UNIT 15 COMPATIBILITY OF ISAR SYSTEMS

Structure

15.0 OBJECTIVES

The Information Storage and Retrieval Systems (ISARS) are developed to satisfy users information needs. Though the objectives vary from system to system, there are many features which are common to them. Thus, if there are compatibilities in various aspects, it becomes easier to exchange the resources, thus saving efforts, costs and duplication. It also facilitates users accessibility to information. It is, thus, worthwhile to study the various compatibility issues, methods and their usefulness.

After going through this Unit, you will be able to:

- explain compatibilities of ISARS;
- describe the areas for compatibility amongst ISAR systems;
- outline multi-task approach to compatibility from various components;
- interpret the interactive planning approach for compatibility; and
- explain the quality control aspects in compatibility issues.

15.1 INTRODUCTION

The term Information Storage and Retrieval System (ISARS) in its widest sense covers all types of organisations concerned with the collection and dissemination of information.

The main purpose of compatibility is to facilitate exchange and sharing of resources. The sharing of resources is a concept which is put to action since a long time which covers various activities undertaken jointly by a group of libraries or other organisations for the purposes of improving services or cutting costs. In today's context of functioning of ISARS, its importance has become more. This Unit discusses the basic and general compatibility issues and provides an overall background of problems to be considered in establishing and maintaining an information system.

In resource sharing context of information system, compatibility is a term concerned with the operations of two or more information systems and their ability to work together effectively to exchange records, make use of each other's services and equipment, etc.

The compatibility is capability of being used together without modification or adaptation and is concerned with all work of information systems. It may be noted that compatibility is at the basis of much of the work that has been done to promote use of national or international standards. There is a relationship between compatibility and standardisation. Adoption of same standards is the most obvious, the easiest and the most economical method of ensuring that two or more organisations will be able to achieve compatibility in the particular functions that they will perform together, that is operating as an information system. For example, when considering the exchange of records relating to sources of information, most vital ones are standards relating to the preparation, production and processing of the bibliographic records.

Compatibility can be achieved also, without standardization by the use of some procedures or devices which reconcile or convert one set of records to the format of another system. But, such solutions may introduce further barriers to be overcome, may be more expensive and perhaps less effective.

Therefore, in planning and establishing information systems of any type, it is most desirable to build compatibility into the system from the beginning. The standards for every step of preparation and processing of records should be defined, developed and agreed upon, as well as other standards related to the functions and services that will be part of the operational system need to be considered.

15.2 NEED FOR COMPATIBILITY AMONG ISAR SYSTEMS

In the context of resource sharing, compatibility is more required. The reasons are:

i) it facilitates exchange of bibliographic records, or some means of common access to these records. It is concerned with the recorded description and item of informational context, not the physical item itself.

ii) computer and telecommunication technologies greatly facilitate sharing of resource among systems which, in many cases are impractical in the manual environment such as exchange of large bibliographic files.

iii) in automated environment, the possibilities of cooperation are very much greater for which compatibility becomes very important. Computers can operate efficiently when standards are rigorously followed and compatibility is maintained.

iv) in automated situation absence of compatibility leads to loss of efficiency and results in additional costs in resource sharing.

v) even in the context of Internet, the absence of compatibility leads to inconsistency in the performance of search engines.

In the words of Taylor G. Arlene and Clemson Patrice [2004]:

- there is much duplication of entries within the same set of retrieved hits;
- results are unpredictable;
- results can be quite misleading–the same search can retrieve no hits by one engine and many hits by another;
- search engines do not readily disclose the contents of their databases nor do they provide a description of the criteria used to include a document in their files;
- vocabulary is not controlled, and punctuation and capitalisation rules are not standardized; and
- relationships and relevance often cannot be analysed without actually examining each item—that is, there is not enough information in the 'index entry' to allow one to make educated choices.

These factors are to be considered in relation to the three groups most involved with information and information systems, namely, producers of information, distributors of information and the users of information.

It is with this perspective different areas of compatibility are described and discussed in the text of this Unit.

15.3 SCOPE OF COMPATIBILITY IN ISAR SYSTEMS

Computerised storage and retrieval of information poses several challenges. The choice of a system depends upon its compatibility with the existing data as well as equipment in terms of both hardware and software tools. Accordingly it has direct impact on the decision-making procedure and necessitates bench marking of existing systems and tools before adapting any one system. Further there is fast development in computer technology and it is absolutely desirable that the adapted system is upward compatible with next generation systems and tools. Perhaps the information storage and retrieval systems are most affected by the changes in the Information Technology tools as demonstrated by the profession having the experience from offline CDROM based services to online dialup (DIALOG like services) then onto web based services delivered in real time.

The profession has gone through several forms of storage of information and also several technological advances in packaging and delivering the information through existing communication methods. While the content has also evolved more into interdisciplinary nature than pure subjects; the matter of real concern of the information professionals lies in achieving compatibility firstly at the level of description, medium of storage, processors, operating system and other tools and communication tools.

15.4 AREAS OF COMPATIBILITIES IN ISAR SYSTEMS

Compatibility is promoted in areas of Information Storage and Retrieval Systems when we need some sort of co-ordination between several of them. Compatibility is to be achieved between ISARS working in different environment and conditions. For example, ISARS in USA and India are a case in point. One way is to directly convert an output of one system (A) into a form suitable for use as information to a second system (B) as for example when a computer program is written to convert the record format of A into a format that can be operated in B's computer. Another way of compatibility target among organizations is from the angle of the establishment of some type of mediating device that acts

as a kind of switching mechanism, converting an output of any participating centre into a form usable by any other participating centre. Thus, a **Common Communication Format**, can transform a processing format used by A into one usable by B (and C, D, and so on) and vice versa. An intermediate lexicon can perform the same functions between vocabulary controls of different organisations. Computer and communications have to be adopted to meet the demands of information service. For this purpose, the automation of information services makes the achievement of compatibility more important than ever before.

Information systems are normally involved in manipulating records representing information sources such as books, periodicals, periodicals articles, and other carriers of information (such as non-print or paper materials). It is in these records and the way they are handled, rather than in the physical items represented or the handling of the physical items, that compatibility is so important. This applies to records in machine-readable form.

Some of the areas of compatibility can be:

i) **Systems and Components**

The present corporate, scientific, research and academic world is knowledge hungry and information systems often contain several terabytes of data. Typically these systems do not operate offline but must make available the terabytes of information online with very efficient retrieval engines and user-friendly interfaces.

There must be both downward and upward compatibility as far as the medium as well as the data storage formats are concerned. Prescription to standards companies dealing with tools and systems is one built-in mechanism to ensure compatibility. Most leading companies ensure the compatibility while the same may not be possible for tools from smaller and more little known or super specialised companies. When selecting a storage system the information professionals are well advised of factors to be considered such as, availability, reliability, interoperability, scalability, costs, optimal performance, etc.

ii) **Record Format**

The compatibility in bibliographic record format has been a live issue during the last 30 years. The development of ISO 2709, UNISIST Reference manual, UNIMARC, MARC21 and Common Communication Format are some of the efforts in addressing important compatibility issues for international standards and representation in this field.

iii) **Data Formats**

Data format by definition is a specified arrangement for storage or retrieval. Several applications produce and interpret data only in proprietary formats. This implies that to read files produced by that application it must be obtained and installed on the system. As against this, formats such as plain text are compatible across applications and directly processible by systems. Popular examples are the computer programs. However, there are several types in binary, plain, image, video and audio formats.

Text formats can be of following types:

Simple Text, such as, texts using ASCII, ISCII, and UNICODE character codes.

Structured Text Format, such as, Standard Generalized Markup Language (SGML), Hypertext Markup Language (HTML), Extensible Markup Language (XML), etc.

Page description languages, such as, postscript, portable document format (PDF), Tex, etc.

Image formats can be of following types:

Graphic Image Files (GIF), Joint Photographic Experts Group (JPEG/ JPG/ JIF), Targa File Format (TGA), Tagged Image File Format (TIFF), Bitmap Image (BMP), etc.

Video file formats can be of following types:

Audio/Video Interleaved (AVI), Movie (MOV), Moving Picture Experts Group (MPEG/ MP3), etc.

Audio file formats can be of following types:

Audio Interchange File Format (AIF), Moving Picture Experts Group (MPEG/ MP3), Musical Instrument Digital Interface (MIDI), VOC Format, WAV Format, etc.

iv) **Media Formats**

There has been a continuous change in the handling of information due to the influence of changing technologies and techniques. Information in different forms was introduced such as microfilms and negative films, cine films and videotapes, discs and sound tapes, microcomputers and optical storage systems.

There are a number of storage media formats, such as, hard disk, floppy disk, CD-ROM, DVD, zip drive, cartage tape, pen drive, etc. that hold data for archival purpose, data backup and online systems. The storage media formats should be compatible across the computer systems, operating systems and applications, so that same data can be reusable. There are communication media formats, where data is transfered across communication media. Here sender's messages should be understood by the receiver's system. For data security reasons, sometimes encrypted data is transmitted from one system to another system. Receiver should have a mechanism to decrypt the data after authentication.

v) **Retrieval Formats**

The storage and retrieval formats generally are different. It is desirable in an IR system to provide for versatile retrieval formats as desired by the users. Generally bibliographic database management system provide for data retrieval in standard format such as AACR2 format.

Query formulation formats play an important role in helping users frame meaningful queries so that the noise factor in retrieval can be reduced. Query formulation must be aided with adequate vocabulary control devices and navigational facilities to help user formulate or re-formulate queries. Intuitive but non-intrusive assistance should be built into the querying system.

The other factor is that of display. An efficient retrieval should result in a meaningful display of the retrieved set. The display features of many search engines leave much to the imagination of end users or sometimes give unnecessary details.

vi) **Interface Compatibility**

Various compatibility issues in ISARS arise in an effort to make the search systems user friendly. The compatibility issues are :

a) can the user terminal communicate with the computer?

b) can all the databases be searched in the same way?

c) can a search strategy be transferred from one database to another?

d) are all the results obtained from ISAR's understandable to users?

e) can outputs be merged and duplications eliminated?

f) can the search outputs be stored in machine-readable form by the user?

In case where more than one computer or bibliographic/textual databases are studied, the user terminal had to communicate with each one of them. This raises the interface for compatibility of information exchange. To be user friendly search, we look to a single command language. This can help a common search through several databases.

15.5 PRINCIPAL ISSUES OF COMPATIBILITY IN ISAR SYSTEMS

The main objectives, structure and function of ISAR systems centre round the following aspects and compatibility is looked for in these aspects:

a) Generation of facts and ideas in compatibility with information requests from the searchers of the system;

b) Provide factual quantitative and qualitative data of information to meet needs for users;

c) Processes of creation, repackaging, or particular kinds of information channels;

d) Processes of creation of particular kinds of documents as communication channels as desired by searchers;

e) Processes of the flow of information carriers to the immediate communication needs;

f) Information banks, their parameters and structure, technological processes of information storage, retrieval, and dissemination;

g) Human element within the systems of originating, and using information the roles of generators, receptors, and mediators of information communication;

h) Information system elements, structural relations and behaviour;

i) Organisation, managing and controlling of information systems and networks and information between systems;

j) Technical compatibility of communication processes and operations;

k) Information languages, natural and artificial in their syntactic, semantic and pragmatic aspects.

Compatibility solutions are being searched for ISARS through multi-disciplinary approaches through the methodologies available in the fields of cybernetics, logic, semantics, linguistics, sociology, psychology, etc. These are leading to variety of cognitive paradigms for compatibility for ISAR systems.

15.5.1 Interoperability

Interoperability refers to the ability of information systems to operate in conjunction with each other encompassing communication protocols, hardware, software, application, and data compatibility layers. It also means the ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner. There are three aspects of interoperability: semantic, structural and syntactical. Interoperability is the ability of one manufacturer's computer equipment to operate alongside, communicate with, and exchange information with another vendor's dissimilar computer equipment. Service

interoperability is the possibility for different services to operate on different networks. The technical specifications at the interconnection interface determine, in part, service interoperability between different operators. Interoperability in information systems refers to the ability of two or more systems to exchange information and to mutually use the information that has been exchanged. For example, if the library OPAC records are in the ISO-2709 format and use the same bibliographic data formats such as MARC21 for bibliographic description then the two are truly interoperable and data can be freely exchanged between the two.

15.5.2 Scalability

Information explosion is indeed a clichéd term in the information service profession as 100 Terabyte online libraries are most common and being added everyday. Several databases are being replicated for disaster recovery and network contingencies. Hence a system designed for such information systems must be scalable to support large databases and still work at an optimal speed of retrieval.

Self Check Exercises

1) Identify the principle issues of compatibility of ISAR system.

2) What is Interoperability?

Note: i) Write your answers in the space given below.
ii) Check your answers with the answers given at the end of this Unit.

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15.6 COMPATIBILITY OF ONLINE IR SYSTEMS

Web has remarkably influenced transactions on the Net and made it truly interoperable. In the sense that when we are browsing the net and click on links and navigate between sites we seldom bother to know what operating system the distant machine may have because in the web environment it really does not make a difference. Hence, even if the library automation software or digital library software is configured on a UNIX platform the end users operations can be through web browsers so that users can be comfortable in familiar environment. Online IR systems are adhering to international and world standards to achieve true interoperability. MARC21 standard is followed for library catalogues. Most tools developed for data exchange between libraries are also geared up to the MARC21 standard.

15.6.1 Z39.50 Standard and Protocol

Z39.50 standard and protocol enables exchange of bibliographic record between libraries even though they may have different description standards. The standard is designed to facilitate interoperability between computer systems whether on Internet or on Intranet. The protocol does not deal with aspects of interaction between user and the origin or target machine. It only deals with interaction between origin and target machine. The essential functions are searching and retrieving information from databases available on multiple hosts. The protocol basically specifies data structures and interchange rules that allow a client machine (origin) to search databases on a server machine (target) and retrieve records.

In a typical implementation of Z39.50, the origin and the target should somehow translate their messages into a common language. Both the origin and target should be Z39.50 compliant. The origin's search query should be mapped as Z39.50 query. On the target side the Z39.50 query should be mapped as its database query and the results are presented.

The Z39.50 standard does not broadcast searches to multiple servers, but a client can open Z39.50 sessions with multiple servers either sequentially or simultaneously. However, manipulating multiple results from different targets, removing duplicates and presenting retrieved records in a uniform fashion to the end-user are not covered by the protocol [http://lcweb.loc.gov/z3950/].

On the target side, the Z39.50 gateway resides on the web server (like Apache or IIS). In addition, browser-based implementations using either Java or Active X applets reside on the target and are to be downloaded to the user's machine.

As no two databases are expected to be alike with regard to the structure (data elements) and searchable fields, it is required to develop a common abstract model of the target databases. The model should contain the abstract data structure (schema) having the data elements like author, title etc and also the searchable elements as all data elements need not be indexed.

Although Z39.50 is not a database indexing standard, Z39.50 profiles developed for specific communities require a commonly agreed upon database indexing standard. These profiles normally include a minimum set of access points and they should be supported by the database indexes to ensure interoperability between target systems.

The Z39.50 protocol also helps in:

- identifying the characteristics of the server data base; and
- locating the databases distributed across the Internet.

15.6.2 Interoperability of Online Repositories

In the area of Internet resources, Dublin Core (DCMES) is followed as a world standard for description of web resources. The Dublin Core metadata standard is a simple, yet effective element set for describing a wide range of networked resources. The Dublin Core standard comprises fifteen elements, the semantics of which have been established through consensus by an international, cross-disciplinary group of professionals from librarianship, computer science, text encoding, the museum community, and other related fields of scholarship. The Dubline Core has been discussed in Block 2 of this course.

To enable meaningful retrieval by search engines it is necessary to semantically enrich the web resources. The OAI-PMH (Open Access Initiative – Protocol for Metadata Harvesting) advocates a simple set of rules for exposing metadata of digital repositories to search engines so that meaningful retrieval is possible. A Static Repository is an XML file that is made accessible at a persistent HTTP URL. The XML file contains metadata records and repository information. A Static Repository becomes accessible via OAI-PMH through the intermediation of a Static Repository Gateway.

The Open Archives Initiative (OAI) has focused on developing a framework where metadata can be harvested from multiple digital library collections or 'repositories'– and can then be loaded into a centralised service. The result is a database of metadata records that has been built from multiple, related repositories. Then, as users search the new database and select metadata records that interest them, the service provides links that allow them to view the

corresponding object on the original repository [Breeding, 2002]. In general terms, this relates to enabling general search engines to search OAI complaint database and retrieve information from structured databases or library collections in addition to searching plain HTML pages.

Compatibility is a concept. No specific method can be prescribed for achieving compatibility. In whatever way two or more systems can be developed by which it is possible to share and interchange the resources decide the methodology.

15.7 APPROACHES TOWARDS COMPATIBILITY IN ISARS

Some of the methodologies that can be seen are:

i) theory of scientific information as an instrument for organisation, management and control of the sources of human knowledge search of compatibility through epistemology function;

ii) structural compatibility of information of a new general method of science studying the diffusion of information from the point of view of generation, circulation and operation of information associated with human development phenomena;

iii) information system analysis and synthesis;

iv) content analysis and transfer of semantic content (not only measuring the ratio and the amount of transferred information);

v) methods of bibliographic organisation and control of human knowledge;

vi) specific techniques and methods for selection of relevant information;

vii) process of reduction and surrogation without loss of intellectual content of information.

15.7.1 Multi-Task Approaches

In compatibility process of ISARS, a multi-task approach can be delineated as follows:

i) All specific fields of information and communication activities, namely the methods, techniques, and organisation (including institutional, regional and national cooperation) of generation (handling and processing), storage, search and dissemination of information contained in the documents;

ii) Problems of effectiveness, scientific character standardization, and legal aspects of information and documentation;

iii) Information and documentation promotion activities;

iv) The history of information and the scientific compacting processes;

v) The essence, structure, and dynamic regularities and also interrelationships between different variety of sources of documented information; and

vi) The essence, structure, and dynamic regularities of information seekers' needs in information contained in documents and specific methods for study and classification of these structures.

Automation is considered as a solution to handle the vast information storage and retrieval process. But introduction of even the most efficient computer together with the necessary communication and reprographic automation and consequently creation of man-machine systems in social information may raise many new intellectual, socio-psychological, neuro-physiological and other problems, that can be solved by cooperation of researchers and practitioners from different fields of knowledge.

Self Check Exercise

3) Enumerate different tasks involved in compatibility process of ISARs.

Note: i) Write your answer in the space given below.
ii) Check your answer with the answers given at the end of this Unit.

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15.7.2 Interactive Planning

Interactive planning has several principles which may facilitate compatibility process between ISAR systems. The process of planning is more important than the actual plan produced. The first principle is the participation process. The idea is that all those who are likely to be affected by the systems should be in the systems planning and development. It leads to coordinated activity leading to organizational integration and motivation. These lead on to the compatibility.

The second principle is that of continuity. The participants, particularly of ISAR systems need change over time and this will necessitate corresponding changes in plans. Surprise events may occur, chaos will emerge. The system may not work as planned or other changes in the organization environment may change the situation in which it finds itself. Thus, principle of continuity should constantly search for compatibility, based on a continuous feedback of changes.

The final principle is the holistic principle. The compatibility process should emphasize simultaneity and inter-dependence for parts and levels of the system. This leads to a principle of coordination which states that units at the same level should plan together and at the same time because it is the interactions between units rather than interdependent actions that give rise to most difficulties; and the other principle is the "principle of integration" which insists that units at different levels plan simultaneously and together, because decisions taken at that level usually have effects on the other systems.

The interactive planning methodology operates in five phases namely:

i) Formulating of the Mess

ii) Ends Planning

iii) Means Planning

iv) Resource Planning

v) Implementation and Control

Formulation of the Mess

It consists of identifying and analysing the problems of opportunities, prospects and organisation for achieving the objective. According to Ackoff, it has three types of projections.

a) System analysis: giving detailed picture of the organisation and how it works, whom it affects and how, and its relationship with its environment;

b) An obstruction analysis: setting out any obstacles to corporate network system developments; and

c) Preparation of reference projections: which extrapolate on the system's present performance in order to predict future performance. If nothing is done, trends in the environment continue as they are.

Synthesising the results of these three types of study yields a reference scenario which is formulation of the mess currently in.

Ends Planning

It concerns with specifying the ends to be achieved in terms of the ideals, objectives and goals. The process begins with 'idealised design' which is both unique and the most essential feature of Ackoff's approach. An idealized design is prepared by going through the following steps:

a) *Selecting a mission* — which is general purpose statement incorporating organisation's responsibilities to its environment and propounding a vision of what the organisation could be like which generates commitment;

b) *Specifying desired properties of the design* — a comprehensive list of the desired properties which users agree to be built into the system; and

c) *Designing the system* — setting out as to how all the specified properties of the idealised design can be achieved.

An idea-seeking system requires a particular kind of organisational design capable of rapid and effective learning and adaptation. Ackoff provides an outline for such a 'responsive decision system'. This contains five essential functions:

a) Identification and formulation of problems (Threat/Opportunities);

b) Decision-making – determining what to do abut the threats and opportunities;

c) Implementation – doing it;

d) Control and monitoring performance and modifying actions to prevent repetition of mistakes; and

e) Acquisition or generation and distribution of the information necessary to carry out the other functions.

Those organisations willing to undertake idealized design should, according to Ackoff, reap considerable benefits. In particular, the process is said to control compatibilities by means such as :

a) Facilitate the participation of all users in the planning process;

b) Allow incorporation of aesthetic values of the information users in the planning of ISARS;

c) Generate consumers among those who participate;

d) Release large amount of suppressed creativity and harness it to the advantage of individual and organisational development;

e) Expand participant's concept of feasibility revealing that the biggest obstruction to the future we most desire ourselves; and

f) Ease of implementation, since people are more inclined to implement plans in which they have a say.

Means Planning

It is the third phase after the reference scenario (phase I) and idealised design (phase II). During phase III, means planning, policies and proposals are generated and examined with a view to decide whether they are capable of helping to fill the gap between the desired future and the way future looks like at the beginning.

Creativity is needed to discover ways of bringing the organisation towards the desirable future, invented by its users. Alternative means to reach the specified ends must be carefully evaluated and selection made. Compatibility issues are to be looked with greater care and vision.

Resource Planning

During the stage of planning, Ackoff recommends that four types of resource should be taken into account :

a) Inputs — materials, supplies, energy and service

b) Facilities and equipment — capital investments

c) Personnel

d) Money

These are to be interacted and analysed with the means adopted in the earlier phase. Compatibility factors for ISAR get into a critical stage in this phase.

Implementation and Control

This final phase of interactive planning concerns itself with the implementation of decisions made in the earlier stages. Who is to do what, when, where and how implementation is continued, should be monitored and with feedback process.

Self Check Exercise

4) Enumerate the resources that are to be considered for compatibility during the Resource Planning Phase.

Note: i) Write your answer in the space given below.
ii) Check your answer with the answers given at the end of this Unit.

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15.8 QUALITY CONTROL AND COMPATIBILITY

The overall compatibility issues in ISAR systems ultimately centre-round quality concepts. Here we can quote Manfred Kochen [1976] : "An information system may be used but not be useful; it may also be useful and not used. It may even be neither useful nor used. It is ideal if it is both used and useful".

Compatibility keeps close with standards. Standards base themselves on measures of quality and quantity. The following quotations from Daniel [1993] indicate the studies on these aspects. To assess feasibility and desirability, quality control issues as applied to the organisation as a whole, will be reviewed. Lessons gleaned from this material will be applied first to qualifying issues dealing with the selection and indexing of documents for inclusion in a database that is, what determines quality in the development of a product or service on the input side. The second aspect of quality control of documents focuses on throughout, that is what determines quality in maintaining currency, and relevancy within the collection of databases.

A third assessment of quality relates to the selection of material from a collection or database in response to a user's need, that is, what determines quality on the output side in the delivery of a product or service. We can further quote Daniel on the quality control to emphasise its correlation to compatibility.

The adoption of a TQM orientation to quality demands emphasis on customer defined standards, where customer is interpreted to mean whoever is the receiver of a product or service, whether internal or external, quality must be judged by the customer. The quality management approach focuses on finding and reducing causes of variation that occur in the systems used to produce the results. We must form partnerships with all other participants in the chain of database producer to end-consumer and plan a total system commitment to continuous quality improvement.

15.9 SUMMARY

Compatibility of Information Storage and Retrieval Systems (ISARS) refers to the property that facilitates two or more organisations to communicate and exchange data. Compatibility between ISAR systems are judged on the basis of the structure and functions performed by the system.

Thus, during the intermediary interaction with the searcher one builds a typology of user model. The interpersonal communication of intermediary with potential users is very important. Usually, the educational level of the users, the type of question, the way the question is phrased, the purpose of the search, and the expected result of search – all play a major role in information service. The intermediary, in essence, builds a user profile and specifies the task requirement process. The user-modelling has played an important role in tuning the database they are having in action. An intelligent interface for document retrieval systems should exhibit for interaction with users and the reaction obtained for improvement of database searching. Frame-based representation does help in defining user modeling and provides pre-search and post search productivity. We can also build models of typical or untypical users, develop stereo types wherever possible and provide interconnection to their information needs and a dialogue with colleagues.

Compatibility of ISAR systems can be achieved either by coordination among several systems or through some mediating device. The mediating device acts as a switching mechanism which converts data output of one centre into a form usable by any other participating centre. The Common Communication Format (CCF) is one such example of a mediating device.

To achieve compatibility of ISAR systems it is essential that they are based on certain set standards. Standardisation of various structure and functions of ISAR system can help in achieving quality. The utility of ISAR systems depend on the compatibility and quality aspects, which can only be achieved through standardisation. ISO 2709, UNISIST Reference Manual, UNIMARC and Common Communication Format, Z39.50, Dublin Core are some of the examples of international standards that focuses on compatibility issues.

Compatibility is essential for information exchange. With increasing storage of information in machine-readable formats and dissemination of information on the multimedia format, compatibility is becoming an important issue. Compatibility aspect needs to be tackled right from the planning stage of the information systems and interactivity between different system in essential to make communication and exchange of ISAR systems possible.

15.10 ANSWERS TO SELF CHECK EXERCISES

1) The compatibility of ISAR systems should be based on :
   i) users need for information
   ii) processing of information and documents according to the user needs
   iii) flow of information carries to immediate information needs
   iv) storage, retrieval and dissemination aspects of information banks
   v) human element as generator, mediator, and user of information
   vi) information system elements
   vii) management of information system
   viii) technical compatibility of communication process and operation
   ix) information languages used.

2) Interoperability refers to the ability of information systems to operate in conjunction with each other encompassing communication protocols, hardware software, application, and data compatibility layers. It also means the ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner. Interoperability in information systems refers to the ability of two or more systems to exchange information and to mutually use the information that has been exchanged. For example, if the library OPAC records are in the ISO2709 format and use the same bibliographic data formats such as MARC21 for bibliographic description then the two are truly interoperable and data can be freely exchanged between the two.

3) The different tasks involved in the compatibility of ISAR systems are :
   i) Methods, techniques and organisation involved in generation, storage, search and dissemination.
   ii) Dealing with problems like standardisation, legal aspects, effectiveness etc.
   iii) Promotional activities
   iv) Scientific compacting processes
   v) Compatibility between variety of sources of information
   vi) Matching of information needs of the users with the information contained in the documents.

4) The four types of resources needs to be taken into consideration while planning for ISAR systems. They are :
   i) Inputs — materials, supplies, energy and service
   ii) Facilities and equipment — capital investment
   iii) Personnel
   iv) Money

15.11 KEYWORDS

Common Communication Format (CCF) : It is bibliographic exchange format useful for libraries and information centres developed by UNISIST.

Compatibility of Information System : Adaptability of Information Systems in various environments.

Dublin Core : A set of 17 elements prescribed for description of web resources

Interoperability : Interoperability refers to the ability of information systems to operate in conjunction with each other encompassing communication protocols, hardware software, application, and data compatibility layers.

TQM : Total Quality Management is a modern technique of quality management and quality assurance that takes care of performance of whole system and its components or subsystems.

UNIMARC : Universal machine-readable catalogue — a standard development under the auspices of a working group set up by IFLA.

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