to explore several other aspects of automation and how it affects the overall management of record-keeping systems.

AIMS AND OUTCOMES

Aims

This module has eight primary aims. These are to

1. explain the purpose, role and nature of automation in records management systems

2. explain what activities or functions might or might not be suitable for automation

3. outline the technical requirements involved in the establishment of an automated programme

4. discuss the process involved with determining appropriate computer equipment, operating systems and software

5. illustrate the specific elements of an automated records system

6. discuss the steps involved in implementing and maintaining automated records and archives systems

7. examine how standardisation and consistency affect the capabilities of an automated system

8. discuss where to go for more information on automation.

Outcomes

At the end of this module, you should understand

1. key automation issues

2. how to plan an automation project

3. the technical requirements involved in automation

4. the process of determining appropriate computer equipment, operating systems and software

5. the specific elements of an automated records system

6. the steps involved in implementing and maintaining automated records and archives management systems

7. how standardisation and consistency affect the capabilities of an automated system

8. where to go for more information.

METHOD OF STUDY AND ASSESSMENT

This module of five lessons should occupy about 56 hours of your time. You should plan to spend about

8	hours on Lesson 1
10	hours on Lesson 2
10	hours on Lesson 3
10	hours on Lesson 4
10	hours on Lesson 5
8	hours on Lesson 6.

This includes time spent doing the reading and considering the study questions.

At the end of each lesson there is a summary of the major points. Sources for additional information are provided in Lesson 6.

Throughout each lesson, activities have been included to help you think about the information provided. Each activity is a 'self-assessed' project; there is no 'right' or 'wrong' answer. Rather, the activity is designed to encourage you to explore the ideas presented and relate them to the environment in which you are studying or working. If you are studying these modules independently and are not part of a records or archives management organisation, you should try to complete the activities with an organisation for which you previously worked or a hypothetical situation in mind, if possible. If the activity suggests writing something, you should keep this brief and to the point; this is not a marked or graded exercise and you should only spend as much time on the activity as you feel necessary to understand the information being taught. You are encouraged to write down your answers for all of the activities and keep the answers together in a booklet or file; you may want to refer back to your answers as you work through this module or through other modules in this study programme. At the end of each lesson are comments on the activities that will help you assess your work.

Following the summary at the end of each lesson are a number of self-study questions. Note that these self-study questions are designed to help you review the material in this module. They are not intended to be graded or marked exercises. You should complete as many of the questions as you feel will help you to understand the concepts presented. External assessments, such as assignments or exams, will be included separately when this module becomes part of a graded educational programme.

ADDITIONAL RESOURCES

This module assumes that you have access to a records office, records centre or archival institution or that you have some involvement with the management of records or archives management systems. Ideally, you will also be involved with automation or be considering automation projects. The various activities may ask you to draw on your own experiences and compare those with the information provided in the lessons. If you do not have access to automated facilities or other resources, you may need to develop a fictitious scenario for your activities. Alternatively, you may wish to discuss this module with friends or colleagues who work with automation so that you can discuss principles and concepts with them and compare your understanding with theirs.

Case Studies

The following case studies will provide valuable additional information.

Case Study:

3:      Rosemary Murray-Lachapelle, Canada, 'Managing Electronic Documents in Office Systems using IMOSA'

4:      Laura Millar and Harry Akussah, Ghana, 'Developing an Automated National Records Centre Management System in Ghana'

5:      Victoria Lemieux, Brian Speirs, Nicolas Maftei, Jamaica. 'Automating the Archives and Records Management Programme at the University of the West Indies'

6:      Laura Millar, Canada. 'Systems Downfall or Organisational Shift? Automation at Andover University Archives'

10:     Chris Seifried, Canada, 'Management Decision Making and Teamwork Case Study'

14:     Cassandra Findlay, Australia, 'Development and Implementation of the Immigration Department's New International Traveller Movements System'

PLANNING AN AUTOMATION PROGRAMME

Lesson 1 outlines the steps involved in planning an automation project for records and archives management. It begins with a discussion of the concept of automating and the reasons for automation; it then discusses the possible uses of automation in a records and archives context. This section includes a brief discussion of the records and archives functions that automation can improve. The lesson then examines how business systems analysis applies in a records or archives situation and outlines the steps involved in planning an automation project. The particular steps discussed include

- understanding the underlying business processes
- recognising the importance of assessment and planning
- understanding the environment in which automation will take place
- conducting an initial assessment
- developing goals, objectives and priorities
- determining resource needs
- getting support for the project
- conducting a feasibility study
- assembling a project team and project structure
- getting support for the project.

WHAT IS AUTOMATION?

Automation is a tool that can be used to facilitate records management and archival functions.

Automation: The use of machines or systems to perform tasks normally performed or controlled by people.

Many functions in life can be automated, including washing clothes or dishes using washing machines or dishwashers, transporting goods using cars or trucks, or adding up lists of numbers using calculators. In this module, automation refers to the use of computers to manage the administrative and information processing tasks in records offices, records centres, and archival institutions.

If used wisely, computers can assist records personnel in managing records better to ensure their continued value as evidence. Automation can help organisations implement authentic and reliable record-keeping practices, through the improved tracking of records through their life cycle as well as the consistent application of records schedules and descriptive standards. Maintaining evidence through authentic and reliable records is a cornerstone of good business practice and helps ensure a valuable record for society.

Many functions in life can be automated.

Automation refers to a variety of applications using computer technology. In this module, a number of different applications will be discussed. These will include applications using generic software, such as word processing, spreadsheet, and database applications, or specially written records management applications. Computers can be stand alone, or linked using networks (LANs, WANs, intranets, or the Internet), and can use a wide range of peripheral devices (such as scanners, bar code readers, printers and so on).

For more information about computer software and hardware, see Understanding Computers

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Computer network: A grouping of computers and peripherals connected together by telecommunications links to enable a group of users to share and exchange information.

Local area network: A computer network located within a relatively limited area such as a building, agency or university campus. Also known as a LAN.

Wide area network (WAN): A computer network that covers a large geographical area.

Internet: A collection of local, regional and national computer networks that are linked together to exchange data and distribute processing tasks.

Intranet: An internal computer network that belongs to an organisation and is accessible only by that organisation's members.

WHAT SHOULD BE AUTOMATED?

The range of technology applications and functions available can make it difficult to select a particular technological solution to a records or archives problem. This module is designed to assist readers in this decision-making process.

The question is not whether records and archives management functions can be automated. Many functions can be automated if the resources are available. But it is important to determine if automation is warranted. Two key questions must be asked:

1. Should a specific records or archives management function be automated at this time?

2. How should a particular records or archives management function be automated?

As is emphasised throughout this module, all records and archives functions should be fully functional in a manual system before attempts are made to automate them. Automating an inefficient process will not transform it into an effective one. If done correctly, however, automation can not only improve archival and records functions but can also make it possible to undertake activities that were too complicated or time consuming to be done in the past on a regular basis.

> *All records and archives functions should be fully functional in a manual system before attempts are made to automate them.*

Because automating an inefficient and ineffective manual process will not help an organisation achieve its objectives, some organisations should consider systems analysis and business process re-engineering in anticipation of automation.

> ***Business process re-engineering (BPR):*** The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed.

> *For more information on business process re-engineering, see* Analysing Business Systems.

It is also important to consider the resources available and staff commitment required before commencing an automation project. Financial resources are important, but people are an even more critical element in any automation process. When considering automation, the key stakeholders need to be identified.

> ***Stakeholder:*** Any person, group or other organisation that has a claim on an organisation's attention, resources or output or is affected by that output.

These stakeholders may include government officials who rely on the archival institution to maintain their records and supply information or return specific files when requested. Other stakeholders are the citizens who depend on the records and archives institution to be able to preserve and locate important records (such as property files) and the staff of the records and archives institution. Researchers may be another key stakeholder group; they can be directly affected by the way information or records are made available to them.

Whether an automation programme succeeds or fails often depends on the support it receives from stakeholders. Automation may entail redesigning work processes and thus changing people's jobs or the way services are offered. It is crucial to assess people's capacity for change in their work environment and to prepare them for that change. Staff may have to be trained in computer skills. Similarly, users may have to be given guidance about the way automated systems work if they are to be expected to use the technology themselves.

Reasons for Automation

Automation should be viewed as a tool to facilitate daily operations and planning in a records and archives institution. If implemented well, automation can increase staff efficiency, perform routine tasks automatically and analyse data more quickly than could be done manually. Manual information systems may not be fast enough or sophisticated enough to meet growing user demands as well as the higher expectations and standards brought about in society by increased computerisation. If people find that they can access information in one office or agency using computers, they will soon come to expect other offices to provide the same level of service.

Public and private sector organisations increasingly rely upon computers and information technology to deliver their services and programmes more efficiently. Records and archives institutions are not exceptions to this trend. Almost any records-related activity can be automated in some fashion. For example, word processing can be used for correspondence, inventory development and report generation. Spreadsheets can be used to manage budgets or track project expenditures. Databases can maintain information about staff or about records or archives.

Automation should facilitate daily operations and planning.

The pressures to automate are great. In this age of 'instant' information, there is an increasing demand for speedy access to information, records and archives. Furthermore, existing manual systems may lead to duplication of effort and repetition of work. Manual systems can be time consuming, costly, inflexible and prone to human error. However, as will be discussed below, computerisation is only effective if the proper analysis and planning is completed prior to the purchase and implementation of new technology. Computers alone are not a solution for poor processes or a lack of standards in the management of records or archives. For example, a computer cannot be a

replacement for, or an alternative to, a properly designed classification system. On the other hand, if such a classification system is in place prior to computerisation, the computer can automate it, facilitate access and provide a faster search mechanisms for it and permit the assignment of relevant file numbers to paper records quickly and efficiently.

Following are some reasons an organisation might choose to automate its records or archives functions, or indeed any of its functions.

- accuracy of information and calculations

- speedy retrieval of information

- reliability of information once input

- increased ability to manipulate data once input

- ability to ensure greater accuracy and consistency in the performance of routine tasks

- large capacity for storage of information

- accessibility of information

- expandability of computer systems

- flexibility of computer systems

- cost efficiency of operations

- better utilisation of personnel

- savings in space and equipment

- instantaneous updating

- multiple simultaneous access to information

- new approaches to work processes.

Activity 1

Before reading further, write down what would be the advantages to your organisation if it automated some of its activities.

Automation also assists in eliminating repetitive work, such as typing new file labels and index cards. Computers can print labels automatically, update indexes regularly, produce reports based on data already entered into the computer, and otherwise reduce time and increase efficiency. Personnel can then focus their work on more significant tasks.

The computerisation of some tasks offers much more flexibility. For example, the computer makes it possible to organise and maintain an index with several searchable

'fields' or attributes of information. As a result, the computer provides increased points of access to information. This access can facilitate the location of items for users who may not be aware of the exact terminology for an item.

In addition, the computer permits the maintenance and updating of finding aids, classification manuals, and indexes with relative ease. Changes can be input quickly into the database and can be immediately reflected in a printout. As long as more than one computer is available, it is also possible for records or archives employees to access the database simultaneously. Thus, staff members at remote storage locations can see new and revised information immediately and not have to wait until they are physically at the main records and archives institution office.

Space savings can be achieved through the use of computers. For example, computers can be programmed to remind users of retention and disposal deadlines, ensuring records are transferred or destroyed on schedule. In an archival setting, computers can also be used to make finding aids more consistent and available to users in remote locations as well as on the premises. Computers may also reduce the need for some office supplies and equipment, saving costs in the long run.

Networked computers allow increased connectivity to other governmental agencies, as well as to records professionals throughout the world. Intranets can connect the records and archives institution to governmental agencies so that records-related questions can be answered quickly. Through the Internet, records professionals can locate professional resources and find model policies, procedures and manuals from other similar institutions to assist them in programme development. They can also communicate more easily with their colleagues, encouraging their professional growth.

USES OF AUTOMATION

> *Almost any operation in a records office or records centre*
> *can be automated.*

Automated technologies can be used for a wide range of records functions. However, this does not mean all such operations should necessarily be computerised. The decision about what to automate, what not to automate and how to prioritise functions in an automation process is considered below.

Potential records-related functions to which technology can be applied include

- administrative tasks such as correspondence, personnel management, accounting, or reporting

- classification and listing of current records

- printing file labels

- scheduling of current records

- location and tracking of current and semi-current records and boxes

- information about authorised users of current and semi-current records

- identification of records for disposal to records centres or archives

- management of physical space and storage for current records, semi-current records or archives

- management of deposits in records centres

- acquisition and accessioning of archives

- donor files in archives

- preservation assessments

- reference and retrieval of archives

- registration of users and researchers

- provision of finding aids or descriptive information about records or archives

- production of management information about the records and archives service.

Activity 2

Before reading further, write down as many records-related functions in your organisation you can think of that could be automated.

Another way to consider the possible applications of a computer system is to examine 'problems' or difficulties encountered by the organisation and evaluate whether they can be facilitated or improved with automation. Sometimes problems are systemic and simply automating a process will not solve the underlying issue. Before computerisation, the 'difficult' process should be analysed and perhaps re-engineered (as discussed below). However, automation has been used successfully to address such common records and archives management problems as the following.

- The records classification function is slow, inconsistent and out of date.

- Key word lists have become obsolete and are difficult to keep up to date.

- Making up new files takes too long.

- Manually managed tasks such as creating or searching file indexes, card indexes or lists are time consuming.

- The manual system does not facilitate the addition and deletion of file index information.

- Records have been mislaid because they have not been regularly tracked around the ministry or department.

- Records schedules are difficult to keep track of and disposal dates often pass without records personnel realising this fact.

- Classification manuals and users' guides are quickly outdated and personnel may be working with different versions.

- Personal filing systems are kept to compensate for the lack of reliability in the central registry system.

- File monitoring and control are not carried out regularly.

- Preservation assessments are not updated regularly.

- Certain tasks are duplicated, such as preparing file jacket labels, index entries or file classification manuals.

- The large volume of information available makes it difficult to collect, organise and link documents using manual systems.

- Management reports are not available on a regular basis and statistics for these reports are hard to compile.

- Resources in the records and archives institution are not sufficient to meet user demands.

- Overtime costs are increasingly necessary to support the system.

- Tasks are repetitious and monotonous, causing morale difficulties.

If the identification and analysis of systemic problems and an ensuing business process re-engineering is not done prior to automation, this can lead to greater problems in the implementation and management of the new technologies.

What are often perceived as automation problems arise not from the implementation of computer technologies but instead from insufficient analysis and planning prior to their implementation. Problems also arise when the processes being automated are poorly designed in the first place. Major problems in automating records and archives functions include the following.

- People may expect too much of the automation system and be disappointed if it is not 'perfect'.

- Insufficient training of personnel using the system can result in morale problems and in data that is not reliable.

- People may not be willing to adapt to the methods, such as standardisation of terminology (required to use automated systems), making compliance difficult.

- Poorly planned systems may not serve organisational requirements adequately and so be considered poor substitutes for previous manual systems.

- Vague or imprecise systems will not serve needs well and may become obsolete quickly.

- Idiosyncratic processes will lead to a failure in automation if they are not altered, as computers require high levels of accuracy and consistency.

- Continual changes in the organisation's needs and requirements may make automated systems obsolete if poorly planned.

BUSINESS SYSTEMS ANALYSIS

Business systems analysis is increasingly common in organisations around the world and is the cornerstone of many public sector reform efforts.

> ***Business systems analysis (BSA):*** An analytical framework that involves analysing organisations as systems or the process of systematically and objectively gathering information about business systems and subjecting that information to formal analysis. This includes identifying broad organisational goals and supporting business areas and processes, and business process definition and decomposition.

Both public sector and private sector records and archives institutions can also benefit from completing this type of analysis of their work processes. In fact, the analysis and subsequent re-engineering of processes within a records and archives institution can bring the organisation into closer alignment with its parent organisation, furthering the mission and objectives of both the records office and the larger organisation.

When embarking on any automation initiative, it is particularly important to verify that the existing manual records or archives management processes are well designed. Automating poor systems will not make them more efficient. Gaining a thorough understanding of the underlying records and archives management functions is an essential step in the automation process. BSA involves the identification of interrelationships among people, tasks, organisational structures, information flow and other elements. In efficient processes, all the elements work together co-operatively. When new elements such as computers are introduced, the balance among these factors can become disturbed. Therefore, it is important to forecast potential problems that may arise with the introduction of technology into a work place prior to the implementation of new systems.

As in any business systems analysis and the ensuing re-engineering, the process of managing change in a records and archives institution requires systems thinking. To accomplish this, one must understand both the parts and the whole of a process as well as interrelationships and dependencies among agencies, activities and people involved in the process.

The steps in a business systems analysis project are outlined in Analysing Business Systems.

> *Automating poor systems will not make them more efficient.*

Consider the following typical records management problem.

Activity 3

Read the scenario below and then answer the questions at the bottom of this activity.

A government archival institution is having difficulty managing the records scheduling process. There is insufficient information collected on agency functions and records to make disposal decisions. As a result, archives staff are constantly rechecking information and agency directors are reluctant to sign off on any schedules that are produced.

The creation of a records schedule involves such activities as functional analysis of the agency, analysis of the record-keeping systems, interviews of the officials in the effected office and perhaps other offices and legal research. These activities are initiated by records personnel.

However, in order for the schedule to be finalised it must be approved by the agency handling the records, legal counsel and perhaps some other government minister.

What problems do you identify within this records scheduling process? What parts of the process could be automated? What benefits should derive from automating those processes? Will automation solve the problems you identified? Write down as many ideas as you can think of for these questions.

In order to use automation efficiently, all records-related processes should be analysed to verify that they facilitate the goals and objectives of the organisation. The problems found may not be solved by automation; for example, it is difficult if not impossible to solve a political problem by automating the process.

The benefits of automation can only be achieved with careful planning. Planning allows records and archives personnel to determine and prioritise their needs and desires. With assessment and planning, there is a greater likelihood that core requirements are met and that other needs and desires are addressed, even if they cannot be accommodated with automation. The planning process should not only consider automation needs but also examine other information management initiatives within the organisation, in order to ensure that the objectives and directions are not opposed and that overlapping goals are noted.

ASSESSMENT AND PLANNING

> *Planning is critical to any automation programme.*

Planning is a crucial part of all records and archives institution activities, as discussed in all the modules in this study programme. Planning is a critical management function that must occur within the organisational context; that is, other organisational components must be taken into account while carrying out any planning exercise. In other words, automation projects cannot be planned for in isolation from the organisation's mandate, mission, functions, resources and other systems.

The computerisation of work processes also requires knowledge, skills and wisdom from more than one discipline. Any automation project has a greater chance of success if it begins with good planning and with consultation with the user and the technology communities, with programme managers, records managers, archivists and systems specialists, as well as with other government officials who depend on records. A system that does not meet the needs of users is counter-productive and represents a misuse of resources. An automation project can only be successful if all stakeholders are involved and, particularly, if senior management supports, endorses and leads such an initiative.

The goals and purposes for automating the records management system should be clearly stated by senior management and communicated to employees. Future users of the system should be consulted to seek their expertise and ideas and promote their acceptance of the new tool. Training and orientation in the new tool is also critical to its success.

Planning ensures the project is completed on time and within budget and that the final product addresses the needs of the organisation as identified. Planning can be quite complex, but it is a necessary part of an automation project. Without planning, the systems developed may be inadequate, people may be poorly trained and the final project may not be successful. Planning involves

- conducting an initial assessment

- developing goals, objectives and priorities

- determining resource needs

- getting support for the project

- conducting a feasibility study

- developing a detailed project plan

- assembling a project team and project structure.

Conducting an Initial Assessment

Whether manual or automated, systems exist within an organisational framework and therefore must be organised in order to meet the needs of the organisation. Prior to developing the automation project in depth, it is wise to conduct an initial assessment of the organisation, to determine if an automation project is in fact even viable. A number of technology-specific factors should be identified and evaluated during this initial assessment phase, including:

- the problem(s) to be resolved by the development of a new automated system

- how technology initiatives fit into overall mission and business objectives

- current or pending legislation that may affect the choice or use of technology

- the state of existing systems within the organisation and how they should relate to any new system

- the system of managing materials in agency records offices as well as in the records centre

- the nature of any existing or planned records management initiatives within the organisation and how they affect or should co-exist with any new system

- the expected benefits resulting from the implementation of an automated system

- how costs will be measured and at what point the costs will outweigh the benefits

- the constraints and limitations of the automation project, including policy, financial requirements and technical skills

- the time and resources required to conduct a feasibility study

- the level of senior management support (it is best to seek a champion for the records system automation project to offer support at senior levels)

- the project team members, their roles and responsibilities.

Once this initial assessment has been completed, it is possible to determine the goals, objectives and priorities for the project and develop the terms of reference for a feasibility study.

> *For more on project management, see* Strategic Planning for Records and Archives Services.

Other non-technical factors can affect the feasibility of an automation project. These factors might include the organisational culture and the physical layout or environmental conditions within the office. Work practices and office cultures will influence the design and implementation of both computer hardware and software. Failure to understand the organisational culture in may result in barriers during the implementation of any automation project. For example, re-engineering a process may entail reorganisation of tasks, additions of duties or deletions of certain steps. This process can affect behaviours and office routines that have been in place for years. If the new automated processes do not work well, they may be of little value because the older routines will persist. In this case, senior management should stress that the re-engineering is not being done for the

benefit of automation. Rather, changes are being made to further the goals and objectives of the organisation.

Several physical factors can assist or impede the automation process, including the actual physical layout of the office, environmental issues and infrastructure. Computers and peripherals require large amounts of workspace to create an efficient working environment. Also, computer users can experience muscle pains if office furniture does not support parts of the body, such as the back and arms. Poor alignment between the computer monitor and the line of vision can result in neck problems. The potential for these concerns needs to be identified during the assessment.

The physical environment is also a factor. Consistent temperature and relative humidity must be maintained to ensure proper functioning of the computer technology. Furthermore, computers are also sensitive to excessive dust or dirt, and air conditioners will help to filter the air. Computer technology also relies on dependable power supplies, without significant surges or long-term power cuts. The initial assessment must address these issues as well. Preservation issues are discussed in more detail below.

Developing Goals, Objectives and Priorities

If the initial assessment proves favourable toward further exploration of automation options, the scope of the project needs to be established. Any automation project (or indeed any project in the organisation) must be well planned, based on clear and achievable goals and objectives and well-established priorities.

If the records management automation project does not blend well with the parent organisation's overall business goals, objectives and priorities, there is likely to be little support for its development. For example, if someone in a records office wished to develop an automated retention and disposal schedule at the same time as all classification systems were being revised, management may reasonably feel the automation project is premature.

When considering how automation in the records and archives institution will support the organisation's business objectives and priorities, consider the following five issues.

Purpose of the System

The purpose of records and archives management systems must be phrased in terms of the larger organisation. Records professionals may want to clarify the purpose of the automated system, what other functions it could or should perform and what information is needed within the system. However senior management will want to know the business objectives to be supported by the automated system.

> *Automated systems must serve the purposes of the larger organisation.*

Technical Considerations

During the assessment and planning process, it is important to consider the organisation's capacity for maintaining the system and its ability to provide the training necessary to support the use and application of automated tools. This process entails working with individuals responsible for information technology in the organisation and understanding their procedures, policies and areas of expertise. Some questions to consider in this area include the following.

- Is there sufficient technical support to solve hardware and software problems in a timely manner?

- What types of software are supported by the institution?

- What systems are already in place?

- How will the new system work with existing systems?

- Are policies and procedures in place for backing up data on a regular basis?

- What precautions are in place to combat viruses?

- What type of training is offered internally to assist employees in gaining and developing their own computer skills?

- Is there someone close by who can answer questions about software packages used by the organisation?

Organisational Factors

Goals, objectives and priorities for the automation project will differ depending on who in the organisation is involved. A key decision to be made is to determine who should be involved in the automation decision-making process. Other major organisational decisions include the following.

- Who will be authorised to enter, change and delete data?

- Who will have access to view data in the new system?

- Are different levels of access needed in the system?

- How will the new system be implemented (for example, full automation of one records office or incrementally by introducing one computer into a number of records offices)?

- Will it be implemented all at once or in phases?

- What levels and types of training are required for different staff members and other users to understand and utilise the system?

Resource Requirements

Resources are measured in terms of money, time and people. The major question usually is: what will the system cost? However, an expensive system may provide few installation and implementation problems and in the long run be less costly than a less expensive system that is difficult to install, hard for records centre staff to use and

shuts down periodically.

An equally important question to ask is: what will be the benefits? This should be answered in terms of the immediate office as well as in terms of the business goals of the larger organisation. Other resource questions include the following.

- Where will necessary funds come from?

- When is the system to be installed?

- Are there sufficient funds to work within this time frame?

- Do sufficient funds exist for long-term maintenance of the hardware and preservation of the data in the system?

- Is there sufficient space to install such a system?

- What are the human resources requirements?

Political Issues

Software designed for automated records management systems includes assumptions about the value of records, the extent to which it is acceptable to provide access to records, users' interest in accessing records and the capacity of the economy to afford the technology. Automating records systems may be well received if a government or organisation values accountability, efficiency, effectiveness and economy; they may be poorly received if the government or organisation is not aware of the importance of good records care. Questions to ask include the following.

- Does senior management accept the value of records as evidence?

- Does senior management see the need for the automated system?

- Will management provide financial and organisational support for the programme over the long term?

- Are there any potential champions of the project among senior officials?

- Who must be involved?

- Who should be involved?

- What consequences will acceptance or rejection of the proposal have on the organisation and its departments?

The answers to these questions will help organisers of the project to develop a written statement of goals, objectives and priorities. This statement will form the basis for the organisation and implementation of the automation project. A sample statement of goals, objectives and priorities is presented in the figure below.

In this example, observe that the goal is two-pronged. The records office desires to standardise descriptive data to enhance their own management of records and it wants to make some of this information accessible to users. The two parts of the goal are presented in more detail in the objectives. However, the top priority is to increase managerial control over records through standardisation and creating an easily updatable database. User access is secondary and will be phased in over the course of

the automation project. This is not to say that user access is not important. However, objectives must be balanced in a realistic fashion taking into consideration the five areas discussed above, the purpose of the system, technical considerations, organisational factors, resource requirements and political issues.

> *For more information on planning techniques, see* Strategic Planning for Records and Archives Services.

A written statement of goals, objectives and priorities will form the basis for the organisation and implementation of the automation project.

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Erewhon National Archives

Finding Aids Automation

Goals, Objectives and Priorities, 1998-2003

Goal

To standardise information on records, such as finding aids and records inventories of the Erewhon National Archives, so that it is more easily analysed by records office staff and widely accessible to users.

Objectives

To manage the descriptions of archival records more efficiently

To standardise descriptive data to facilitate retrieval

To create an easily updatable database of holdings descriptions that presents timely information

To increase users' access to the descriptions of holdings by networking the database.

Priorities

1. Standardisation of descriptive practices (December 1998)

2. Pilot project to automate 25 finding aids and test various systems (completed by June 1999)

3. Evaluation of pilot demonstrations of systems and finalisation of technical requirements for purchase of software and hardware for the full-scale project (completed by December 1999)

4. Staff training in entering data, search and retrieval of information and explaining the system to users (completed June 2000)

5. Input of data from all manual systems in priority order by level of public use (completed by December 2000)

6. Input of data from new acquisitions as processed and described (ongoing)

7. Networking system for public access (June 2001).

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Figure 1: Sample Statement of Goals, Objectives and Priorities

Determining Resource Needs

> *Adequate resources are critical to successful automation.*

Determining resource needs for the planning, implementation, and operational stages of an automation project is important. In the initial planning stage monetary resources are required to conduct the initial analyses and complete the requisite research on potential computer systems. However, during this phase, a more significant resource may be internal support from senior management and other key individuals in the organisation. This factor is discussed in the following section.

During the implementation stage, monetary resources will be needed for purchasing the equipment, but also access to appropriate educational facilities and instructors to train staff in the use of computers in general as well as the system in particular. Finally, in the operational stage resources are needed to continually upgrade parts of the system and office supplies are needed to sustain the output from the system.

Throughout each of these stages, access to technical support is needed. First, technical support is required to assist in evaluating computer systems and identifying solutions that are feasible in the organisation's technical environment. During implementation, technical assistance is critical in troubleshooting the problems that will undoubtedly occur at this stage. When the system is fully operational, technical assistance is needed to perform system back-ups, checks, and perform routine maintenance in order to keep the system fully functional.

The monetary resources needed to evaluate, implement, and purchase computer equipment go far beyond the costs of the equipment itself. In fact, the cost of the actual equipment may be small in comparison to the number of hours personnel in records offices, records centres, and the organisation's technical staff will work performing such activities as evaluation of existing processes, implementation, and staff training. Furthermore, computer supplies and the necessary upgrades of software and hardware are significant on-going costs associated with automation.

Getting Support for the Project

The success of any project depends on support from all parts of the organisation, particularly senior management. This is why a member of senior management should be on the planning team if possible. Support from management is critical, so that staff are given time to undertake the work involved as part of their daily duties. If staff are asked to do this work but not given release time for it, or their supervisors are not told that this work is an appropriate part of their duties, then the success of the project will be seriously compromised. Management support can include:

- allowing release time for participation in the planning, implementation and training phases of the automation project

- ensuring adequate finances for the project

- promoting the project within or outside the organisation as needed to ensure additional support

- providing the project team with adequate authority to complete its work

- assisting with planning for time and costs to ensure management's needs are recognised.

Another area where support may be needed is from actual or potential users of the system. It is important to have positive support from users, but they may resist changes to existing, familiar systems. People often do not like new ways of doing things, so users should be kept aware of the status of the project, consulted on their needs and helped to understand the benefits of the new system. If users point out issues of concern or have ideas about improvements, these suggestions should be listened to carefully. After all, users might know even better than staff how the systems should operate to serve their needs well. If they are the primary clientele for the new system, their input can be critical to its success.

Conducting a Feasibility Study

A feasibility study is a process leading to the identification of desired functionalities and technical requirements of an automated system. There are a variety of ways a feasibility study can be carried out, such as through site visits and in-person interviews, questionnaires or surveys or other types of studies and evaluations. Following are some key principles to follow regardless of the methodology chosen for the study. A feasibility study should

- reconsider the characteristics of the current situation and confirm the definition of the problem that the new system will address

- gather additional data to analyse the problem(s) and anticipated benefits

- gather data to test the feasibility of the goals and objectives

- conduct a cost-benefit analysis and an impact analysis

- establish alternative solutions

- develop a preliminary plan for installation and implementation

- seek senior management approval.

During the course of a feasibility study, everyone in the office who may be affected by the system should be asked for input and comments; they should have an opportunity to voice their opinions and express their ideas. Officials in other stakeholder offices should also be consulted. For example, the government's legal advisor should be consulted to ensure the legality of any changes in the record-keeping practices. Furthermore, those involved in deploying the system –

from staff in information technology offices to maintenance workers – should be consulted about the work involved with setting up the new system. A range of options may be available, depending on the type of automation project being considered.

Assembling a Project Team and Project Structure

As with all projects, any automation project needs a strong structure to be successful and will benefit from having the best people possible involved. The size and scope of the project will determine how many people should be on a project team and their particular roles. Even the smallest project should have at least two members so they can work together and ensure that one person is not relied on entirely to complete the project. More than eight or ten members is often too large to allow the project team to be managed efficiently. Only one person should be in charge, so that there is no confusion when decisions are made.

Project team members might include representatives of senior management, some of the sections or departments affected and possibly researchers or other users of the final system. In particular, any section or department of the organisation that will be affected by the final system should have some form of input into the project, either by participating on the team or by providing comments and advice. Internal and external technical advisors should also be involved, if possible. Consultants can be included if they are available; to ensure costs are managed, consulting duties should be clearly outlined in advance and contracts prepared with consultants to clarify their role.

The project team will need to develop a project structure: that is, procedures, methodologies and a reporting relationship devised to ensure clear lines of communication and efficient operations. In particular, the following project management issues will need to be clarified.

- structure: what are the goals of the project? what are team members' roles and responsibilities?

- methodology: what is the project approach and work plan? how will the project be monitored and evaluated?

- reporting and communications: who will report to whom? what will be reported and why? how often will reports be prepared? who will receive reports?

- documentation: how will project documentation be maintained and by whom?

The members of the team may undertake the following roles and responsibilities.

- The chair will lead the group and be responsible for the overall cost-analysis of the automation project.

- The technical specialist will be in charge of researching options for infrastructure, networking and hardware as well as researching the software options.

- The records specialist will evaluate the software to see if it meets the needs of the users and the required records management standards.

- A member of senior management will act as a sponsor for the project and 'sell' the project to peers at the senior level.

- Various members from offices affected by the system or future users of the system will participate to articulate their own information needs.

The project should be governed by clear time frames and deliverables. Scheduling the project helps the team identify the tasks to be done and arrange them in a logical order so that they can be completed efficiently. To be useful, schedules must be kept current and they must be realistic. They should identify specific, discrete tasks and they should state who is responsible for executing what tasks. A target date for completion should be included, along with information about the present status of the work.

Also, the project should be supported by well-maintained budget documents. The resources required for an automation project may be limited and should be used efficiently; accurate monitoring of expenses is critical to avoiding budget overruns and ensuring on-time, on-cost delivery of services.

> *For more information on team building and project management, see* Strategic Planning for Records and Archives Services.

Activity 4

1. If conducting a large scale project that affects users throughout the government, who would you have on the project team and why would you select these individuals?

2. If conducting a small scale project within the records centre purely for internal use, who would you have on the project team and why would you select these individuals?

SUMMARY

This lesson has outlined the steps involved in planning an automation project for records and archives management. It has discussed the reasons for automation, emphasising the benefits of computerisation, including accuracy, speed, flexibility, great information storage capacity and expandability. The lesson also cautioned against viewing technology as a solution. Technology is a tool; it will not solve underlying systemic problems within existing records centre processes.

This lesson also discussed possible uses of automation for records and archives work, including administrative work, records management tasks such as classification, scheduling and tracking; semi-current records management work; and archives work such as acquisition, accessioning, description, preservation, reference and registration. The lesson then discussed the importance of planning and some of the environmental considerations to remember when planning an automation programme.

The lesson outlined the steps involved in planning an automation project, including

- analysing the records and archives institution business systems

- recognising the importance of assessment and planning

- conducting an initial assessment

- developing goals, objectives and priorities

- determining resource needs

- getting support for the project.

- conducting a feasibility study

- assembling a project team and project structure.

STUDY QUESTIONS

1. A number of applications of automation in an archival setting are provided, can you think of others?

2. Explain three reasons a records and archives institution may wish to automate its functions.

3. Define business systems analysis

4. Discuss the importance of planning for automation.

5. What environmental considerations must be taken into account when planning for automation?

6. Explain three reasons an archival institution may wish to automate its functions.

7. What are the advantages of computerisation for office work?

8. What are some of the drawbacks of computerisation?

9. What records or archives 'problems' can be improved with automation?

10. What types of records and archives functions can be managed with automation?

11. Why should these functions be fully operational in a manual fashion before attempts are made to automate them?

12. Explain the steps involved in planning an automation project.

13. What is the purpose of planning?

14. Explain the purpose of an initial assessment and explain why it is different from a feasibility study.

15. Why should goals, objectives and priorities be established for an automation project?

16. What key issues arise when considering the organisation's goals, objectives and priorities for automation?

17. How can a project team obtain senior management support? Why is such support useful?

18. Why is user support valuable?

19. What management priorities need to be established during a feasibility study?

20. Who should be on a project management team?

21. What is the purpose of a project schedule?

22. What financial considerations must be taken into account when planning an automation project?

ACTIVITIES: COMMENTS

Activity 1

The activities you choose to automate will reflect the activities in the preceding list, although you may think of others. Try and consider what you main priorities are, do not simply repeat the list in the text. For example your main problems might be the need for more than one member of staff to access the same information at the same time, coupled with a problem with the information being accurate. Your information retrieval and space utilisation may be more than adequate at the moment.

Activity 2

As with Activity 1, try to think of what is actually relevant for your organisation in terms of the automation of records-related functions. You could probably automate all the functions you carry out, but what is really necessary?

Activity 3

The records and archives institution may wish to automate the scheduling process, in order to manage all the information collected as part of that process. It may be more important, however, to create a more efficient means of managing the data used to develop schedules, not necessarily to automate the entire process. Automation is not a solution in and of itself; rather, it is a tool that must be used appropriately.

In this example, one problem may be that, although adequate information is collected in order to prepare schedules, analysis of these disparate data is difficult. A computer could help to manage, sort and collate these data.

However, the problem may also be with data collection. Data concerning office functions and records may vary among records officers, so rechecking is needed to collect standard and complete information. In this case, automation will not solve the problem. The underlying process of analyzing the record-keeping system needs to be changed. This type of problem is common in countries that are striving to replace obsolete records systems with newer more efficient processes.

The problem may also be external to the records and archives institution. The government official may not want to sign off on the records schedule because he or she thinks that the records will then become inaccessible to his or her own staff. This is an information flow problem. Automation could solve this problem by generating faster updates and current inventories of all materials held in the records and archives institution.

The government official may refuse to sign off on the schedule because of a desire not to part with records. This is a political problem. In this case, automation can do nothing to persuade the official to speed up his or her work.

Activity 4

If you are conducting a large-scale project throughout government, you may want to have a senior officer from the Office of the Head of the Civil Service (or equivalent in your organisation) as the project sponsor. Representatives from all the ministries and departments involved should be on the project team along with senior staff from the Archives or Records and archives institution. The reason for including staff from ministries is so that they will 'own' the project and use whatever system is finally installed. It is important to get users involved. Government IT specialists should also be involved.

If you are conducting a small project within the records and archives institution, you may want to have the director or deputy director as the project sponsor. The project team will be much smaller than for a large project, although it may be useful to involve government IT specialists, particularly if the government uses standard systems. Staff from the relevant section of the institution will need to be involved.

IDENTIFYING TECHNICAL REQUIREMENTS AND SELECTING COMPUTER EQUIPMENT

The decision to acquire computers and associated equipment must be based upon the same kind of needs analysis and the identification of requirements used to select any piece of equipment in an organisation. The purposes and efficiency of the equipment must be considered in light of the overall business goals of the organisation and the particular problem to be solved.

> *The selection and procurement of equipment are dealt with more generally in* Managing Resources for Records and Archives Services.

Although it is beneficial, it is not necessary for the records manager or archivist to be intimately familiar with information technology and all of its implications in order to determine technical requirements and select equipment. The records manager or archivist will ideally work with a project team equipped with at least one technical expert, who can assist with decisions about technology purchases.

This lesson begins with a brief overview of the functional requirements of some records operations. It then outlines the issues to consider when assessing technical requirements – that is, the precise computer needs required to make the automation system operate – and selecting hardware and software. The lesson includes information about some of the standards to consider. The lesson continues with a discussion of how to choose a vendor, how to acquire computer systems and how to make decisions about ongoing vendor support for the system. There are several lists in this chapter. These are collated and combined into an appendix that can be copied and used by the organisation to gather data about software and hardware specifications.

This lesson assumes that the reader is familiar with types of automated systems, such as relational databases, web-based systems, word processing software and so on.

> *The way these automated systems work is discussed in more detail in* Understanding Computers: An Overview for Records and Archives Staff.

ANALYSING FUNCTIONAL REQUIREMENTS

Technical requirements and the computer equipment selected will vary greatly depending on the intended uses of automation as well as the specific records or archives functions designated for automation. Automation of records offices and records management operation covers a broad range of options. For example:

- Using a word processor can make writing correspondence, producing lists or printing labels easier and more efficient.

- A spreadsheet can assist with keeping the accounts if a specialist accounting package is not available. It can also be of benefit in producing statistical reports about the records services that can be of use in making management decisions. It is even possible to use a spreadsheet as a simple database.

- Databases can be used to store and manipulate many different kinds of information that can be used to classify and catalogue records, track files, register users, schedule records amongst other uses. Setting up a small database to allow records office staff to search for files more quickly will still have a great impact on how the office operates.

- Communications software will allow the records office or National Archives to send faxes and emails from their computers.

- An integrated records management software package can track files and box locations, check materials in and out, generate lists of records to be considered for destruction based on retention schedules, and create managerial reports.

No matter what is being automated, there are two sets of requirements to keep in mind. First, there are the functional requirements of the task or process. Functional requirements are a minimal set of activities or operations that must be accomplished by the computer to complete the task in the authorised manner.

> ***Functional requirements:*** The tasks a computer application must perform to carry out a process satisfactorily.

Functional requirements relate to the task being automated and are used to conceptualise the operations a computer application must perform to carry out a particular process in an automated environment. Functional requirements for record keeping, for example, must ensure the computer executes certain commands that protect records as evidence and as archives. Functional requirements should be built into computer systems in order to manage records office or records management functions, such as maintaining registries, records classification systems, indexing information, retrieving records, controlling the movement of boxes and files, managing the life cycle of records (such as scheduling and disposal) and generating administrative reports. Functional requirements should be determined during the initial planning stages and in the feasibility study.

The second set of requirements concern the technical requirements needed to accomplish the functional requirements. Matching functional requirements to the technical specifications of the computer equipment is key in any successful automation process. Technical requirements needed to support the functional requirements of a record keeping system, for example, would include the ability to authenticate users, track changes in records, and monitor use.

> **Technical requirements**: The specifications a computer must have to carry out the functional requirements.

The following sections demonstrate how functional requirements and technical requirements are linked using the example of an integrated Automated Records Management System (ARMS). While this is a specific example of records automation, the principles are similar for looking at other automation projects.

> *No matter what is being automated, functional and technical requirements must be considered.*

Managing Records

Records classification systems are based upon provenance. This means that the primary system of control is based on the creator or creating entity, such as a ministry, office, or task force. A critical functional requirement for an ARMS is to identify creating entities and to track changes in that entity, such as names or functions over time. Without this functionality, the ARMS cannot present evidence in context.

ARMS should also be able to sustain a hierarchical structure between elements in the records description. For example, records can be described at the group or fonds level, series, file, or in rare cases, item level. The primary level of control is the series.

> *For more information on levels, see The* Management of Public Sector Records: Principles and Context *and* Managing Archives.

While some automated systems can control information at the item level, this is not recommended as a priority for data entry until the records and archives institution has control at the group and series levels. If the computer is programmed appropriately, it will allow for the separate input and retrieval of variables at each level of the hierarchy. Different descriptive variables will be active at each level.

For example, at the group level, description may focus more on the creating agency, while at the series level, the title of the records, dates and a description of the records will be emphasised. In some systems, elements are inherited from higher levels. This is a beneficial feature because it prevents needless duplication of data entry. This

structure will allow for great flexibility in data entry and updating. To accomplish this, the system should verify that the previous level exists before allowing a record to be created on a lower level. Records classification systems should also act as a means of authority control and limit the variability of entries in fields, such as the creating agency and subjects. Finally, when determining the functional requirements of the computer for managing records classification systems, it is important to check that the field lengths used are sufficient to hold the data required and that the fields will accept alphabetic, numeric, alphanumeric, or structured data.

Possible fields in an automated records classification system may include the creating office, functions, open and close dates of the records, security level, retention period, disposal action and disposal authority.

> *The structure of fields in a records management database is discussed in detail in Lesson 4.*

Life-cycle Tracking

Monitoring records through their life is a key business function of the continuum approach to records management. In order to automate the life-cycle tracking process data elements must be collected at each phase in the cycle. Some data will remain static and relevant throughout the life-cycle while other data will change from phase to phase, or even within a phase. Technical requirements needed to back up these functions include the ability to create information that carries over from one phase of the life cycle to the next without having to rekey in the data and the ability to alter other types of information, in some cases on a daily basis.

Static Elements

Static elements are essential details necessary to manage records functions at a particular stage. These are additive. For example, information entered into the system in the current phase should be carried over to the semi-current and archival phases. Likewise, information added in the semi-current phase should be carried over to the archival phase. Even if records are destroyed, information about those record should be maintained and the system should always indicate that form and date of the disposal actions taken.

Semi-static Elements (All Phases)

Semi-static elements represent changes in the physical location of the records and the operations surrounding use of records. These data include elements such as:

- Storage location

- Users authorised to have access

- Available/unavailable (generated automatically from charge-out data).

These data will change from phase to phase, although they may change within a phase.

Input at Current Phase	Added at Semi-Current Phase	Added at the Archival Phase
Agency/office of origin (provenance)	Date of transfer to records centre	Date of transfer to archival repository
File Series	Disposal action taken	Archival reference/code assigned
File Code	Officer authorising disposal	Date list made available
File Title	Designated method of disposal	State of preservation
Keywords	Date disposal action taken	Conservation treatment
Date of first document on file		Access period prescribed by legislation or regulation
Date of latest/last document on file (active until file closed then static)		Access date (could be generated automatically)
Proposed disposal action		Availability as microform or as a digital image
Proposed retention period		
Disposal date (could be generated automatically)		

Figure 2: Data Input During the Life-cycle Tracking Process

Active Elements (All Phases)

Active elements principally concern the use of records or charge-out data. These data will change frequently in all phases and include such elements as:

- Date of request for file

- Name/ID/location of requesting user

- Date of dispatch/production

- Date of transfer to another user (current phase only)

- Name/ID/location of user to whom transferred (current phase only)

- Date of last reminder if overdue for return

- Date of return to storage

- Number of times produced from storage in year.

Scheduling and Disposal

As noted in the table and lists above Automation can aid in the management of the life cycle through computerisation of the processes of scheduling and disposal. Scheduling and disposal are excellent functions to automate because of the great time saving involved in automating the process of tracking records and alerting personnel to the disposal requirements. However, if any application calls for the disposal of records, this decision should be confirmed by the records office personnel responsible for all such decisions; people should not destroy records with only the authority of a computerised notification.

For the scheduling function to work properly, records staff must plan the processes well. Series, boxes, or files must be identified and coded to represent retention periods. Information about the codes must be programmed into the computer. In some applications the coding scheme can also be linked to commercially available retention schedules, allowing retention codes to be applied automatically.

When planning to automate the scheduling and disposal function, it is important to ensure adequate safeguards are in place. For example, all disposal decisions should be approved and the actions recorded. Many governments have laws that require a permanent record to be kept of disposal actions as well as a summary of all records destroyed. It is also useful to ensure the application can produce appropriate histories, lists and reports, as well as box lists, lists of destroyed files, list of files transferred to archival storage and so on. The application should also be set up so that disposal dates are handled consistently. Some computers round numbers up or down to the first of the month or the end of the year. This approximation can cause inefficiencies or problems.

Indexing and Retrieval Systems

An automated records management system should be able to create and update indexes efficiently and automatically. This capacity provides better accountability for the records and archives institution and better user access to records. Many users approach records according to subject rather than provenance. Automatic indexing also reduces duplication of effort and errors in indexing and updating. With a good indexing system, records personnel can search and create different subject lists with little advance notice.

In thinking about the technical requirements, records professionals should determine which data elements in the records need to be indexed and how the indexing parameters should be established. For example, titles are usually automatically indexed, with only relevant words in the title included. That is, no prepositions or other stop words (such as 'a' or 'the') are included. In addition, controlled vocabulary lists or keywords are usually used for indexing. Staff are responsible for updating keyword lists. Keywords could be linked to authority files of proper names and subjects that can be developed so that one word could mean that word and all of its synonyms.

> *For more information on principles of indexing and the construction of authority files, see* Managing Archives.

There are many different ways to search an automated index. For example, users could search for information by identifying keywords, the names of agencies, dates, geographic names or type of record. When selecting a computer system, it is important to enquire about the search engine or the method of search that can be used. Some computer systems use 'fuzzy' logic in their search processes, meaning that the system will still retrieve the desired keyword even if it is misspelled or if it is in its plural or singular form. Others are able to search all the permutations of a word. In this case, the user truncates the word at some point, such as after the root, using a symbol designated by the system, such as an asterisk (*). This symbol is called a 'wildcard.' When a computer receives a query using a wildcard, the search engine will retrieve all the possible permutations of the word. For example, 'swim*' may be entered into the computer, and the search will reveal information about 'swimming' and 'swimmers'. Or 'educ*' may be entered, and the computer will find information about 'education', 'educators' and 'educate'.

Boolean logic is another method of searching. It allows users to broaden or narrow searches. This function is accomplished through the use of the conjunctions 'and,' 'or,' and 'not.' For example, the records office or records centre may contain older records from the transportation department and the finance department. A commerce under-secretary is interested in investigating the cost of airline use in the government. In a Boolean search using 'or,' airlines or finances, the researcher would get everything from the departments dealing with airlines (including regulation, local and international carriers and so on) as well as everything documenting finances (budgets,

expenditures and so on). If the Boolean term 'and' is used with the same search, the researcher would only retrieve descriptions of records that dealt with both airlines and finances.

Retrieval queries should result in a selection of 'hits', or successful search items, from which one can select the desired hit or browse through to find the most appropriate hit. In some systems these are rated according to relevance or how well the system has determined that they matched the query.

It is important to note that such systems require extensive analysis on the part of records staff to identify and index records, so that information about them can be added to the computer. And, as mentioned above, standardised index terms are crucial. If a researcher typed in 'airlines' but the records office used the term 'airplanes' the search would find nothing, even though there may be useful information available. It is important to consider the costs and time involved with such work before commencing automated indexing systems, especially at a detailed level.

In more sophisticated systems, users may actually be able to access the full text of documents on the computer. Many word processing applications offer this feature on a document-by-document basis. Although appealing, full text retrieval in large document sets often produces an enormous response to general queries. This creates information overload and records personnel must learn how to construct more specific queries or develop other means to narrow down these large document sets.

Such wide access to actual documents, as opposed to descriptions of records, also presents security problems. Full text access requires the records office or records centre to establish guidelines about who can access what records. Some materials may be security classified or confidential, and policies would have to be established about whether or not to make those available electronically and to whom. Again, this process can be extremely time consuming and the benefits of full-text access have to be weighed against the costs of getting the information into the computer.

> *An automated records management system should be able to create and update indexes efficiently and automatically.*

Controlling File Movements

Automated records management systems can also be used to control the movement of files throughout a records office, records centre or archival institution. The ability to track current and previous file movements is an essential records and archives institution function. An automated file control system should be able to track files and automatically issue periodic reports. These reports might include a 'bring forward' (BF) and overdue memo to remind records management staff of the need to send a file; reports might also include queries to offices to determine if files are still needed or if they can be returned. If the ARMS consolidates records tracking and

control, manual processes such as file recalls, charge-out slips and paper-based bring forward files can be eliminated.

Computers can also streamline the process of charging out a file. For example, file control can be linked to an automated employee list containing all authorised users and identifying their security clearance level. When information requested has a security level higher than the user's, records staff can be alerted by the system when the records are being checked out. This user list would have to be able to be updated regularly.

Charge out and check in can also be facilitated through the use of bar coding technology.

> **Bar code**: a type of code used on labels to be read by a scanner. Each bar code is unique and identifies a specific item, file, or box.

Every file and box in the records office, records centre or archival institution can be bar coded with a unique number. These numbers are entered into the ARMS along with the other descriptive information. Whenever a box or file is removed from its records storage location, the bar code is read by a special scanning device attached to the computer and the name and location of the 'borrower' is noted. The efficiency of bar codes comes after all the bar codes are assigned to boxes or files and entered into the database. From that time on, no one has to retype that information; records staff simply swipe the bar code reader across the identification strip and they will automatically receive a description of the item. In any automated system, it is important to track records wherever they are, even if they never leave the records facility.

> *Automated records management systems can control the movement of files throughout an institution.*

User Registration

It is also possible to use automation to register users of records and archives. This could be applied to both internal and external users or researchers. As with automating the life cycle tracking process, one of the functional requirements of a registration system is that fields must be able to be modified frequently to reflect the status of users and records. Ideally, a registration system should generate the types of reports suggested below to better administer the records.

Registration Data

Registration data should be constructed so that users can be tracked over time and can be contacted in case of problems with the records they used. Registration data is also

a useful administrative tool to determine the most heavily used collections or the most popular research subjects. This information can be used to target audiences and to determine the most appropriate records to send to remote storage.

Registration data should be able to generate reports of all items used or, for users within the organisation, materials currently checked out and formerly requested. Once a user is registered, this can speed up the records delivery process by eliminating the need to reregister users at each request. This view along with the file tracking view can be used to trace records if parts of files have been removed when they are returned or if some purposeful file tampering has occurred.

Internal Users	External Users
Name	Name
Position	Institutional Affiliation
Office	Position
Telephone number	Address
Fax number	Telephone number
Electronic mail address	Fax number
Security classification	Electronic mail address
Items requested (can repeat this field)	Type of identification
	Items requested (can repeat this field)

Figure 3: Registration Data

Reporting

Reporting is a key requirement in any records or archives management operation. The computer system should be able to generate a variety of regular and ad-hoc reports. For example, staff and users should be able to specify that they want to print only a portion of the index or a file label. Some of the common reports needed in a records management system are

1. a printout of the screen

2. alphabetic subject/file index

3. numeric code/file index

4. files reserved (BF) list

5. unavailable file notice

6. overdue file list

7. file recall notice

8. file charge-in/out history

9. file volume labels

10. volume open/close forms

11. closed file reports

12. files eligible for disposal

13. files/volumes destroyed

14. files/volumes transferred to archives

15. files/volumes transferred to inactive storage

16. statistics on actions performed

17. use statistics based both on individual users as well as on files and subject areas.

Activity 5

Identify one function in your records office or records centre to be automated. What are the necessary functional requirements or steps in the process?

IDENTIFYING TECHNICAL REQUIREMENTS

As shown above, there are many uses of automation for records and archives management. In order to select an appropriate automated system and ensure it works effectively, it is necessary to identify the functional requirements associated with these uses and then match these to the technical specifications of a computer or system. At times, it can be difficult to match the organisation's wishes for the computer with what is technically possible.

Ideally, an automated records management system will mirror the functions found in the manual records management process. This is why it is so important that the manual system be well structured and effective. During the automation process, each

of the six major areas of records management functions highlighted above (registry system, life cycle tracking, indexing, controlling file movements, user registration and reporting), must, in turn, be functionally analysed closely to determine all relevant data fields that apply to the function. These functions then matched against the technical specifications of the computer.

For example, the data fields and the detailed data input, the resulting computer process, and output on the computer screen description for the *charge-out* sub-activity of the controlling file movements function discussed above is outlined in the following table.

Input	Process	Output on Computer Screen
Control number (bar code) File number Volume number Provenance/series information Requester Requester contact information Organisational unit Contact information Charge-out date Control number File number Action(s) 1. Charge-out 2. Modify charge-out 3. Return of item	**1. Add charge-out information** Verify that all mandatory inputs have been satisfied Add the new information to the database System report on match between security clearance of person and security classification of the item --- **2. Modify charge-out information** Conduct search for files based on the information entered at the input stage Modify fields as required, for example requester, charge-out date, and so on --- **3. Delete charge-out information** Conduct search for files based on the information entered at the input stage Delete charge-out fields	Display message that the new information has been added to the database Display of security check results Display charge-out information relevant to files ----------------------------------- Display message that modifications have been accepted by the system Display charge-out information relevant to files ----------------------------------- Display message that information has been deleted from the system

Figure 4: Charge-out Activity

ACQUIRING SOFTWARE

After a thorough review of the functional requirements has been done and an initial outline of the technical requirements is complete, investigation of the technical requirements continues with the selection of a software application. Selecting software that facilitates different processes and activities for managing records is the essential building block in any automation project. If possible, software should be selected prior to the hardware, LANs, or WANs. When considering automating the management of records there are three options for acquiring software.

• The organisation can write a new programme for the records and archives institution.

• The organisation can purchase off-the-shelf or generic software and adapt it for records control purposes.

• The organisation can purchase specialised ARMS software, from a specialist supplier.

Writing a Software Application

Working with a programmer to design a customised system to fit a records and archives institution sounds attractive, at first. On the plus side, the software can be designed to fit work processes in the locality and unique features of the record-keeping systems can be programmed into the software. However, customised programmes written specifically for a records and archives institution are often difficult to support if the original programmer leaves. Careful and complete documentation must be retained on the system, but in many cases part of the code for most customised packages remains in the computer programmer's head. Other problems are that it can be difficult to articulate the records office's functional requirements to a programmer unfamiliar with its processes and not accustomed to thinking about records as evidence. Also, it is often difficult to exchange information with other systems if the records and archives institution employs its own computer program.

Adapting Existing Software

Another option is to adapt a generic word processing, spreadsheet, or relational database software for use in the records and archives institution. One benefit of this approach is that if the software selected is supported by the larger institution, ongoing support by individuals who understand how to maintain the software and who can trouble shoot problems is local. It may be less expensive than specially written or specialised software. Negative aspects are that the adaptation process involves setting up forms, fields and establishing guidelines for data entry in the newly designed software templates. This is a time consuming process, both in terms of the original design as well as in training staff to use the templates correctly. But, once completed, the adapted software can simulate many of the functions of specific records management software. Another downside is that the functional requirements of the records centre may be difficult to program into generic software.

Purchasing Specialised Software

Many ARMS software packages are available on the market today. The prices of these software packages are usually competitive but access to different types of software and technical support may be difficult in some regions. The benefit of specialised ARMS programs is that they are more likely to be designed to meet the functional requirements of records offices. However, support for specialised ARMS software can be a problem and the information technology departments within the organisation, if they exist, may be unwilling to provide assistance with such programs.

> *Selecting software that facilitates different processes and activities is essential to any automation project.*

SELECTING APPROPRIATE SOFTWARE

During the process of selecting software, it is prudent to attend product demonstrations and visit or correspond with other institutions using different types of software. Both a technical systems expert and a records management expert should attend any demonstrations, to help ensure the system chosen meets the technical and information management needs and business objectives of the organisation. It is often possible to obtain a demonstration copy of the software to view in the office, prior to making a decision. If there is any chance to attend trade shows, conferences and seminars, these venues are excellent for seeing new developments in computer technologies. It is also important to read brochures and publications containing reviews and articles on the subject and to talk to others in the records management

community and listen to their experiences. Finally, if the records and archives institution has some existing systems with electronic data, an added consideration will be the ease of migrating these data to the new system.

Criteria for Software Selection

When determining the criteria for choosing a particular software package, it is important to consider technical capabilities in light of the discussions above about functional requirements. It is also necessary to consider the general suitability of the software as well as the short-term and long-term costs associated with any application.

> *Do not select software to automate poorly functioning*
> *records processes.*

Remember, automation will not create better records centre operations if the underlying processes are inefficient. Do not select software to automate an underlying records process that is poorly designed. Some organisations try to standardise their computing environments and only support or allow offices to purchase specific software packages. This can drastically limit the organisation's choices but, as stated above can provide a workable solution if adapted well. The benefits of local support cannot be over emphasised. Remember that no matter how careful an organisation is in selecting software, it may never meet all of the agency's requirements and it will include elements that do not suit the organisation. It is wise to confirm that the vendor will provide customisation services after installation, so that necessary changes can be made. Remember, such services are rarely free.

Consider the following points.

1. Calculate the immediate and ongoing costs of the software, installation, maintenance, training and manuals. Remember to assess the potential costs for upgrades to computers, software or other elements, as well as other costs associated with maintaining and upgrading the software over time.

2. Determine compatibility of the software with any operating system, hardware platform and network already used or being purchased by the organisation. This comparison should include an examination of the memory, storage and processing requirements for the new software. Software manufacturers often list minimal and optimal requirements for memory and data processing. If existing computers only meet the minimal memory and data processing requirements for operating a piece of software, the software may not run as fast and may not support a high number of users. Ask the manufacturer about memory and processing needs for the software.

3. Determine the ability to import data from other systems (such as word processing or existing databases) to the new software.

4. Can data from the new software be exported to other programs to prepare presentations, reports, and so on.

5. Find out if the software is designed for stand-alone computers or if it can be networked or used on an Intranet or the Internet. Is the software compatible with any existing or proposed LANs or WANs within the organisation?

6. Find out what limitations may be in place in the software applications, such as a maximum numbers of simultaneous users, number of records that can be entered into the database or the volume of transactions that can be handled in a given period.

7. Identify the extent of the software's security features, language capabilities, communication capabilities and ability to handle bar codes and colours.

8. Identify the software interface. Does it have menu- or command-driven systems or work in a windows environment? Depending on what type of interface the records staff is familiar with, a new type of interface may necessitate additional training.

9. Identify other software features, such as the following: variable length fields, subject classification capabilities, indexing, retrieval, scheduling and disposal features; the capacity to add, modify and delete various levels of the subject classification system.

10. Identify the software's ability to handle adding information, modifying and deleting, verifying that a subject exists before a file can be added and what kind of audit trail it keeps to preserve the history of each file and subject, modified or deleted and so on.

11. Identify if the software tracks files, documents, volumes, boxes and so on, including charging in and out, identifying location, tracking transfers, maintaining an audit trail of charge-out actions and so on.

12. Are modifications to data presented in the system possible to accommodate the handling of records in geographically dispersed regions?

13. Clarify the software's ability to generate regular and ad-hoc reports from status and statistical reports to indexes, file recall notices and labels.

14. If the software is based on relational database concepts, the organisation should be able to enter data once and use it many times to eliminate duplicate keyboarding and the proliferation of files. Verify that the database software selected functions in this manner.

15. Determine if the software is able to handle authentication and provide selective access to performing actions (such as adding, deleting, editing existing records) and records based on security classification or if these functions must be handled on a higher level by the operating system or server.

16. Investigate how well the software interacts and/or shares data with other applications.

When selecting records management software, the best practice is to formulate a checklist based on the functional requirements, view the software and, with the vendor and the organisation's technical systems expert, review the checklist to ensure that the software meets the specified criteria. The various questions in this lesson could be used as the basis for interviews with representatives of the different software manufacturers. Additional issues to cover with the vendor are

- Are demonstrations available?

- Where are any current user sites?

- What installation services are available?

- What types of user documentation are available (in print as well as on line)?

- What training is available from the vendor?

- What types of help are available (online, telephone, and so on)?

- In which languages are documentation and training materials written?

Another source of information concerning software applications is current and former users of the software or system. Ask users what records functions the application performed and how well it carried out those functions. Ask them how easily staff learned to utilise the package and what implementation problems occurred. Users are a good source of information about how well the software meets vendor claims and what to expect from the application. Finally, enquire whether users would purchase the software again, given their experience.

A final source of information about candidate software applications. Get a trial version from the vendor. Trial versions can give you an insight into how difficult training may be, if the software meets the records office's functional requirements, and if existing data in electronic format can easily be imported into the new application. Keep notes of all interviews and tests.

The difficulty of transferring data from existing software applications to the new system can be minimal or it can be great. It is important to perform a trial migration between the old application and any system being considered, before purchasing the new system. Vendors, anxious to make a sale, may be very interested in helping a records facility solve data migration problems. After purchase, however, such assistance may be difficult to secure. If migration proves to be very difficult in all packages tested, rekeying in the information may be more efficient and cost effective.

Once a sufficient number of software packages have been seen and tested, the notes taken for each interview can be compared and an appropriate software package can be selected. This process will ensure that the organisation gets the best value, that all records management needs are met and that the records managers have done everything possible to avoid expensive mistakes.

SELECTING HARDWARE

When selecting hardware, it is important to begin with some general guidelines about computer needs. Regardless of the specific software to be used, all computers will have to have an adequate power supply, suitable physical space and a secure environment; otherwise, they will not operate efficiently or may not operate at all. After determining that the hardware will provide sufficient support for the software application, some of the organisational, records office or records centre related factors to consider when determining hardware needs include the following.

> *When selecting hardware, consider not only software requirements but also organisational, management and technical issues.*

Organisational Factors

Consider the following organisational issues.

1. What hardware standards are required by the organisation?

2. What operating system and hardware platform is in use in the organisation (for example, are IBM style personal computers with DOS or Windows operating systems in place, or are Apple/Macintosh computers with Apple/Mac operating systems in use)?

3. Does the organisation have stand-alone computers (computers that operate independently) or is there connectivity provided by a Local Area Network (LAN), Wide Area Network (WAN), or Intranet (computers that can communicate with each other and software programs do not have to be resident on the local computer in order to be used)? What protocols for connectivity (such as TCP/IP) need to be supported by the new system?

4. Will the current network connection and server(s) interface with and support new hardware?

5. Does the organisation have or need peripherals that need to interface with the new computers, such as printers, fax machines, computer modems, scanning equipment, bar coding devices, or optical disk systems?

6. Does the organisation employ security measures on the hardware or operating system level? This should be analysed both in terms of hackers or unauthorised persons who try to access the computers as well as in terms of protection against viruses. How often is anti-viral software updated?

7. Does the organisation have a regular schedule for backing up data and what method is used, full disk or mirror back up or selective back up of files that have changed since the last back up?

Management Issues

Consider the following administrative and management issues.

1. The equipment purchased should be compatible with any computer hardware that may already be in the records and archives institution and preferably within the organisation as a whole.

2. There should be an adequate source of power.

3. Precautions should be taken to ward against damage done by uneven current and surges; this can be done by purchasing surge protectors or transformers. Surge protectors offer some protection against powers surges. Surge protectors are rated in terms of joules. The higher the joules the better the protection. Records officers should investigate the minimum number of minimum number joules required in their country for adequate protection of computer equipment. Electrical current is often uneven and can cause damage without surging or spiking. Transformers even out the current and create a more even flow of electrical current.

4. There should be adequate office space available to house current and projected computer hardware and the necessary furniture.

5. Maintenance, repair and replacement needs should be considered, so that computers can be serviced efficiently.

6. Appropriate security or environmental controls should be in place to protect the equipment against theft and natural disasters.

7. A systematic plan for the purchase and maintenance of computer equipment should be developed and implemented.

In addition to understanding these general organisational and records-related needs, the records manager or archivist should know the answers to the following critical questions concerning the technical specifications, so that they can ensure computers chosen are adequate to the needs of the automation project.

A records office can select software that will satisfy most of its functional requirements only to find that the organisation or the existing hardware cannot meet the minimal standards for either operating the software or setting it up on a network in the manner required. These questions may need to be directed to internal information technology officials as well as to the manufacturer of the selected hardware. They will help a records office or records centre to select hardware that meets the specifications of the software application.

Technical Specifications

Consider the following technical issues.

1. The storage, processing and memory capacity of the computer hardware should meet and preferably exceed storage and memory requirements stated by the software manufacturer.

2. How are data processed? Does the system require 'batch' processing, where a large quantity of data is processed by the computer at one time, or is data processed at the time it is entered?

3. How much random access memory (RAM) is resident in the computer? Can memory be added?

4. How much video random access memory (VRAM) is resident in the computer? Can this be upgraded? This is important if a significant number of images and image manipulation will be part of the automation system.

5. What are the megahertz (MHz) of the computer? Megahertz (MHz) refers to the speed of the central processing unit (CPU) and determines the rate at which data can be transferred. Therefore, the more MHz the better.

6. Are the computers configured to support the types of peripheral devices needed for the management of records?

7. Can the types of peripheral devices you will need be attached to the computer systems?

8. What type of internal drive is used to manage the peripheral devices (Small Computer Systems Interface (SCSI) or Integrated Drive Electronics (IDE). This will affect the number of peripheral devices you can attach to the computer.

9. What type of input/output bus (I/O bus) is being used? The I/O bus is a combination of the hardware and wiring that allows data to be transferred between the internal and external peripheral devices (hard drive, ethernet card, scanner, monitor and printer) and the CPU. Bus structures have band widths that limit the maximum amount of information that can be sent to a fixed number of bit addresses per second. Along with MHz, the bus defines the rate of speed at which data can be transferred. I/O bus strength is measured by bits. 32 bit systems should be considered the minimum needed to transfer image information and a 64 bit system is preferable. I/O bus systems include:

MCA (Micro Channel Architecture) – 32 bit

EISA (Extended Industry Standard Architecture) – 32 bit

PCI (Peripheral Component Architecture) – 32 & 64 bit

Activity 8

Answer the questions in the section on technical specifications concerning computer needs in relation to the situation in your organisation.

ENVIRONMENTAL AND PRESERVATION REQUIREMENTS

By implementing an automated records management system, the records and archives institution will find that it has crossed into the world of electronic records management. The institution must think about how best to maintain and preserve its own electronic records. Preservation measures need to be developed so that the information maintained in an automated records system can be protected. If the institution cannot ensure the physical protection of the electronic records, it should think carefully about whether or not to establish an automated records programme.

> *For more information on caring for electronic records, see* Managing Electronic Records.

Preservation of electronic records extends far beyond preservation of the actual media on which the data is recorded. It encompasses both the actual media containing the information as well as the technology (hardware and software) holding the data. In dealing with electronic records, the problems of the physical media pale in comparison with the larger problem of technological obsolescence. However, preservation plans must include activities aimed at both preserving the physical media as well as avoiding technological obsolescence.

Preservation planning for automation begins with an assessment of the physical environment. This includes maintaining the best possible and most consistent environmental conditions in terms of temperature, relative humidity and cleanliness, ensuring proper security for the data and the equipment and guarding against known problems, such as power surges, by installing surge protectors and transformers. Care also needs to be taken not to place electronic records stored on magnetic media in places where the magnetic charge may be lost, such as near high voltage electrical equipment. These steps protect the system and the data in the present. However, preservation planning must also include ensuring the accessibility of the data in the future.

For example, conduct a preservation assessment but consider the need to develop procedures and policies for backing up data. Backing up data is an important preservation measure, but by itself this activity does not constitute a preservation plan. Depending on the frequency of backups, much data can still be lost in an emergency. Furthermore, backups stored onsite would also be destroyed if a catastrophe happened to the building. Therefore, copies of all vital records, including information in computerised form, should be stored in several locations outside the records office, records centre or archival institution.

The preservation assessment must also consider the inevitable reality that the computer technology used will eventually become obsolete. Data created on modern electronic record-keeping systems is often dependent on both the hardware and the software on which it was created. This is particularly true of relational databases where the data contains many internal relationships and dependencies. Preservation of the system needs to take into account the preservation of these relationships, not simply the preservation of the data elements. In fact, the authenticity and reliability of the data in automated systems depend on the preservation of the interdependencies of the data.

To overcome the problems of technological obsolescence, it may be necessary migrate data from one system to another.

> *Migration:* The transfer of data in electronic form from one hardware or software configuration or generation to another.

To succeed, migration must transfer not only the data (content), but also its structure, any pre-established relationships among data elements (context) and all functionalities of the system, such as the ability to display, retrieve, manipulate and use the electronic data. The context is often embedded in the system's metadata and therefore metadata as well as its functionalities must be transferred or migrated along with the actual data.

Migration is more difficult if the older system employs proprietary, rather than open, standards. Proprietary standards can contain secret codes and make the transfer of data and in particular the migration of metadata from successfully occurring. Migration should be considered by the project planning team that is preparing for a new ARMS. Selecting an ARMS that follows common usage rules and open

standards makes eventual migration of data, metadata and functionality easier.

For more information on migration, see Managing Electronic Records.

One new technique for accessing data from older electronic record-keeping systems currently under investigation is emulation. Emulation is a means for data recorded on one system to be read by other systems in the future. Emulation works by embedding devices called emulators into systems. The emulator contains all the information necessary for future hardware, operating systems, and applications to read the older data and use it in its original format. This option is still highly experimental. No current commercial software or ARMS currently include emulators.

Preservation measures need to be developed so that the information maintained in an automated records system can be protected.

Activity 9

If you have an existing computer system, how are you going to upgrade it? What costs would be involved?

VENDOR SELECTION AND RESPONSIBILITIES

Many organisations acquire new equipment by going through a competitive vendor selection or tendering process. This process can assist the records and archives institution to evaluate different products and compare and contrast their qualities and capacities. In order to begin this competitive process, the records and archives institution must have researched its own functional requirements as well as the organisation's technical capabilities and limits; the organisation should also have determined its project timeline and the process it will use for vendor evaluation.

Tender: An offer by a potential supplier to supply a specified product or service at a specified cost.

The invitation to tender documents all areas of requirements, fixes the form and content of the vendors' responses and determines the schedule for the response. Organisations may have strict guidelines that must be followed throughout the tendering process. The records and archives institution should be aware of these

guidelines early in the automation planning stages because the rules may have explicit timing requirements. If there are only vague guidelines, the records and archives institution may have to set up its own procedures in order to be fair with bidders.

One suggested process is to issue the invitation to tender and then hold a conference and invite potential vendors to the conference. Additional vendors may also request an invitation and they should also be encouraged to attend. This provides the records and archives institution with some indication of the level of interest in the overall project and some idea of the number of bidders. At the conference, the records and archives institution can outline the functional requirements that need to be met, discuss other needs that it would like to satisfy, present organisational limitations in terms of the computing infrastructure and discuss the evaluation procedures that will be used. The conference also provides an opportunity for the vendors to ask questions and for these to be answered in one place and at one time.

For many organisations, holding a conference will not be feasible. However, some process must be established to answer vendors' questions. It is best to require that all questions from vendors be received in writing by a given date. Then, questions can be compiled and answered in written format. The answers are then sent to all vendors who have expressed an interest in bidding. The identity of vendors is not revealed. This ensures that all vendors are provided with consistent information and provides for a fairer bid process.

A procedure must also be established to review proposals fairly. Criteria should be established based on how well the system meets the established goals and objectives of the organisation and the records office or records centre, technical requirements, on-going system support, and cost-competitiveness. For example, consider the example of the Erewhon National Archives in Lesson 1. The priority there was to standardise the descriptive system; user access was of only secondary importance. Therefore, proposals received that concentrated on user access would be rated below automation systems that prioritised increased control over records through a standardised descriptive system in the area of meeting the goals and objectives of the organisation.

Following is an outline of the major components of an invitation to tender.

1. Executive Summary

2. Background information

3. Goals and objectives of the automation project

4. Organisational and technological objectives

5. How the new automation system will interface with existing systems and processes

6. Guidelines for preparing & submitting

7. Procurement timetable (how specified, flow, completion date, rush order provisions)

8. Whether and under what circumstances subcontracting is allowable

9. Reporting

10. Billing

11. Policies of your organisation

12. Recommendations for key components, standards, process needs

13. Criteria by which the proposal will be evaluated

14. Assessment of organisational support

15. Discussion of risks

16. Technical Section

17. Definitions of terms or concepts that may be unique to vendors

18. Specifications, standards, and so on required

19. Management Section

20. Pricing Section

21. Requirements concerning timing and/or staging of the project.

Evaluation of the tender should be done according to pre-established criteria. The group tasked with making the purchasing recommendation should also decide how different criteria will be weighted. Criteria should include the contractor's previous experience with the work required, years in business, recommendations from other purchasers of the product, quality of work samples or the trial version of the software, the overall size of the business and audited financial statements in annual reports. Size and longevity in business are indicators of ongoing product support. If the committee is having a hard time making a final decision, it is not unreasonable to ask vendors to make presentations.

Once a vendor is selected, a contract will be issued. Many vendors have pre-drafted contracts. These must be read carefully to ensure that all the specifications outlined in the tender are included as well as any additional items agreed upon during any negotiations. Vendors are not responsible for supplying anything outside the terms of the contract, including items agreed upon orally in discussions.

At the time hardware and software is purchased, the records and archives institution will be offered a variety of options concerning maintenance and upgrades for the system. The types of ongoing contracts include: training of staff to use the system,

software user support, hardware repair, hardware set-up support and software customisation. These services can entail a significant outlay of funds and each option should be decided on an individual basis.

Staff training by the vendor can be worthwhile if a large percentage of the staff is a first-time user of the system. The vendor is able to explain the system clearly as well as answer individualised questions that may be unique to the environment. This service may not be necessary if the underlying software is used throughout the organisation and only the specific databases are unique to the records centre.

ARMS-specific software usually comes with a small amount of free help desk time. If the records centre staff is new to the system and no vendor staff training has been given, setting aside funds for additional vendor assistance is prudent.

Purchasing a service contract for the hardware will depend on the amount of internal support the records and archives institution gets from the internal information technology personnel. If the information technology department is over worked and cannot provide quick, effective assistance, a vendor service contract may be worthwhile and a means of keeping the automated records management system up and running. The downside of service contracts is that they are usually a fixed fee and one must pay the fee whether or not the services are used. Hardware manufacturers also provide some free assistance, particularly with setting up the hardware and getting peripherals properly interfaced with the hardware.

Customisation of software can be expensive. If major changes are needed, perhaps the underlying software selected was not the most appropriate. Also, large amounts of customisation can have the long-term support problems as custom software written specifically for a records and archives institution. Customisation can also introduce bugs and problems into the underlying software, so should be kept to a minimum.

If the project is very small, it may not be necessary to go through a full tendering process. However it is still important to draw up a set of criteria and measure vendors against that list.

Activity 10

What process is used in your organisation to solicit bids for supplies or equipment? Is this process used to purchase computer equipment? Write a brief description of the process followed. Then compare the process with the list of points in the outline for a tender. Is there any information on that list that your organisation does not capture? Why or why not?

AUTOMATED RECORDS MANAGEMENT SYSTEM (ARMS): TECHNOLOGY REQUIREMENTS CHECKLIST

The following checklist may be useful when investigating and selecting an automated records management system (ARMS).

1. What are the costs associated with the software?

- Stand-alone version $_____
- Network version $_____
- Installation costs $_____
- Customisation $_____
- Upgrades $_____
- Warranty $_____
- Maintenance $_____
- Hotline support $_____
- *Manuals:*
- Systems Staff $_____
- User $_____
- Training $_____ (per diem)
- Other $_____
  Total Cost   **$_____**

2. Are demonstrations available? If so, at the vendor's location, at the customer's site, elsewhere?

3. Are trial version available?

4. Who are the current users?

_____

_____

5.   Can data be imported into the software from other applications?

- Word processing
- Spreadsheet
- Other database management system
- Other ARMS
- Other_____

6.   Can data be exported from this application to other applications?

- Word processing
- Spreadsheet
- Other database management system
- Other ARMS
- Other_____

7.   What installation services are available?

- Convert existing data
- Data entry service

8.   What hardware is the software compatible with?

- Apple
- DEC Vax
- IBM-PC or compatibles
- Printers
- Other(s) _____

9.   What are the hardware costs?

- Computer
- Added memory
- RAM
- VRAM
- Added processors
- Ethernet card
- SCSI drive

10.   What are the memory requirements?

- Minimum memory requirement for workstation   _____
- Minimum memory requirement for software on server   _____
- Minimum memory requirement for database on server   _____

11.   What operating systems does the software use?

- DOS
- OS/2
- UNIX
- Other(s) _____

12.   What multi-user environment is supported?

- Novell
- 3 Com
- Banyan Vines
- Other(s) _____
- Limit to number of users _____

13.   How does the software interface with other systems?

- Accept ASCII data
- Convert to ASCII
- Accept EBSDIC
- CAR system
- Bar code
- Data import/export
- Fax import/export
- Electronic mail import/export
- Attachments method (for example, MIME)
- Optical disk system
- Scanner
- ODA/ODIF
- SGML
- Other(s) _____

14.   What is the user interface?

- Command-driven
- Menu-driven
- Graphical User Interface
- Other(s)_____

15.   What help is available?

- Internal information technology division
- Telephone help line to manufacturer
- Local representative of manufacturer
- Web-based support
- Help menu in program
- Tutorial on-line
- Manufacturer designed training program
- Error message guide

16.   What are the language features?

- English characters, screens, field labels, help messages, manuals, reports, training
- Other language characters, screens, field labels, help messages, manuals, reports, training

17.   What access controls are provided?

- Network authentication
- User profiles
- User name
- Alias
- Position
- Branch
- Division
- Address
- E-mail address
- Telephone
- Fax
- Access to functions

- Language
- Security clearance level
- Bar code
- Authority lists
- Notes
- Access control to the ARMS
- Login password
- Three attempts only
- Restriction by function
- Restriction by individuals or groups
- Restriction by security level
- Up to 5 levels of security

18. How does the software support indexing and retrieval?

- Full text on database fields
- Full text on documents
- Combined database fields
- Combined database fields and document text
- Keywords in subject fields
- Controlled vocabularies used in conjunction with the software
- Artificial intelligence (fuzzy logic)
- Boolean logic
- Proximity search
- Phrase search
- Range search
- Leading wild card
- Embedded wild card
- Trailing wild card
- Hypertext
- Stop word list possible in certain fields
- Edit stop word list
- Hit list displayed on screen
- Number of hits displayed at one time in a search result
- Ability to abandon search
- Edit search results

- Move to previous/next hits
- Go to detail screen from search results screen
- Save all or selected search results for later use
- Save routine searches for later use
- Sort search results numerically, alphabetically, alpha-numerically
- By any field

19.   What are the reporting capabilities?

- Audit trails
- Hardware and software errors
- Statistics
- Access history
- Unauthorised access attempts
- Dates of all accesses
- User names and contact information
- Type of retrieval/action taken
- Based on any data items
- In any order of fields
- Ability to print generated reports

SUMMARY

This lesson has outlined the issues to consider in the selection of software and hardware. This included

- analysing functional requirements

- identifying technical requirements

- environmental and preservation requirements

- vendor selection and responsibilities.

The major points discussed assessing how well the functional requirements of records operations map onto technical requirements of both software and hardware to make the automation system operate effectively. The lesson provided criteria involved with selecting appropriate software and hardware for an automated system, by positing sample questions for current users and vendors and providing a checklist of main points to consider. It also discussed environmental and data preservation requirements that need to be addressed in the selection process. Finally, the lesson ended with a discussion of the vendor selection process and ongoing vendor support issues.

STUDY QUESTIONS

1. What basic physical requirements must be in place when installing computer equipment in an organisation?

2. Why should an organisation assess the nature of computers already available before determining what new computer systems to install?

3. Explain each of the following tasks an automated records management system should be able to perform: maintaining file classification systems, indexing information, retrieving records, controlling the movement of files, managing the scheduling of records and generating reports.

4. Explain the benefits of automatic indexing using a computer.

5. How can a computer help track file movements?

6. What kinds of reports might an automated records system produce?

7. What general questions should be asked when determining what type of computer system to install?

8. What is a data base system?

9. How should the organisation assess the suitability of available software packages?

10. Name five criteria to be considered when selecting software.

11. Outline the key points to bear in mind when investigating software.

12. What are the benefits of piloting a trial version of a software application?

13. What is an invitation to tender?

14. What are the parts of a tender process?

15. What are the benefits of holding a conference in conjunction with the invitation to tender?

ACTIVITIES: COMMENTS

Activity 5

If you are automating the file request process, the steps in the process, or functional requirements would be receiving a request from the user, locating the file, marking the file out, sending it to the user, tracking the movement of the file, receiving it back into the records office, marking it back into the system, replacing it on the shelf or in the box.

Activity 6

Using the same example in the previous activity, the data to be input would be user name and department, file requested, date. When the file is returned the data to be input would be date returned.

The computer operations necessary would be searching for the file location and user on the system and creating one record linking the user to that file on that date.

The desired output on the computer screen would be fields that showed user name and department, file title and code and date of retrieval. The date returned field will be blank. When the file is returned the view on the computer screen will also show the date returned.

Activity 7

The sorts of questions you may wish to ask a user of the system are:

1. Why did they choose that particular system?

2. How many other systems did they look at and what were they?

3. How easy is the chosen system to use?

4. How much did it cost?

5. Were there any problems with installation?

6. How thorough was the training?

7. Did they have to buy any new equipment or did they use existing equipment?

8. Have there been any problems with the software since installation?

9. Would they recommend the vendors?

10. How long did the whole process of selection and installation take?

Activity 8

The information you need to answer the questions about technical specifications can be found by looking at your computer and the system manuals that came with it. If you cannot find some of the answers then ask the person who installed your computer, or contact the unit within your organisation that is responsible for IT.

Activity 9

Once you know the specification of your existing computer system you may find that you need to upgrade parts of it to run the software package. It may be possible to upgrade your existing equipment, for example increase the memory, install a new bigger hard disk, or install the latest operating system such as Windows 98. If, however, your existing system is very old you may have to purchase a new computer. You may have to upgrade peripherals such as printers, scanners and so on. Costs will include not just the equipment but also the cost of getting a professional to install it. It is also important to buy equipment that is more than sufficient for your needs. You do not want to have to upgrade again next year.

Activity 10

You will have to talk to the person responsible for procurement to find out what processes are used to solicit supplies or services in your organisation. If you do not have procurement procedures you will have to write them.

IMPLEMENTING AND MAINTAINING THE AUTOMATED RECORDS MANAGEMENT SYSTEMS

Once the automation programme has been planned, the hardware and software selected and purchased, it is time to install the equipment and software and implement the program or programs chosen. The installation of an automated system for managing records requires physical and procedural changes in a records and archives institution. It is up to the project team to plan for the transition in order to ensure that services are not disrupted any more than necessary.

At least one permanent staff member should be assigned as a systems administrator and, if possible, the organisation should require the vendor to provide a project director during the installation and training periods. The systems administrator is charged with the overall project management as well as with the development and maintenance of written system documentation. This lesson examines the steps involved in installing a system to accomplish records-related functions in a records office or records centre and maintaining the programme once operational. It discusses issues involved with

- setting up the system

- converting to the new automated system

- documenting the system

- training staff

- evaluating the system on installation and reviewing it periodically

- sustaining organisational support.

SETTING UP THE SYSTEM

> *If feasible, computer professionals from the organisation's information technology services should set up the computers.*

Physically setting up the hardware and installing the software can be complicated and time consuming. If at all feasible, computer professionals from the organisation's information technology support services should set up the computers. In setting up the system, the following tasks need to be done.

1. Identify the location(s) where the hardware is to be installed and ensure that there is an adequate power supply and sufficient and correctly positioned power points?

2. Hardware should be unpacked and the packing list and components should be checked to verify that the order was filled correctly.

3. Software should be checked to verify that it is the version ordered and runs on the right operating system.

4. The computer and peripherals should be set up and all software installed.

5. Each software package should be checked to make sure that it is installed correctly. Records staff will have to work closely with computer technicians at this point to ensure that the software is set up correctly, both in terms of its functionality and in terms of the security and authorisation options to be selected during set up.

6. The operation of all peripherals should be checked, as should the software that operates these devices.

7. If the computer is being networked, all connections to printers, the network (electronic mail, LANs, WANs, Intranets, or the Internet) should be established and checked.

Activity 11

Develop a plan for setting up the system in your organisation, including who is responsible for physically configuring the computers as well as who will ensure that all aspects of the new automated system is functional.

CONVERTING TO THE NEW SYSTEM

In many cases, the records office will be faced with two types of conversion: migrating data from another software application into the new automated system and converting data from manual systems into new automated systems for managing records. For instance, if the organisation had already started maintaining file title information in a spreadsheet application and has decided to convert this to a new relational database, the old data will need to be migrated to the new system. Similarly, if an archival institution maintained its card catalogue and indexes manually and decided to convert these to an electronic system, it would need to enter the data from the cards onto the computer manually. These two types of conversion require different strategies and present separate problems.

Migrating Data from Other Applications

The strategy employed to transfer data from an older automated system to a new system will depend on the amount of data to be transferred, the projected ease of transfer and the cost of rekeying versus other options for conversion. Whatever method is selected, careful checking of the converted data is required to ensure accuracy of the transfer and continued ability to use the data. Strategies for migration include

- directly transferring data from one application to another

- using a 'bridge' program

- writing a special computer program to facilitate conversion.

Direct transfer is always preferable, since it is usually the easiest method and ensures the least possible errors. But such a transfer may not always be possible, particularly if data is in an old application based on proprietary features rather than open standards that enable data to be read across applications and platforms. A platform is a the type of computer or operating system on which a software application runs. For example, some common platforms are Windows (PC), Macintosh, and Unix. While there is a growing amount of interoperability across platforms, there is usually some data loss when migrating between platforms. If cross-platform migration is necessary, data should be carefully checked after the migration to ascertain its continued reliability.

> *Platform*: The type of computer or operating system on which a software application runs. For example, some common platforms are PC (Windows), Macintosh, and Unix.

Bridge or conversion programs are used when transferring data from one database program to another. The person transferring data has to identify a field in the old application and then specify which field a piece of data will be inserted into in the new application. This process of aligning fields in the old and new applications

requires a significant amount of effort 'up front' to ensure that when data are automatically transferred from one application to the other they are consistently placed into the correct fields of the new application. This can be quite time consuming if the records are large and the fields are complex.

If an off-the-shelf conversion program does not work, a final alternative is to have a customised program written. As noted previously, computer programming is expensive and there is no guarantee that the results will be good.

Activity 12

If possible, identify an existing record-related activity in your organisation or in another organisation that is automated and discuss how you would migrate the data into a new database.

Entering Data from a Manual System

Converting data from a manual system involves data entry, a time-consuming task. The records office or records centre will be working with both manual and automated systems for some time after the hardware and software is in place. A good strategy is to choose a 'close' date, at which time the old manual system is no longer updated and the automated system is used. This date will be some days or weeks after the new system has been installed. Staff will then enter information into the computer when working with new materials transferred to the records and archives institution after the date chosen. All earlier information will be maintained in the manual system and staff can slowly convert that data as time allows, by keying it into the computer and carefully tracking which information has been transferred. This process is known as 'retrospective conversion'.

Data entry is a time-consuming task.

All retrospective conversion efforts uncover data errors and data omissions in the manual system. These problems should be addressed during the retrospective conversion process. Although it slows the speed of conversion down, it provides greater control over records in the long run. Retrospective conversion should be done systematically and according to a predetermined plan. For example, information concerning the most heavily used records may be entered into the system first, in order to make retrieval more efficient by both users and the records office staff. The retrospective conversion plan may also be based on office hierarchy, with records from the highest administrative offices entered into the system before offices with lesser authority. Politics may also dictate conversion order. If the automation project had a champion in the Treasury, for instance, the records of that agency may be made accessible using the new system during the initial stages. Thus information is readily

available to a department or agency that will likely make good use of it.

Accurate data entry is one of the key factors that determine if an automation project was successful or not. Therefore, data entry should not just be considered typing information into the computer; it is important to establish formal procedures and standards, provide training and maintain quality control.

Standards for data entry are discussed in detail in the next lesson.

Quality control is essential in any data entry operation. Functional requirements such as search, retrieval and indexing are based on the availability of accurate and error-free data. A quality control programme should be established prior to implementation so that it is ready to go when data entry commences. During implementation, supervisory staff should frequently and carefully check information entered to ensure that staff are using fields correctly and entering error-free data. During the first three to six months of operation, quality control checks should be frequent and should check large percentages of the data entered. When staff are fully trained and the system has been operational for six or more months, quality control checks can become less frequent and may be based on some proportion of the data entered.

Activity 13

Based on your organisation, design a retrospective conversion plan. Identify a process to be automated and outline your plan for entering data into the new system. Provide some rationale for your decisions.

DOCUMENTING THE SYSTEM

Documentation is a critical factor in using and maintaining any automated system for handling records responsibilities. Three types of documentation are essential. Two types – the user manual and systems administration manual – are created by the records and archives institution; the third – metadata – is automatically generated by the ARMS. However, the metadata information generated can vary depending on how the system is set up and what types of data the records and archives institution decides to collect.

Documentation is a critical factor in using and maintaining any automated system.

System Administration Manual

A systems administration manual is important to ensure optimal functioning of the system. The systems administration manual should describes the requirements, capabilities, limitations, design, operation, and maintenance of the automated system. Such a manual will assist information technology or records personnel fix the system should problems occur. This manual is also a source of documentation on the system and should contain information concerning the installation, configuration of the hardware, operating system and all software applications. Should difficulties arise, this information may be key in helping to identify conflicts between peripheral devices or software loaded onto the system. Major sections of the systems administration manual are

- hardware: types, brand names, model numbers, and dates of installation of all hardware components of the system.

- Software: version numbers, implementation dates, and backup copies of all systems software and applications programs.

- Maintenance: an equipment maintenance log should be kept to document the occurrence of regular maintenance.

Additions and deletions of peripheral devices and software can affect the set up of the system and can cause conflicts in system operation. Care should be taken to inventory all hardware and note its technical specifications. If something is added to the basic computer, such as memory or an ethernet card, this information should be included in the inventory.

Documentation should also include a list of users and a list of anyone who has the authority to add, edit, or delete records from the system. This latter list will undoubtedly be a list of staff who must 'authenticate' themselves to the system prior to completing any operations. Systems administration also include printing out regular activity reports in order to detect unauthorised access and unusual activity in the system.

The system administration manuals should also cover activities that ensure the ongoing functioning and maintenance of the system. These include such actions as periodic system integrity checks, regular backups of data and installation of up-to-date virus detection programs.

User Manual

It is the responsibility of the records office or records centre administration to maintain written documentation of system procedures or Standard Operating Procedures or SOPs in a user manual. The user manual should contain a written record of procedures, operating systems, decisions, changes and updates made to the system. The manual should be drafted in a clear and complete fashion with as many references to specific tasks as possible.

Documentation of procedures includes descriptions of methods for entering and revising data, updating or expunging records, indexing techniques, backup procedures for disks, tapes, microfilm and so on, procedures for testing the integrity of records, and security safeguards to prevent tampering and unauthorised access. The user manual should encompass all aspects of any automated systems used to manage records, from turning on the computer to data entry. In essence, the user manual should take records personnel through all the procedures performed on the system in a clear step-by-step outline. Sections of the user manual should include the following:

- introduction to the computing environment: whether the automated system is a client-server application run over a network or whether it runs on a stand-alone desktop computer and so on

- instructions on how to turn on the computer and monitor

- policies regarding computer usage, such as personal use of the computer

- guidelines on logging on to the computer and the automated system for managing records

- overview of the automated system for managing records and its functions

- how to access different applications (automated system for managing records, word processing, Internet)

- how to access each function within the automated system for managing records and the purpose and scope of that function

- how to apply file and folder naming conventions

- how to operate peripherals, such as printers, scanners and CD ROMs and how these interface with the automated system for managing records

- procedures for saving and backing up data.

Metadata

Metadata is data about data.

In addition to maintaining system documentation, automated records management systems should also generate and use their own documentation. System generated documentation is one type of metadata. Other types of metadata rely on information entered into the system by the users. Whatever its origin, metadata is an important element in any system used to manage records where the object is to preserve the authenticity and integrity of the data and to retain context with which to analyse the actual records. Metadata can be employed to increase accessibility and regulate use automatically. In summary, if used well, metadata can increase the efficiencies and cost-savings of the system by automatically performing some operations formerly done manually by staff and providing for the reuse of authentic information.

> ***Metadata:*** The information about a record that explains the technical and administrative processes used to create, manipulate, use and store that record.

Metadata relates to an automated system or an individual information object and documents how it behaves, its function and use, its relationship to other information objects and how it should be managed. Metadata can refer to the codes used to indicate **bold** or *italics*. Although we only see the actual word in **bold**, the computer is able to read codes that are embedded around the word that indicate that the word **bold** and only the word **bold** should be highlighted.

At the other extreme, metadata can be used for administrative purposes and help to identify and document the scope, authenticity, and integrity of a record in an electronic system. Following is an example of selected types of information that would be collected for a database entry concerning the records of the Treasury Department of the Erewhon National Archives. In the ensuing paragraphs, the different types of metadata that might be associated with different fields in this record will be discussed. Note that some metadata are publically viewable, such as descriptive or index terms. Other types of metadata that track modifications and use are only visible to the system administrator.

> *For more information on metadata, see* Managing Electronic Records.

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┌─────────────────────────────────────────────────────────────┐
│                                                               │
│                  Erewhon National Archives                    │
│                                                               │
│ Control number:                                               │
│                                                               │
│ Record creation/Modification dates:                           │
│                                                               │
│ Provenance: Treasury Department                               │
│                                                               │
│ Title: Records                                                │
│                                                               │
│ Dates: 1946 – 1988                                            │
│                                                               │
│ Extent (total): 168 linear metres                             │
│                                                               │
│ Format(s): Paper, photographs.                                │
│                                                               │
│ Contact Person: Name                                          │
│                     Address                                   │
│                     Telephone/Fax                             │
│                     Email                                     │
│                                                               │
│ Records transferred: 5/18/72                                  │
│                     Extent: 68 linear metres                  │
│                     Contents Note                             │
│                     Inventory list of boxes                   │
│                     Security classification                   │
│                                                               │
│ Records transferred: 8/18/92                                  │
│                     Extent: 100 linear metres                 │
│                     Contents Note                             │
│                     Inventory list of boxes                   │
│                     Security classification                   │
│                                                               │
│ Index terms (controlled):                                     │
│                                                               │
│ Index terms (uncontrolled):                                   │
│                                                               │
│ Links to related records:                                     │
│                                                               │
│ Location:                                                     │
│                                                               │
└─────────────────────────────────────────────────────────────┘
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Metadata can be created by a number of different actors. The system itself creates metadata. In the above example, the control number and the creation and modification dates for the record would be system-generated metadata. Along with these metadata, the system would also track the identification of the person entering

or editing the information through metadata not seen in this public view. The creator of this record would also create metadata during data entry. These metadata might include the descriptive index terms. Computing bureau staff acting as system administrators for an organisation will create metadata during installation and set-up of the system.

These metadata would control such fields as the index terms (controlled) field and only allow certain terms to be included in this field. Users may even create metadata if they have the need to revise documents or manipulate data.

Given the abundance of metadata that is created by a system, it is only natural to think about how this could be used in the daily operation and long-term planning processes in the records repository. The categories of metadata include: administrative, descriptive, structural and technical.

Administrative Metadata

Administrative metadata is used in managing and administering information resources. It is related to the management of a record in a particular server or repository. In the above example, some types of information considered administrative metadata are:

- date of creation

- date of last modification

- record creator's or modifier's identity.

The first two types of information would be visible to all viewing the record. The final piece of information would only be available to the system administrator. Another type of metadata only available to the system administrator would be administrative metadata tracing the evolution of records over time by tracking the different versions or metadata regulating use.

For example, administrative metadata could incorporate security classification information and match this to users. For example, when a user completed a search and retrieved the Treasury Department Records, metadata would match the user's security classification to the security classification of each records transfer to determine if the user had the appropriate classification to see a full listing of the records transferred in each of the two accessions.

Descriptive Metadata

Descriptive metadata describes or identifies information. This is the most commonly used type of metadata. It allows some fields to be programmed only to accept data in a certain prescribed format. For example it could regulate the form of the date to permit 10/02/32 as opposed to 10/2/1932 or 10 February 1932, in fields such as the records transfer date field.

Descriptive metadata would also govern fields such as the index terms. If a controlled vocabulary is being employed, as at the Erewhon National Archives, metadata would only allow certain terms to be entered into the index terms (controlled) field.

Technical Metadata

Technical metadata relates to the hardware, operating system and software set-up in a given system installation. It also includes authentication and security data, such as encryption key and password use. Technical metadata is also invisible to the general user. However, in order to log onto the system to create the computer records for the Treasury Department Records in the Erewhon National Archives, the records staff member would have had to log onto the system by entering a unique username and password.

Structural Metadata

Structural metadata defines the logical components of complex or compound records and how to access those components, for example a table of contents for a report. Structurall metadata does not apply in this example, but is particularly important for access to digitised documents, as will be discussed in Chapter 5.

Activity 14

If you were using an automated file classification system, what fields would you have and what would they look like?

TRAINING STAFF

The staff training programme needs to be carefully planned.

The content, depth and pace of staff training will depend on the amount of experience records personnel have already had with computers. There may be great variability of computer expertise among staff members. If computers are being introduced to the records office along with the new ARMS, in all likelihood the staff will have to be instructed in basic computer skills as well as on the particular automated records management system selected. Therefore, the staff training programme needs to be carefully outlined. Making sure that appropriate computer skills are offered should be a concern of the automation project team, although development of the actual lesson plans and teaching the courses is usually delegated to people with expertise in those areas.

The first step in the training programme is to assess the computer knowledge of staff members. This can be done through a short survey, ideally conducted prior to implementation of the system so that staff who require basic computer skills can receive instruction before the system is installed. This is particularly important in identifying staff who have never even handled a typewriter and thus have no

keyboarding skills whatsoever. Thus, all records personnel can be trained on the actual system at one time, since they will all have the basic skills required. This ability to train everyone at one time can be important if special arrangements have been made with the vendor itself to offer basic training on the system.

The survey may demonstrate that the members of the staff have divergent computer skills: some staff may never have turned on a computer, others may have knowledge of word processing, while still others may have extensive expertise in a variety of applications, including some records management software. In this case, staff can be divided into training sessions that address issues at different levels. For example, those who have never operated a computer will be taught such skills as keyboarding, mouse operations and word processing.

In planning the training programme, the records and archives institution need not develop and teach all computer skills itself, the larger organisation, local colleges and business education programmes may also offer established programmes of which the records and archives institution can take advantage. This frees the records and archives institution to concentrate its training on the automated records management system.

In designing a training programme, the records and archives institution should also remember that individuals in the agency have different responsibilities and duties. Staff members will require different levels and types of computer skills to complete their jobs. For example, a secretarial job may solely entail data entry, therefore training for that job would focus on keyboarding (accuracy of data entry) and in understanding the rules for entering data into each field. A records analyst may do less data entry but may be more involved in creating specialised indexes, developing search strategies and interpreting retrieval results for users. These activities would require a much more in-depth understanding of how the software application works and the concepts behind the different functions.

A computer training programme needs to address more than just the technological issues. Implementation of a computer system can raise significant change management issues as well as challenge staff expectations of their roles and responsibilities. For example, senior managers need to know how to use the computers just as much as secretaries, therefore these divergent staff members may both need to learn basic keyboarding. Furthermore, training needs to address unrest caused by fear of the computer and job insecurity by those who are new users. The curriculum should also address the issues of computer ethics and workplace computer policies.

Activity 15

Does your organisation have access to people with expertise in computerisation? Could these people teach workshops or sessions on computerisation? If not, what steps would you take to identify people within the public or the private sector who could teach computer skills to staff in the organisation?

EVALUATING THE AUTOMATION SYSTEM

Evaluation is a key element in the success of any automation programme. Different types of evaluation can be adapted to the specific needs of an organisation in order to monitor the system's implementation.

In order to follow and assess progress, it is useful to have collected base line data from the site prior to the implementation. In the records centre setting, these data might include numbers of records processed in a month, number of requests for information, time spent searching manual systems for information, time spent indexing records, linear or cubic feet of records transferred to the records office, average time to fulfil a reference query. These variables are then used to compare with data collected after the implementation of an automated records management system.

In conducting an evaluation, it must be clear what is being evaluated. For example, is the focus on the system or on the performance of records staff? Another decision to make is just who will be the evaluators. Will they include records personnel as well as users? Given the politics that can be involved with choosing automated systems, as well as the importance of strong co-operation and technical co-ordination throughout the organisation, the broadest possible evaluation of any new system should be done. This broad analysis will ensure that records office staff, colleagues in other departments and outside users have an opportunity to express their thoughts.

Evaluation is critical to the success of automation.

There are two types of evaluation, formative evaluation and summative evaluation. A formative evaluation is a type of evaluation done during a change process, such as the introduction of new computers into one or more records management processes. A summative evaluation is a type of evaluation done after the implementation of some change, such as a new automated system. These can be done individually, however, some combination of the two is often used to ensure the best possible results.

Formative evaluation is done on an ongoing basis throughout a project. Evaluators then systematically feed their analyses back to the project management team. This has been proven to be an effective method of evaluating new technologies. When used in the development of new software applications, the type of formative evaluation is called user-centred design and has proven to be very effective in introducing automation. This approach permits changes and corrective measures to be taken immediately as problems are encountered and to monitor on an ongoing basis whether organisational needs and objectives are being met.

Since formative evaluation is done during the project, it is sometimes difficult to analyse responses because a certain function that is desired is not yet implemented or small problems become blown out of proportion if a formative evaluation is taking place at that point. Formative evaluation is done using a mix of methods including observations, interviews, surveys and transaction logs of users operating the software.

At the development stage of a software package, observations are particularly useful in understanding reactions to the software and in seeing where problems arise.

Summative evaluation is done at the end of a project. This is helpful because it is completed after an entire system is fully functional and running. Thus, the evaluation is of a fully operational system. Summative evaluations also take advantage of observations, interviews, surveys and transaction logs of users operating the software. However, with summative evaluation there is little chance that the evaluation will influence the overall design, set up, or implementation of the system, the way a formative evaluation does.

If an evaluation is focusing on users, appropriate elements to measure might include users' overall understanding of different views, retrieval success and familiarity with searching. If the evaluation focuses on records personnel, the evaluation may focus on ease of data entry, if all the right information is displayed in each view and response time of the system during heavy use times.

Activity 16

Write down at least four questions you would like answered in an evaluation, whether formative or summative.

Reviewing the System Periodically

Technology evolves rapidly. Very shortly after implementing any system, staff will note new needs or identify ways to alter the system to address those needs. Some possible changes may require alterations to the overall set up of the system. Others changes may require additional hardware or software purchases. As with the initial development of requirements, the possible changes need to be analysed and prioritised into 'required,' 'very beneficial,' and 'would be nice' items.

All systems, manual or automated, require periodic evaluation and review. Evaluation is not something that is done only during system development or just after implementation. Evaluations should be conducted on at least a yearly basis to ensure that the system still meets the business objectives of the records and archives institution as well as the parent organisation. After a system has been in place for some time, it is useful to evaluate its benefits and drawbacks, because by then all users will have had a chance to familiarise themselves with the system and will be more aware of its positive and negative features. These evaluations can also provide an opportunity to see how well users understand the functionalities of the system. Evaluations may also indicate where additional user training or system documentation is needed.

> *All systems, manual or automated, should be reviewed periodically.*

Different evaluation processes will have to be used for records staff than for other staff or for external users. If the organisation is large, only some staff will be involved in the evaluation. However, evaluators should ensure that all units in the parent organisation are represented in the evaluation and that both users and non-users of the system are given a chance to comment on the system. Understanding why people do not use the system can be very instrumental in prioritising upgrades and determining design changes.

Evaluation can be done internally by records office staff. Alternatively, a consultant can be hired to perform the evaluation, analyse the data and create a report. This is an added expense, but if no member of the records and archives institution staff is skilled in evaluation methods and analysis, hiring a consultant can yield better results. An outside consultant can also add credence and help to leverage system needs previously articulated by records office staff to senior officials in the organisation. Sometimes, organisational authorities listen more to outside consultants than to internal staff members.

Once a system is set up, even minor changes can have cascading effect throughout a records management system. If an evaluation recommends changes, these should be considered carefully before they are undertaken. They should be vetted through a committee that investigates the changes and discusses the issues with users and managers. At the end of these discussions, it may be decided to pay for the enhancements through the vendor or another computer program; wait until a new version of the software comes out; or change procedures to match the computer constraints.

Regular monitoring and periodic evaluation is needed to make sure that the ARMS system

- is current

- is in line with the latest technology

- meets user and records staff needs

- meets legislated and policy requirements

- is essential to the ongoing success and effectiveness of the organisation's ARMS.

SUSTAINING ORGANISATIONAL SUPPORT

Support for all automated systems is needed long after the automation selection and implementation project is over. The implementation process can be difficult, and problems can arise during the installation process. Organisational support is needed to encourage staff to work through the problems and bear with some inconveniences during the initial months of operation in anticipation of greater benefits in the future.

Users may also be accustomed to the manual system and initially be reluctant to change. The records and archives institution may want to develop some public relations materials for colleagues in other departments, explaining the goals and objectives of the new system and the potential for better supporting their own business objectives. Some users may demand that the records and archives institution maintain dual systems: manual and automated. This is not possible and would negate some of the time savings and efficiencies of the automated system. Records staff should ensure that officials high up in the organisation or government are committed to the change to an automated system.

SUMMARY

Lesson 3 has outlined installation and implementation considerations to be taken into account when introducing any new automated system into the records office or records centre. Issues include

- setting up the system

- converting to the new automated system

- documenting the system

- training staff

- evaluating the system on installation and reviewing it periodically

- sustaining organisational support.

Setting up the system should be done systematically to avoid physical and procedural disruptions. Conversion from one system to another entails migration or retrospective conversion. Both of these processes are time consuming and require intensive planning 'up front' before the process begins to ensure that data is consistently and accurately transferred between systems. System and user documentation is an essential component of organisational memory.

Of particular note is the use of metadata in order to better administer the system as well as the records contained the new automated system. Staff training and orientation to the new system is a major factor in its successful implementation. Many problems can be anticipated and perhaps even forestalled if an appropriate training programme is implemented along with the new system. System evaluation is a key component in any automation programme. This not only assists in developing the current system, but also provides data that can be used in future assessments leading to the planning for other automation projects. Finally, sustaining organisational support through the implementation stage and beyond is crucial for the continued development of an automation programme.

STUDY QUESTIONS

1. What are three important things to consider during system set-up?

2. Name one type option for data migration and discuss its benefits and drawbacks.

3. Name three strategies for retrospective conversion.

4. What types of manuals are needed to assist in the use and administration of an ARMS.

5. Name three elements required in a user manual.

6. Name three elements in a systems administration manual.

7. What is the purpose of a summative evaluation?

8. What is the purpose of a formative evaluation?

9. Why is organisational support important?

ACTIVITIES: COMMENTS

Activity 11

Your plan should include unpacking, locating and setting up the computer equipment. It is important to have enough space for the equipment. Workspaces should be set up beforehand. You will want representatives from your organisation and the computer suppliers to be present. Suppliers usually help to set up the equipment free of charge, but make sure they do. Do not assume they will do it or that it will be free. If the system is being networked, who is putting in the cabling etc and who is responsible for making sure the computer equipment is attached to the network and working correctly.

The software will have to be loaded onto the system once it has been set up. The system supplier will do this, but make sure you know how much it will cost. Depending on how many users there are, the software may be quite complicated to set up. How long will this take. Who will test it.

When the whole system has been set up, it is important that someone thoroughly tests the whole thing to make sure that hardware and software interact correctly. This should be done by suppliers and representatives from the organisation.

Questions to ask in this activity are who, how long and how much?

Activity 12

For example, if user registration was automated you would have to identify the fields in the old system (name, title, department etc) and map them onto appropriate fields in the new system. Is anything missing in the new system, or does the new system have more fields than the old. You will need to find out if your existing system has an export function, and if so is there a choice of export formats. If so you need to know what format the new system will accept for a successful import of the data. Many software packages have automatic import functions available.

If the export/import function is not automatic then you may have to ask an IT expert to write a special program for you.

Activity 13

If, for example, you were entering details about files into a new database, you might decide to enter details about all new files created into the database from a particular date, the first of the month for example. For an initial period it will probably be wise to continue using your existing system along side the new computer system. This might seem like a lot of work, but if you have problems with the new system you will have a fall back position.

Once you are happy with inputting data about new files into the system you can design a retrospective conversion plan. You need to know how long it takes to put information about a file into the new automated system. Then you will know how

many files can be processed in one hour. Armed with this knowledge it is possible to calculate how long it will take to input data about all your existing files into the system. The length of time may be prohibitive. You may find, for example, that it takes 12 months. In this case you have to prioritise the files. For example you may decide to input details of files used within the last six months. When they have been processed you can input details about files used between six and twelve months ago and so on. Alternatively you could input details about the files based on their reference codes, working through them numerically or alphabetically. You may decide not to input details of certain files, for example if they are more than two years old. Information about these will be kept in the old system.

When you are happy that the new automated system is working well, and that back ups are happening regularly, you can stop using the old system. Do not run the systems parallel to each other for too long.

Activity 14

You might find the following automated classification system for current files:

Field	Descriptive metadata
Title	Text
Series	Text from controlled list of series
Reference	Alpha numeric: AAA/999/999/999
Date opened	DD/MMM/YYYY
Date closed	DD/MMM/YYYY
Part number	Numeric field with 2 digits: 01, 02, 03 etc
Key words	Text from controlled list of key words

Activity 15

The archives of records and archives institution may have people with computer expertise. Otherwise see whether there is a special unit within the civil service that can assist. You may have to seek expertise from the private sector. There are many companies who can provide training in different aspects of computerisation. Ask colleagues with computer knowledge whether they can recommend any one.

Activity 16

You should always ask question that can be easily measured. Questions you may wish to ask in an evaluation are:

Is the system easy to use?

Is the implementation running to schedule?

Is the retrospective conversion running to schedule?

Has the retrieval time for records improved?

DEVELOPING STANDARDS AND PROCEDURES FOR DATA ENTRY

Before entering data into any automated records management system, it is critical to develop standards for data entry, including standardised data entry forms, procedures for entering data and guidelines for acceptable content. Establishing standards and conventions will help ensure consistency throughout the program. Consistency is also essential for other operations, such as searching and retrieval.

This lesson discusses three levels of standards needed in the development and implementation of an ARMS and the creation of data entry rules:

- data structure standards govern the overall template or schema into which data are entered as well as the structure of the internal relationships among records in a database and among fields within each record

- data content standards govern the selection and formulation of certain data elements in selected fields

- data value standards prescribe that specific sources for terminology must be employed when entering data in selected fields requiring a controlled vocabulary.

The value and purpose of these three levels of standards will be outlined, examples will be given and information will be provided about how these standards relate to the ongoing international efforts to standardise work in records and archives management. Also, general rules for data entry will be outlined and examples of these rules provided. General rules are important for consistency in data entry and future retrieval of information.

STANDARD DATA STRUCTURES

Data structure: A scheme for organising related pieces of information. The basic types of structures include: files, lists, arrays, records, trees, tables. Each of these basic structures has many variations and allows different operations to be performed on the data.

A data structure refers to the overall design for records in a database, such as the fields contained in a certain view and the configuration of fields and subfields for data entry. The data structure should present a uniform format to facilitate information exchange. Software applications such as records management software contain pre-established data structures or sets of fields into which data are entered. But data structures can be implemented using different types of software, from relational databases to word processing. Of course, a records and archives institution will reap more benefits in terms of search and retrieval and reporting when a data structure is embodied within a relational database.

A records office or records centre needs to develop a number of data structures to satisfy the requirements outlined in Lesson 2. These fields in any specific data structure would comprise the different views of data possible in relational databases, also discussed in Lesson 2. Some of the data structures required include a data structure for records series, a data structure for records inventories and a data structure for an automated registry data structure. These will be considered below as examples of data structures.

> *A records and archives institution needs to develop a number of data structures.*

Records Series Data Structure

The records series is the primary level of arrangement and control of records. As noted in *Organising and Controlling Current Records*, a records series brings together records that are linked by function, activity, form, or have some relationship arising from a common creation, receipt, or use. As a result, the data structure developed to support administrative and descriptive information about a record series is a key data structure. Fields in a data structure representing a records series might include

- a unique identifier

- provenance / creating authority (ministry and sub-office)

- title

- level of description (in this case a series)

- inclusive dates of the records

- extent

- physical form

- administrative history or description of the function that generated the records

- contents note

- index terms

- location

- links to related records series (such as predecessor or subsequent series).

Automated Registry Data Structure

An automated correspondence register would contain all the data fields present in an effective and efficient manual register. These fields include:

- a unique identifier

- date of registration

- name of document

- indication of content

- author

- sender

- recipient

- physical form

- means of transmission

- links to related records.

> *See* Organising and Controlling Current Records *for more information on registers.*

From these two examples of data structures, it can be seen that there are both unique and overlapping data fields in each structure. In a relational database, the overlapping fields would be shared in all views. In other words, certain core data are shared by different functions within one database system.

In this way, basic information about individual records or series, such as provenance, date, location, and so on, can be entered once and then utilised as needed. Currently, all records offices and centres are using data structures, even if the forms used are not referred to in this manner. Prior to automation, these data entry forms should be carefully examined as part of the business systems analysis described in chapter 1 to ensure that all the necessary information is being collected and to inform the creation of new data structures in the automated environment.

Activity 17

Define the data structure for the process of tracking records. What information would need to be captured?

Established Data Structures for Archival Materials

General International Standard Archival Description – ISAD(G)

The General International Standard Archival Description, familiarly known as ISAD(G), developed under the auspices of the International Council on Archives (ICA), provides guidance on developing data structures for archival records. ISAD(G) outlines a variety of data elements that can be used to formulate a sound data structure for managing descriptive information concerning archival records. More importantly, ISAD(G) dictates that certain data elements as well as a minimal number of fields are required in any archival data structure. These fields are

- a reference code

- title

- dates of creation of the material in the unit of description (the unit of description will be determined by the level of description, below)

- level of description (for example, series, sub-series, file, item)

- extent of the unit of description (physical extent as well as type of material; for example, 45 linear metres).

Note that all of these elements appear in the records series example above.

In addition, ISAD(G) provides a long list of optional elements for use in archival description. These are divided into three areas: content and context, conditions of access and use, allied materials, and note elements. An outline of these follows

CONTENT AND CONTEXT AREA

- administrative/biographical history

- dates of accumulation of the unit of description

- custodial history

- immediate source of acquisition

- legal status

- appraisal, destruction and scheduling information

- accruals

- system of arrangement

- scope and content note/abstract.

- conditions of access and use

- language

- physical characteristics

- access conditions

- copyright/terms governing reproduction

- finding aids.

ALLIED MATERIALS

- location of originals

- existence of copies

- related units of description

- associated material

- publication note.

- note area

- note.

Machine-readable Cataloging (MARC)

Primarily in the United States, one type of data structure for archival materials is the Machine Readable Cataloguing (MARC) format. MARC standardises what information is recorded in what order. The MARC format establishes a structure of fields and subfields to capture descriptive information on archival records. In the MARC format, fields are designated by numerical tags as well as named. For example, the tag numbered '110' refers to the main entry or creating office field. Although there are many MARC fields, a minimal MARC record requires only a few fields, such as main entry, title, date of the materials, location and extent.

The MARC format itself is a data structure; not hardware, an operating system or software. It is implemented in different software packages and in different hardware configurations. MARC is incorporated into desktop applications that run on individual computers or networks. It runs within larger bibliographic systems, particularly in libraries and it is implemented in bibliographic networks. Each software package, system and network implements the MARC format differently, therefore if an organisation plans to use MARC for describing archival collections, it is important to consider which type of system will be used. The type of system may affect how the data content and data value standards discussed below are used.

MARC is used to capture summary descriptive information on archival holdings. It is not intended to recreate entire finding aids in an online format. Encoded Archival Description (EAD), discussed below, represents finding aids online. The abbreviated descriptions of records represented in the MARC format do and will have a continued place in archival description. MARC records are a good point of entry into collections for researchers and should help a researcher decide if he or she wants more information and to move on to more in-depth information on the collection in the finding aid. MARC records are also a good means for exchanging standardised data about archival records between repositories.

Field Number	Field Name	Data Content of Field
040	(Agency creating record)	Erewhon National Archives
110	(Creating Office)	Treasury Department
245	(Title)	Treasury Department Records, 1946-1989
351	(Arrangement)	Chronological
545	(Administrative History)	After independence, the Treasury Department was initially called the Ministry of Budget and Accounting and had limited governmental responsibilities for the control of currency and managing the national budget. In 1960, the name was changed to the current Treasury Department and the functions of the Department were expanded to include taxation.
520	(Content)	The records cover the initial creation and work of the Ministry of Budget and Accounting and the formation of the Treasury Department, including the establishment of a national income tax.
610	(Additional Creators)	Ministry of Budget and Accounting
650	(Subject/Index Terms)	Budget

Figure 5 : Example of a MARC Record

Data Content Standards

Data content standards are guidelines or rules controlling how information is formulated or how to make decisions regarding the selection of data entered into different fields.

Consider the following example.

The Ministry of Defence has been called several names over time. It was the Ministry of War (1968-1972), then the Ministry of Military Operations (1972-1986) and now the Ministry of Defence (1987-present). Records are transferred to the records centre from the period of the Ministry of War. The data content standard would determine whether the main entry/provenance field in the data structure uses the name of the agency at the time the records were created or uses the current name.

For example, one organisation might have chosen a data content standard that says that all main entries would be for the current name with cross references back to earlier names. Another organisation might insert main entries using the names in place at the time. Although the links can be done either way, best practice indicates that the most current name of a department should be entered into the database and references made to all previous names by which the department was known.

In order to facilitate database operations, data content standards have to be developed and applied consistently. For automated records management systems, the records office staff must often formulate, document and apply its own data content standards. This should be done prior to automation, not as a trial and error process during system implementation. If it is done during automation, quality control work will be very time-consuming and much clean up and re-entry of data will have to be done.

ISAD(G), mentioned above, is also a source of data content standards. Each descriptive element in ISAD(G) is accompanied by an indication of its purpose and a rule (data content standard) governing its use. For example the rules governing the five mandated data fields in ISAD(G) are:

- a reference code

  Rule: Record the country code in accordance with ISO 3166, followed by the repository code in accordance with the national repository code standard, followed by a local reference code.

- Title

  Rules: a. When the unit of description bears a formal title, transcribe it exactly as to wording, order and spelling but not necessarily as to punctuation and capitalisation. b. If no formal title appears in or on the unit of description, compose a brief title. The supplied title should include the name of the creator and a term indicating the form of the material comprising the unit of description and, where appropriate, a phrase reflecting function, activity, subject, location or theme. The example on p. 79 of the Treasury Department Records from the Erewhon National Archives reflects adherence to the latter rule.

- dates of creation of the material in the unit of description (the unit of description will be determined by the level of description, below)

  Rules: Give the dates of creation of the material in the unit of description as a single date or a range of dates as appropriate. A range of dates should always be inclusive. Optionally, also record the predominant dates or significant gaps.

- level of description (for example, series, sub-series, file, item)

  Rule: Record the level of the unit of description.

- extent of the unit of description (physical extent as well as type of material; for example, 45 linear metres).

  Rules: Record the extent of the unit of description by giving the number of the physical units in Arabic numerals and the specific unit designation appropriate for the broad class of material to which the unit belongs.

There are a number of other published sources outlining data content standards employed in archival settings. *Archives, Personal Papers and Manuscripts*, (APPM) by Steven L. Hensen is used in the United States. This volume adapts chapter 4 of the *Anglo-American Cataloguing Rules* for the description of archival and manuscript materials.

The *Rules for Archival Description* by the Bureau of Canadian Archivists in Canada, build on the *Anglo-American Cataloguing Rules* and ISAD(G).

A Manual of Archival Description by Michael Cook and Margaret Proctor is used in the United Kingdom, however, it is less prescriptive than the first two sources.

Activity 18

Establish data content standards for a) the name of a recipient of a document in a registry office and b) the name of a governmental agency in a series description.

STANDARDS FOR DATA ENTRY

As with the manual description of records or archives, data entry should follow established standards.

> *Data entry must follow established rules and guidelines, in order for data to be effective and consistent.*

> *For more information on description and standards, see* Organising and Controlling Records *and* Managing Archives.

Data Value Standards

Data value standards are standards that are implemented in certain fields of a database. For those select fields, the data value or index term must be selected from designated thesauri or controlled vocabulary lists. Data value standards apply to fields in a database where terms listed in thesauri or controlled vocabularies must be employed.

A thesaurus, or controlled vocabulary, lists the authorised form of a proper name, agency, organisation, or subject term that will be used for descriptions.

> ***Thesaurus (pl. thesauri):*** A controlled and structured vocabulary of keywords showing synonymous, hierarchical and other relationships and dependencies.

This vocabulary works in conjunction with the authority files, which demonstrate the evolution of such terminology and names. Published thesauri are available, or the organisation may develop its own in-house controlled vocabulary.

> *For more information on published thesauri, see* Managing Archives.

Authority Control

To ensure consistency and accuracy, all staff must understand that information in descriptions conforms to the standards and rules established by the institution. Authority control files are created to establish the form and spelling for the proper names of persons, agencies and organisations.

> ***Authority control*:** The process of verifying and authorising the choice of unique access points, such as names, subjects and forms, and ensuring that the access points are consistently applied and maintained in an information retrieval system.

The authority file also traces the evolution of the use of terms, names and particularly the designations for governmental agencies or offices in an organisation. Consider the case of the government's Ministry of Defence. Records personnel could use an authority file to access information using the current or former names of the agency: Ministry of War (1968-1972), Ministry of Military Operations (1972-1986), or Ministry of Defence (1987-present). However, the authority records would indicate that the list the latter as the 'official' form of the name. If personnel accessed the former names, they would be referred to the official designation. Authority files also contain notes documenting the research and decisions that took place prior to establishing a formal heading. See the figure below for sample authority controls.

2.   INFORMATION AREA

Purpose:

To describe the corporate body, person, or family named in the authority entry.

Rule:

Record relevant information, as specified in the elements below, according to the national or international conventions or rules used by the agency that created the record. (Specify in 3.2 which rules have been used). These conventions or rules may specify the minimum elements required and how they may be structured.

2.1 Corporate Bodies

2.1.1 Legal number(s)

Any official number that serves to identify the corporate body in countries where legal numbers, (for example, a company registration number) are assigned by public authorities. Indicate by a qualifier the nature of any number used.

2.1.2 Names

Names by which the corporate body may be known, other than that used in the authority entry a) other forms of the same name b) other names, for example, changes of names over time with their dates.

Examples

(a) Historical Manuscripts Commission

(For the UK entry Royal Commission on Historical Manuscripts)

Clothworker's Company

(For the UK entry Worshipful Company of Clothworkers)

(b) Archives nationales (1790-1800)

Archives impériales (1800-1814)

Archives royales (1815-1848)

Archives impériales (1850-1870)

(For the French entry Archives nationales)

2.2 Persons

2.2.1 (Not used)

2.2.2 Names

Names by which the person may be known, other than that used in the authority entry a) other forms of the same name b) other names, for example, changes of names over time with their dates including pseudonyms, maiden names, and so on). Names and pronominal and postnominal titles, for example, titles of nobility, or titles of honour held by the individual.

Examples (a) Shakespear, Shakspere...

(For the UK entry Shakespeare, William)

(b) Mary Wollstonecraft Godwin... *(For the UK entry* Wollstonecraft, Mary)

(c) first Duke of Wellington *(For the UK entry* Wellesley, Arthur (1769-1852))

Figure 6: Examples of Authority Controls

Extracts from ISAAR (CPF) web site used with permission from ICA.

General Data Entry Rules and Standards

As emphasised throughout this lesson, the efficiency of any automated system is dependent on consistency. Following are the types of general content entry rules that need to be established.

Company, Organisational and Government Agency Names

Company or organisation names should be entered exactly as legally registered, such as Petro-Canada, Dickens International Limited or International Monetary Fund.

Measurements

Consistency in measurement is crucial. Records should be measured consistently using a standard measure, such as linear feet and cubic feet. Even measuring by number of boxes or file drawers is imprecise because file drawers and boxes come in different sizes. Accurate and consistent measurement is critical not just in manual descriptive systems but more especially in automated databases, where searches may not be possible if elements are not entered to a standard.

Abbreviations

A standard set of abbreviations should be used. Some organisations have approved abbreviation lists for automated systems, for example the US Library of Congress.

Capitalisation

Consistent rules for capitalisation must be established. For example, how will series titles be expressed? Will each word be capitalised or just the first word?

Signs and Symbols

If signs and symbols are used they should be used consistently and in the same manner. For example, the percent sign should be consistently expressed as either '%' or spelled out as 'percent' or as 'per cent'.

Spelling

The rules should establish specified reference books as authoritative, such as a dictionary of English and other languages used to supply terms and a handbook of style and language usage. It is necessary to agree upon a consistent spelling for problematic words by selecting a specific edition of a dictionary, such as the Oxford or Webster's (English) dictionary.

Dates

Determine how dates will be entered into the system:

- years - 1992

- fiscal years - 1992/93

- dates - July 30, 1992.

Geographic Locations

Specific locations may be called several different names. Decide how this will be handled and document the decision. The institution may want to select a specific source as the authoritative source for geographic names, then a decision on geographic name form does not have to be made for each individual geographic entity. However, the source designates the locale or geographic feature (lake, river and so on) is the form that will be used.

Acronyms

Use the full title followed by the officially recognised acronym, if there is one, in brackets, such as North Atlantic Treaty Organisation (NATO).

Numbers

Will numbers be spelled out or not? A single method should be employed consistently within one field. For example, in the extent field or if the reference is to an address, an actual number, such as 356 may be preferable. In a historical note about an activity to which a series relates, spelling out the number may be better, such as 'the functions of the Ministry of Budget and Accounting remained the same for fifteen years until changes were made in the tax law.

SGML OR HTML?

Standardised General Mark-up Language (SGML) and Hypertext Mark-up Language (HTML) can both be used to exchange data concerning records in an Internet environment. However, SGML is much more powerful. SGML can represent complex data structures and relationships as well as provide more detailed searching capabilities in the networked environment.

> ***Standardised General Mark-up Language*** (***SGML):*** A metalanguage that can be applied to documents in order to maintain their structure and context. (A metalanguage is a computer language based on metadata coding of documents to represent the content of those documents on-line.)

> ***HyperText Markup Language (HTML):*** One of the
> main standards that controls how the World Wide Web
> works; it is an SGML document type definition that
> determines how web pages are formatted and displayed
> and thus enables information to be exchanged on the
> World Wide Web.

Although HTML is an SGML document type definition (DTD), it is largely designed for data formatting, whereas other DTDs also provide more data structuring and can designate values and establish relationships between elements. For example, while page titles can be specified in HTML, it is primarily used to designate formatting functions, such as bold, centre, italics. HTML is popular because it is relatively easy to learn and there are few encoding rules and standards. This differs from many other SGML DTDs.

However, other SGML DTDs do much more than format text. Personal, corporate and geographic names can be designated and isolated so that searching can be done on one or all of these categories. In HTML, a whole document is searched. For example, if we were to search for the Ministry of Culture in the same document tagged in HTML and SGML we would get radically different search results. In HTML all instances of the word 'culture' would be retrieved, whether or not it had anything to do with the Ministry or not. In SGML one can specifically search for organisational names containing the term 'culture.' The result of the SGML search would bring up only occurrences of organisations, such as the Ministry of Culture. Also, SGML can provide for hierarchical and other relationships and inheritance between data and data elements. As a result, the creation of data structures and the application of data content and data value standards is very critical for the exchange of data on records using SGML DTDs.

Encoded Archival Description (EAD)

Encoded Archival Description (EAD) is an SGML DTD for encoding information in archival finding aids. EAD preserves hierarchical relationships between elements in a finding aid that often mirrors relationships between parts of a fonds or records series. An EAD record includes two types of information; information about the finding aid itself (such as author, date of creation) and information about the archival records described in that finding aid. Following is an example of excerpts from a finding aid describing the records of Greene County, PA.

```
<!DOCTYPE ead PUBLIC "-//Society of American Archivists//DTD ead.dtd
(Encoded Archival Description (EAD) Version 1.0)//EN"><ead
audience="external"><!-- Revised template 4/28/1999 --><eadheader
audience="internal">

<eadid>US-QQS-MSS#97</eadid><filedesc><titlestmt><titleproper>Guide    to
the Records of Greene County (Pa.), <date>1785-1877</date></titleproper>

<sponsor>This finding aid has been encoded as a part of the Historic Pittsburgh
project a joint effort of the University of Pittsburgh and the Historical Society of
Western Pennsylvania. Funding for this portion of the project has been donated
by the Hillman Foundation.</sponsor></titlestmt>

<publicationstmt><publisher>Digital Research Library, University Library
System    </publisher><publisher>Historical    Society    of    Western
Pennsylvania</publisher>

<address><addressline>Senator   John   Heinz   Pittsburgh   Regional   History
Center</addressline>

<addressline>1212 Smallman Street</addressline><addressline>Pittsburgh, PA
15222</addressline> <addressline>drl-uls+@pitt.edu</addressline></address>

<date>Fall, 1999</date></publicationstmt></filedesc>

<profiledesc><creation> Encoded by: Lisa Sheets on <date normal="19990910"
type="encoder">September 10, 1999</date> from an existing finding
aid.<lb>Reviewed    by    Curator    on    <date    normal=""
type="reviewer"></date></creation></profiledesc></eadheader>

<frontmatter>    <titlepage><publisher>Historical   Society   of   Western
Pennsylvania</publisher>

<address><addressline>Senator   John   Heinz   Pittsburgh   Regional   History
Center</addressline>

<addressline>1212 Smallman Street</addressline>

<addressline>Pittsburgh, PA 15222</addressline>
```

Figure 7: Finding Aid Marked up in Encoded Archival Description (EAD)

Courtesy of the University of Pittsburgh, Digital Resources Library.

```
<addressline>library@hswp.org</addressline></address>

<titleproper>Guide to the Records of Greene County (Pa), <date>1785-
1877</date></titleproper><subtitle>MSS# 97 </subtitle><p>This guide to the
collection was originally prepared by: Jessica Broadwell on<date>July 7, 1994
</date>. Revisions occurred to the finding aid as a part of the encoding process
in <date>Fall, 1999</date></p></titlepage></frontmatter>

<archdesc        level="collection"><did><unitid        repositorycode="QQS"
countrycode="US"              type="collection">MSS#97</unitid><unittitle
label="collection">Collection of Records from Greene County (Pa.), <unitdate
normal="17850000-18770000"  type="inclusive"  label="collection">1785-1877
</unitdate><unittitle>

<origination          label="collector"          audience="external">Greene
County</origination>  <physdesc  label="collection"><extent  unit="linear
feet">1.5 </extent>(2 Boxes)</physdesc>

<repository><corpname>Historical         Society         of         Western
Pennsylvania</corpname><corpname>Senator John Heinz Pittsburgh Regional
History       Center</corpname><address><addressline>1212       Smallman
Street</addressline>

<addressline>Pittsburgh,         PA         15222</addressline>
<addressline>library@hswp.org</addressline></address></repository>

<abstract>Greene County, Pennsylvania is located in the southwest corner of the
state and was carved out of Washington County in 1796.  These records include
court action documents, court minutes and bonds, letters, wills, receipts, bills,
estate papers, election papers, tax records, and other sundry items.  Justices of
the Peace, licensed tavern keepers, and election officers are examples of public
figures whose names appear in these records.  The records clearly document the
operation of the court in the late eighteenth and in most of the nineteenth
centuries.</abstract></did>

<admininfo>

<acqinfo       audience="external"><p>These       items       came       in       one
accession.</p><p>Acc#   1935x   Purchase   from   David   K.   Webb
(Records)</p></acqinfo>  <accessrestrict><p>This  collection  is  open  for
research.</p></accessrestrict>
```

Figure 7: Finding Aid Marked up in Encoded Archival Description (EAD) (cont.)

Courtesy of the University of Pittsburgh, Digital Resources Library.

<userestrict><p>Property rights reside with the Historical Society of Western Pennsylvania. Literary rights are retained by the creators of the records and their heirs. For permissions to reproduce or publish, please contact the curator of the Archives.</p></userestrict>

<processinfo><p>This collection was processed by <name role="processor">Jessica Broadwell</name>on <date normal="19940707" type="processed">July 7, 1994</date></p>

<p>Revision and rearrangement for the encoded version of the finding aid provided by <name role="revision">Lisa Sheets</name> on <date normal="19990910" type="revision">September 10, 1999</date></p></processinfo></admininfo>

<bioghist> <head>History of Greene County, Pennsylvania</head>

<p>Greene County, Pennsylvania is located in the southwest corner of the state and was carved out of Washington County in 1796 in response to residents who complained that the county seat at Washington, Pennsylvania was too far north. Previously, the land that comprises Greene County had, at various times, been part of Westmoreland, Bedford, Cumberland and Lancaster Counties. The land was also part of the dispute between Virginia and Pennsylvania concerning the western border. This dispute was resolved by the creation of the Mason-Dixon Line in 1783. The early settlement is traced to 1764 with the end of the major Native American wars on the colonial settlers. Greene County was named for General Nathaniel Greene, who served in the Rhode Island State Militia and in the Continental Army during the Revolutionary War. Greene County originally had five townships: Greene, Cumberland, Franklin, Morgan and Richhill. Shortly thereafter, the number of townships increased to eighteen. These townships are: Aleppo, Centre, Cumberland, Dunkard, Franklin, Gilmore, Greene, Jackson, Jefferson, Monongahela, Morgan, Morris, Perry, Richhill, Springhill, Wayne, Washington, and Whiteley.</p>

<p>The names of John Boreman and William T. Hays, the first and second Clerks of the Court, Registers, Prothonotaries, and Recorders appear on many of the records between 1796 and 1832. </p></bioghist>

Figure 7: Finding Aid Marked up in Encoded Archival Description (EAD) (cont.)

Courtesy of the University of Pittsburgh, Digital Resources Library.

<scopecontent><head>Scope and Content Notes</head><p>The Greene County (Pa.) records include court action documents, court minutes and bonds, letters, wills, receipts, bills, estate papers, election papers, tax records, and other sundry items. The bulk of the records are legal documents relating to trials and court decisions, estate and financial materials, public office, elections, appointments, and taxes. The records clearly document the operation of the court in the late eighteenth and in most of the nineteenth centuries. Of interest is documentation of individual court cases and the handling of specific legal matters. Only through close examination of these legal records will researchers find information on other aspects of Greene County's commercial and social life.</p></scopecontent>

<arrangement><p>The Greene County (Pa.) Records are housed in two archival boxes and are arranged in four series.</p></arrangement>

<controlaccess><head>Controlled Access Terms</head><p>These records are indexed under the following terms in the Historical Society of Western Pennsylvania catalog. Researchers wishing to find related materials may wish to search under these terms.</p>

<controlaccess><head>Topics</head>

<subject   encodinganalog="650"   source="lcsh">Courts   --   Officials   and employees</subject>

<subject   encodinganalog="650"   source="lcsh">Courts   --   Pennsylvania   -- Greene County.</subject>

<subject encodinganalog="650" source="lcsh">Criminal justice personnel -- Pennsylvania -- Greene County.</subject>

<subject encodinganalog="650" source="lcsh">Education -- Pennsylvania -- Greene County.</subject>

<controlaccess><head>Corporate Names</head>

<corpname encodinganalog="710">United States. -- Army. -- Pennsylvania Militia. -- 122nd Regiment.</corpname>

<corpname   encodinganalog="710">Waynesburg   Union   Society (Pa.)</corpname><corpname encodinganalog="710">Butler Academy (Greene County, Pa.)</corpname></controlaccess>

Figure 7: Finding Aid Marked up in Encoded Archival Description (EAD) (cont.)

Courtesy of the University of Pittsburgh, Digital Resources Library.

```
<controlaccess><head>Personal Names</head>

<persname encodinganalog="700"> Boreman, John </persname>

<persname encodinganalog="700">Hays, William</persname></controlaccess>

<controlaccess><head>Locations</head>

<geogname encodinganalog="651" source="lcsh">Greene County (Pa.) --
Genealogy.</geogname><geogname                          encodinganalog="651"
source="lcsh">United States -- History -- Revolution, 1775-1783 --
Veterans.</geogname></controlaccess></controlaccess>

<dsc type="combined"><c01 level="series">

<did><unitid   type="series">I</unitid><unittitle>Trial   Documents<unitdate
type="inclusive">1797-1877 </unitdate></unittitle></did>

<scopecontent><p>The Trial Documents are arranged alphabetically by folder
title and include court books and loose court documents.  The court books
document actions taken by the court and are very legible.  Court minutes and
bonds document the money or other property people owed as a result of the
court's judgments and are also included with these records.  A lawyer's notes on
a court case and some blank forms are found with material that is undated.  Also
included with trial documents are a treasurer's report, 1828-1830, sheriff's book,
1831-1860 and subpoena docket, 1804-1817, all of which further document legal
activities in the county. </p></scopecontent>

<c02 level="file"><did><unittitle>Court Books</unittitle></did>

<c03            level="file"><did><container            type="box"
id="mss97.b1">1</container><container            parent="mss97.b1"
type="folder">1</container><unittitle><unitdate    type="inclusive">1801-
1804</unitdate></unittitle></did></c03>

<c03            level="file"><did><container            parent="mss97.b1"
type="folder">2</container><unittitle> <unitdate  type="inclusive">1805-
1811</unitdate></unittitle></did></c02></c03></dsc></archdesc></ead>
```

Figure 7: Finding Aid Marked up in Encoded Archival Description (EAD) (cont.)

Courtesy of the University of Pittsburgh, Digital Resources Library.

DOCUMENTATION

All standards established must be documented in specific data entry or data management manuals. These manuals will be in addition to the system administration and user manuals discussed in the previous lesson, and these manuals will need to be available not only for people entering data into the computer but also for users of automated data, so they know how information is maintained in the automated system. In particular, the following information must be included in a data entry manual:

- procedures for maintaining authority controls
- procedures for the selection and the formulation of data content in different fields
- procedures and rules for standardisation of information and data in different fields
- organisational, governmental office and personal names
- measurements
- abbreviations
- capitalisation
- signs and symbols
- spelling
- dates
- geographic locations
- acronyms
- numbers.

> *All standards must be documented in specific manuals.*

SUMMARY

This lesson discussed the importance of data structures, data content and data value standards within the context of an automated system. It also discussed more generalised stylistic rules for entering textual and numerical data in a database environment. These are the underlying elements that ensure accurate and consistent data entry. Without these, effective use of any automated system will be impossible. Search will be difficult and retrieval results will be flawed.

Although some external sources for standards and rules are referred to in this chapter, many internal rules must be developed and consistently applied. This chapter also reviewed the SGML standard and several related methods of exchanging archival descriptive information over the World Wide Web, such as HTML and EAD. The lesson suggests the that these rules be codified and documented in a manual for staff use.

STUDY QUESTIONS

1. What is a data structure?

2. Give an example of a data content standard.

3. Give an example of a data value standard.

4. How do data content and data value standards effect database operations?

5. What is the difference between HTML and SGML?

6. Are data content and data value standards more important in HTML or SGML?

7. What types of documentation need to be developed to ensure the application of data content and data value standards by staff members?

ACTIVITIES: COMMENTS

Activity 17

Data structure for tracking records:

- A unique identifier
- Title of file
- Reference code
- records office location
- Name of original user
- Date of retrieval
- Data of transfer another users
- Name of additional users
- Date of return

Activity 18

For example these are the rules you may decide to use for the following:

- The name of a recipient of a document in a registry office

  Rule: surname, first name initial (for example Smith, William B)

- The name of a governmental agency in a series description

  Rule: use the current official title for the agency, cross reference to previous titles.

DIGITISATION

Lesson 5 examines some of the problems and procedures involved in digitisation. These include

- Digitisation as a method of preservation

- Selection for digitisation

- The digitisation production process

- Outsourcing digitisation

> *Automation will not solve all an organisation's information management problems.*

In spite of the great benefits brought by automation, there are a number of drawbacks or concerns. One particular area of concern is digitisation.

> ***Digitisation:*** The conversion of characters or images into binary digits.

In the digitisation process, there are two types of outcomes: images of documents or fully functional electronic records. Simply scanning an analogue object will create a digital image of the source document, essentially an electronic photograph. However, in some cases optical character recognition can be applied to the digital image, creating an electronic record that looks exactly like a document that was originally word processed using a computer. Both of these outcomes require time-consuming and labour-intensive activities. While digitisation offers many benefits in the future, it is important to consider the potential problems with the creation of digital images or electronic records.

There are two goals for digitisation; access and preservation. These can be done in tandem or separately. This choice is significant because it will affect all aspects of the digitisation process, such as the metadata collected, resolution requirements, file format, and the selection of storage media for the captured images. Digitisation does increase access to records by creating surrogates that can be exchanged electronically or accessed on LANs, WANs, or the Internet. It can be also be a means of reducing the use of fragile paper records and thus be a factor in an overall preservation plan for paper records. However, there is currently substantial debate on whether digitisation

and the subsequent replacement of the original document with an electronic surrogate, is or ever will be, a viable means of preservation.

Digitisation as a Method of Preservation

There are several obstacles standing in the way of fully relying on digitisation as a means of preservation. First, there are few standardised formats for the storage and display of digitised images. In fact, currently one must store the digital master in one format and display objects in a different format more suitable to the exchange of networked information. A digital image file format is a structured container for information about each digital image and the image data. Information found in a digital image file includes, but is not limited to, name, width, length, resolution, and method of compression.

The computer requires this information to display a digital image. Non-proprietary image file formats ensure the ability to successfully transfer digital images between different systems during upgrading or modification. The American National Standards Institute (ANSI) and the Association for Information and Image Management (AIIM) have developed the Standard Recommended Practice - File Format for Storage and Exchange of Images - Bi-Level Image File Format: Part I (MS53-1993). Despite the existence of a standard, there is not an agreed-upon, industry-wide image format standard. Many digital imaging systems use the Tagged Image File Format (TIFF). However, different versions of TIFF exist so there is no guarantee that TIFF images can be transported seamlessly from one system to another.

Second, most software and some devices used for image capture and storage are proprietary. This means that the future migration of these data created using such systems is dependent on the availability of commercial software packages that can read the digitised information. Third, the market in equipment and software for high-end scanning is volatile. Equipment is evolving quickly and numerous companies are moving in and out of the market creating many orphan products.

Fourth, scanning certain types of records, such as handwritten documents (or typed documents with handwriting on the record), documents with low contrast between the ink and the paper, and physically large materials, is very difficult. A significant amount of image enhancement and manipulation is necessary if these types of materials are to be legibly displayed. This not only endangers the authenticity of the record, but drives the cost of digitisation up considerably.

Finally, the recreation of context and structure of records as they move from paper (analogue) to electronic (digital) form is difficult and time-consuming, particularly when the authenticity and reliability of the records depends on getting this information correct. At this point it is very difficult to maintain the authenticity and reliability of images in a digitisation process and so the source documents must also be retained as the official, legal evidence.

Any digitisation project requires careful planning, environmental analysis, goal-setting, and an understanding of potential problems with the creation of digital

images or electronic records. It is particularly important to examine the current computer and network infrastructure to determine if the present levels of computing and connectivity and staff expertise can support a digitisation project.

Digitisation also involves dealing with vendors. Vendors can either supply the equipment for a digitisation project or can be used to outsource the scanning process. In fact, many libraries and archives in Europe and the United States outsource digitisation to vendors who actually do the work in Asia, the Caribbean, Latin America, and Africa.

> *There are many obstacles to successful digitisation, and it is a process that should be considered carefully before any project is undertaken.*

See Preserving Records and Archives *For more information on other methods of preservation*

Activity 19:

Find out if a digitisation project exists or is planned in your organisation. What is the reason it is being introduced?

Selection for Digitisation

Selecting materials for digitisation is critical to the success of any reformatting project. Selection criteria vary among projects. Furthermore, records officers, records managers, and archivists have traditionally been very poor at articulating one set of priorities for selection of materials for any reformatting projects (micrographics or digitisation). Nevertheless, selection criteria should be developed by the project team prior to beginning a digitisation project. Selection criteria that have been used in the past are listed below. These are not in order of priority because priorities will vary depending on the goals of the project.

- Uniqueness of the source materials.

- Source materials of high economic value.

- Information value of the source materials.

- Need to provide multiple points of access to the source documents.

- Physical condition or fragility of the source documents.

- High demand for access by organisational colleagues or the public.

- Suitability of the materials for reformatting.

- Legal considerations, such as copyright.

- Cost of reformatting a given selection of source documents compared with the potential benefits of providing access to the digital surrogates.

Copyright

Many records produced by governments, organisations, and individuals are copyrighted. Copyright is an issue in any digitisation project because of the ability to 'publish' the results of a project on-line.

> *Copyright:* A statutory right that grants creators (authors) certain exclusive rights in their creations for a legally established duration of time.

Governments and organisations own the physical materials as well as the intellectual property of materials created under their auspices. However, registries, records centres, and archives also contain a substantial number of records from private citizens and organisations outside of the government or organisation. The copyright and the intellectual property of these materials is retained by the originating individual or organisation, despite the fact that the physical property is not in their possession.

Activity 20

In the previous activity what are the materials being digitised and what was the criteria for their selection. If you have not been able to identify a digitisation project, identify a group of materials in your organisation as a candidate for digitisation. Write down two advantages that digitisation will bring to this group.

The Digitisation Production Process

Digitisation involves much more than the actual scanning process. The digitisation production process involves five operations. These are

- analysis of the object (such as a book or document) to assess its suitability for digital imaging and the technical requirements required for imaging

- scanning, indexing, and transforming the object

- managing the newly created electronic file

- networking the information

- displaying or printing a copy of the digital document

Analysis of the Object

The digitisation process includes analysing each object to determine if it is a suitable candidate for digitisation and to identify the most appropriate resolution. Resolution determines fidelity to the original and is a critical decision in the digitisation process, particularly when the object is digital preservation. Resolution is measured by the number of pixels (dots) representing the source document in a given space, usually dots per inch (dpi). The greater the number of pixels per inch, the higher the resolution. When this analysis is done for the purposes of digital preservation, this process is referred to as benchmarking. The benchmarking process includes the application of a quality index, based on algebraic formulas, to determine the most appropriate resolution and such measures as the identification of the smallest significant detail that must be captured.

This analysis also leads to a decision on the type of scanning; bitonal (black and white), greyscale, or colour, that is required. Many objects are more suited to one type of scanning than another.

In bitonal scanning, pixels are assigned a tonal value or either black or white and there is one bit per pixel or dot. If bitonal scanning is being done for preservation purposes, it has been determined that 600 dots per inch (dpi) is required to ensure that full information from the source document has been captured. For projects aiming at increasing access, but not preservation, good quality images of modern office documents can be captured using use a scanning density of at least 200 dpi.

Preservation digitisation using bitonal scanning results in very large file sizes per document. For example, an 8.5 x 11 page scanned at 600 dpi would equal 4,207,500 bytes or 4.2 mb. This means that one 400 page book alone would be 1.6 gigabytes. While compression will reduce the size of the file, compression will further sample data from the image which may result in information loss. As of August 1999, there were two international standards for compression. All digitisation projects should employ one of these specifications to increase the likelihood that the images can be used with other technologies or later migrated between systems.

Because the scanner must decide and then assign a given pixel a value of black or white, error can occur if the text is light or if the typeface contains very fine lines. The threshold of scanners can be changed. This means that a scanner's settings can be altered to better detect and register either black and white during the scanning process. Printed textual materials and those with very distinct delineation between the black and white tones are the best candidates for bitonal scanning.

Greyscale scanning allows the assignment of 8 bits (1 byte) per pixel indicating shades of grey. The use of grayscale scanning is most appropriate for materials with subtle gradations of tone, such as continuous tone and halftone documents. Greyscale is also often appropriate for handwritten manuscripts.

Colour scanning involves the assignment of 24 or more bits per pixel to represent colour. Colour scanning is suitable for all document types containing colour as well as photographs.

Scanning, Indexing, and Transforming the Image

Scanning is the creation of a digital surrogate for an analogue original. In order to accomplish this, the appropriate type of scanner must be selected. Considerations in selecting a scanner include

- form, such as text or photographs, and attributes, such as size, of materials to be scanned

- volume of materials to be scanned

- compatibility with existing hardware and software, particularly image editing applications

- performance

Scanners sample pixels from the source document and map them on a grid of dots or pixels. Each pixel is then assigned a tonal value (that is, black, white, shades of gray, or colour). These tonal values are represented digitally in binary form (zeros and ones) in the automated system.

> *Scanning:* The process of converting an image into a form that a computer can use.

In essence, digital images are dumb files. The scanning process alone, does not 'read' the record and therefore data on the image cannot be retrieved without further processing. Therefore, scanning must be followed by entering information concerning each image into an automated system and indexing the image. This information includes technical data documenting the scanning process, such as resolution and compression, as well as indexing information about the source document. Data entry is crucial for future migration of the image, now in electronic form, as well as for future retrieval of the image to ensure access. Also this data entry is critical to maintain the context of the record, in terms of both its internal parts as well as how one record related to other scanned records. For example, in a paper system, the relationships among documents in a file folder are visually discernable. This is not true in the electronic environment, so all this data must be entered into the system manually.

As noted above, digitisation results in an image of the original or source document. Individual indexing of the record must be done in order to retrieve the image in the future. Furthermore, if the record being digitised contains multiple pages, such as an annual report, the pages must be linked and the context and structure must be re-established. Therefore, if tables of contents, for instance, are to be active navigational tools in the electronic environment, this must be reconstituted manually using a tool such as SGML.

In order to recreate paper documents as fully functional electronic records, the original paper records are scanned and then optical character recognition (OCR) software and spell checking is done on the electronic output. Thoroughly recreating paper records as electronic records by applying optical character recognition is still in the early stages. OCR software 'reads' the document. The end result is not just a still

image, but a document that is searchable and can be edited, just like any other word processing document. OCR can be done on any document, however accuracy is exponentially better with clean, typed documents containing alphanumeric elements.

Even with good source documents, OCR software has a 99 per cent accuracy rate. Initially, this may be appealing, but given that a typical typed page contains 250 words, this can add up to a substantial number of errors (2.5 per page) that must be found and corrected. OCR software is improving every year, though and accuracy and the ability to read different types of materials and symbols will increase over time. Even in the case of recreating fully functional electronic records, data entry is necessary to create context. This context includes the digitisation settings, additional operations performed on the document, as well as noting the relationships between the original paper documents and their electronic surrogates.

Quality control procedures must also be established to ensure that the scanning, indexing, and OCR processes, if applicable, have captured all the necessary information. Many digitisation projects are outsourced to vendors specialising in the creation of digital images. It is very important to establish quality control procedures for the digital files returned from the vendors.

Managing the Electronic Files

Managing the electronic file includes a variety of operations including

- maintenance, such as periodic back-ups, and storage of the electronic files

- manipulating the image for fidelity to the original and use

- planning for eventual migration

The management of electronic files resulting from a digitisation project is key for their accessibility. Project planners should select storage devices based on an analysis of the capacity or volume of the project, the speed the information will be needed, reliability of the media, security considerations, and cost. Media choices for storage of digitised images include magnetic disks (hard drives), optical disks, and tape. These media choices also mean a choice of having the digitised data on-line, near-line, and off-line, respectively. As noted above, storage requirements can easily run into gigabytes so devices with multiple drives are required, particularly if access is the goal of the project.

Scanning results in a digital master. However, it is often the case that the best delivery of that image involves some manipulation of the image for fidelity or more frequently scaling the image for use. If an image must be scaled, the digital master should be copied and this copy is the one that is altered for use. This process is necessary if scanning is done at a higher resolution.

Planning for migration of digitised images is a complex process. Due to the proprietary nature of much of the software, choices for system upgrades may be limited.   Furthermore, in order to maintain access to the images, technical, administrative, and descriptive metadata must also be migrated along with the images to which they refer. Maintaining the relationships and links between the images, metadata, and perhaps even an OCR version of the document over time and between

systems poses significant problems.

Networking

In order to get the full benefit of a database of digitised images or recreated electronic documents, a functional network is needed to deliver the images to records staff, the organisation's staff, or researchers. Networks delivering digitised images must be robust enough to handle multiple hits or retrieval attempts simultaneously. At the same time, the network must be able to manage access requests in order to control the authorisation process so only authorised records staff can manipulate the digitised images.

Displaying the Image

Digitisation is most appropriately done to enhance access to unique, fragile, or heavily used records. Thinking about how digitised documents will be used during the planning stages of the digitisation project is necessary to create a user-friendly database. Users want a combination of high image quality, completeness of the information, dimensions that are on a scale with the original, and quick delivery of the images over the network. Image quality, completeness of the information, and correct scaling can be controlled to a certain extent by the records office, records centre, or archives through a carefully developed scanning process. However, image quality and quick delivery are dependent on the quality of the user's network and computer.

Activity 21

Write down how your digitised documents are going to be accessed now and in the future. Is there adequate information about context to ensure intellectual control?

Outsourcing the Digitisation Process

Most large digitisation projects are outsourced to vendors who specialise in digital imaging and/or the conversion of images to readable text through optical character recognition. Outsourcing – purchasing services that could be done internally from an external business – is done for several reasons. One reason is that an organisation does not plan to do a consistent and substantial amount of digitisation and so it is not cost-effective to invest in equipment that will not be fully utilised. Another consideration is that if the organisation will not be consistently digitising materials, it will be difficult to maintain staff expertise in this area.

This does not mean that records staff need not learn about digitisation. It is very important the at least some individuals in the organisation are familiar with digitisation in order to negotiate a cost-effective project with a reasonable production schedule as well as have a realistic idea about the goals and results of a digitisation project. Internal expertise is also necessary to understand the different options posed by vendors and how various options will affect the goals of the project regarding

preservation and access.

When selecting vendors for digitisation, the processes described in Lesson 2 concerning requests for information and requests for proposals should be followed.

> *The selection and procurement of equipment are also dealt with more generally in* Managing Resources for Records and Archives Services.

SUMMARY

This lesson has covered a number of key aspects of digitisation including:

- digitisation as a means of preservation

- selection for digitisation

- the digitisation production process

- outsourcing the digitisation process.

Digitisation for preservation is currently highly experimental. As with all electronic records, migration of digital surrogates as well as the metadata that ensures their authenticity, provides descriptive information about the image, and makes retrieval a possibility, is a major issue that needs to be addressed at the beginning of any digitisation project. There are also other problems with digitisation, including the following.

- Selection for digitisation is difficult and there are no established standards for selection.

- Legal constraints, particularly establishing the authenticity and reliability of digitised images in court and securing copyright to fully utilise digital files is difficult.

- Lack of standardised formats for the storage and transfer of digitised images.

- Proprietary hardware and software which affects the future migration of data.

- A volatile high-end scanning market. Equipment is evolving quickly and numerous companies are moving in and out of the market creating many orphan products.

- Difficulties in scanning certain types of records, such as handwritten documents (or typed documents with handwriting on the record), documents with low contrast between the ink and the paper, and physically large materials.

- Recreating the context and structure of records as they move from paper (analogue) to electronic (digital) form is difficult and time-consuming, particularly when the authenticity and reliability of the records depends on getting this information correct.

These concerns make digital preservation an interesting, but highly experimental area. Digitisation for access, however, can be a very effective means of providing users with information and documentation that they would not otherwise been able to view.

STUDY QUESTIONS

1. What are the two goals of digitisation?

2. Identify some of the problems associated with digitising for preservation.

3. What are some of the selection criteria that have been used to identify materials for digitisation projects?

4. Why is copyright an important consideration in digitisation projects?

5. What are the steps in a digitisation production process?

6. Why is resolution important?

7. What are the three modes of scanning?

8. What are some of the factors affecting scanner selection?

9. What are the issues involved in the management of the electronic files of digitised images?

10. What are some of the migration considerations pertinent to digital images?

11. List three factors affecting the display of digitised images.

12. Why is outsourcing a consideration for digitisation projects?

ACTIVITIES: COMMENTS

Activity 19

If there is not a digitisation project in your department there may be one elsewhere in the civil service. If it is not based in the Archives it may not have been introduced in order to preserve material. It is more likely that it is to save storage space or allow multiple concurrent access to documents.

Activity 20

Selection criteria is important. If your organisation wants to digitise financial records, how easy are they to scan? For example cheques may have very faint ink stamps on the reverse which are visible to the naked eye but not electronically. However the high volume of cheques that have to be stored do make them good candidates for digitisation if the scanning difficulties can be overcome.

Activity 21

How are digitised documents stored on the system? Are they indexed individually, or are related documents indexed together. How easy is it to identify 'files' in your document imaging system. The problem here is that in manual systems documents are held together in files. In document imaging or document management systems documents are treated as individuals. Is this really how you want to access information. How will you ensure that you retain intellectual control over groups of documents, and retain the context of documents in terms of which file they belong to.

WHAT TO DO NEXT?

This module on *Automating Records Services* has focused on the principles and practices of automating records and archives management functions. It has addressed the following issues:

- systems analysis leading to the restructuring of inefficient manual processes

- planning for automation through the assessment of the current environment

- implementation and evaluation of an automated system

- data entry standards

- digitisation

Throughout these lessons, readers have been asked to reflect on how the questions raised apply in their own organisational setting. If these activities have been completed, the reader is well on his or her way towards planning an automation programme. Often, after reading a manual the reader comes away with a substantial amount of good information, but without a clear idea concerning where to begin. This lesson will discuss establishing priorities for action and delineate concrete steps to take in developing an automation project.

ESTABLISHING PRIORITIES FOR ACTION

The principles and practices outlined in this module are fundamental to the development of effective automated systems. But in considering automation in your own organisation, what should be done first? Each situation will differ.

Activity 22

Based on the work you have done for this module, what priorities would you establish for the automation of records services in your organisation? What would you do first? What next? Why?

Consider the following list of priorities as some suggestions for the steps that should follow. Some of the activities outlined may overlap and may be able to take place simultaneously.

Priority 1: Examine Current Activities

Examine the current records-related activities supporting the business processes in your organisation. Conduct an initial assessment of activities that are candidates for automation. Ascertain whether these processes are currently efficient and whether or not the underlying manual processes require reengineering. This will be useful even if the processes are not automated in the near future.

Priority 2: Build Organisational Support

Begin to build organisational support for your project. Discuss the benefits of automation with the records staff, other organisational staff members, as well as outside researchers. Identify allies and potential members of the planning project team. Assess who might be an organisational champion of the project. Remember to tie overall organisational goals to the automation project.

Priority 3: Establish an Assessment Process

Establish a planning and assessment process for the automation project that facilitates a scan of the environment in which the automation project will take place. This includes conducting a feasibility study, developing goals, objectives, and priorities, identifying resources needed for the planning and assessment phase, assembling a project team and project structure, and getting and maintaining support for the project.

Priority 4: Consider Automation Issues

Think about automation implementation issues. Determine if there are any activities, such as staff training and initial orientation to computers that can take place now, rather than waiting until the computers are actually introduced.

Priority 5: Improve Data Consistency

Consider how the improve the consistency of the data currently being collected in the manual system. Begin thinking about the data structure that will be introduced and whether existing data content (rules for data entry) and data value (thesauri or controlled vocabulary lists) standards are feasible to use. If internal standards must be developed, create a working group to begin their development prior to automation.

Priority 6: Develop an Evaluation Plan

Develop an evaluation plan that includes records staff, other members of the organisation who will utilise the system, as well as external researchers.

Priority 7: Identify Resources

Identify the key internal and external resources needed to successfully complete the automation project and become familiar with these resources.

> *For more information on establishing priorities, see* Strategic Planning for Records and Archives Services.

GETTING HELP

Many institutions, particularly in countries with limited resources, have little access to resources for electronic records work. However, there are places you can go to get more information or to obtain assistance. Following are names and addresses of agencies that could be contacted for assistance.

> *See the* Additional Resources *document for information on other organisations and associations involved with records and archives management generally.*

Professional Associations and Organisations

American Society for Information Science (ASIS)

8720 Georgia Avenue, Suite 501
Silver Spring, MD
20910, US
Tel: +1 301 495 0900
Fax: +1 301495 0810
Email: asis@asis.org
Web site: http://www.asis.org/

ASIS brings together diverse streams of knowledge, focusing what might be disparate approaches into novel solutions to common problems. ASIS bridges the gaps not only between disciplines but also between the research that drives and the practices that sustain new developments. ASIS counts among its membership some 4,000 information specialists from such fields as computer science, linguistics, management,

librarianship, engineering, law, medicine, chemistry and education; individuals who share a common interest in improving the ways society stores, retrieves, analyses, manages, archives and disseminates information.

Association for Information and Image Management (AIIM)

1100 Wayne Ave., Suite 1100
Silver Spring, MD 20910-5603 US
Tel (toll free in US): +1 888 839 3165
Tel: +1 301 587 8202
Fax: +1 301 587 2711

or

2 Crown Walk
Winchester Hampshire
SO23 8BB UK
Phone: +44 1962 868333
Fax: +44 1962 868111
Website: www.aiim.org

The Association for Information and Image Management was organised to bring together the users and providers of document and information management technologies, such as document management, knowledge management, workflow and imaging. This organisation has a mail order bookstore that offers publications, standards and tools that apply to every facet of Records Management from hard copy filing to electronic imaging.

The Association for Information Management (ASLIB)

Staple Hall
Stone House Court
London EC3A 7PB UK
Tel: +44 0 20 7903 0000
Fax: +44 0 20 7903 0011
Email: membership@aslib.co.uk
Website: http://www.aslib.co.uk/aslib/

Founded in 1924, ASLIB is a corporate membership organisation with over 2,000 members in some seventy countries. ASLIB actively promotes best practice in the management of information resources, represents its members and lobbies on all aspects of the management of and legislation concerning information at local, national and international levels.

Association of Records Managers and Administrators (ARMA International)

4200 Somerset Dr., Suite 215
Prairie Village, KS
66208-0540 US
Tel: +1 800 422-2762 / +1 913 341 3808
Fax: +1 913 341 3742
Email: hq@arma.org

Website: http://www.arma.org/

The Association of Record Managers and Administrators (ARMA International) is a not-for-profit association of over 10,000 information professionals in the United states, Canada and over 30 other nations. Among other positions, ARMA International members are employed as records and information managers, Managing Information Systems and Automated Data Processing professionals, imaging specialists, archivists, hospital administrators, legal administrators, librarians and educators.

The ARMA website also includes links to other professional associations involved with record keeping and includes an extensive 'bookstore' with a wide range of advice and information, from introductory to expert. Prices for publications vary and there are significant discounts for ARMA members. The bookshop lists are accessible at http://commerce.shreve.net/armahqstorem/

International Council on Archives (ICA)

60, rue des Francs-Bourgeois
75003 Paris, France
Tel: +33 0 1 40 27 63 06
Fax: +33 0 1 42 72 20 65
Email: 100640@compuserve.com
Website: http://www.archives.ca/ICA/

The ICA is the professional organisation for the world archival community, dedicated to the preservation, development and use of the world's archival heritage. Of particular interest are the following ICA committees:

- Committee on Electronic and Other Current Records

- Committee on Information Technology

Information Systems Audit and Control Association (ISACA)

3701 Algonquin Road, Suite 1010
Rolling Meadows, Illinois
60008, US
Tel: +1 847 253 1545
Fax: +1 847 253 1443
Email: chap/coord@isaca.org
Website: http://www.isaca.org/

The ISACA is concerned with IT governance, control and assurance. ISACA does that by providing value through various services such as research, standards, information, education, certification and professional advocacy. The association helps information systems audit, control and security professionals focus not only on IT, IT risks and security issues, but also on the relationship between IT and the business, business processes and business risks. Local chapters have been established in the following regions: Africa and Europe; Asia; North America; Oceania; and South and Central America.

International Federation for Information and Documentation (FID)

FID Secretariat
PO Box 90402 - 2509 LK
The Hague
The Netherlands
Tel.: +31 70 314 0671
Fax: +31 70 314 0667
Email: fid@python.konbib.nl
Website: http://fid.conicyt.cl:8000/

Since 1895 FID Members, representing organisations and individuals in over 90 nations, have promoted best management practice of information as the critical resource for all society.

International Organization for Standardization (ISO)

Case postale 56
CH-1211 Geneva 20, Switzerland
Tel: +41 22 749 01 11
Fax: +44 22 733 34

Website: http://www.iso.ch

The ISO is a worldwide federation of national standards bodies from some 130 countries, one from each country. The ISO promotes the development of standardisation in order to help facilitate the international exchange of goods and services as well as to help develop cooperation in intellectual, scientific, economic and technical activities.

The ISO has established many standards that affect records and archives work, particularly with regard to quality of microfilm, photographic equipment, paper quality and so on. ISO standards are identified by the term 'ISO' and a number, such as ISO 9000, the standard for quality management and quality assurance, or the ISO 14000 series of standards for environmental management.

Of particular note is ISO/TC46/SC11: Information and Documentation: Archives and Records Management, which is drawing up an international standard for records management. Details of SC11 secretariat should be in ISO literature at www.iso.ch.

International Records Management Trust (IRMT)

12 John Street
London WC1N 2EB, UK
Tel: +44 20 7831 4101
Fax: +44 20 7831 7404
Email: info@irmt.org
Website: http://www.irmt.org

The Trust was established in 1989 in order to support developing country requirements for managing official government records. As technology began to have a rapidly escalating impact on the way records were created, used and stored, it became clear that there was a pressing need for innovative and strategic solutions. The Trust was established to support this need. As a charity dedicated to education,

research and practical technical assistance, it set out to undertake a range of project work. Projects evolved and grew in three areas, as summarised below:

- *Country Projects* were introduced to support local officials and professionals in managing official records. This includes defining legal and regulatory frameworks; developing organisational structures, including strengthening the national archives' capacity to regulate the continuum of records management functions and developing and introducing new systems and procedures for managing records and developing professional capacity.

- *Education Projects* were conceived as a vehicle for introducing greater awareness of the importance of records and for developing educational modules and materials which could be shared between English speaking countries. It was intended that where desirable, these materials could be adapted to meet the requirements of developing countries with different administrative traditions. The aim in all cases was to ensure that the material was in line with global theory and best practice but relevant to local realities where there were severe constraints on funding and a limited technical and institutional infrastructure.

- *Research Projects* were introduced to study the requirements for well-managed records in key areas, such as financial and personnel management, particularly in an environment of rapid technological change. The Trust's research projects have focused on real problems and the practical solutions required to solve them.

The range and complexity of Trust's programme areas and project work has expanded in parallel with the growth and spread of technological applications and with global development concerns, such as good governance, accountability, human rights, economic reform, transparency and accountability and cultural heritage for sustainable development. Its work has demonstrated repeatedly that neither technology nor global development agendas can be successfully addressed in the absence of effective control of official records. The Trust is therefore committed to providing an expanded level of services and support for developing countries as they make the transition to the electronic age.

ARCHIVAL INSTITUTIONS

Many national and state or provincial archives in the metropolitan English-speaking countries have excellent leaflets and publications that can be adapted to smaller or different contexts. Many of the institutions also provide useful information on their websites. This list only highlights some key institutions; note that many of their websites include links to other national or state repositories and related agencies.

Archives of Ontario

77 Grenville Street, Unit 300
Toronto, ON
M5S 1B3 Canada

Tel: +1 416 327 1600
Fax: +1 416 327 1999
Email: reference@archives.gov.on.ca
http://www.gov.on.ca/MCZCR/archives/english/index.html

Library of Congress

110 First Street, SE
Washington, DC
20540, US
Tel: +1 202 426 5213
Email: lcweb@loc.gov
Website: http://lcweb.loc.gov

National Archives of Australia

PO Box 34
Dickson
Canberra, A.C.T. 2602 Australia
Fax: +61 6 257 7564
Website: http://www.naa.gov.au

National Archives of Canada

395 Wellington Street
Ottawa, ON
K1A 0N3, Canada
Tel: +1 613 996 7430 (Library)
Fax: +1 613 995 6274 (Library)
Website: http://www.archives.ca

National Archives and Records Administration (NARA)

700 Pennsylvania Avenue, NW
Washington, DC
20408, US
Fax: +1 202 208 5248
Website: http://www.nara.gov/

The New York State Archives and Records Administration

New York State Education Department
Cultural Education Center
Albany, NY
12230 US
Tel: +1 518 474 6926
Email: sarainfo@mail.nysed.gov
http://www.sara.nysed.gov/

Public Record Office (PRO)

Kew, Richmond
Surrey TW9 4DU, UK

Tel: +44 208 876 3444
Fax: +44 208 878 8905
Website: http://www.pro.gov/uk

State Records Authority of New South Wales

Level 3, 66 Harrington Street
The Rocks
Sydney, NSW 2000
Australia
Tel: +61 2 9237 0200
Fax: +61 2 9237 0142
Email: srecords@records.nsw.gov.au
Website: http://www.records.nsw.gov.au

Industry Analysts and Consultants

Doculabs

Headquarters
1201 West Harrison Street
Third Floor
Chicago, IL 60607
Tel: +1 312-433-7793
Fax: +1 312-433-7795
Email: info@doculabs.com
Website: http://www.doculabs.com.

Doculabs is an independent industry analyst firm that provides unbiased assessments of software. Doculabs specializes in emerging technology solutions for all facets of information management including electronic document management systems (EDMS), electronic document output systems (EDOS) and development tools and infrastructure components for Internet, intranet and extranet applications.

Cohasset Associates, Inc.

505 N. Lake Shore Drive
Chicago, Illinois US
Tel: +1 312-527-1550
Fax: +1 312-527-1552.

Cohasset Associates Inc. is a management consulting firm specialising in the management of hardcopy and electronic records. Cohasset sponsors a yearly conference on 'Managing Electronic Records' that presents up-to-date research, legislation and analysis of issues surrounding automated electronic record-keeping systems.

ADDITIONAL RESOURCES

There are many publications available about automation care. The Additional Resources tool lists many more publications than are listed here; this bibliography includes key works that might be of value, particularly in your institution's resource centre or library. Some are more easily obtained than others, and some more up-to-date than others. However, older publications also contain valuable information and may be more easily found in libraries in your particular country or region than very new publications that have not yet circulated around the world. Core publications are identified with an asterisk (*).

> *Core publications are also identified in the* Additional Resources *document; refer to that document for information on more general publications on records and archives management.*

Selected Journals

Information Management Journal (formerly *Records Management Quarterly*) produced by ARMA. This is the leading journal in the records management area and carries articles on systems planning and implementation, automated records management systems and all other aspects of records management.

http://www.arma.org/resource/journal/journal.php3

The *Records Management Journal* is published by ASLIB (the Association for Information Management) in association with the Society of Archivists and the Records Management Society. The *Records Management Journal* publishes material on all aspects of creating, processing and the disposal or retention of records, whatever their form. It emphasises the latest research and current practice.

http://www.aslib.co.uk/rmj/index.html

Records and Information Management Report (formerly *The Records & Retrieval Report*) published by Greenwood Publishing Group, 88 Post Road West, P.O. Box 5007, Westport, CT 06881.

Selected Published Monographs

* ARMA International. *Criteria for Developing/Evaluating Records Management Software.* Prairie Village, KS: ARMA, 1994.

Baca, Murtha, ed. *Introduction to Metadata: Pathways to Digital Information*, Los Angeles, CA: Getty Information Institute, 1998.

Cook, Michael. *An Introduction to Archival Automation: A RAMP Study.* (RAMP Study PGI-86/WS/15). Paris, FR: UNESCO, 1986.

Doculabs, *Special Report on Records Management Systems*, Chicago: Doculabs, 1998.

Green, Adam. *The Elaboration of Policies and Plans for the Automation of Archives.* (RAMP Study PGI-91/WS/19). Paris, FR: UNESCO, 1991.

Hedstrom, Margaret. *Digital Preservation.* Boston, MA: MIT Press, forthcoming.

Kenney, Ann R. *Preserving Archival Materials Through Digital Technology: A Cooperative Demonstration Project*. Ithaka, NY: Cornell University, 1993.

Kenney Anne R and Stephen Chapman, *Digital Imaging for Libraries and Archives*, Ithaca, NY: Cornell, 1996.

Kitching, Christopher. *The Impact of Computerization on Archival Finding Aids: A RAMP Study with Guidelines.* (RAMP Study PGI-91/WS/16). Paris, FR: UNESCO, 1991. Available electronically through the UNESCO website.

Parker, Elizabeth. *Records Management Software Survey.* Issue 4. Bucks, UK: Records Management Society, February 1998. This survey is updated regularly.

* Robek, Mary F, Gerald F Brown and David O Stephens. *Information and Records Management: Document-Based Information Systems.* 4th ed. New York, NY: Glencoe McGraw Hill, 1995.

Sutton, Michael J. *Document Management for the Enterprise: Principles, Techniques and Applications.* New York, NY: John Wiley and Sons, 1996.

Web-Based Resources

National Archives of Australia has been a leader in developing automated records management systems and on the forefront in confronting electronic records issues.

http://www.naa.gov.au/index.htm

National Archives of Canada provides services to governments, contains requests for proposals, thesauri and subject classification guidelines.

http://www.archives.ca/exec/naweb.dll?fs&0603&e&top&0

Consortium of University Research Libraries, CURL Exemplars for Digital ARchiveS (CEDARS) Project, addresses the needs of libraries and archives that are encountering a massive increase in the range and volume of digital information resources, without a formal mechanism for the long-term preservation of this material. The CEDARS project aims to address the strategic, methodological and practical issues and will provide guidance for libraries in best practice for digital preservation.

University of Pittsburgh, Center for Electronic Record-keeping and Archival Research, is a research centre focusing on electronic record-keeping issues: design, policy, implementation and standards.

http://www.sis.pitt.edu/~cerar/

University of Michigan conducts electronic records research, presents an overview of electronic record-keeping projects in the United States.

http://www.si.umich.edu/e-recs/Research/

University of British Columbia is conducting a project on the preservation of the integrity of electronic records.

http://www.slais.ubc.ca/users/duranti/intro.htm

Activity 24

Check your institution's, or any other library or resource centre. What books or other resources do you have about automation? Are any of the publications listed above available in your institution or elsewhere? If so, examine two or three of them and assess their currency and value to your institution. If not, identify two or three publications you think would be most useful to help develop or expand your library. Devise a plan outlining how you could realistically obtain copies of these.

SUMMARY

This lesson has provided an overview of the entire module, *Automating Records Services.* This lesson has then discussed how to establish priorities for action and suggested that the main priorities for action are often as follows:

Priority 1: examine current activities

Priority 2: build organisational support

Priority 3: establish an assessment process

Priority 4: consider automation issues

Priority 5: improve data consistency

Priority 6: develop an evaluation plan

Priority 7: identify resources

The lesson then examined resources available to assist with automation planning.

STUDY QUESTIONS

- In your own words, explain the reason why the priorities proposed in this lesson are offered in the order they are in.

- Indicate two of the organisations listed in this lesson that you would choose to contact first and explain why.

- Indicate two of the publications listed in this lesson that you would choose to purchase first and explain why.

ACTIVITIES: COMMENTS

Activity 22

Every institution will find itself at a different stage of development in terms of automation. Similarly, every person will have a different level of knowledge of automation issues. It is important to study core materials first and become comfortable with key principles and concepts before exploring those with colleagues or reading into more complex literature. However, contact with colleagues and access to other literature is valuable, and joining and participating in professional associations is one way to expand your horizons and those of your institution.

Activity 23

If resources are limited, it is wise to communicate with international organisations first, as they often obtain and filter information from national or regional associations. Thus valuable information is passed on to your organisation through the international group, which can save resources for all. It is also advisable to focus on records management information before obtaining specialised publications or information.

Activity 24

As mentioned in relation to the previous activity, it is important to begin with general information and ensure you have a good resource library of introductory and overview publications before developing a more specialised library.