CANONICAL CONCEPTS OF CONTENT MANAGEMENT – *PROSPECTS IN RETROSPECT*

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Content is the indispensable essence of information. In communication of information, content delivery in right format implies receivers' acceptance of the communication. The content creation precedes content development and management. One of the primary functions of LIS professionals has been in the vocation of content creation, development and its management since long time, and been the objective of its preservation for posterity. Documentation in early 1960s emerged as a technique in this regard and the LIS professional imbibed and practicing it, though with changes in its scope and innovative techniques. The growth of information exploded with varieties of forms of content which is conceived as one of the components of the 'Document' which identified new functions "documentation work and service". Since the invention of movable type of printing and to the advent of the Internet and WWW that has been extended to new formats – hypermedia and digital content, the function of content development and management has become part and parcel of LIS professionals. So in this paper, the author provides an account of generic view of content development and its management and the future prospects in store for the LIS professionals.

Keywords : ***Content Creation, Content Development, Content Management, Professional Skills***

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1. Introduction:

The word "Content" has many meanings, connotations, veritable expressions and formats of presentation are used in different fields of study and context. The word "content" is often used colloquially to refer to media (Wikipedia). However, content is more accurately used as a specific term in that it means the content of the medium rather than the medium itself. But in the context of information it is conceived as 'subject matter or substance or the essence of information" (wiktionary). The field like Journalism and Mass Communication and presently e-learning and learning management systems deal with the subject matter or the content rather in a populist approach and written with the expressions that would appeal to the audience at large. In contrast, in the context of scientific communication, the content chooses a selective audience, proper format and an exclusive subject matter. The content of the medium in the context refers to the different kinds of information sources, like books, periodicals, patents and so on.

The content as the essence of information and its dissemination and its delivery has been one of the functions of LIS profession. The growth of information termed as 'Information Explosion', the expression much deliberated in mid 1970s, has also been attributed to the growth of new forms of documents or sources of information, and with new formats of content – scientific papers, standards, patents, reports, theses and dissertations. Since the ending of World War II the growth of such new forms of documents has been on the increase and handling of these forms of documents has become one of the essential functions of LIS profession.

The technique of 'Documentation Work" devised by Dr. Ranganathan in this context was the delegated function of the LIS profession which is one of its changing dimensions that also provided a diverse approach to the profession(Ranganathan,1963). This essentially helped the LIS

professionals to imbibe the technique of dealing with varieties of "content" represented by different forms of information sources – normally categorized as Primary, Secondary and Tertiary, and one of the basic discerning features of this categorization has also been their "content". The Library service which was confined rather to "Acquisition and Lending" of books across the counter was endowed with this new function the "Documentation work and service" which helped the LIS professionals to acquire the skill of content extraction, creation and development in its earlier periods. The essence of this matter is identified in the products like 'Abstracts and Digests' as content analysis and consolidation functions. An endless treatise can be presented on these functions, however it is implied here that the content analysis, development and management is one of the skills that are acquired, nurtured and assimilated by the LIS profession and is now one of the 'front end' techniques in the context of Internet and the World Wide Web today.

The LIS profession is performing the function of content development and management since ages when the humans learnt the art of recording knowledge. The earlier chained libraries were the first instances of content management.



Courtesy: *chained library.com*[1]

From the **chained libraries**, the process of content management has changed in scope and dimension and in the present times, the content refer to the 'digital content" or "web content" which has new forms of media termed as 'Hypermedia" or "Multimedia" which have also been encompassing the new physical and invisible environment, like the optical disks, the World Wide Web and the INTERNET.

In this paper an overview of content development and management techniques created, practiced by the LIS profession are profiled retrospectively and has highlighted the skills embedded in the profession and also future prospects for the profession.

2. Content Development

The term Content development has now conceived to be a new concept in the context of digital environment with a particular reference to INTERNET and Web content and that will be discussed later in this paper. However the process is not new to Library and Information profession as it is being practiced by the professionals since long. The Library Cataloguing, Abstracting and Indexing, Digests and Guides to Information Sources and Services are the best examples in the context. This technique gradually moved to 'information consolidation and repackaging' concept, which required refined skills of content analysis and synthesis (DRTC, 1981;Seetharama, 1997). The information products and services – Digests, State-of-the-Art reports, Trend Reports are some of the examples of Content analysis and development.

3. Content Management

Content management, is the set of processes and technologies that support the collection, managing, and publishing of information in any form or medium. The present digital or the Web environment in which the information is typically referred to as digital content. Digital content may take the form of

text, such as documents, multimedia files, such as audio or video files, image files or any other file type which follows a content lifecycle which requires management. The content management therefore is a method of gaining control over its identification, creation, development, structuring and then delivering to the seeker for its functional use. In this manner it is a group and collaborative activity. In fact the DRUPAL, content management system software has the objective of collaborative approach to content (Kumbar and others, 2010)

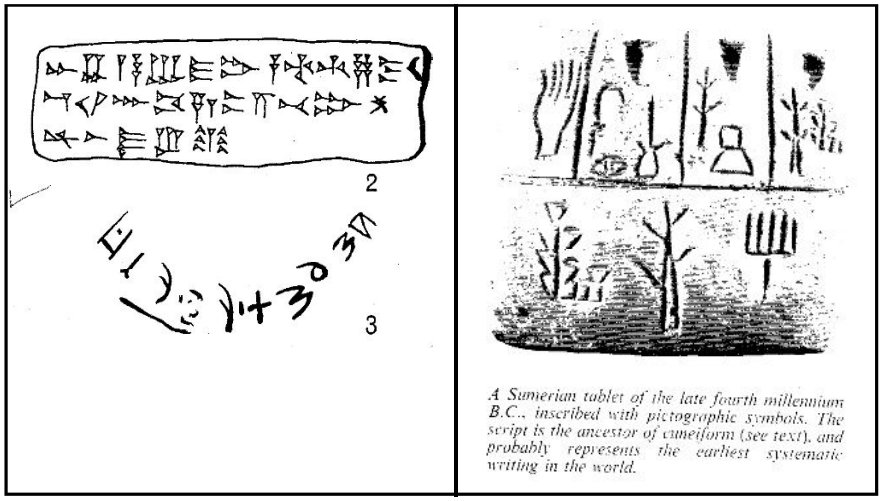
Content management is an inherently collaborative process. It often consists of the following basic roles and responsibilities

- Creator - responsible for creating and editing content.
- Editor - responsible for tuning the content message and the style of delivery, including translation and localization.
- Publisher - responsible for releasing the content for use.
- Administrator - responsible for managing access permissions to folders and files, usually accomplished by assigning access rights to user groups or roles. Administrator may also assist and support users in various ways.
- Consumer, viewer or guest- the person who reads or otherwise takes in content after it is published or shared.

A critical aspect of content management is the ability to manage versions of content as it evolves (*see also* version control). Authors and editors often need to restore older versions of edited products due to a process failure or an undesirable series of edits. Another equally important aspect of content management involves the creation, maintenance, and application of review standards. Each member of the content creation and review process has a unique role and set of responsibilities in the development and/or publication of the content. Each review team member requires clear

and concise review standards which must be maintained on an ongoing basis to ensure the long-term consistency and health of the knowledge base.

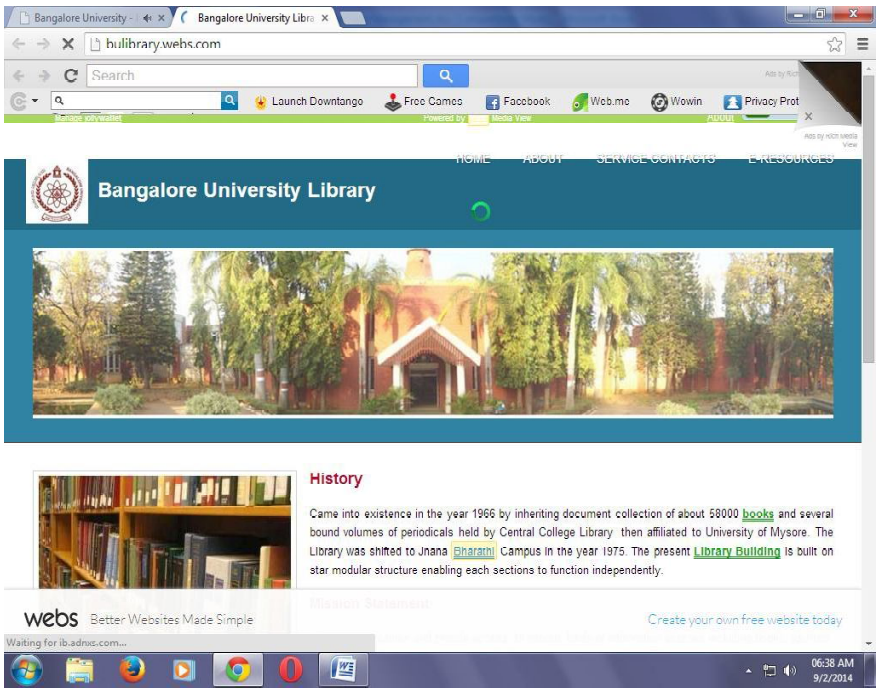
The core entity of Library and Information Science is the "recorded knowledge" which depicts varieties of content – ***from clay tablet to web resources***. The content management therefore has been practiced by the library profession since the time man developed the passion for recording knowledge. Some illustrations of recorded content on clay tablets are shown below.



A Sumerian tablet of the late fourth millennium B.C., inscribed with pictographic symbols. The script is the ancestor of cuneiform (see text), and probably represents the earliest systematic writing in the world.

Source : https://www.google.com/#q=Sumerian+tablet

The advent of Networks and particularly INTERNET expanded to the horizons of content creation and development for the Web-pages. Today content creation and development has become a specialized area of 'Web' based publishing, both scholarly and informative, with the proliferation of 'dot com' business. For Library and information professionals numbers of opportunities are in the offing in this area, with growth of Library Web Sites as part of network-based service. An example of Library Website is given in the screen shot below.



Courtesy: Bangalore University Library Home page

The process of researching, gathering, compiling, writing and editing information for publication on web portals is content development. So the library professionals are actively engaged in content creation and development at various levels and stages and it is not new to the profession. However with the growing emphasis of this aspect in the INTERNET environment essentially requires some new approaches in its design and development. A course of training in content creation and development is therefore imperative in this context. Hence an attempt is made in this paper to delineate the requirements for the training of students in Library and Information Science Courses and enhance their job opportunities.

4. Underlying Canonical Concepts

After understanding the concepts, Content Development and Management,

it is desirable to know some of the underlying canonical concepts, which give a clear understanding of the process of content development and management. It is basically due to the fact that the formats and presentations are changing over time and will have definite and direct relevance to the effectiveness of the use. There are various issues and concepts that need to be considered as an evolutionary process for the content organization and development from basic understanding of a document to web content management as it presented today.

a) Ranganathan's Concept of a Document

Dr. Ranganathan (Ranganathan and Neelmeghan, 1975) viewed a document consisting of three aspects :

i) a **Soul** that is the ideas (thought content) embodied
ii) a **Subtle body**, that is the mode of expression, organization of content – illustrations, dictionary, style, tabular form etc.
iii) the **Gross body**, that is the medium of recording, carrier, for storing and distribution

b) Cataloguing Practices - Codes and Standards

CCC, AACRII, ISBDs, General Material Descriptions (GMD), CCF

c) Machine Readable Catalogue – E.g. MARC Record format

i) Physical Record
ii) Logical Record
iii) Tags and the content representations
iv) MARC and its Versions viz. MARC21

d) Web or Digital Content

i) Metadata – Dublin Core, MARC, TEI
ii) Mark-up Languages – SGML, HTML, XML and RDF
iii) Content Management Systems – E-learning, LMS, CMS
iv) E-Learning – Moodle, Bruhaspati, Authoring Tools (Articulate)
v) Scripting Languages – JavaScript, PHP, VBScript

5. An Overview of Library Practices

An over view of Library practices in Content development and management and processing is presented here. As described above the document consists of basically three aspects which are represented in Cataloguing and Classification, the content management tools which are being practiced since the birth of recorded knowledge.

5.1 Library Classification – Content Representation

Library Classification represented by two components – Class Number and Book Number, respectively represent as conceptualized by Ranganathan's document concept- the soul (the subject content), the subtle body (mode of arrangement of content – (common isolates) and the gross body (the book number). The concept of Book Number enunciated by Ranganathan has detailed inherent ideas that describe the content more precisely as followed in the present web environment. For example the notation ***'f'*** refers to a ***'Picture'*** and ***f2*** – refers to ***Negative***. In the context of the Web also the representations of such formats represented by "File Extensions" viz. ***jpeg, tiff, bmp, gif*** and so on. The other Classification systems also have similar attributes of representing the document content in their three component parts, but not as precise and specific as presented by Ranganathan's Colon Classification.

5.2 Library Cataloguing – Content Description

The next widely practiced and used function which has succinctly applied content description and management techniques is cataloguing and has adapted to contemporary changes too. The concepts of Physical Record

and Logical Record are applied here to the 5"x3" card and to the Catalogue Entry respectively. The 5"x3" card one of the media used by the Libraries since decades as a content organization and management tool, like the magnetic media or the optical media used in the machine readable catalogue or databases. The Logical Record in machine environment remains to be same as that in a Card Catalogue, and only the Physical Record (media) has changed.

The Catalogue Card is the unique and representative tool both for the organisation of content, as well as providing the user access point. Recalling the Main Entry concept in this context, the entry elements, Call Number, Author, Title and other are put in a sequence that is most sought by the user. It is similar to the TEMPLATE for document representation as used in JOOMLA software. The Call Number delegate users' subject approach and it is often conceived as most sought after users' search option, followed by the Authorship of the work. The source of cataloguing is the Title page or the Contents Page of a book or any other document and conversely the Contents page of a document has a likeness with the Web-pages (Homepage) of a Website, in the content organization, development and its management. The disadvantage of a Library catalogue is lack of portability or delivery of information contained. The user has to be present at the location of the catalogue and cannot be accessed at more than one place – only if it is duplicated which is expensive and time consuming. The advantage of the card catalogue is that it could handle the "Variable" length of the Logical Record. An example of a Catalogue Record is illustrated with its veritable contents.

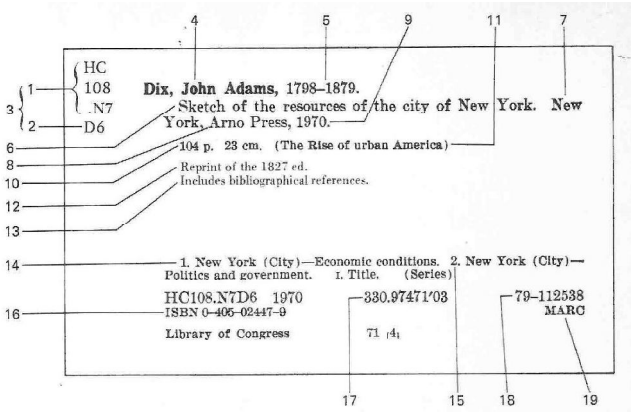


Figure 1 Author card or main entry: (1) Class number. (2) Author or book number. (3) Call number. (4) Author's name, inverted. (5) Author's dates. (6) Title of book. (7) Place of publication. (8) Publisher. (9) Date of publication. (10) Collation. (11) Series note. (12) Explanatory note. (13) Bibliographical note. (14) Subject heading (the subject treated fully). (15) Another subject treated. (16) Identifying number of book—International Standard Book Number. (17) Dewey Decimal class number. (18) Library of Congress catalog card number (to be used to order the card). (19) The information on this catalog card is available in machine-readable format (MARC means "Machine Readable Cataloging").

Courtesy: Jean Key Gates: Guide to use of books and libraries. 4th ed. p.55

As the development in document formats and presentation techniques changed, the cataloguing standards, Codes incorporated them, with formulation of cataloguing rules for different types of documents – Single Author, Two Authors, Corporate Author, Cartographic Materials, Non-book materials and more and more complexities added.

The cataloguing rules for example are formulated separately for the Cartographic Materials as their content and its representation is exclusive and the description too different from Books and other conventional documents. In case of a Map the exclusive content representation and description in its cataloguing is the "Scale" or "Raised Map" or the category of map "Administrative" or "Road Map" and so on. The catalogue codes

devised schema to represent such and many more designations of documents.

In fact the AACR II adds to manage different forms of documents and express them precisely with a schedule of "General Material Designations"(GMD) to represent the formats of contents. The Table below gives the GMD Schema.

a) General Material Designations

General Material Designations (GMDs) according to AACR2R List 1 is used in British Libraries and List 2 is used in North American Libraries, particularly in LC.

List 1	List 2	List 2 (Contd.)
Braille	Activity Card	Microforms
Cartographic Material	Art Original	Microscope slide
Computer Files	Art Reproduction	Model
Graphics	Braille	Motion Picture
Manuscripts	Chart	Music
Microforms	Computer Files	Picture
Motion Picture	Diorama	Realia
Multimedia	Filmstrip	Slide
Music	Flash card	Sound Recording
Object	Game	Technical Drawing
Sound Recording	Globe	Text
Text	Kit	Toy
Video Recording	Manuscripts	Transparency
	Map	Video Recording

The International Standard Bibliographic Description (ISBD) is an extension of the Cataloguing practices – Standards with international scope and gradual shifting to the machine environment with the concept of

"delimiters" introduced which was created for as many as Seven different forms of documents – ISBD (G), ISBD (M), ISBD (S), ISBD(CM), ISBD (NBM), ISBD (CF), ISBD (ER). Another best example of content development, management and sharing is the Union Catalogue concept.

5.3 Machine Readable Catalogue – Virtual Content Representation

The Library cataloguing as a content (document) description entered the machine environment in 1970s with advent of MARC – for Machine Readable Catalogue. It is a virtual representation of the contents of a book on a magnetic tape – the physical record and where as the logical record part was redesigned to suit the machine domain, organization, storage, search and retrieval. The MARC has a very comprehensive method of representing all the types, forms of documents. In Card Catalogue, both Physical and Logical Records are visible. But in Machine Readable Catalogue only the physical record is seen, but the logical record is not visible to externally, but can get displayed by using the computer. The MARC suggested as many as 300 elements of different forms of documents which are represented by 'Three Digit Numerical Tags" and "Sub-field Delimiters". This was necessary to deal the "Variable" length of Logical Record. This brings another dimension in content representation of which derivations can be seen in the present Web environment.

5.4 Documentation and Information Services

The library apart providing access to the variety of reading materials, it undertakes number of promotional steps and activities to enable and enhance the use of library materials, which are termed as documentation and information services. There are numbers of services, with a very simple method of "List of Recent Additions" or a "Bibliographic Service" to a complex "State of the Art Report" or a "Digest Service". The Abstracting is the best example of content development. These are termed as

"Documentation Work and Services and Information Services". They are simply traditional "Content Development and Management" methods being practiced since decades. The extension of these practices was designated to the contemporary developments in the field as "Information Analysis, Consolidation, and Repackaging". In the Web Environment they are designated as "Push (based) Services".

5.5 Content Development in Web Environment

Until the advent of World Wide Web the content development in the electronic environment was in it infancy and was almost non-significant. The concept of content development then was restricted to the Database Management Systems – ***structuring, organizing, storage,search and retrieval of content.*** Yet another important development that led to the advent of digital content and its growth. The emergence of 'digital" concept changed the entire scenario of content development, management because of portability, interoperability, global access and the developments in Hardware and the growth of Open Source Software. Some areas emerged in this regard are presented here.

5.5.1 The Metadata

The bibliographic content is the main resource of libraries where its deployment through the networks was the main objective. In this regard the advent of Metadata is considered one of the key developments even though a beginning had been already made by MARC in this area. In general, Metadata is "data about data;" functionally, "structured data about data." Metadata includes data associated with either an information system or an information object for purposes of description, administration, legal requirements, technical functionality, use and usage, and preservation and delivery. The Dublin Core (DC), Metadata Encoding and Transmission Standard (METS), Text Encoding Initiative (TEI) and recent Resource Description Framework (RDF) are some of the widely referred Metadata Initiatives and used to represent information that expresses the intellectual

content, intellectual property and/or instantiation characteristics of an information resource. An item of metadata may describe an individual data item or a collection of data items. Metadata is used to facilitate the understanding, use and management of data. One of the metadata creators includes; by content creators; people who create the intellectual content of an object and the metadata for that object. (Wikipedia)

5.5.1. The Role of Mark-up Languages

The key role in content development and management in the Web Environment however was played by the coming up of "Markup Languages" pioneered by "Standard Generalised Markup Language" (SGML) and its segment "Hypertext Mark-up Language" (HTML) and subsequently the Dynamic Hypertext Mark-up Language (DHTML)., eXtensible Markup Language (XML) and Resource Description Framework (RDF). Among the above, the Hyper Text Markup Language, simple coding method for the varieties of content – text, images, sound, multimedia and others and also facilitated the 'hyper-linking' versatility which enabled access to content within and outside and linking different locations on a WAN. HTML made an auspicious beginning for the Web content development and management.

The HTML is standard text-formatting language for documents on the World Wide Web, originally designed and created by Tim Barners-Lee, who also conceptualized the World Wide Web (Wikipedia). The HTML text files contain content that is rendered on a computer screen and markup, or tags, that can be used to tell the computer how to format that content. HTML tags can also be used to encode metadata and to tell the computer how to respond to certain user actions, such as a mouse click. The advantage of the HTML was that it featured most of the advantages of the word processors and therefore it is simple language for formatting the document in a desired manner and to organize the content provided to it.

HTML with its 'code tags' can perform character formatting and page layout to a web browser. The basic structure of an HTML Document is;

<HTML>	(Opening Tag for the Page)
<HEAD>	(Heading Section)
</HEAD>	(Closing Statement for the Heading Section)
<BODY>	
……	(Content with respective formatting codes)
</BODY>	(Closing Tag for the Content)
</HTML>	(Closing Statement for Page)

For example: to define the bulleted list the HTML coding is as shown below:

```
<HTML>
    <p>
    <ul>
    <li>is it in Times New Roman font or Geneva? </li>
    <li>is it black or red?</li>
    <li>is it 12 point or 36 point?</li>
    <li>is there a paragraph after the first 45 characters? or
                                                    60?</li>
    <li>is there a horizontal rule after the third paragraph?</li>
    <li>are there images embeded in the document?</li>
    <li>and so on...</li>
    </ul>
    </p>
</HTML> (Closing Tag for the Page)
```

The HTML is revised continuously and new versions are created with new tags for the management of content. DHTML – Dynamic HTML, XHTML- a family of XML but uses the core of HTML and the latest being the HTML Version 5. The HTML can be used to display the content or document of any type or format on the host computer, which can be geographically distributed. The content development using HTML can be seen how it evolved from a simple encoding schema to a dynamic Web-pages with many versatilities of a word processor. The evolution of HTML is seen in stages or levels.

- Level – 0 : Included only the basic structural elements.
- Level - 1 : Advanced features included to represent Text and Graphics
- Level – 2 : Introduced WWW as an interactive medium through Linking and the filling up of the Forms on the Internet
- Level – 3 : Introduced frames, inline, video, sound etc.
- Level – 3.2 : Integrating TABLES, image, heading and ALIGN attributes,
- Level – 4.01 support for Cascading Style Sheets, extra TABLE, FORM, and JavaScript enhancements
- Version 5 : A revised version of HTML and XHTML to handle drag and drop.

The next and now widely applied mark-up language is XML – or the eXtensible Mark-up Language. A technical definition of XML is "a document markup language for defining structured information". But that is a bit abstract, so let's take it step-by-step.

In HTML the problem is to use only those valid and prescribed HTML tags which have a predetermined meaning and that cannot be changed. In XML you can define your own mark-up language. One thing to note XML, unlike HTML, isn't really a language of tags. XML is the definition of how

to create the tags in the first place. The following example is about creating an address of an individual, you might use tags such as:

```
<entry>
<name>
<address>
<city>
<email>
```


Then, when you build your address book document, you would write :

```
<entry id="1">
<caption>Dr</caption>
<name>A.Y.Asundi</name>
<address>#77 3rd Main Road</address>
<city>Bangalore</city>
<pincode>560 079</pincode>
<email>ashokasundi@rediffmail.com</email>
</entry>
```

The Resource Description Framework or RDF a specification originally was designed as a metadata data model. It has come to be used as a general method for conceptual description or modeling of information that is implemented in web resources, using a variety of syntax formats. The subject of an RDF statement is either a Uniform Resource Identifier (URI) or a blank node, both of which denote resources. It may, in the following case may be an URL of a website. However, RDF puts the information in a formal way that a machine can understand. The purpose of RDF is to provide an encoding and interpretation mechanism so that resources can be described in a way that particular software can understand it; in other words, so that software can access and use information that it otherwise couldn't use.

5.6 Content Management and CMS

The developments in the markup and the scripting languages led to the new versions of software known as Content Management Systems, which use the PHP scripting language, such as in JOOMLA and WordPress. The structure of these CMS almost match with the Cataloguing practices such as Unit Card system followed in AACR and parallels with the architecture of DRUPAL which follows a modular system and which has functional controls in modules.

Content management is basically gaining control for the creation and distribution of information and functionality. Content management is practiced for e-commerce websites, and educational institutions and libraries, but in different ways. Over the times that content may be edited, one or more individuals may provide some editorial oversight thereby approving the content for publication Publishing may be the act of pushing content to others, or simply granting digital access rights to certain content to a particular person or group of persons. Content management is an inherently collaborative process. It often consists of the following basic roles and responsibilities:

- Creator - responsible for creating and editing content.
- Editor - responsible for tuning the content message and the style of delivery, including translation and localization.
- Publisher - responsible for releasing the content for use.
- Administrator - responsible for managing access permissions to folders and files, by assigning access rights to user groups or roles.
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A **content management system** is a set of automated processes that may support the following features :

- Import and creation of documents and multimedia material.
- Identification of all key users and their roles.
- The ability to assign roles and responsibilities to different instances of content categories or types.
- Definition of workflow tasks often coupled with messaging so that content managers are alerted to changes in content.
- The ability to track and manage multiple versions of a single instance of content.
- The ability to publish the content to a repository to support access to the content. Increasingly, the repository is an inherent part of the system, and incorporates enterprise search and retrieval.

Content Management Systems take the following forms :

- a web content management system is software for web site management - which is often what is implicitly meant by this term
- the work of a newspaper editorial staff organization
- a workflow for article publication
- a document management system
- a single source content management system - where content is stored in chunks within a relational database

5.6.1 Examples of a CMS
DRUPAL and JOOMLA

The Content Management Systems have now moved from physical space to virtual space – from Card Catalogue to WebOPAC. The virtual content management systems are software that allows an individual or individuals to easily publish manage and organize a wide variety of content of a Website. DRUPAL and JOOMLA are two popular CMS software that support creation, management, distribution, publishing and discovery of content. It covers the complete lifecycle of the content from providing simple tools to create the content through publishing and finally archiving.

5.7 Conclusion:

The Content creation, development and its management has been a vocation of LIS professionals since the genesis of recorded knowledge. Prospectively it is shown that the LIS professionals are endowed with knowledge and skills of creation, management and development of content, which has good prospects of applications on the web environment. A breed of new professionals, Knowledge Workers and Knowledge Managers has already emerged on the Web scenario and LIS professionals have a good opportunities to excel in that vocation with the background knowledge of content management from Print to virtual environment.

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