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# Introduction to library standards and the players in the field

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*What are standards? Have you ever wandered why so many standards begin with "Z"? The present article wishes to provide an answer to these and many other questions you always wanted to know about standards. Standards can be* de jure, de facto *and proprietary, though there is not always clear cut as to which category a standard belongs to. In the area of librarianship and information management, many standards are guidelines advising particular practices: the subject which they seek to standardise is not one which has to be uniform for the situation to work. Standards are often conceived by professional associations or national institutions needing to promote standard methodologies within their constituency. They are then proposed to a national standards body before being offered to ISO for international standardisation. In the library and information field, the interest lies in each country's own national standard, in ISO standards and in NISO standards, which though American national standards sometimes get used internationally. Standards in the field can be grouped by their applications: describing and identifying information resources, information exchange, managing collections, and delivering services. The article provides an overview of the main standards in use in these four areas of work, and of the bodies which developed or adopted them. As a conclusion, the author looks at standard development in emerging areas such as RFID technology and metadata. Standards are an important part of library and information work, and will become even more so in a increasingly connected electronic environment. Library and information professionals will need to understand which standards apply to their work, and will have to play a significant role in the development of standards concerned with information management and retrieval.*

## Introduction

Have you ever wondered why so many standard numbers begin with "Z"? Z39.50, which is often referred to as "Search and Retrieve" is the best known but there are also (to mention just two examples) Z39.71 *Holdings statements for*

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*bibliographic items* and Z39.48-1992 (R2002) *Permanence of paper for publications and documents in libraries and archives.*

If you read on you will find the answer to this and many other questions you always wanted to know about standards.

What are standards? Amongst standards you will find that some are *de jure*, some *de facto* and others *proprietary*.

To deal with *de jure* first, which means "according to the law", within almost every country there is one organization tasked with being the national focal point for standards. In some countries this has a legal status as being part of national law, in others the body acts by common consent. In the United States there is a body for each industry which has responsibility delegated from the American National Standards Institute (ANSI). In the field of library and information this is the National Information Standards Organization (NISO), which covers also archives, records management, museums and some areas of publishing. In the United Kingdom, the situation is clearer because the British Standards Institution (BSI) deals with all areas of standardization. Standards which are approved by BSI have to go through various procedures to ensure that they are really the consensus and technically sound and then they have a certain status, in some fields a legal status if enshrined in law – but it is the law that endows that – though in the case of library standards they are generally advisory or recommendations for good practice. In Germany the standards body is DIN (remember films used to be labelled 100 ASA/21 DIN, not to mention DIN plugs for cabling) and in France it is AFNOR. All these bodies are members of the International Organization for Standardization (ISO) and more of that relationship later.

Many practices are governed by standards which appear no different for the most part from a *de jure* standards but which have not been through the procedures required of a national body or ISO. They may have been through equally rigorous procedures and may be under the auspices of a national institution that leas the field or a professional society. MARC (Machine Readable Cataloguing) is such a standard. Most likely MARC is a national standard somewhere because many countries have their own national MARC standard, but the almost defunct UK MARC has never by itself been a British Standard, purely a document produced by the British Library for its own system needs and because the British Library produced the records for others to use in their catalogues it became a *de facto* standard. MARC 21 started out as LC MARC (Library of Congress MARC) and later became US MARC. Now it is MARC 21 but all along it has been the joint work of the Library of Congress and a committee known as MARBI (American Library

Association's Machine Readable Bibliographic Information Committee). Having said this, the record structure of MARC is a standard, and has been from the very early days, initially a NISO standard and then adopted as an international standard.

There is no legal distinction between a *de facto* standard and a proprietary standard. A good example of proprietary standards are the "rules" which govern the way that a range of the features of Microsoft Windows work. These features may require, for example, a certain design for a mouse; drop down menus work in particular way. Software and hardware designers need specifications for these features so that they can develop further tools for these systems. The specifications are available but they do not have the status of standards though they have the same force of standards. These features were not agreed by any international committee but they are nevertheless used in many systems around the globe. They would appear to have the status of standards but are purely the development of one company, Microsoft and no doubt were "standardised" by Microsoft developers rather than any formally established committee.

It is not always clear cut as to which category a standard belongs. In the area of librarianship and information management, many standards are guidelines advising particular practices; the subject which they seek to standardise is not one which has to be uniform for the situation to work. Take BS 1629 which indicates how bibliographical references should be made; it is a variant of other "standards" such as Harvard or MLA which are proprietary. Cataloguing codes such as AACR are related in their function; like Harvard rules AACR has never been made into a formal standard though it has the same effect. However, in the late 1970s, there was a move to make the ISBD (International Standard Bibliographical Descriptions) into a formal international standard. ISBD is a set of rules for the descriptive part of the cataloguing record (as opposed to the access points or headings). These are intended to be incorporated into national cataloguing codes. In certain countries, particularly in the eastern European countries at that time, in order that this incorporation could be mandated, their legislation required that the ISBDs be enacted as international standards. In the case of the ISBDs, this was never achieved. When an international standard is under development, it has to go through certain procedures to ensure that it meets approval. During these procedures in the case of the ISBDs, the committees wished to make certain changes to the document that were not acceptable to the Committee of the International Federation of Library Associations (IFLA) that had developed the standard in the first place. The IFLA group who had rather reluctantly proposed the standard withdrew it from the international standardisation process. IFLA of course had already gone through its own rigorous procedures to develop the standard.

So far we already have a flavour of the organizations involved in standards making in our field but not a complete picture. Standards are made by standards bodies at both the national and international level, they are often initiated by professional associations and by national institutions. How do standards come into being? Often they are conceived by professional associations or national institutions needing to promote standard methodologies within their constituency. They are then proposed to a national standards body before being offered to ISO for international standardisation. Sometimes a national standards body may feel the need to cooperate in the development of a certain standard with other countries and will propose it initially as an international standard. To get this approved it is necessary to propose it to the appropriate ISO committee as a New Work Item. This then has to be voted on, and if there is a majority work can begin. Having said that, there have to be at least three countries involved. Currently, NISO is being very productive in developing standards, and they often invite representatives from outside the US to participate in their working groups. Nevertheless this does not give them an official international status, but it eases the path to subsequent adoption as an international standard if a standard has been given international consideration. The DCMES (Dublin Core Metadata Element Set) is an example of a document with the status of a *de facto* standard. This was then accepted as a NISO standard before being accepted as an ISO Standard. It is now incidentally a British Standard. Instead of having its own numbering in the BS series it is given an identifier BS ISO 15836 to indicate that it is approved as a British Standard.

In the library and information field, we are interested only in our own national standards, ISO standards and NISO standards, which though American national standards sometimes get used internationally. Other countries' standards become usually ISO standards when they are of international interest or application. National standards bodies and ISO have committees which deal with standards making in the field which is referred to officially as Information and Documentation. This covers librarianship, archives, records management, museum documentation and certain aspects of the publishing industry. In British Standards, for example, the committee that oversees this is IDT/2 and this has various subcommittees as in figure 1.

IDT/2 Information and documentation (responsible for oversight of the area)
IDT/2/1 Bibliographic references and descriptions
IDT/2/2 Indexes, filing and thesauri
IDT/2/7 Computer applications in information and documentation
IDT/2/9 Document preservation
IDT/2/10 Technical manuals
IDT/2/11 Coding of country names and related entities

IDT/2/15 Library and publishing statistics
IDT/2/17 Archives/records management
IDT/2/18 Identifiers and metadata

Standards can be grouped by their applications:

– describing and identifying information resources;
– information exchange;
– managing collections;
– delivering services.

## Describing and identifying information resources

Perhaps the most fundamental area of standards work for libraries is when it comes to identifying and describing information – whether it is books in a catalogue or information resources on a Web site.

Many library and information standards are guidelines advising particular practices. Take British Standard BS 1629:1989 *Recommendations for references to published materials,* which indicates how bibliographical references should be made. There are proprietary standards such as Harvard rules to which it is related as well as to ISO 690:1987 *Bibliographic references – content, form and structure* and ISO 690-2:1997 *Bibliographic references Part 2 – Electronic Documents or parts thereof*. Cataloguing codes such as AACR2 are related in their function; like Harvard rules AACR2 has never been made into a formal ISO standard though it has the same effect. Guidance for authors, publishers and editors also comes from: BS5605:1990 *Recommendations for citing and referencing published material* and BS6371:1983 *Recommendations for citation of unpublished documents*.

Some standards are used to describe the subject content of information resources and are widely used beyond the library and information domain. For instance, ISO 639-1:2002 and ISO 639-2:1998 deal with two-letter and three-letter codes respectively for languages. ISO 3166-1:1998 *Codes for the representation of names of countries and their subdivisions – Country codes* are used as the two-letter codes in URLs to designate country of origin. Fortunately these codes were originally developed long before the Internet age or else no doubt a small country such as Tuvalu would never have been given TV, the selling of which earns it half its Gross National Product!

Many librarians are concerned with classifying and indexing information resources, or developing vocabularies and classifications for specialist collections.

Some of the general classification systems such as DDC (Dewey Decimal Classification), UDC and the Root Thesaurus are actual standards or, in the case of DDC, *de facto* standards. The British Standards Institution publishes the English-language versions of the complete and abridged UDC (Universal Decimal Classification), as well as the online version, so it has authority of a British Standard.

Standards that cover indexing include ISO 5963:1985 *Methods for examining documents, determining their subjects, and selecting index terms* and the related British Standard BS 6529:1984 *Recommendations for examining documents, determining their subjects and selecting indexing terms*. Arranging indexing and items in catalogues are covered by ISO 999:1996 *Guidelines for the content organization and presentation of indexes* and ISO 7154:1983 *Bibliographic filing principles*.

Thesaurus development is an area of considerable activity where the BSI is taking a leading role internationally. The long-established ISO 2788:1986 *Guide to Establishment and Development of Monolingual Thesauri* has been superseded in the UK by BS 8723-2:2005 *Structured Vocabularies for Information Retrieval: Guide: Thesauri* to incorporate some of the lessons that have been learnt from applying thesauri in machine-readable environments. The second standard is ISO 5964:1985 *Guidelines for the establishment and development of multilingual thesauri*. Also of note is ISO 1987-1:2000 *Terminology work – Vocabulary – Part 1: Theory and Application.*

The International Organization for Standardization has a number of Technical Committees and Subcommittees. One such, Technical Interoperability in Information and Documentation ISO TC 46/SC 4, also oversees ISO 15511:2003 *International Standards Identifier for Libraries and Related Organizations (ISIL)* and a number of data element directories which cover inter-library loan, acquisitions, information retrieval and circulation applications and data elements for the exchange of cataloguing and metadata.

Identifiers and metadata are covered by a subcommittee entitled identifiers and Description, ISO TC 46/SC 9. The bulk of the standards of SC 9 relate to international numbering. The best known of these is ISO 2108:2005 *International Standard Book Number (ISBN)* which has grown from 10 to 13 digits in the latest standard. ISO 3297:1998 *International Standard Serial Number (ISSN)* is currently under revision. Other important identifiers are: ISO 3901:2001 *International Standard Recording Code (ISRC)*, ISO 10444:1994 *International Standard Technical Report Number (ISRN)*, ISO 10957:1993 *International*

*Standard Music Number (ISMN)*, ISO15706:2002 *International Standard Audiovisual Number (ISAN)* and ISO 15707:2001 *International Standard Musical Work Code (ISMWC)*.

On the Internet, Dublin Core has been widely adopted as a standard for describing Web content. This metadata standard originally arose from an open, informal international collaboration and became a *de facto* standard. It was then adopted as a NISO standard and is now an international standard, ISO 15836:2003 *The Dublin Core metadata element set*.

## Information exchange

When exchanging information between systems, standards are essential. This is important for interoperability (where different systems are involved in a single transaction or series of transactions) and for migration of data to new systems. Many libraries now require their library management systems to be able to handle UNIMARC or MARC 21 records, for instance. This allows libraries to migrate their catalogues on to new systems, regardless of manufacturer and to purchase standard bibliographic records from vendors. MARC was originally designed for the mass production of library catalogue cards, in the days when data processing was done on mainframe computers and access was severely limited. All the MARC formats conform to ISO 2709:1996 *Format for information exchange*.

MARC is very specifically aimed at producing catalogues, but in the last decade or so the book trade sector has become interested in bibliographic records for a wider range of functions. A standard known as ONIX has been developed by The International Group for Electronic Commerce in the Book and Serials Sectors (EDItEUR). Again, as in the case of MARC, this is a *de facto* standard and used generally across the sectors though it has never been formalized as an international standard. The record structure used is XML. This is a record structure used widely across many sectors unlike ISO 2709 which is used only in library data processing. Earlier EDItEUR worked with EDI for the book industry which was based on ISO 9735: *Electronic data interchange for administration, commerce and transport (EDIFACT)* which was developed outside the book trade by commerce in general and was originally sponsored by the United Nations In the UK, Book Industry Communication (BIC) is the lead body in these activities spanning the library world and the book trade.

One of the most often talked about of standards in the library field is the NISO standard Z39.50-2003 *Information retrieval: application service definition and protocol specification* (also adopted an international standard ISO 23950) which

allows the development of virtual union catalogues. Z39.50 develops standard protocols for searching which can be incorporated into a search engine (in an OPAC or library management system, for instance) to search other catalogues even though they may be mounted on different systems. NISO has also produced Z39.88-2004 *OpenURL Framework for Context-Sensitive Services,* which enables catalogues of books and journal articles or lists of bibliographical references to link to a preferred source for an electronic resource which is available at more than one location.

There are several international standards which cover the way in which characters are coded and transliterated. The Unicode standard is based on the character set of ISO/IEC 10646:2003 *Universal Multiple-Octet Character Set (UCS)* which allocates a computer code for the representation of the majority of the world's scripts. This is based on ASCII (an equally important ANSI standard) which allocates numeric values to each character in the Latin alphabet, so that @ gets a value of 64, A of 65, and a of 97. The library world was first in the field in requiring non-Latin scripts to be produced by computers and the ISO Technical Committee 46 which deals with libraries and information science is responsible for standards for transliteration of non-Latin scripts:

ISO 9:1995 *Transliteration of Cyrillic characters into Latin characters*
ISO 233:1984 *Transliteration of Arab characters into Latin characters*
ISO 259:1984 *Transliteration of Hebrew characters into Latin characters*
ISO 843:1997 *Transliteration of Greek characters into Latin characters*
ISO 3602:1989 *Romanization of Japanese (Kana script)*
ISO 7098:1991 *Romanization of Chinese*

Metadata is a key resource for information exchange and apart from Dublin Core, there are standards dealing with the exchange of metadata: ISO 8459-5:2002: *Bibliographic data element directory – Part 5: Data elements for the exchange of cataloguing and metadata*; and ISO/IEC 11179-1 to -6 *Metadata Registries (MDR)*.

## Managing collections

Collection management includes standards for conservation, management of processes and housing of collections.
Some aspects of this are covered by:

ISO 11108:1996 *Archival paper. Requirements for permanence and durability*
ISO 11799:2003 *Document storage requirements for archive and library materials*

Records management has been the focus of considerable activity in recent years and the current international standard based on the Australian national standards was published in 2001:

ISO 15489-1:2001 *Records management – Part 1: General*
ISO/TR 15489-2:2001 *Records management – Part 2: Guidelines*

And more recently:

ISO 23081-1:2006 *Records management processes. Metadata for records. Part 1: Principles*

Many libraries have started using RFID tags to manage circulation and loans. Several standards are emerging for bibliographic data on RFID tags; and there is as yet no international consensus on the issue. Some manufacturers are also concerned about keeping a competitive edge with their proprietary systems and are applying for patent protection before a standard is agreed. NISO is currently investigating this area and the Danish Standards Institute has probably gone furthest in developing a standard for bibliographic data held on RFID tags. An ISO TC46 working group is developing a standard data model for encoding information on RFID tags used in libraries and it is likely that a new international standard will eventually emerge.

## Delivering services

Several countries have worked on standards for service delivery. For instance the UK Department for Culture, Media and Sport (DCMS) has published Public Library Standards (http://www.dcms.gov.uk). In order to monitor service delivery, performance measures have been developed and there are several ISO standards for performance measures specifically aimed at libraries:

ISO 11620:1998 *Library performance indicators*
ISO 11620 Amd.1:2003 *Library performance indicators. Amendment 1: Additional performance indicators for libraries*
PD ISO/TR 20983:2003 *Performance indicators for electronic library services*

Performance indicators for electronic library services are rapidly developing and are dealt with comprehensively in *E-Metrics for library and information professionals* (Facet Publishing, 2005).

Many sectors monitor library performance and produce library statistics – see ISO

2789:2003 *International library statistics*. UNESCO (http://www.unesco.org) produces a series of statistics, as do several bodies in the UK such as LISU (http://www.lboro.ac.uk/departments/ls/lisu), SCONUL (http://www.sconul.ac.uk) and CIPFA (http://www.cipfa.org.uk).

## Where are standards going?

Standards will continue to consolidate in emerging areas such as RFID technology as it becomes more widely adopted in libraries. There will be more development of standards concerned with information exchange as the Internet develops and we see new ways of operating on Web 2.0. Metadata in particular has developed in the last five years in response to new demands placed on electronic information systems and no doubt new metadata schemas will begin to emerge in new areas of application.

Standards are an important part of library and information work and in an increasingly connected electronic environment we believe that they will become even more so. Library and information professionals will need to understand which standards apply to their work. Even more importantly they will have a significant role to play in the development of new standards concerned with information management and retrieval.

*Cosa sono gli standard? Vi siete mai chiesti perchè così tanti standard cominciano con "Z"? Questo articolo intende fornire una risposta a questo e a molti altri interrogativi che avete sempre voluto conoscere. Gli standard possono essere* de jure, de facto *e proprietari, sebbene non sia sempre possibile determinare con precisione a quale di queste categorie uno standard appartiene. Nel campo della biblioteconomia e dell'information management, molti standard costituiscono delle linee guida che forniscono consigli su determinate attività: cercano di standardizzare oggetti che, all'atto pratico, non devono essere necessariamente uniformi. Spesso gli standard vengono elaborati da associazioni professionali o istituzioni nazionali che hanno la necessità di promuovere le metodologie standard nell'ambito dei loro associati. Successivamente vengono sottoposti a un organismo nazionale di standardizzazione prima di essere trasmessi all'ISO per la realizzazione dello standard internazionale. Nel campo delle biblioteche e dell'informazione, l'attenzione si concentra sugli standard nazionali di ciascun paese, sugli standard ISO e sugli standard NISO che, sebbene siano standard nazionali americani, vengono talvolta usati in campo internazionale.*

*Gli standard in questo campo possono essere raggruppati secondo le loro applicazioni: descrivere e identificare le risorse informative, lo scambio di informazioni, la gestione delle collezioni e la fornitura di servizi. L'articolo fornisce una panoramica degli standard principali utilizzati in queste quat-*

*tro aree di attività insieme agli enti che li sviluppano o li adottano. Per concludere, l'autore getta uno sguardo allo sviluppo di standard in settori emergenti quali la tecnologia RFID e i metadati. Gli standard costituiscono una componente importante del lavoro nel campo delle biblioteche e dell'informazione e lo diventeranno ancora di più in un ambiente sempre più connesso elettronicamente. Gli operatori professionali delle biblioteche e del settore dell'informazione avranno bisogno di comprendere quali standard trovano applicazione nel loro lavoro e quindi giocheranno un ruolo significativo nello sviluppo di standard implicati nell'information management e nell'*information retrieval.

*Qu'est ce que les standards? Vous êtes-vous jamais demandés pourquoi un nombre si élevé de standards commencent par «Z»? Le but de cet article est répondre à cette question et aux nombreuses questions que vous vous êtes posés au sujet des standards. Les standards peuvent être* de jure, de facto *et propriétaires, quoiqu'il ne soit pas toujours possible d'établir avec précision la catégorie à laquelle un standard appartient. Dans le domaine de la bibliothéconomie et de l'information management de nombreux standards constituent les directives qui fournissent des conseils sur des activités précises: ils tentent de standardiser des objets qui, dans la pratique, ne doivent pas forcément être uniformes. Les standards sont souvent élaborés par les associations professionnelles ou les institutions nationales qui doivent promouvoir des méthodologies standards pour leurs associés. Ils sont par la suite évalués par un organisme national de standardisation avant d'être transmis à l'ISO pour la réalisation du standard international. Dans le domaine des bibliothèques et de l'information, l'attention se focalise sur les standards internationaux de chaque pays, sur les standards ISO et sur les standards NISO qui, bien qu'il s'agisse de standards américains nationaux, sont parfois utilisés dans le domaine international.*
*Dans ce domaine les standards peuvent être regroupés selon leurs applications: décrire et identifier les ressources informatives, l'échange d'informations, la gestion des collections et la fourniture de services. Cet article offre un panorama des principaux standards utilisés dans ces quatre aires d'activités ainsi que des organismes qui les développent ou qui les emploient. Pour conclure l'auteur jette un regard sur le développement des standards dans des secteurs émergeants tels que la technologie RFID et les métadonnées. Les standards sont une composante importante dans le domaine des bibliothèques et de l'information et ils le deviendront encore plus dans un milieu de plus en plus connecté électroniquement. Les opérateurs professionnels des bibliothèques et du secteur de l'information auront besoin de repérer les standards qu'ils appliqueront dans leur travail et qui joueront donc un rôle important pour le développement des standards impliqués dans l'information management et dans l'*information retrieval.