CHAPTER - 2
REVIEW OF RELATED LITERATURE

A literature review is a body of text that aims to review the critical points of current findings, innovations or knowledge on a particular topic. It discusses the published article in a particular subject area, and sometimes information in a particular subject area within a certain time period. A literature review is a summary of previous research on a topic. It can be either a part of a larger report of a research project, a thesis or a bibliographic essay that is published separately in scholarly journals. The review of relevant literature is nearly always a standard chapter of a thesis or dissertation. The review forms an important part in a thesis where its purpose is to provide the background to and justification for the research undertaken.¹

According to Dictionary for Library and Information Science² the literature review or review of literature is defined as “a comprehensive survey of the works published in a particular field of study or a line of research usually over a specified period of time, in the form of an in-depth, critical bibliographic essay or annotated list in which attention is drawn to the most significant works”.

The purpose of a literature review is to convey to the reader what knowledge and ideas have been established on a topic and what are the strengths and weaknesses. The literature review allows the reader to be brought up to date regarding the state of research in the field and familiarizes the reader with any contrasting perspectives and viewpoints on the topic. There are good reasons for beginning a literature review before starting a research paper which include³:

1. To see what has and has not been investigated;
2. To develop general explanation for observed variations in a behaviour or phenomenon;
3. To identify potential relationships between concepts and to identify researchable hypotheses;
4. To learn how others have defined and measured key concepts;
5. To identify data sources that other researchers have used;
6. To develop alternative research projects; To discover how a research project is related to the work of others; and
7. To publish your area of study, i.e. your research topic.

2.1 Components of Literature Review

Similar to primary research, development of the literature review requires four stages:
1. Problem Formulation: which topic or field is being examined and what are its component issues?
2. Literature Search: finding materials relevant to the subject being explored
3. Data Evaluation: determining which literature makes a significant contribution to the understanding of the topic
4. Analysis and Interpretation: discussing the findings and conclusions of pertinent literature.

2.2 Elements of Literature Review

Literature reviews should comprise the following elements:

1. An overview of the subject, issue or theory under consideration, along with the objectives of the literature review;
2. Division of works under review into categories (e.g. those in support of a particular position, those against, and those offering alternative theses entirely);
3. Explanation of how each work is similar to and how it varies from the others;
4. Conclusions as to which pieces are best considered in their argument, are most convincing of their opinions, and make the greatest contribution to the understanding and development of their area of research
A lot of literature is available on the library classification schemes. There are many articles and papers written by many Indian and Foreign authors at national and international level. The literature related to library classification which has been published in various foreign and Indian journals is described according to the broad categories which are as follows:

1. Library Classification – General
2. Library Classification Schemes – Use and its related case studies
3. Dewey Decimal Classification
4. Universal Decimal Classification
5. Colon Classification
6. Comparative Study of the Library Classification Schemes
7. Library Classification Schemes and ICT Environment

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Foreign Studies
The literature related to library classification schemes which has been published by foreign authors is described in the following broad categories:

Library Classification – General
Dahlberg⁶ (2011) in his research paper has talked about the general concepts are all those form-categorical concepts which–attached to a specific concept of a classification system or thesaurus–can help to widen, sometimes even in a syntactical sense, the understanding of a case. In some existing universal classification systems such concepts have been named “auxiliaries” or “common isolates” as in the colon classification (CC). However, by such auxiliaries, different kinds of such concepts are listed, e.g. concepts of space and time, concepts of races and languages and concepts of kinds of documents, next to them also concepts of kinds of general activities, properties, persons, and institutions. Such latter kinds form part of the nine aspects ruling the facets in the Information Coding Classification (ICC) through the principle of using a systematizer for the subdivision of subject groups and fields. Based on this principle and using and extending existing systems of such concepts, e.g. which A. Diemer had presented to the German Thesaurus Committee as well as those found in the UDC, in CC and attached to the Subject Heading System of the German National Library, a faceted classification is proposed for critical assessment, necessary improvement and possible later use in classification systems and thesauri.

Steele and Foote⁷ (2011) in their article examines whether academic libraries are still reclassifying materials, how they are doing so, and if the acquisition of electronic materials has an impact on reclassification efforts. An online survey was sent to the heads of cataloguing units at libraries belonging to the Association of Research Libraries to answer these questions. Almost one-third of libraries are currently involved in reclassification projects. Most respondents reported they do not believe that purchasing e-books has affected their decisions about reclassification. The article also examines the
faceted search capability of next-generation catalogs and their possible impact on patrons' opinion of classification.

Casciato\(^8\) (2010) in his article re-visits a scenario from 1987: a university president required a library director to reclassify some materials into a science classification. The author looks at the prominence of the *Code of Ethics of the American Library Association* in the general library literature and in classification and cataloging practice literature. The issue of censorship is also discussed. The author then reviews classification for *Creationism* and *Intelligent design* and some decision-making processes one could use when deciding on the professional ethics of such a request, concluding that in some cases the ethical action might indeed be to go ahead with the reclassification.

Dilevko and Gottlieb\(^9\) (2009) in their article demonstrates the applicability of classification theory to various textual-analytic approaches such as grounded theory, content analysis, discourse analysis, and conversation analysis/membership categorization analysis. This applicability is based on three factors: extant and elicited texts can be broken down into categories that are essentially classification systems created and defined by the researcher; extant texts are themselves explicit or implicit classification systems; and classificatory frameworks can be applied to extant and elicited texts “in order to clarify their contribution to processes of meaning-making” (Fairclough, N. (2003). Analysing discourse: Textual analysis for social research. London: Routledge, p.11). The recommendation is made that classification theory should be incorporated in the teaching of textual-analytic approaches in university-level research-methods courses, especially in the field of library and information science (LIS).

Show\(^10\) (2009) in his paper has discussed the idea of a unitary universe of knowledge has persisted throughout most of mankind's recorded history. The influence of new movements in thinking, such as cognitive science and post-modernism, have questioned the old idea of a fundamentally ordered universe of knowledge and introduced new ideas on the "miscellaneous-ness" of information, how and why humans are driven to
categorize their world, and the possibility that there is more than one order of the universe or no definitive order at all. How the idea of the universe of knowledge has evolved and been challenged by various disciplines, as well as the impact of this debate upon library classification, is the subject of this paper.

Adeleke and Olorunsola\(^{11}\) (2007) in this paper is to report the use of ICT by cataloguers at a private university library in Nigeria. A description of the procedures and processes undertaken is given. The description of the processes involved in the use of ICT by cataloguers reveals the effectiveness and efficiency of online searches for the purpose of cataloguing and classification. A few were identified. The study shows the potential offered by the use of ICT, which libraries in developing nations – and indeed Nigeria – have not fully embraced. The paper reveals the low level of ICT literacy in libraries in Nigeria and concludes that this is a result of the deficiency in the practical training of librarians in the use of ICT in Nigerian library schools. The conclusion is that there is an urgent need for librarians in developing nations to gain proficiency in the use of ICT as a tool in libraries. The paper provides information on the level of ICT use for cataloguing and classification in a private university library in Nigeria. This experience shows the importance of why libraries in developing countries should address the desired level of ICT literacy among their librarians.

Broughton\(^{12}\) (2006) in his article aims to estimate the impact of faceted classification and the faceted analytical method on the development of various information retrieval tools over the latter part of the twentieth and early twenty-first centuries. The article presents an examination of various subject access tools intended for retrieval of both print and digital materials to determine whether they exhibit features of faceted systems. Some attention is paid to use of the faceted approach as a means of structuring information on commercial web sites. The secondary and research literature is also surveyed for commentary on and evaluation of facet analysis as a basis for the building of vocabulary and conceptual tools. The study finds that faceted systems are now very common, with a
major increase in their use over the last 15 years. Most LIS subject indexing tools (classifications, subject heading lists and thesauri) now demonstrate features of facet analysis to a greater or lesser degree. A faceted approach is frequently taken to the presentation of product information on commercial web sites, and there is an independent strand of theory and documentation related to this application. There is some significant research on semi-automatic indexing and retrieval (query expansion and query formulation) using facet analytical techniques. This article provides an overview of an important conceptual approach to information retrieval, and compares different understandings and applications of this methodology.

Wasserman\textsuperscript{13} (2006) in her study described the basic principles, including bibliographic records and subject headings, with a focus on the Elazar and Weine classification systems compared to Dewey and LC; MARC records and the Z39.50 utility and their relation to automated cataloging.

Mai\textsuperscript{14} (2004) in his research paper surveys classification research literature, discusses various classification theories, and shows that the focus has traditionally been on establishing a scientific foundation for classification research. This paper argues that a shift has taken place, and suggests that contemporary classification research focus on contextual information as the guide for the design and construction of classification schemes.

Kublik\textsuperscript{15} (2003) in this paper addresses the process of adapting to a particular culture or context a classification that has grown out of western culture to become a global standard. We use a project that adapts DDC for use in a feminist/women's issues context to demonstrate an approach that works. The project is particularly useful as an interdisciplinary example. Our discussion consists of four parts: (1) definition of the problem indicating the need for adaptation and efforts to date; (2) description of the methodology we developed for creating an expansion; (3) description of the interface developed for actually doing the work with its potential for a distributed group to work
on it together (could even be internationally distributed); and (4) generalization of how our methodology could be used for particular contexts by country, ethnicity, perspective or other defining factors. Keywords: Dewey Decimal Classification, feminism, women’s issues, adaptation of classification systems

Kwasnik and Rubin\(^\text{16}\) (2003) in their article has describe the difficulties of translating classifications from a source language and culture to another language and culture. To demonstrate these problems we collected kinship terms and concepts from native speakers of fourteen languages and analyzed them to find differences between their terms and structures and those used in English. Using the representations of kinship terms in the Library of Congress Classification (LCC) and the Dewey Decimal Classification (DDC) as examples, we identified the source of possible lack of mapping between the domain of kinship in the fourteen languages we studied and the LCC and DDC. Finally, we offer some preliminary suggestions for how to make translated classifications more linguistically and culturally hospitable. Keywords: Classification, translation, cultural hospitality, Dewey Decimal Classification (DDC), Library of Congress Classification (LCC).

Mai\(^\text{17}\) (2003) in his paper discusses problems related to accessing multiple collections using a single retrieval language. Surveys the concepts of interoperability and switching language. Finds that mapping between more indexing languages always will be an approximation. Surveys the issues related to general classification and contrasts that to special classifications. Argues for the use of general classifications to provide access to collections nationally and internationally.

Hickery and Goetz\(^\text{18}\) (2001) in his study has pointed out that the use of the DDC in metadata offers unique opportunities for organizing and searching Web resources. In this paper, we describe CORC tools for applying and using the DDC as a metadata element. Both the CORC system and the DDC are benefiting from the inclusion of Dewey in the CORC project. CORC benefits from having integrated access to a rich classification
system that can be used to organize its metadata; the DDC benefits from its inclusion in an easily adaptable Web-based system that facilitates the exploration of what a classification system can do in this new environment.

Encinas, Llorens and Amescua\textsuperscript{19} (1999) in their study has explored on the applications dealing with information extracted from images are becoming more common. The growth of multimedia information has made it necessary that applications be able to store information, such as images, video and audio, and to retrieve it. Information extracted from images is complex and highly dimensional. The extraction of specific low-level indexing features from images is now a research area given the costs of storing and retrieving the huge amount of information needed for the representation of some features. A new way to deal with features extracted from images for retrieval purposes is proposed, and a system for dealing with the described ideas is presented.

Cann\textsuperscript{20} (1997) in his paper has discussed about the nature of classification, division of classes and their principles. Discussed about the kinds of classification system, their advantages and disadvantages. Enumerates the filing order and indexing system, its types. Discussed about the implications for the development of the ICIS classification schedules.

Coates\textsuperscript{21} (1997) in his article has thrown light on Herbert Coblans and its classification and classification since the Dorking Conference. Discussed about the classification syntactic and semantics and their implementation.

Dahlberg\textsuperscript{22} (1995) in this essay, the author argues that the future of classification in libraries and networks should not be based on structures of knowledge as they existed 120 years ago. Rather, these older classification systems should provide guidance for a theoretical foundation for new future systems. The theories behind the existing universal classification schemes are described: the Dewey Decimal Classification, the Universal
Decimal Classification, and the Library of Congress Classification. The article then examines principles deemed necessary concerning a system's structure, desiderata for principles of a future general classification system, and the British attempt in 1963 to construct a new general classification system on the basis of general form categories.

Svenonius\textsuperscript{23} (1992) in his paper discusses some of Ranganathan's contributions to the productive, practical and theoretical aspects of classification science. These include: (1) a set of design criteria to guide the designing of schemes for knowledge/subject classification; (2) a conceptual framework for organizing the universe of subjects; and (3) an understanding of the general principles underlying subject disciplines and classificatory languages. It concludes that Ranganathan has contributed significantly to laying the foundations for a science of subject classification.

Diaz\textsuperscript{24} (1991) in her article has pointed out that the central component of the technology reported in this article is a software reuse library organized around a faceted classification scheme. The system supports search and retrieval of reusable components and librarian functions such as cataloging and classification. To be effective, the system must operate within the context of an organizational infrastructure aimed at promoting reusability. Definition, implementation, and management of such infrastructure is considered part of the technology. The first part of this article introduces a faceted-based library system and reports on the experiences with a first prototype. It includes justification for using faceted classification and discusses the need for librarian and organizational support. The second part reports on the deployment of reuse library technology.

Whitrow\textsuperscript{25} (1983) in his study has successfully defined the faceted classification system of 18\textsuperscript{th} century. Discussed the use of condorcet’s technique.
Whatmore26 (1973) in his article has discussed the classification system for new libraries. Pointed out the classification objectives, how heading should be given, their advantages and disadvantages and the future of the classification system in the new libraries.

Foskett27 (1970) in his article has tried to throw light on the significance of classification and indexing techniques in social sciences.

Library Classification Schemes – Use and its related Case Studies
Lambert28 (2011) in his paper has described libraries and information centres often use multiple classification schemes for organizing their collections. In Canadian full depository libraries government publications can be organized in collections using a government publishing office's own notation, knowledge organization notation, or other notational scheme designed especially for government publications. Provenance-based schemes such as CODOC are attractive for their universality and for work-related purposes that may be influenced by financial challenges. However, libraries that use multiple notations for government publications may open the potential for intellectual disruption to information retrieval practices in either physical or virtual browsing.

Zins and Placida29 (2011) in this study explores, in 3 steps, how the 3 main library classification systems, the Library of Congress Classification, the Dewey Decimal Classification, and the Universal Decimal Classification, cover human knowledge. First, we mapped the knowledge covered by the 3 systems. We used the '10 Pillars of Knowledge: Map of Human Knowledge,' which comprises 10 pillars, as an evaluative model. We mapped all the subject-based classes and subclasses that are part of the first 2 levels of the 3 hierarchical structures. Then, we zoomed into each of the 10 pillars and analyzed how the three systems cover the 10 knowledge domains. Finally, we focused on the 3 library systems. Based on the way each one of them covers the 10 knowledge domains, it is evident that they failed to adequately and systematically present
contemporary human knowledge. They are unsystematic and biased, and, at the top 2 levels of the hierarchical structures, they are incomplete.

Idress and Mahmood (2010) in this paper has drawn an exact and accurate picture of classification problems being faced by libraries having a reasonable amount of collections on Islam. Different classification systems have been developed during the last two centuries to organize library materials. Where these systems provided libraries with better solution for organization of materials, the systems have also some limitations. Religious materials are one of the areas where these systems could not satisfy a reasonable number of libraries. The libraries that have rich collections on Islam are also facing such problems. This study has been conducted with the aim of addressing this problem. The study comprises a precise review of literature relevant to this problem, along with the collection and analysis of data from such libraries from all the main cities of Pakistan. The data have been collected using the interview technique. The review of literature and empirical data collected for this study show that the libraries are facing problems regarding the classification of materials where there are rich collections on Islam. The standard classification systems have not provided proper place and enumeration to Islamic topics in their schemes. There is no standard or uniform practice among the libraries to classify materials on Islam. Different libraries are using different systems, which has resulted placement of same materials at different locations. There is no coordination among libraries having rich collections on Islam for some common plan of action to resolve the problem in hand. No work on automated classification has been done in Pakistan so far and this is the area that needs working on in the future. The paper focuses on materials in libraries in one country only, however highlights issues relevant to other Islamic countries in organizing such materials. The paper discusses an area of professional concern that has been discussed widely in Islamic countries, but only in a limited fashion outside of Islamic countries. Thus the paper should be of interest to researchers and practitioners interested in cataloguing theory.
Arellano and Garrido\textsuperscript{31} (2009) in their paper have taken for granted that the Dewey Decimal Classification and Library of Congress Classification are the most used classification systems worldwide. However, LIS literature does not include studies or research reports about classification systems currently used in Latin American libraries, and the reasons behind their adoption. This paper shows the results of an e-mail survey carried out among Latin American libraries to learn what were the classifications systems used in them, as well as some of the reasons that motivated them to select those classification system.

Elazar\textsuperscript{32} (2009) in his study contended that there was and is a need for a classification system for libraries of Judaica to classify and arrange their collections according to Jewish concepts based upon Jewish thought and terminology. This paper describes the history of A Classification System for Libraries of Judaica it's development, the process involved in preparing the 2nd and 3rd revisions, and its use in various libraries.

Idress and Mahmood\textsuperscript{33} (2009) in their article has discussed the significance of classification schemes in organization, physical arrangement, access and retrieval of library material. They have pointed out the following objectives: To know the suitability of standard classification systems in libraries those contain reasonably big collections on Islam; To discover satisfaction level LIS and Islamic studies scholars with presently adopted classification systems; To know the opinion of LIS and Islamic studies scholars regarding the possible solution to problem of having a suitable classification system for materials on Islam; To know about the need and possibility of developing an independent and comprehensive classification system for Islam; To know the depth & variety of topics, addition in body of knowledge in Islamic studies and publishing trends of present and future on Islam; To know if Islamic studies scholars would be helpful to develop an independent and comprehensive classification system for Islam, if required.
Weaver and Stanning\textsuperscript{34} (2007) in their article has clearly outlined the approach taken to the reclassification of the library collection within a small multi-site college of higher education—whereby 160,000 volumes were converted from the Bliss system to the Dewey Decimal Classification system, over a period of 11 weeks during Summer 2004. An automated approach was taken whereby the Library Systems Supplier—Talis was commissioned to convert catalogue records using a batch process. Risk analysis and critical path analysis were used as tools to keep the project on schedule and provide quality control. An automated approach allowed the project to be completed on time, within budget and with minimal disruption to services. Project planning was crucial to the success of the project. This included mapping Bliss to Dewey numbers, recruitment of a student team, management of work packages and ensuring continuity of the Library Service during the project. Institutional support for the project was secured because of its relevance to the College’s corporate agenda and the promise of a wider impact that the project would have in terms of modernisation of the library service. Despite the apparent lack of current articles on re-classification, many libraries are still grappling with ongoing retrospective cataloguing projects. This case study demonstrates how one institution approached the problem and demonstrates that an automated approach can yield benefits. It will be of use to other libraries thinking of, or involved with, similar conversions. The partnership role of the Library Management System Supplier is also highlighted.

Bowman\textsuperscript{35} (2005) in his article has pointed out that Dewey decimal classification has become almost universal in British public libraries. In the 1890s, however, most public libraries were arranged using a system of main classes. Gradually this system gave way to more systematic classification schemes, such as Quinn-Brown, Brown’s Adjustable, and others. This article examines the spread of these schemes, including the longest lived of the rivals to Dewey, Brown’s Subject Classification, which survived into the late 1960s and is still in use in a few local studies collections.
Griffiths\textsuperscript{36} (2005) in his study has pointed out that the Anecdotal evidence suggests that dissatisfaction with the United Nations Classification Scheme (UNCS), a notational system in continuous use since 1946, has been widespread among researchers and government information specialists. Through the examination of over fourteen thousand document symbols assigned over the course of a year, this study identifies flaws in the notation that have limited its effectiveness. The criteria for this evaluation, which are drawn from both archival and library classification literature, include simplicity, the appropriate use of mnemonics, brevity, serial piece collocation, and the appropriate representation of administrative origin. The author concludes that the scheme satisfies none of these criteria consistently, due in part to the lack of centralized control over its development, and offers recommendations for correcting its defects.

Araghi\textsuperscript{37} (2004) in his research paper has proposed new classification scheme is based on two main elements: hierarchism and binary theory. Hence, it is called Universal Binary Classification (UBC). Some advantages of this classification are highlighted including subject heading development, construction of a thesaurus, and all terms with meaningful features arranged in tabular form that can help researchers, through a semantic process, to find what they need. This classification scheme is fully consistent with the classification of knowledge. The classification of knowledge is also based on hierarchism and binary principle. Finally, a survey on randomly selected books in McLennan Library of McGill University is presented to compare the codes of this new classification with the currently employed Library of Congress Classification (LCC) numbers in the discipline of Library and Information Sciences.

Marthinus\textsuperscript{38} (2004) in his article proposes a generic classification scheme for the purpose of organizing electronic documents in business enterprises in the SMME sector. Data were gathered from literature on information organization, business information, competitive intelligence and information systems, as well as through an empirical study of information organization practices in a sample of 24 small businesses in three different
provinces in South Africa. The concepts gathered from folder systems for documents, email and Internet favorites, augmented by concepts derived from the literature, were analyzed using the technique of facet analysis. Business processes feature prominently in the resultant scheme.

Pu and Yang (2003) in their paper explores the possibility of adding user-oriented class association to hierarchical library classification schemes. Some highly associated classes not grouped in the same subject hierarchies, yet relevant to user’s knowledge, are automatically obtained by analyzing a two-year log of book circulation records from a university library in Taiwan. The library uses the Chinese Decimal Classification Scheme, which has similar structure and notation to Dewey Decimal Classification. Methods, from both collaborative filtering and information retrieval research, were employed and their performance compared based on similarity estimation of classes. The results show that classification schemes can, therefore, be made more adaptable to changes of users and the uses of different library collections by analyzing the circulation patterns of similar users. Limitations of the methods and implications for applications are also discussed.

Currier (2002) in her write-up has talked about subject access to physical or electronic resource collections can be divided into two complementary areas: searching and browsing. Searching involves the use of subject headings, indexing terms from a controlled vocabulary, or natural language keywords. Browsing, whether along a shelf or through a subject tree on the Web, requires the application of some kind of taxonomy or classification scheme. Looks at they types of classification schemes that art libraries are using to arrange their book collections in the UK today. Based on an informal survey via the ARLIS e-mail discussion list, concludes that the Dewey Decimal Classification is not only the most commonly-used classification scheme, but is the one that most art libraries choose when they reclassify their libraries.
Mcllwaine\textsuperscript{41} (1997) in his study has pointed out that recent developments in the improvement of communication between those responsible for editing the general schemes of classification and their users are outlined. Increased participation in conferences, the publication of guides and manuals for aiding the implementation of general classifications, and the use of the Internet as a means of communicating are all ways in which users hear more about these schemes and can make their views known to those responsible for maintaining them. Increased communication at editorial level, including coordination of current developments and future revisions, is discussed.

Yi and Jin\textsuperscript{42} (1996) in their paper has discussed that in China, the Dewey Decimal Classification (DDC) is one of the most influential classifications. It had a great impact on the development of Chinese classification. A comparison between DDC and three representative Chinese classifications corresponding to ancient, modern and contemporary times, illustrate the influence of DDC on Chinese classifications. The celebration of the 120th anniversary of the DDC is the context for this review of DDC's introduction, application, development and impact on China.

Studwell, Wu and Wang\textsuperscript{43} (1994) In their paper has discussed about the four major classification schemes used in the People's Republic of China are briefly discussed to show how ideology considerations have influenced their structure and contents. Recommendations are made for possible future revision.

Poulin and Yglesias\textsuperscript{44} (1993) in their paper presents experiences with software classification in a large corporate reuse software library (RSL) at IBM. We use facets extensively as one method of component classification in the IBM RSL. However, facets alone cannot adequately provide all the information needed to fully classify and understand a reusable component. Experience with an operational RSL reveals that we require a combination of classification techniques to meet the needs of software developers. Following an overview of the IBM classification method, we discuss the
issues surrounding the use of facets and software classification in a large reuse system and give techniques used at IBM to address those issues.

Scheerer and Hines\textsuperscript{45} (1974) in their present study identifies the classification systems used in 941 libraries. It explores the reasons behind the choice of the National Library of Medicine Classification by 589 libraries. Reclassification procedures were investigated through a questionnaire sent to twenty-five libraries that have changed to NLM since 1959. Statistics and replies are given on: the classification systems employed prior to reclassification; the use of broad or specific Library of Congress class numbers in the LC schedules outside the scope of the NLM schedules; the number of catalogers in each library doing the reclassification; the use of cut-off dates for retrospective materials; the adoption of MeSH headings; user preference; and cost differences. Chief reasons for the change to NLM proved to be local circumstances, currency, arrangement of subclasses by NLM, its dovetailing with the LC Classification, and reliance upon nationally centralized cataloging services.

**Dewey Decimal Classification**

Lynne\textsuperscript{46} (2012) in the essay presents information on the re-classification of a nursing collection at the U.S. National Library of Medicine (NLM) into Dewey. For the project, staff and users of the nursing site library needed training in Dewey and how to find books in this scheme. It is stated that the re-classification from NLM to Dewey required a lot of planning; and the project had a definite aim, a staffing requirement, a financial requirement, and a defined timescale.

Green\textsuperscript{47} (2011) in her essay investigates the semantics of topical, associative see-also relationships in schedule and table entries of the Dewey Decimal Classification (DDC) system. Based on the see-also relationships in a random sample of 100 classes containing one or more of these relationships, a semi-structured inventory of sources of see-also relationships is generated, of which the most important are lexical similarity,
complementarity, facet difference, and relational configuration difference. The premise that see-also relationships based on lexical similarity may be language-specific is briefly examined. The paper concludes with recommendations on the continued use of see-also relationships in the DDC.

Green and Panzer\textsuperscript{48} (2011) in their study has stated that as part of a larger assessment of relationships in the Dewey Decimal Classification (DDC) system, this study investigates the semantic nature of relationships in the DDC notational hierarchy. The semantic relationship between each of a set of randomly selected classes and its parent class in the notational hierarchy is examined against a set of relationship types (specialization, class-instance, several flavors of whole-part). The analysis addresses the prevalence of specific relationship types, their lexical expression, difficulties encountered in assigning relationship types, compatibility of relationships found in the DDC with those found in other knowledge organization systems (KOS), and compatibility of relationships found in the DDC with those in a shared formalism like the Web Ontology Language (OWL). Since notational hierarchy is an organizational mechanism shared across most classification schemes and is often considered to provide an easy solution for ontological transformation of a classification system, the findings of the study are likely to generalize across classification schemes with respect to difficulties that might be encountered in such a transformation process.

Beall and Mitchell\textsuperscript{49} (2010) in their article explores the history of the representation of the DDC in the MARC formats, with a special emphasis on the development of the MARC classification format. Until 2009, the format used to represent the DDC has been a proprietary one that predated the development of the MARC classification format. The need to replace the current editorial support system, the desire to deliver DDC data in a variety of formats to support different uses, and the increasingly global context of editorial work with translation partners around the world prompted the Dewey editorial team, along with OCLC research and development colleagues, to rethink the underlying representation of the DDC and choose the MARC 21 formats for classification and
authority data. The discussion is framed with quotes from the writings of Nancy J. Williamson, whose analysis of the content of the Library of Congress Classification (LCC) schedules played a key role in shaping the original MARC classification format.

Goetz and Mitchell\(^5\) (2010) in their paper has discussed about Dewey Decimal Classification numbers organize resources using a hierarchical structure that is ideal for browsing by subject area. To enhance the usefulness of DDC as an online tool, OCLC conducts research in these areas: developing customizable views of the DDC, enhancing links to other thesauri, improving links to other editions, transforming the captions into end-user language, and decomposing numbers and using the parts for improved access. This paper discusses these research areas.

Beall\(^5\) (2009) in this work explores ways that notation in Table 5 Ethnic and National Groups of the Dewey Decimal Classification (DDC) system can be used to extend subject access to works about racially mixed people beyond that provided by the rules for constructing standard DDC numbers. The proposed approach makes use of the new 083 field (Additional Dewey Decimal Classification Number) in the MARC Bibliographic Format and techniques developed for DeweyBrowser beta v2.0 by OCLC Research, especially tag clouds.

Landry\(^5\) (2009) in his research in Swiss National Library adopted the DDC as its classification scheme for its open access stacks collections and the structure of its national bibliography, Das Schweizer Buch, in 1999. The paper explains why the library decided to adopt the DDC and how the decision was made. The factors leading to the decision are explained, namely the use of the DDC in Europe and the decision taken by libraries in Germany to translate and adapt DDC 22 in German. The article also describes the implementation process of the DDC and the results so far attained at the Swiss National Library.
Mehlar and Waltinger\textsuperscript{53} (2009) in their paper had discussed about the purpose of this paper is to present a topic classification model using the Dewey Decimal Classification (DDC) as the target scheme. This is to be done by exploring metadata as provided by the Open Archives Initiative (OAI) to derive document snippets as minimal document representations. The reason is to reduce the effort of document processing in digital libraries. Further, the paper seeks to perform feature selection and extension by means of social ontologies and related web-based lexical resources. This is done to provide reliable topic-related classifications while circumventing the problem of data sparseness. Finally, the paper aims to evaluate the model by means of two language-specific corpora. The paper bridges digital libraries, on the one hand, and computational linguistics, on the other. The aim is to make accessible computational linguistic methods to provide thematic classifications in digital libraries based on closed topic models such as the DDC. The approach takes the form of text classification, text-technology, computational linguistics, computational semantics, and social semantics. It is shown that SVM-based classifiers perform best by exploring certain selections of OAI document metadata. The findings show that it is necessary to further develop SVM-based DDC-classifiers by using larger training sets possibly for more than two languages in order to get better F-measure values. Algorithmic and formal-mathematical information is provided on how to build DDC-classifiers for digital libraries.

Mitchell and Goetz\textsuperscript{54} (2009) in their article discusses the Dewey Decimal Classification’s value proposition as a general knowledge organization system in terms of basic design, history, ongoing development, translations, mappings, applications, and research. The authors conclude with prospects for use of the DDC inside and outside of libraries.

Wang\textsuperscript{55} (2009) in his study has presented a theoretical analysis and extensive experiments on the automated assignment of Dewey Decimal Classification (DDC) classes to bibliographic data with a supervised machine-learning approach. Library classification systems, such as the DDC, impose great obstacles on state-of-art text categorization (TC)
technologies, including deep hierarchy, data sparseness, and skewed distribution. We first analyze statistically the document and category distributions over the DDC, and discuss the obstacles imposed by bibliographic corpora and library classification schemes on TC technology. To overcome these obstacles, we propose an innovative algorithm to reshape the DDC structure into a balanced virtual tree by balancing the category distribution and flattening the hierarchy. To improve the classification effectiveness to a level acceptable to real-world applications, we propose an interactive classification model that is able to predict a class of any depth within a limited number of user interactions. The experiments are conducted on a large bibliographic collection created by the Library of Congress within the science and technology domains over 10 years. With no more than three interactions, a classification accuracy of nearly 90% is achieved, thus providing a practical solution to the automatic bibliographic classification problem.

Basuki\textsuperscript{56} (2007) in his paper has discussed that although Indonesian libraries have been using Dewey Decimal Classification for more than half century, since 1952 until present times, from 15\textsuperscript{th} through 22\textsuperscript{nd} editions still many Indonesian librarians and users complained on certain DDC notation which they thought didn’t reflect the true condition of Indonesia as well as the real needs of the users. This paper proposed some modification and corrections for DDC notations especially those notations on languages in Indonesia including Bahasa Indonesia, geographical and historical period. All those modifications, corrections and expansions were based on the languages map of Indonesia, Indonesian geographical division while historical period were based on Indonesian presidents’ administration, from 1945 until present time. It is hoped that such modifications will yield better access to Indonesian-related-materials.

Basuki and Mulyani\textsuperscript{57} (2007) in their article had pointed out that two points must be considered on utilizing notation classification on Islam. One is that Indonesia is the largest Islamic country in the world, in which about 90% of 220 million people are Muslims. The other is that Indonesian libraries have been using Dewey Decimal
Classification (DDC) since early 1950s. From Indonesian librarians point of view, the term used in 15th edition is not appropriate that is Mohammedanism and the notation given is very limited for the second largest denomination in the world. The term then changed to Islam albeit the available notations were still felt not enough for the organization of Islamic books. This paper traces and describes the effort by Indonesian librarians and Islamic libraries to improve the notation 297 of the various editions of the DDC since 1973 to 1987. In 1987 the joint declaration between Minister of Religious Affairs and Minister of Education and Culture issued an adaptation and expansion of the DDC. This version is widely used especially in public and Islamic-based-schools, Islamic higher education institutions, Islamic colleges but not in non-Islamic-denomination academic and special libraries. In 2005 the National Library of Indonesia issued its version based on DDC 22nd edition and the details of this version are explained. Based on the various versions, the authors proposed that the future adaptation and expansion should be based on the original DDC version and with that adaptation then the proposed expansion match with the international usage and practice could contribute to future DDC editions.

Furner58 (2007) in his study has introduced Critical race theory as a potentially useful approach to the evaluation of bibliographic classification schemes. An overview is presented of the essential elements of critical race theory, including clarifications of the meanings of some important terms such as “race” and “social justice.” On the basis of a review of existing conceptions of the just and the antiracist library service, a rationale is presented for hypothesizing that critical race theory may be of use to the library and information sciences. The role of classification schemes as information institutions in their own right is established, and the Dewey Decimal Classification is introduced as the case to be studied. The challenges faced by classification-scheme designers in the construction and/or reconstruction of race-related categories are reviewed; and an analysis is presented of one sense in which it might be suggested that recent (2003) revisions in one of the DDC’s tables appear not to meet those challenges wholly.
successfully. An account is given of a further sense in which adoption of a critical race-theoretic approach has the more radical effect of calling into question a fundamental decision recently taken to “deracialize” the DDC. In conclusion, an assessment is made of critical race theory as a framework for evaluating library classification schemes.

Tait\(^5\) (2007) in his study has discussed about the features of DDC-18\(^{\text{th}}\) Edition, citation order, special tables and its index.

Freiling\(^6\) (2006) in his paper will give a short outline of the project DDC German. The project is not limited to a mere translation of DDC 22, but aims at the implementation of Dewey in the library networks of the German-language countries. Use of DDC mainly for retrieval purposes, not for shelving, leads to certain new approaches in classifying with Dewey which are described in detail and presented together with the German web service Melvil. Based on the German experience of cooperation and data exchange in the field of verbal indexing, the paper develops some ideas on future Dewey cooperation between European and American libraries.

Goetz\(^7\) (2006) in his article has discussed about DeweyBrowser allows users to search and browse collections of library resources organized by the Dewey Decimal Classification (DDC) system. The visual interface provides access to several million records from the OCLC WorldCat database and to a collection of records derived from the abridged edition of DDC. The prototype was developed out of a desire to make the most of Dewey numbers assigned to library materials and to explore new ways of providing access to the DDC.

Koch, Golub and Ardo\(^8\) (2006) in their study explores the navigation behaviour of all users of a large web service, Renardus, using web log analysis. Renardus provides integrated searching and browsing access to quality-controlled web resources from major individual subject gateway services. The main navigation feature is subject browsing
through the Dewey Decimal Classification (DDC) based on mapping of classes of resources from the distributed gateways to the DDC structure.

Miksa (2006) in his paper has described relative index of the Dewey Decimal Classification (DDC) is investigated over the span of its lifetime in 22 editions of the DDC as to its character as a concept indexing system, its provision of conceptual contexts for the terms it lists, and the way in which the index intersects with special tables of categories used in the system. Striking features of the index that are discussed include how the locater function of an index is expressed in it, its practice of including concepts that have not been given specific notational locations in the system, its two methods of providing conceptual contexts for indexed terms (by means of the notation of the system and by the insertion of enhancement terms that portray conceptual context), and how the index has intersected with three types of special tables of categories in the system. Critical issues raised include the indexing of constructed or synthesized complex concepts, inconsistencies in how enhancement terms are portrayed and the absence of them in some instances, the problem of equating conceptual context with disciplinary context, and problems associated with not indexing one type of special table. Summary and conclusions are extended to problems that arise in studying the index.

Nicholson, Dawson and Shiri (2006) in their paper has discussed the role of DDC in the ongoing HILT (High-level Thesaurus) project is discussed. A phased initiative, funded by JISC in the UK, HILT addresses an issue of likely interest to anyone serving users wishing to cross-search or cross-browse groups of networked information services, whether at regional, national or international level - the problem of subject-based retrieval from multiple sources using different subject schemes for resource description. Although all three phases of HILT to date are covered, the primary concern is with the subject interoperability solution piloted in phase II, and with the use of DDC as a spine in that approach.
Taylor\(^{65}\) (2006) in his paper has discussed about the Dewey decimal classification (DDC) system is a logical approach to a hierarchical categorization of recorded knowledge that makes sense to many people. It both illustrates classification theory and provides a practical way to organize information. It is taught in several different settings with content relying upon the purpose of the education or training. With reference to communications from colleagues, the author identifies some problems in teaching DDC, followed by some of the content covered and some methodologies used to overcome the problems. Several examples of teaching tools are included as appendices.

Zeeman and Turner\(^{66}\) (2006) in their paper has discussed that Library and Archives Canada (LAC) has capitalized on the Dewey Decimal Classification (DDC) potential for organizing Web resources in two projects. Since 1995, LAC has been providing a service that offers links to authoritative Web resources about Canada categorized according to the DDC via its Web site. More recently, LAC has partnered with the federal government Department of Canadian Heritage to manage Web content related to Canadian culture in a DDC-based subject tree. Although the DDC works well to organize a broadly-based collection, challenges have been encountered in adapting it for a specific subject domain.

Freiling and Landry\(^{67}\) (2005) in their paper describes the efforts of three national libraries to use the DDC to improve access in German to the national bibliographies of Switzerland, Germany and Austria. The reasons that led to the use of the DDC for the organization of the bibliographies and the difficulties in adopting a common approach will be explained. The paper will deal with the approach of using the Second Dewey Summary and the adaptations made to suit the bibliographic requirements of each country’s bibliography. The presentation will also explain the challenges of incorporating German requirements in the new outline of the different series of the Deutsche National bibliographie and will show how these were successfully resolved.

Franklin and Stephens\(^{68}\) (2005) in their article Focuses on the Dewey Decimal System, a library classification system developed by librarian Melvil Dewey. Main categories of the
system; Advantages of the system to library media specialists; Factors that need to be considered in reorganizing a library media center.

Hider\textsuperscript{69} (2004) in his article has talked about the two versions of the Dewey Decimal Classification (DDC) scheme were offered as options to distance education students at Charles Sturt University (CSU) as the basis for their study and eventual application of it; the traditional printed version and the new online version called WebDewey. Students were provided with the same supporting materials. A study was carried out to examine whether the students’ use of a particular version of DDC affected their learning. Despite the author’s concerns about teaching elementary classification using the online version, no significant difference in performance between students who used WebDewey and students who used the printed volumes was found, although on the average the sample using the latter did perform a little better in the assessment. Neither were significant differences in aspects of DDC classification found. Nevertheless, the conclusions may not hold true for other online products, nor for other educational contexts, and educators must take care to consider each product’s effectiveness as a teaching medium, irrespective of the current trend in favor of online materials. In any case, a revision of supporting materials when an online product replaces a printed one may well be worthwhile.

Khan\textsuperscript{70} (2004) has discussed the purpose of this article is to introduce the DDC 22nd edition. This edition has brought many changes especially in Religion, Social Groups, Computer Science, Mathematics and DDC Tables. As DDC 22nd edition has been produced in web context, thus the readers can also learn about new uses of the DDC in web environment. The objectives of the present study are to inform the library professional and students about several different strategies for changing from Dewey 21 to Dewey 22 and how to use Dewey Classification System 22nd edition which is the latest edition. DDC22 edition has been released in print and electronic form in July 2003. Edition 22 includes structural changes, many new changes and topics and significant
updates to selected fields. The new edition is designed to aid in classifier ease and efficiency.

Kua\textsuperscript{71} (2004) in paper has talked about that a classification scheme reinforces the social systems that were in place at the time the system was devised, and projects, no matter how subtly or ineffectively, the social, moral and intellectual values of that system. The Dewey Decimal Classification (DDC) scheme is the most widely used library classification scheme in the world today; it is based on the shape of the 19th century North American academic world, and shows a distinct bias no longer acceptable for libraries of the 21st century. Non-Western languages and literatures are given short shrift in classes 400 and 800 of the DDC. The situation of African languages and literatures is a case in point. Attempts at official and local revisions have been made, but more systemic efforts are necessary. The problem is complex and there are no easy answers. Nevertheless, national libraries should step forward to address the issue, and the new models for adapting the DDC should be investigated.

Saeed and Chaudhry\textsuperscript{72} (2002) in their article had described that terms drawn from DDC indexes and IEEE Web Thesaurus were merged with DDC hierarchies to build taxonomy in the domain of Computer Sciences. When displayed as a directory structure using a shareware tool MyInfo, the resultant taxonomy appeared to be a promising tool for categorization that can facilitate browsing of information resources in information environment.

Schreoder\textsuperscript{73} (2001) in her article have talked about Dewey Decimal Classification-22\textsuperscript{nd} edition and described various DDC web resources.

Usmani\textsuperscript{74} (1997) in the research thesis has discussed about the study, its scope, research design and method of study, review of literature, Muslim theology, data collection and analysis, design of a classification schedule and findings suggestions and area of further research. Schedule, Related index. Contains bibliography and appendices.
Will and Will\textsuperscript{75} (1997) in their work presents an overview of the Dewey Decimal Classification (DDC) for Windows--Dewey for Windows (DFW)--which is the leading general classification scheme for libraries and it is now being used for electronic resources, both as standalone products and on the Internet. It takes account of work in classification theory and facet analysis, and by providing facilities for combining and building numbers, it provides for many more specific subjects than those listed in its schedules. DFW is the latest, twenty first, edition of DDC in the form of one CD-ROM. The authors examine the key features of DFW and explain some of the minor problems of DFW that can easily be resolved. They conclude that DFW's additional searching and display features, and the ease of moving from one part to another, provide substantial added value over DDC's four volume printed version.

Mitchell\textsuperscript{76} (1995) in his piece of work has discussed about the Dewey Decimal Classification is preparing for the future in a number of ways. Editorial work is supported by a UNIX-based system and access to online bibliographic databases. Two editions of Electronic Dewey have been published and a Windows version is under development. The Classification is continuously revised to keep pace with knowledge. Various changes have been introduced to address classifier convenience, modern classification design principles, and electronic distribution. A Dewey research agenda has been identified to guide future development and explore new opportunities. The author describes a few of the changes underway and suggests some questions to guide future directions for the Dewey Decimal Classification.

Trotter\textsuperscript{77} (1995) in his paper describes the features of Electronic Dewey bringing out the ways in which it differs from the printed version of the Classification. The various search techniques available are discussed and the use of the DDC functions is considered. The paper concludes that while improvements could be made the CD-ROM heralds the electronic age of classification.
Boll (1987-1988) in the article compares the classification guidelines contained in various editions of DDC (Dewey Decimal Classification). Two decision charts which illustrate the differences and similarities between the two sets of rules are included.

Markey (1987) in the essay explain the subject searchers' use of the subject online search capability of the Dewey Decimal Classification Online Project. The catalog referred searchers to classifications based on their entry of subject terms. Failure analyses of subject online searches demonstrated its strengths and weaknesses. Recommendations are provided for the improvement of the subject outline search in online catalogs.

Sweeny (1983) in her article had talked about the development of DDC. The paper will concentrate on three conflicts which have influenced the recent developments in the Classification. There may well be other topics which have a bearing on the growth of the Classification, but all of them are dependent, in some way, on one or other of the following: 1. Integrity of numbers versus keeping pace with knowledge, 2. Detailed bibliographic classification versus shelf location device, 3. National bias versus internationalization of the Classification.

Chan and Smith (1975) in their work describes and evaluates an experimental computer-assisted instruction program for teaching the Dewey decimal classification portion of an introductory cataloging course.

Hanson (1975) in her paper focuses on the Dewey Decimal classification system used in American libraries. Origin of the concept of the Decimal; Detailing of specifications for the original Decimal; Indications of Melvil Dewey's proclivity for systems and classifications.

**Universal Decimal Classification**

Alexander and Heather (2011) in their paper reviews a project to remodel and unify diverse BBC Archive classification schemes, including the large Universal Decimal
Classification (UDC) - based classification, long class, as part of the BBC’s Digital Media Initiative (DMI). The aims of the re-modeling included migrating classification data from legacy systems and using the faceted structure of the classifications as a basis for proto-ontological relationship building. The processes of analysis and development of a methodology to decompose and reassemble the classifications raised such challenges as how to adapt bibliographic classifications for use as digital asset management tools and how to preserve the legacy intellectual property to enable continuing use of taxonomic classification as an access route to multimedia content. These objectives required the sophisticated semantics of the UDC-based classification to be retained during migration to an off-the-shelf taxonomy management product that could be integrated with diverse systems to form the basis of an enterprise-wide framework. The decompositions and reclassification process informed ways of preserving the high precision semantics of bibliographic classifications for use as a foundation for natural language-based retrieval and for translation into ontologically expressive formats, such as Resource Description Framework (RDF).

Brun and Calosci\textsuperscript{84} (2011) in their article analyses the use of the Universal Decimal Classification (UDC) as a knowledge framework for building Web-enabled ontologies based on the Web Ontology Language (OWL), and an approach for the visualization of the relationships between the different concepts that make up the target ontology. Traditional use and applications of Universal Decimal Classification have been restricted to the physical arrangement of books within libraries, and although different research projects have been executed to adapt UDC for web-searching in OPACs (Online Public Access Catalogue) and other information services, current professional practice shows that UDC in the context of online retrieval has not been widely implemented. As the Web evolves to a knowledge-based, data driven repository of repositories, it raises the following question: what is the role that UDC and other classification schemas play in the information services we expect to use and deliver in the future? The authors describe the use of UDC to generate a basic ontology for the representation of civil engineering
knowledge. The need of this ontology was raised during the development of a web-based portal for historical documents on civil engineering developed for the Spanish Centre for Historical Studies of Public Works and Town Planning (CEHOPU).

Colillas\textsuperscript{85} (2011) has discussed that the starting point of this article is to compare the features of faceted classification and ontologies with a re-evaluation of UDC (Universal Decimal Classification) as an analytico-synthetic classification system. We are therefore proposing a theory that was used as the basis of a project in the 1980s but which will imply an advance in the field of information retrieval in the future context of the Internet. This theory is based on the post-coordinated use of LCSH (Library of Congress Subject Headings) and the setting-up of their equivalence with UDC for indexing. The retrieval process is based on the generation of clusters characteristic of data mining and the linking of existing controlled vocabularies and free language in all languages with the corresponding UDC notations. This will be achieved by making UDC compatible with existing classifications, thus profiting from all the knowledge structured so far, thanks to the creation of a suitable format.

Huevel, Salah and Knowledge Space Lab\textsuperscript{86} (2011) in their study has clearly pointed out that in the 1950s, the “universe of knowledge” metaphor returned in discussions around the “first theory of faceted classification”, the Colon Classification (CC) of S.R. Ranganathan, to stress the differences within an “universe of concepts” system. Here we claim that the Universal Decimal Classification (UDC) has been either ignored or incorrectly represented in studies that focused on the pivotal role of Ranganathan in a transition from "top-down universe of concepts systems" to “bottom-up universe of concepts systems.” Early 20\textsuperscript{th} century designs from Paul Otlet reveal a two directional interaction between “elements” and “ensembles” that can be compared to the relations between the universe of knowledge and universe of concepts systems. Moreover, an unpublished manuscript with the title “Theorie schematique de la Classification” of 1908 includes sketches that demonstrate an exploration by Paul Otlet of the multidimensional
characteristics of the UDC. The interactions between these one- and multidimensional representations of the UDC support Donker Duyvis’ critical comments to Ranganathan who had dismissed it as a rigid hierarchical system in comparison to his own Colon Classification. A visualization of the experiments of the Knowledge Space Lab in which main categories of Wikipedia were mapped on the UDC provides empirical evidence of its faceted structure’s flexibility.

Scharnhorst and others. 8 (2011) in their article has pointed out that Classification systems are often described as stable reference systems. Sometimes they are accused of being inflexible concerning the coverage of new ideas and scientific fields. Classification as an activity is the basis of all theory-generating research, and also plays a powerful role in social ordering. It is obvious that the ways in which we seek information and in which information is provided has changed dramatically since the emergence of digital information processing and even more with the internet, and web-based technologies. The purpose of this paper is to illustrate the notion of a stable knowledge organization classification as a temporary stationary manifestation of an open and evolving system of classification. We compare the structure of the main classes in the Universal Decimal Classification (UDC) according to their usage of special auxiliaries to demonstrate the dynamic evolution of the UDC over time, as a stable reference system representing published organized knowledge. We view the ecology of the UDC, and discover that most changes are to the ecology itself as numbers are re-interpreted. This subtle type of change is a key to monitoring the evolution of knowledge as it is represented in the UDC’s stable reference system.

Sauperl 8 (2010) in the article has mentioned that social tagging systems, known as "folksonomies,” represent an important part of web resource discovery as they enable free and unrestricted browsing through information space. Folksonomies consisting of subject designators (tags) assigned by users, however, have one important drawback: they do not express semantic relationships, either hierarchical or associative, between tags. As a
consequence, the use of tags to browse information resources requires moving from one resource to another, based on coincidence and not on the pre-established meaningful or logical connections that may exist between related resources. We suggest that the semantic structure of the Universal Decimal Classification (UDC) may be used in complementing and supporting tag-based browsing. In this work, two specific questions were investigated: 1) Are terms used as tags in folksonomies included in the UDC?; and, 2) Which facets of UDC match the characteristics of documents or information objects that are tagged in folksonomies? A collection of the most popular tags from Amazon, LibraryThing, Delicious, and 43Things was investigated. The universal nature of UDC was examined through the universality of topics and facets covering diverse human interests which are at the same time interconnected and form a rich and intricate semantic structure. The results suggest that UDC-supported folksonomies could be implemented in resource discovery, in particular in library portals and catalogues.

Balikova\textsuperscript{89} (2009) in his paper outlines the standardization function of the Czech Subject Authority File and explores the role of UDC as a switching language, i.e. as an intermediary between various indexing systems at institutional, national and international level. Subject indexing and classification systems used at the institutional and national level may differ from one another in their levels of specificity, syntactic features (e.g. word order of terms, subject headings versus descriptors), and in the usage of terminology. These differences raise compatibility problems and make any mapping efforts more difficult. The paper explains how such difficulties may be partially overcome by means of the UDC system. The author illustrates the potential application of UDC as a linking element between different subject organization tools used by memory institutions. In this context the author discusses subject indexing systems used in libraries, museums, galleries and archives.

Manuel\textsuperscript{90} (2009) in her article has explored on the USMARC classification format, developed in the early 1990s for the DDC and LCC systems, is also amenable for other
classification systems. This paper presents a proposal for using the MARC classification format for UDC. There are advantages in using this format for the UDC data in an authority file, e.g., for the MRF records and records for combined notations as well. There has been a trend in library catalogues for subject interoperability between traditional classification systems such as the UDC, DDC, LCC and subject headings. An example with great impact is WebDewey, which offers interlinking between classification numbers, the alphabetical index of the tables and LCSH. Another example is the electronic version of LCC Plus, also including links to LCSH. Subject gateways built upon library authority files can support the interoperability between classification systems and subject headings. These gateways can be the backbone of a more universal access through hyper textual navigation structures supported by classification systems including UDC. To our knowledge, the MARC classification format has not yet been applied to the UDC and in this paper we are going to propose a solution supported by some examples.

Balikova\textsuperscript{91} (2008) in his paper explores the role of classification and other terminological subject systems in subject gateways showing the Czech experience. The potential of combining a top level classification such as Conspectus with the application of further classified sets of subject access points using UDC is explained. Some examples are given of special subject gateways developed under a general gateway, all interlinked and providing similar interfaces and functionalities. The potential of a common strategy of subject access tools is emphasized, to further improve subject retrieval across the different gateways in a consistent and transparent manner.

Kaosar\textsuperscript{92} (2008) in her thesis has discussed that in the online environment, a faceted classification has a distinct advantage over an enumerative one in the kind of search strategies it empowers as well as in expert system applications making use of the synthesis and decomposition of class numbers. As we know that Universal Decimal Classification is a combination of facet analysis and enumerative scheme. So I believe,
Universal Decimal classification can perform better than other schemes like (Dewey Decimal Classification, Colon Classification, Bliss Classification) because these schemes are only facet analysis or enumerative schemes. In this thesis Universal Decimal Classification (UDC) approach is discussed and the arguments for and against using UDC on the Internet is examined.

Slavic (2008) in his article has one question that has often been asked is how many translations of the UDC exist? A lack of recent data is one obstacle to a full evaluation of the UDC's potential application in global information exchange. The question of translation has been raised by many stakeholders interested in the use of the classification. This paper reports on research undertaken in 2004 aimed at establishing the current number of UDC translations in different languages, their form/format and the date these were last reported. The research was completed in September 2004 and was based on relevant literature research, bibliographic surveys and e-mail interviews with cataloguing agencies and library schools world-wide. The objective of this report is to give an overview of translation activity over the past three decades providing additional background information where appropriate. A list of the last reported translations into 39 languages is given. The bibliography provided includes the most recent editions in many languages and a few references in languages for which there is only a single translation. This was included irrespective of the date for historical reasons. The survey was part of independent academic research at University College London. The hope is that this report will raise further discussion, resulting in more data that the UDC user community can share.

Slavic, Cordeiro and Riesthuis (2008) in their study highlights some aspects of the UDC management policy for 2007 and onwards. Following an overview of the long history of modernization of the classification, which started in the 1960s and has influenced the scheme's revision and development since 1990, major changes and policies from the recent history of the UDC revision are summarized. The perspective of the new editorial
team, established in 2007, is presented. The new policy focuses on the improved organization and efficiency of editorial work and of UDC products.

Balikova (2007) in his article UDC is widely used in all types of libraries in the Czech Republic (Czechia). The classification plays an important role in the National Library as well as the entire library information network. It is central to the subject authority file of the National Library of the Czech Republic (NLCR) and its bibliographic services. The author explains the importance and potential of UDC use online especially in a multilingual context and illustrates this with examples from the national union catalogue, the Czech Uniform Information Gateway (UIG), the Multilingual Subject Access to Library Catalogues (MSAC) system and the Multilingual Content Aggregation System (M-CAST) projects. The advantages of using UDC in improving precision and recall are explained using the M-CAST system.

Linden, Vliegen and Wijk (2007) presents a tool developed by the Dutch company Magna View that enables the visual representation of the content of the UDC Master Reference File (UDC MRF). The tool contains a pre-processed UDC MRF and allows visualization of, for instance, hierarchy levels, number of classes within a hierarchy and provides an overview of UDC number distribution across all fields of knowledge. The tool is aimed at users and developers who work with and utilize the UDC MRF and can benefit from different kinds of classification data representation.

Manuel (2007) in her paper has discussed that it was from 1895 onwards, the year in which the First International Bibliography Conference was held that the Decimal Classification system began to be implemented on a European scale and started to be disseminated in Spain. The introduction of the UDC scheme was initially subject to numerous difficulties faced by the various initiatives undertaken by individual librarians, but it subsequently received the support of the Spanish Administration. In 1939, the adoption of the UDC was established for all Spanish libraries, by official decree.
Although what was stipulated in the decree was the 1934 German version, in practice libraries implemented the latest version of the UDC tables. Finally, from 1989 onwards, the compulsoriness of using UDC to classify collections and catalogues was abandoned, although its implementation in libraries, catalogues and bibliographies remained in most cases. The UDC is taught within the framework of regulated Library and Information Science schools, from both a theoretical and a practical point of view. In Spain, research on the UDC is already quite important: translations, adaptations and versions of the tables have been undertaken and there are also analytical works on different aspects of the UDC system.

Rifl, Rozman and Musek 98 (2007) in their paper has pointed out that in Slovenia, the majority of libraries use the Universal Decimal Classification (UDC). The authors give an overview of the extent of the use of classification in both open access and bibliographic control in their country. Since 1991 there have been no editions of the UDC published in the Slovenian language and this paper announces the change that occurred when two very important tools were made available to UDC users in 2006 and 2007 respectively. The new Slovenian translation of the UDC was produced by the National and University Library (NUL) in Ljubljana in 2007. This Web edition uses the original structure of the ISO 2709 file format which allows searching of UDC numbers (string searching and full text searching), searching UDC captions, notes, examples, etc. The tool has a user friendly web interface for browsing and navigating UDC schedules via hyperlinks, facilitating checking and selection of an appropriate class mark. At the same time a group of authors in the Slovenian National Library published a Slovenian UDC manual addressing the specific needs of Slovenian libraries and established practice in subject indexing. The manual is abundant with practical examples for both inexperienced and advanced users of UDC and represents a much needed resource for teaching and training of the classification.
Slavic, Cordeiro and Riesthuis (2007) in their paper gave an overview of the present context of the development and use of Universal Decimal Classification (UDC) and describe the current work towards enrichment and improvement of the UDC data. UDC is a classification system used worldwide for organization and information access in various kinds of collections and information services. From 1993 UDC has been available for distribution to publishers and users as a database file which has initially improved the classification's potential for online use. From 1993 to 2007 the UDC vocabulary has been extensively revised and 14 updated UDC files have been distributed, on an annual basis. In order to take full advantage of this electronic availability, new developments should be carried out to support a better alignment between the forms and formats in which the UDC scheme is distributed and the classification's practical use in networked information services. The authors discuss different aspects that may concur with this aim, at the data structure, data content and data transmission levels. Examples include the possible provision of: an enhanced UDC data format; UDC multilingual data and UDC mappings to other subject indexing systems; UDC data exports in various other data formats that can be easily implemented, updated, shared or exchanged. In this context, a summary of current initiatives of the UDC Consortium is provided, notably in terms of renovation of the UDC technological management.

Slavic (2004) in his paper has demonstrated that the purpose of this paper is to present a general overview with up-to-date information on the Universal Decimal Classification (UDC) use worldwide. Design/methodology/approach – The research combined e-mail interviews with LIS professionals in 208 countries, literature research and information obtained from UDC distributors/publishers (AENOR, BSI, UDC Consortium). The following categorization of UDC use was offered: A – dominant system; B – used in some kind of libraries only; or C – rarely used. The paper finds that, of the 208 countries contacted and researched through the literature in 2004-2006, the UDC was found to be used in 124 (60 per cent) of these. In 34 (28 per cent) of the countries researched (in Europe, Asia and Africa), UDC is the main classification system used across national
information networks. In 45 (36 per cent) of the countries it is used in certain kinds of libraries. In the remaining 45 (36 per cent) of the countries it is used rarely, in only a few libraries or information centers. It was beyond the scope of this research to provide any information regarding the actual number of institutions using UDC in a given country or to give an estimate of the size and number of document collections organized by it. Although a decline in UDC use since the 1980s was reported from a number of countries, it was not possible to measure this accurately. The interest shown for using UDC in the organization of digital collections, information exchange and cross domain and cross collection resource discovery depends on accurate knowledge of its actual usage worldwide. This gives a measure of its global importance and verifies its credentials as an indexing standard. This research, which attempted wider and more systematic coverage than previous surveys, should help clarify the status of UDC and its potential use in the networked environment. The paper provides up-to-date information on the presence of the UDC system across countries and languages.

Francu (2003) in his article describes the research done over a bibliographic database in order to show the impact the specificity of the knowledge organising tools may have on information retrieval (IR). For this purpose two multilingual Universal Decimal Classification (UDC) based thesauri having different degrees of specificity are considered. Issues of harmonising a classificatory structure with a thesaurus structure are introduced and significant aspects of information retrieval in a multilingual environment are examined in an extensive manner. Aspects of complementarity are discussed with particular emphasis on the real impact produced on IR by alternative search facilities. Finally a number of conclusions are formulated as they arise from the study.

Robinson (1999) in his article has stated that the British Standards Institution has been active in Universal Decimal Classification (UDC) as the English-language publisher for more than half a century, and--like its fellow publishers in other languages--has issued parts of it and versions of it in various degrees of detail, but limitations of resources have usually meant that effort has been concentrated on one product at any one time. Gives an
account of the editing of the UDC from the full database to produce a brief, simplified version. Describes the selection criteria, difficulties in maintaining consistency, and insights gained into optimizing future maintenance of the scheme.

Mcllwaine (1998) in his article has clearly pointed out the problems posed by automation for those responsible for the maintenance of bibliographic classifications have been widely rehearsed both in the professional literature and at conferences. This paper will not repeat them, but will rather give some indication of the attempts currently being made to fit a classification that was devised in the nineteenth century for use in the twenty-first.

Mcllwaine (1997) in his paper has discussed the bibliographic enterprise envisaged by Otlet and Fontaine, which resulted in the Universal Decimal Classification (UDC) being developed in 1895, and the subsequent history of the scheme is outlined. Relationship with Dewey Decimal Classification (DDC) from which it fifth edition was derived deteriorated in the early 20th century and changes in funding, location, and editorship of Duyvis from 1929–1959 had a profound effect on the scheme’s development and management. Lloyd, Duyvis’s successor, reformed the revision structure, and further management changes from 1975 to the present day, culminated in the formation of the UDC Consortium in 1992. The subsequent creation of a machine-readable Master Reference File and speedier revision procedures are noted. The scheme’s structure, development, and influence on classification theory are examined, problems caused by longevity and lack of standard procedures and proposals for their reform to improve the scheme’s suitability for an automated world are highlighted. Research projects in the 1960s foreshadowed possibilities today being explored, such as a complementary thesaurus and individualization of single concepts notationally. The value of classification in a multilingual environment is emphasized and future developments outlined. A list of recent editions is appended.
Williamson\textsuperscript{105} (1994) in her article discusses the background, nature, and progress of experimental and exploratory research to determine the feasibility of restructuring the Universal Decimal Classification (UDC). The study uses the facet framework established in the Bliss Bibliographic Classification, 2nd edition, Class H, and the discipline being restructured is UDC Class 61 Medical Sciences. States the background, purpose, and scope of the study. A methodology for carrying out a complete restructuring is being tested, and problems with the process are identified and solutions presented. Outlines the general framework proposed for the class, with examples of possible results from the restructuring process. One of the by-products of the research may provide a model for future new classification systems in special subject areas and that it might provide some insight into classification requirements for online systems of the future. Proceeding Published by American Society for Information Science, Washington, DC, 1994

Greaves\textsuperscript{106} (1987) in this paper summarizes the main facts about the UDC (Universal Decimal Classification) as an international classification scheme, including its history, the role of the FID, the editions, schedules, notation and user revision. The results of a survey of UDC users in Nigeria are reported on. In general, users are satisfied with the scheme; major complaints are related to its slow revision and the high cost of schedules.

Edwards\textsuperscript{107} (1981) in his paper has presented use of UDC for the Botanical Collection in the Botanical Library, British Museum.

Hindson\textsuperscript{108} (1979) in his study has clearly pointed out that until recently the writer participated actively in the application and development of the Universal Decimal Classification, principally by means of computer-based techniques available via large ICL 1900 series installations. During the decade 1968–1978 a multi-purpose database was developed and operated using remote computer resources equipped with extensive telecommunication facilities. Primarily designed to support senior managers, the subject coverage of the system encompasses all matters judged to be useful in the particular
business environment concerned. One feature of the system is the use of the UDC for both information (reference) retrieval and profile matching. It is hoped that some personal reflections arising from the experience gained and on associated matters will be useful to those involved in the management of information in large organizations.

Thomas\textsuperscript{109} (1977) in his article has described the importance of UDC and made it compulsory in North American Library Education.

Halm\textsuperscript{110} (1972) in the essay has clearly pointed out that the universal decimal classification is the main classification scheme used in both library and documentation functions at the central information department of Bronswerk-Amersfoort. Mechanization has been introduced in the preparation of UDC and alphabetical indexes using a KWIC program to access directly documentation files. A special feature of the system is that the KWIC serial number = the program sorting number = the encoded UDC form = the storage or shelving number. Thus, encoded UDC numbers make the use of a special UDC sorting program unnecessary.

Dahlberg\textsuperscript{111} (1971) in his paper has given the reasons for a proposed new universal decimal classification obtained by re-allocating the subject fields of the UDC main classes according to present day views, state of knowledge, and priorities, and to subdivide these main classes only by subfields of subject fields. The specific facets of each field should be represented by a uniform array of special auxiliaries attached to the fields through the technique of interrupted subdivision. These should express the following categories: (1) Theory, (2) Objects, (3) Processes, (4) Attributes, (6) Order, organization, (7) Relation, (8) Determination, (9) Evaluation ((5) is left free for the moment). Proposals for further simplification of the scheme are outlined regarding the general categories, the symbols used, and the rules for syntagmatic organization, taking into account the implications of computer technology. Possible changes in the layout and editions of such a new classification are discussed.
Smith\textsuperscript{112} (1971) in his work has presented defects of UDC. The purpose of the present paper was to put forward the views of five practicing librarians on what were the most serious of those defects, and to try to see whether the SRC was likely to remedy them.

Lloyd\textsuperscript{113} (1969) in his discussion meeting on recent developments in UDC has pointed out the development of UDC as a scheme both at national and International level and to examine progress on the English full edition, stressing the point that this could be accelerated with more active help and interest on the part of UDC users in this country.

Wellisch\textsuperscript{114} (1968) in his study has pointed out that contrary to criticism of universal decimal classification; a programmed instruction course made in a review of that book by T.S. Morgan, journal of documentation, 27(1), 64-66 (1971 march), the book passed inspection by fid classification department personnel and is consisted with current UDC practice.

\textbf{Colon Classification}

Curras\textsuperscript{115} (1992) in his article describes the basic ideas concerning systems science. Discusses S R Ranganathan's ideas about concepts of 'universe of ideas', 'universe of science', 'universe of knowledge' and 'universe of classification'. Examines the principles, canons and postulates underlying Colon Classification, Discusses the structure of Colon Classification. Points out that the ideas of Ranganathan conform to the concept 'unity of science'. Concludes that the principles of systems science or systems thinking are helpful in understanding theory of classification formulated by him.

Wells\textsuperscript{116} (1950) in his paper has discussed about Colon Classification and its principles and pointed out some suggestions for a classification of package manufacturers on colon principles.
Comparative Study of the Library Classification Schemes

Niculescu\textsuperscript{117} (2010) in the study has pointed out that in the context of the multidisciplinary approach to information indexing, the study analyzes the compositional structures of the Dewey system compared to UDC regarding the codification of the auxiliary determinations of subjects. The study, by systematic, typological and methodological analysis of the subdivisions for arts, individual literatures and specific literary forms and of the analytical or special auxiliary indices, accompanied by the argumentation of their value and importance in the information management, reflects the findings of a co-relational research of the auxiliary structures of the most important indexing languages with hierarchical structure and from the perspective of the information offer, it maintains the fundamentally interdisciplinary nature of the Dewey system and UDC.

Tim\textsuperscript{118} (2009) his project of Singapore Polytechnic (SP) Library embarked to convert books and periodicals from the Universal Decimal Classification system to the Library of Congress Classification (LCC) system after benchmarking projects showed that work performance could be improved upon the conversion. Planning began in 2005 with strong support from SP management. It was decided to carry out the project in-house. Internship at the National University of Singapore Library was arranged for one staff to learn the use of LCC and how special collections and issues were handled. Student assistants were recruited to assist in various processes. In addition, 10,000 bibliographic records were outsourced to a vendor to assign LCC call numbers in order to speed up the project. The library collection was converted and re-shelved during the Polytechnic vacation periods from February 2007 to March 2008, with the Library remaining open throughout the period.

Fandeno\textsuperscript{119} (2008) in her paper has pointed out that The Universal Decimal Classification (UDC) is currently used in the National Library of Liechtenstein (NLL). Librarians have been using the 1978 German medium edition “Dezimalklassifikation: Internationale
Mittlere Ausgabe: FID 550” published by the German Institute for Standardization (Deutsches Institut für Normung - DIN). Since DIN ceased its activity as UDC publisher, there has been no other interest in publishing a German edition of the classification. Hence, the NLL library lacks a suitable and up-to-date UDC edition in German to extend and modernize its content indexing. In order to update information access to its collection, the NLL is faced with two options: reclassifying books to the more recent edition of the UDC or reclassifying to DDC 22 (Dewey Decimal Classification), recently translated and published in German. In 2007-2008, as part of a graduate library & information science programme internship, has conducted a research to assess the suitability of the two classification schemes in supporting collection management and information access in the NLL-with relation to costs, work expenditure and practical classification issues.

Yuefang and Yinto\textsuperscript{120} (2007) in their Comparative study has compared the Dewey Decimal Classification, 21st ed. (DDC) and the Chinese Library Classification 4th ed. (CLC), there exist some differences, one of which is the treatment (classification) of works of literature.

Mcllwaine and Mitchell\textsuperscript{121} (2006) in their article explores the feasibility of using the Universal Decimal Classification’s revised religion scheme as the framework for an alternative view of 200 Religion in the Dewey Decimal Classification, and as a potential model for future revision. The study investigates the development of a top-level crosswalk between the two systems, and a detailed mapping using Buddhism as a case study.

Tennis\textsuperscript{122} (2006) his article outlines three information organization frameworks: library classification, social tagging, and boundary infrastructures. It then outlines functionality of these frameworks. The paper takes a neo-pragmatic approach. The paper finds that these frameworks are complementary, and by understanding the differences and
similarities that obtain between them, researchers and developers can begin to craft a vocabulary of evaluation.

Stump and Torgerson\textsuperscript{123} (2004) in their work presents information about the Dewey Decimal Classification and the Library of Congress Classification schemes. The Library of Congress scheme is easier to use with larger collections and is in use in most academic libraries. The Dewey Decimal scheme is used by most public and school libraries. The article continues to discuss how each classification scheme is used.

Szunejko\textsuperscript{124} (2003) her study has done the comparison of the special classification schemes for literature used at two university libraries: the University of Western Australia and Murdoch University. Each scheme is outlined, and built numbers are compared. The advantages and disadvantages of each scheme are discussed in terms of the requirements of a classification scheme: collocation of subject matter, partition of subject aspects, ease of application, shelf browse-ability, retrieve-ability, identification, access and navigation.

Connaway and Sievert\textsuperscript{125} (1996) in their work has presented the application of three classification schemes, Library of Congress Classification, Dewey Decimal Classification and National Library of Medicine Classification systems were queried to determine the classification of materials on health insurance. Two hypotheses were examined. First, there would be no difference in the scatter of the three classification schemes. The second hypothesis was that where there was overlap between all three schemes there would be no difference in the classes into which the subject was placed. Results demonstrated that there was subject scatter in all three classification schemes and that there was little overlap between the three systems.
Library Classification Schemes and ICT

Brickley\textsuperscript{126} (2011) in his talk focuses on the relationship between subject classification and ‘Web of data’ trends around RDF, OWL and SKOS. In particular it sketches ways in which factual and ontological data can be used alongside subject classification and on the practical possibilities this creates — for collaboration amongst vocabulary and dataset maintainers, and in user facing applications. Although factual ontologies and subject classification systems typically serve different purposes, they often overlap in topical coverage and are can all be expressed using shared underlying ‘Web of data’ technologies, such as RDF. With each passing week, new datasets—whether scientific, library, cultural heritage, governmental or social—are published as ‘linked data’, with RDF vocabularies, OWL ontologies and SKOS schemes as the representational ‘glue’ that holds the whole thing together. Factual representations of people, places and things serve as bridges between the subject classification world and the world of general Web data. Despite this, we have not yet collectively produced ‘best practice’ guidance that show how such linkage can be created, curated and exploited using practical, modern Web tools. A goal of this talk is to motivate such collaboration, and to suggest some priorities for the short and medium term.

Buxton\textsuperscript{127} (2011) in his article has discussed about the chemistry schedule in the Universal Decimal Classification (UDC) is badly in need of revision. In many places it is enumerative rather than synthetic (giving rules for constructing numbers for any compound required). In principle, chemistry should be the ideal subject for a synthetic classification but many common compounds have complex formulae and a synthetic system becomes unwieldy. Also, all compounds belong to several hierarchies, e.g. chloroquin is a heterocycle, an aromatic compound, amine, anti-malarial drug, etc. and rules need to be drawn up as to which ones take precedence and which ones should be taken into account in classifying a compound. There are obvious similarities between a classification and ontology. This paper looks at existing ontologies for chemistry, especially ChEBI which is one of the largest, to examine how a classification and an
ontology might draw on each other and what the problem areas are. An ontology might help in creating an index to a classification (for chemicals not listed or to provide access by facets not used in the classification) and a classification could provide a hierarchy to use in an ontology.

Joorabchi and Mahdi\textsuperscript{128} (2011) in their article describes an unsupervised approach for automatic classification of scientific literature archived in digital libraries and repositories according to a standard library classification scheme. The method is based on identifying all the references cited in the document to be classified and, using the subject classification metadata of extracted references as catalogued in existing conventional libraries, inferring the most probable class for the document itself with the help of a weighting mechanism. We have demonstrated the application of the proposed method and assessed its performance by developing a prototype software system for automatic classification of scientific documents according to the Dewey Decimal Classification scheme. A dataset of 1000 research articles, papers, and reports from a well-known scientific digital library, CiteSeer, were used to evaluate the classification performance of the system. Detailed results of this experiment are presented and discussed.

Keshet\textsuperscript{129} (2011) has pointed out the purpose of the study is that classification is an important process in making sense of the world, and has a pronounced social dimension. This paper aims to compare folksonomy, a new social classification system currently being developed on the web, with conventional taxonomy in the light of theoretical sociological and anthropological approaches. The co-existence of these two types of classification system raises the questions: Will and should taxonomies be hybridized with folksonomies? What can each of these systems contribute to information-searching processes, and how can the sociology of knowledge provide an answer to these questions? This paper aims also to address these issues. Design/methodology/approach – This paper is situated at the meeting point of the sociology of knowledge, epistemology and information science and aims at examining systems of classification in the light of both classical theory and current late-modern sociological and anthropological
approaches. Findings – Using theoretical approaches current in the sociology of science and knowledge, the paper envisages two divergent possible outcomes.

Putkey (2011) in his paper looks at Simple Knowledge Organization System (SKOS) to investigate how a faceted classification can be expressed in RDF and shared on the Semantic Web.

Ruther, Fock and Krutisch (2011) in their research has pointed out that the Federal Environment Agency (FEA), Germany, has a long tradition in knowledge organization, using a library along with many Web-based information systems. The backbone of this information space is a classification system enhanced by a reference vocabulary which consists of a thesaurus, a gazetteer and a chronicle. Over the years, classification has increasingly been relegated to the background compared with the reference vocabulary indexing and full text search. Bibliographic items are no longer classified directly but tagged with thesaurus terms, with those terms being classified. Since 2010 we have been developing a linked data representation of this knowledge base. While we are linking bibliographic and observation data with the controlled vocabulary in a Resource Description Framework (RDF) representation, the classification may be revisited as a powerful organization system by inference. This also raises questions about the quality and feasibility of an unambiguous classification of thesaurus terms.

Smiraglia, Heuvel and Dousa (2011) in their article discussed about the contrasts in 20th century classification theory relate to a transition from a universe of “knowledge” system towards one of “concepts.” Initiatives to develop a Simple Knowledge Organization Systems (SKOS) standard based on classification schemes and taxonomies within the framework of the Semantic Web (SW) are attempts to bridge the gap. Current knowledge organization systems (KOS) seem to reinforce “syntactics” at the expense of semantics. We claim that all structure is syntactic but knowledge structures need to have a semantic component as well. Therefore we consider classifications as artificial languages. The Universal Decimal Classification (UDC) constitutes a natural language-
independent notation system that allows for mediating between concepts and knowledge systems. We discuss an elementary theory of knowledge organization based on the structure of knowledge rather than on the content of documents. Semantics becomes not a matter of synonymous concepts, but rather of coordinating knowledge structures. The interactions between these systems represent interactions between different universes of knowledge or concepts.

Zeng, Panzer and Salaba\textsuperscript{133} (2010) has based their research on three general classification schemes, this paper discusses issues encountered when expressing classification schemes in SKOS and explores opportunities of resolving major issues using OWL 2 Web Ontology Language.

Zhonghong, Chaudhry and Khoo\textsuperscript{134} (2010) conducted a study to investigate the capability of a general classification scheme and domain thesauri to support the construction of an organizational taxonomy to be used for navigation, and to develop steps and guidelines for constructing the hierarchical structure and categories. The study was conducted in the context of a graduate department in information studies in Singapore that offers Master's and Ph D programs in information studies, information systems, and knowledge management. An organizational taxonomy, called Information Studies Taxonomy, was built for learning, teaching and research tasks of the department using the Dewey decimal classification and three domain thesauri (ASIS&T, LISA, and ERIC). The support and difficulties of using the general classification scheme and domain thesauri were identified in the taxonomy development process. Steps and guidelines for constructing the hierarchical structure and categories were developed based on problems encountered in using the sources.

Golub and Lykke\textsuperscript{135} (2009) in their article clearly pointed out the purpose of this study is twofold: to investigate whether it is meaningful to use the Engineering Index (Ei) classification scheme for browsing, and then, if proven useful, to investigate the performance of an automated classification algorithm based on the Ei classification...
scheme. A user study was conducted in which users solved four controlled searching tasks. The users browsed the Ei classification scheme in order to examine the suitability of the classification systems for browsing. The classification algorithm was evaluated by the users who judged the correctness of the automatically assigned classes. The study showed that the Ei classification scheme is suited for browsing. Automatically assigned classes were on average partly correct, with some classes working better than others. Success of browsing showed to be correlated and dependent on classification correctness. Further research should address problems of disparate evaluations of one and the same web page. Additional reasons behind browsing failures in the Ei classification scheme also need further investigation. Improvements for browsing were identified: describing class captions and/or listing their subclasses from start; allowing for searching for words from class captions with synonym search (easily provided for Ei since the classes are mapped to thesauri terms); when searching for class captions, returning the hierarchical tree expanded around the class in which caption the search term is found. The need for improvements of classification schemes was also indicated. A user-based evaluation of automated subject classification in the context of browsing has not been conducted before; hence the study also presents new findings concerning methodology.

Panzer and Zeng\textsuperscript{136} (2009) in their article represents classification systems on the web for publication and exchange continues to be a challenge within the SKOS framework. This paper focuses on the differences between classification schemes and other families of KOS (knowledge organization systems) that make it difficult to express classifications without sacrificing a large amount of their semantic richness. Issues resulting from the specific set of relationships between classes and topics that defines the basic nature of any classification system are discussed. Where possible, different solutions within the frameworks of SKOS and OWL are proposed and examined.

Veldon\textsuperscript{137} (2008) in his study addresses the classification of development knowledge in web-based resources. Seven categories of a marginalized knowledge domain are mapped across eleven web resources, with additional observations of classification work in India
and Kenya. The analysis discusses how technological designs for web-based classification systems can become global hegemonic structures that may limit the participation of marginalized knowledge communities. The question of a more inclusive design is further explored in two offline, indigenous approaches to classifications. They suggest that a combination of both online and offline classification work, in which localized classifications are created, using local categories and tags, may enhance the participation of marginalized communities. The results of this research point to the need to design web-based resources that support the participation of diverse knowledge communities as well as the generation and representation of the diversity of knowledge. Future research may focus on the use of tags and the visualization of the diverse ways in which an item can be categorized, in order to make web-based classifications more meaningful to marginalized knowledge communities.

Golub\textsuperscript{138} (2006) in his study has defined the purpose is to provide an integrated perspective to similarities and differences between approaches to automated classification in different research communities (machine learning, information retrieval and library science), and point to problems with the approaches and automated classification as such. A range of works dealing with automated classification of full-text web documents are discussed. Explorations of individual approaches are given in the following sections: special features (description, differences, evaluation), application and characteristics of web pages. Provides major similarities and differences between the three approaches: document pre-processing and utilization of web-specific document characteristics is common to all the approaches; major differences are in applied algorithms, employment or not of the vector space model and of controlled vocabularies. Problems of automated classification are recognized. The paper does not attempt to provide an exhaustive bibliography of related resources. As an integrated overview of approaches from different research communities with application examples, it is very useful for students in library and information science and computer science, as well as for practitioners. Researchers from one community have the information on how similar tasks are conducted in different communities. To the author’s knowledge, no review paper on automated text
classification attempted to discuss more than one community’s approach from an integrated perspective.

Horvat and Ojstersek\textsuperscript{139} (2006) in their paper have pointed out that nowadays, in almost all libraries, librarians still maintain a rather obsolete practice of setting their books and other material according to a variation of the well-known UDC arrangement. However, the habits of today's users force libraries to provide a different approach for accessing library material, it should be in a digital form and easy to find. On the one hand, the library items should have richer description than mere UDC, i.e. using the automatic text indexing as well as considering the intentional point of view. On the other hand, users' needs should be specified to facilitate obtaining and delivery of the relevant items to the right users. Moreover, otherwise valuable implicit knowledge could be partially captured in a step-by-step form via forum discussions.

Kim and Lee\textsuperscript{140} (2006) in their paper reports on the design of a knowledge base for an automatic classification in the library science field, by using the facet classification principles of colon classification (CC). to do so, by designing and constructing a knowledge base that is able to be classified automatically, and by inputting titles or key words of volumes into the computer, it aims to create class numbers automatically through automatic subject recognition and processing of keywords in titles through the facet combination method of CC. Especially, the knowledge base for classification was designed along with the principle of globe and cylinder, automatic classification which can be possible.

Porto and Marchitelli\textsuperscript{141} (2006) has discussed about role of library classification schemes especially DDC and JITA applied to Content Management Software

Uddin, Islam and Haque\textsuperscript{142} (2006) in their article has discussed about Classification structures are useful for organizing and finding information. The right use of classification structure in the web information architecture provides a user friendly
interface and can serve as an effective tool for information retrieval. This paper defines the concepts related to the recent development in classification and gives an overview with case studies of using classification structure in information description and discovery in Web. The study found that hierarchical-enumerative structure is used mostly in directories, subject gateways and in cataloguing electronic contents. Faceted structure is used in the commercial sites to effectively organize and retrieve the web document through a multidimensional taxonomy. A third approach known as Folksonomy has emerged as a user oriented classification on the Web without maintaining any explicit relationship of classifying document. This study suggests using these three approaches in the appropriate context to ensure the optimum use of corporate information.

Yi (2006) in his study has discussed that a major library classification scheme has long been standard classification framework for information sources in traditional library environment, and text classification (TC) becomes a popular and attractive tool of organizing digital information. This paper gives an overview of previous projects and studies on TC using major library classification schemes, and summarizes a discussion of TC research challenges.

Agrahi (2004) in his article the relationship between classification indexing and retrieval is discussed. In library and information science, classification and retrieval have always been closely associated with each other. But in certain ages, because of a lack of interest in applying knowledge, it was thought that libraries were just a place for gathering and keeping books and other documents as assets. And therefore, people thought that classification was simply for arrangement, in order to have a kind of system for objects that they considered to be luxuries. The reason for this lies in their static view of things, including libraries. Changing attitudes and having a dynamic view of the world of reality will change everything. Thus, if we define that the library is not only a place for book collection but is a place where people fill their information needs, and also that
librarianship is not mainly about classification, but is a discipline by which we retrieve information and receive knowledge, we may see a great change in the retrieval process.

Knutsen\textsuperscript{145} (2003) in his paper describes the development of the 5th Norwegian edition of the Dewey Decimal Classification. The new Norwegian edition is an intermediary edition with features from both DDC 21 (1996) and the Abridged Edition 13 (1997) to meet the subject needs of Norwegian libraries. The edition was developed in a distributed XML environment, and with close communication between the Norwegian editorial team and the Dewey editors at the Library of Congress. This collaboration resulted in improvements to DDC 22 and the 5th Norwegian edition.

Goetz\textsuperscript{146} (2002) in his study has discussed that classification experts and librarians have long recognized the potential of library classification schemes for improving subject access to information. In a 1983 article, Svenonius describes several uses for classification in online retrieval systems, including the following, (1) to improve precision or recall, (2) to provide context for search terms, (3) to enable browsing, and (4) to serve as a mechanism for switching between languages. In the Dewey Decimal Classification (DDC) Online Project (Markey and Demeyer 1986), Markey demonstrated the first implementation of a library classification scheme for end-user subject access, browsing, and display. Although many online catalogs provide call number browsing, few employ classification in the manner described by Svenonius or explored by Markey in her innovative use of the DDC in an experimental online catalog which enabled users to search and browse online classification data. Only recently, some ten years after Markey's pioneering research, is online classification data once again being seriously viewed as a tool for providing advanced browsing and retrieval capabilities in online systems.

Toth\textsuperscript{147} (2002) in his paper has pointed out that there is a growing need for practical solutions to provide flexible access to digital documents in a structured form on the Web.
The existing library classification schemes serve as good bases for achieving this goal. This paper presents a brief review of the various methods applied in automatic classification. It focuses on the main activities fulfilled within various research projects to make possible the effective automatic indexing and classification of Web sources. It describes the approaches taken in the Nordic WAIS/WWW; DESIRE II – Engineering Electronic Library System (EELS); GERHARD; and SCORPION projects. Artificial neural networks and artificial intelligence show great potential.

Soergel\(^{148}\) (1999) in his research paper has pointed out that Classifications/ontologies, thesauri, and dictionaries serve many functions, which are summarized in this note. As a result of this multiplicity of functions, classifications—often called ontologies—are developed in many communities of research and practice. Unfortunately, there is little communication and mutual learning; thus, efforts are fragmented, resulting in considerable reinvention and less than optimal products.

Albrechsten and Jacob\(^{149}\) (1998) in their research paper has talked about the notion of the classification scheme as a transitional element or “boundary object” (Star, 1989) offers an alternative to the more traditional approach that views classification as an organizational structure imposed upon a body of knowledge to facilitate access within a universal and frequently static framework. Recognition of the underlying relationship between user access and the collective knowledge structures that are the basis for knowledge production indicates the dynamic role of classification in supporting coherence and articulation across heterogeneous contexts. To this end, it is argued that the library should be an active participant in the production of knowledge, and that this role can be effected by the development of classificatory structures that can support the needs of a diverse information ecology consisting of a complex web of interacting agents, users, and technologies. Within such information ecology, a classificatory structure cannot follow a one-size-fits-all paradigm but must evolve in cooperative interaction between librarians and their user groups.
Williamson150 (1997) in her article has discussed about the classification, work which can be done in this field and successfully addressed the challenges in the millennium.

Woodward151 (1996) in his piece of work has mentioned that since its beginning, librarians and information scientists have been debating the merits of different strategies for bringing order to the chaos that characterizes the Internet. This paper reviews the traditional and 'quasi-traditional' strategies for cataloging and classifying information resources available on the Internet, addressing the problem of citation to resources that exist only in electronic form. Topics include automatic classification projects and classified subject trees such as the BUBL Subject Tree, CyberDewey, and the World Wide Web Virtual Library. Also considered are OPAC-like library catalogs, including the British CATRIONA Project and OCLC's InterCat. The author explores retrieval tools used with concept analysis and other nontraditional proposals, which include some element of library expertise, usually the use of one of the major library classifications. The Universal Decimal Classification (UDC) is given special attention, both because of its recent resurgence and its international acceptance. In presenting these varied projects, the review also inquires into the applicability of traditional library skills in an electronic, networked environment.

Koh152 (1995) in his article has described that option in classification available through modern information technologies are explored and discussed in terms of system design options and user searching options. The integrated subject tool will give options for the simultaneous presentation of the types of catalogs desired-dictionary, divided, or classified, as well as the concurrent consultation of multiple classification systems. The problems of electronic union catalogs, including a "virtual union catalog" in particular, are considered and enhancements made possible through classification are explored. The combined system of subject headings and classification is presented as the model of the integrated subject searching tool, which will meet individualized learning styles and user responsive vocabulary. The integrated subject tool box (including classification) for an
effective modern subject system is discussed in particular as a searching tool to assist "shelf browsing" of virtual reality (VR) objects.

**Indian Studies**
The literature related to library classification schemes which has been published by Indian authors is described in the following broad categories:

**Library Classification – General**
Satija\(^{153}\) (2012) his article has introduced the concept of classification and its various classifications. The article elaborates on the process of classification. The specific uses of library classification are narrated.

Madhabmohan and Amitava\(^{154}\) (2003) in their paper has pointed out the basic idea of classification framed by Ranganathan are embedded in Indian Philosophy. He cited in his Prolegomena, the Purva-mimamsa-darsana, the Nyaya-Kosa etc. He has also accepted the contribution of Naiyayika Kuppuswami Sastri and hence by investigating the philosophical texts as well as the different monographs of Ranganathan, essence has been extracted for, that the established ideas and concepts of Ranganathan blossom forth in a rather modified way to his intuition.

Gopinath\(^{155}\) (2001) in his essay shows how classification starts at a very young age of a child and during its learning periods. How cognition helps in classification and as a person grows up how he learns the intricacies of classification. The abilities of classifying objects helps in professional growth. Deals with how our sensory perceptions help in classification.

Dhyani\(^{156}\) (1999) in her study has pointed out that Library classification is constantly being influenced by multifaceted, multidimensional, and infinite growth of literature on one hand and the users needs on the other. Dewey pioneered in devising a scheme of classification for the documentation utility of the organised knowledge. Subsequent
schemes of classification worked purely without any theoretical foundation, colon
classification being the exception. With the emergence of computer technology the
library classification is being metamorphosed. This paper attempts to delve a state-of-the-
art of library classification in the new computer age.

Gopinath\textsuperscript{157} (1999) in the research paper, Paradigms, Paradigm Shifts and Classifications
has cited developments in the scientific paradigms which indicate growth of knowledge
in different stages. Paradigm shifts indicate the landmarks in this growth of knowledge. A
study of Aviation Systems Engineering and its correlations to the Dewey decimal
classification are presented. The structure of knowledge classification has to indicate
paradigm shifts.

Gopinath and Das\textsuperscript{158} (1997) in the article discusses about the various purposes of
knowledge representation including text understanding, cognitive research, expert
systems, development and information retrieval. How classification is related to
knowledge representation has been discussed. Clustering analysis also produced
knowledge representation has also been highlighted. The problems of knowledge
representation and how it can be solved through proper classification of knowledge has
also been discussed.

Gopinath\textsuperscript{159} (1992) in his study identifies the contribution of Ranganathan towards
scientific basis for classification. Discusses the value in developing theory and practice of
classification in the current day inter-disciplinary subjects in Library and Information
Science.

Krishan Kumar\textsuperscript{160} (1992) in article points out that Dr S R Ranganathan was truly a great
scholar, who made rich contribution to different aspects of library and information
science, but is better known for his work in the field of library classification. Discusses
the distinctive contribution to classification such as normative principles, three plane
model of work, freely faceted classification (involving facet analysis and synthetic
principle), postulation approach, fundamental categories and certain notational devices like sector device, group notation device, emptying digit device and seminal mnemonic device. Regards these as seminal ideas forming basis of his theory of library classification. Considers seventh edition of Colon Classification as best example of application of these ideas.

Neelameghan\(^{161}\) (1992) in his study discusses and presents examples of some practical applications of the postulates, principles and techniques formulated by Dr. S.R. Ranganathan within the framework of his general theory of knowledge classification, at various stages in the design and development of specialized databases, such as, in conceptualizing, structuring and organizing information as perceived by specialist users and preparing databases there from; in preparing field definition table; and in object-oriented analysis and design. The usefulness of the Postulational Approach to Facet Analysis and Synthesis and the Principles of Helpful Sequence are highlighted. Application of the concepts and technique of seminal, systematic, scheduled and verbal mnemonics in designing integrated databases is illustrated. Interaction between system designers and end-users and the participation of the latter in various stages of system designing and development are essential for the designer to understand users' perception of reality and their information requirements. This is implied in Ranganathan's Five Laws of Library Science.

Guha and Prasad\(^{162}\) (1985) in the research article have discussed about the role of classification in the changed context of computerized handling of information. It is stressed that the old systems of classification and the simulation of the human classifier by computer may not be very successful. Instead, a relative system of classification based on the changing relationship of concepts, which the computer itself will be able to monitor is considered to be more suitable. The nature of such a scheme of classification is discussed.
Kaula¹⁶³ (1985) in the research paper states the various patterns of classification systems and the introduction of depth classification pattern. Observes the challenges posed by the Information Revolution to existing classification systems and their limitations in communication. Refers to the emergence of new patterns – computer aided system and compatibility of existing schemes. Describes the theory based classification system for communication and its advantages. Examines the development of UDC relating to its revision, radical changes, application to mechanization and restructuring of schedules. Put forth the alternatives for the future development of classification for information retrieval which include fundamental changes, reconstruction of schedules, developments in common isolates and Thesauro facet and suggests that work on these lines be taken up by FID/CR, FID/CCC and FID/CCC-SN.

Raghavan¹⁶⁴ (1985) in the research paper defines the basic functions of surrogates files in information retrieval, exemplifies the categories enunciated in the general theory of classification developed in India. Defines the principles for structuring of concepts. Formulates sets of general postulates pertaining to the structure of subject headings. Demonstrates the application of procedures through examples.

**Library Classification Schemes – Use and its related case studies**

Jamdade, Jamdade and Panage¹⁶⁵ (2011) in their study assesses how many Ayurved college libraries in Maharashtra follow the classification schemes and the commonly used ones. Considers the impressions and opinions of the librarians of the Ayurved colleges regarding application of the classification scheme. Survey of librarians of the 43 Ayurved college libraries in Maharashtra, literature review and information obtained from books, journals, articles and the internet were carried out to study about classification schemes in Ayurved college libraries. Finds that out of 43 Ayurved college libraries only 13 libraries make use of classification schemes while 30 Ayurved college libraries have adopted unconventional methods of classification. Out of the 13 Ayurved college libraries applying classification schemes, 12 of these libraries
were using Dewey Decimal Classification and the remaining one was using the Colon Classification Scheme.

Rao and Niranjan\textsuperscript{166} (2008) in his study has discussed the reuse is the key paradigm for increasing productivity and quality in software development. To be able to reuse software components, whether it is code or designs, it is necessary to locate the component that can be reused. Locating components, or even realizing they exist, can be quite difficult in a large collection of components. These components need to be suitably classified and stored in a repository to enable efficient retrieval. Four schemes had been previously employed, free text, enumerated, attribute value and faceted classification. Experiences revealed that individual classification schemes were unable to solve the problems associated with component classification. We required a combination of classification techniques to meet the problems with individual schemes and to improve retrieval efficiency. This research looked at each of the classification techniques above, and proposes a new method for classifying component details within a repository.

Minj and Rajashekar\textsuperscript{167} (2005) in their article has clearly demonstrated that SALIS is a repository of open source software along with metadata information. The objective is to empower the Indian academic and developer community to make informed decisions while using open source software. To enable organization and retrieval of the information stored in the repository, a modified CCS (Computing Classification Scheme) classification scheme by the ACM (Association of Computing Machinery) was used. Since a sizeable section of the end users community were familiar with the USPTO classification scheme, a need was felt to classify the software by USPTO scheme also. Instead of classifying by two schemes it was decided to have a mapping or a concordance between the two schemes so that the classification takes place semi-automatically. The approach used to derive a concordance between two diverse classification schemes is described in this paper.
Walters and Rajashekar\textsuperscript{168} (2005) in their paper has discussed that SALIS is a repository of open source software along with metadata information. It is a pilot project covering the areas of computer networks and information systems. The objective is to demonstrate the usefulness of such repositories to the Indian academic and developer community in making informed decisions while using open source software. To enable organization and retrieval of the information stored in the repository, a modified CCS (Computing Classification Scheme) classification scheme by the ACM (Association of Computing Machinery) was used. Since a sizeable section of the end users community were familiar with the USPTO classification scheme, a need was felt to classify the software by USPTO scheme also. Instead of classifying by two schemes it was decided to have a mapping or a concordance between the two schemes so that the classification process can be simplified. The approach used to derive a concordance between two diverse classification schemes is described. Keywords: Classification schemes, mapping, concordance, open source software.

Tadasad and Maheswarappa\textsuperscript{169} (2002) reports the survey of five hundred and seventy one college libraries in Karnataka State with regard to classification of books, use of classification scheme, provision of book numbers, method used for providing book numbers, problems faced in classifying and the reasons for not classifying the books. It is found that three hundred and eighty-four of five hundred and seventy-one college libraries classify the books. DDC (209) and CC (140) are the schemes chiefly used. Book numbers are provided in two hundred and sixty-eight college libraries out of which one hundred and seventy-nine college libraries follow Ranganathan's book number. Inadequate staff (N= 216), inter-disciplinary nature of books (N=128) and identification of specific subjects (N=77) are the major problems in classifying the books. Inadequate staff (N=150), insufficient funds to purchase the schedule (N=77), lack of support from the authorities (N=39), and lack of interest (N=15) are the major reasons for not classifying the books. Concludes that unless the problems are solved or minimized it is difficult to expect from college librarians to classify the books.
Vaishisth (1997) in his article traces the origin and growth of Bibliothecal Bibliographical Classification (BBK). Describes its structural organization and discusses its conceptual basis. Describes the mechanism for its revision and updating. Maps out the universe of subjects as obtainable in BBK and gives its salient features.

Dhyani (1984) in the paper has presented a synopsis of Ph. D. thesis submitted to the University of Rajasthan, Jaipur and the topic entitled, “Use of Classification Schemes in Different Libraries in India”. The synopsis describes the problems studied, methodology followed and major findings.

Krishan Kumar and Vyas (1979) study is based on information collected through a questionnaire circulated among 66 libraries of colleges (out of whom 65 responded) during October 1976 to 1977. Enumerates the various schemes of classification adopted by college libraries. Describes the modifications carried out in the schemes. Discusses the problems faced in classifying the documents. Enumerates the subjects which are in urgent need of revision in Colon Classification, Dewey Decimal Classification and Universal Decimal Classification. Describes the extent of satisfaction achieved on the part of college libraries regarding schemes of classification being used by them. Discusses the future of Colon Classification and Dewey Decimal Classification schemes in India.

Ranganathan (1968) in his article relates his Colon Classification (CC) to the Dewey Decimal Classification, Library of Congress Classification, and the Universal Decimal Classification in response to Rasmus Molgaard-Hansen's paper 'UDC, DDC and LC in competition on the domain of the university library'. The four schemes are considered within the context of the laws of library science and the Indian (Ranganathan's) theory of classification. Molgaard-hansen indicated that UDC is generally preferable to DC or LC, and Ranganathan agrees. Ranganathan concentrates his attach upon UDC, stressing the equality or superiority of CC on point after point. Major specific criteria include the sequence of main subjects, accommodation of newly emerging main subjects, treatment...
of compound subjects, and provision for the representation of complex subjects. There is a plea for a permanent organization to develop CC and to promote its use.

**Dewey Decimal Classification**

Satija\(^{174}\) (2012) in the paper talk about the 23rd edition of the "DDC" that was published in May 2011 in the 135th year of its first publication in 1876. He offers a history of the publication which is counted among the big three library classification systems and used in about two lac libraries in 130 countries. He mentions Caroline Kent who is the chairperson of the Dewey Decimal Classification Editorial Policy Committee. He also explores several changes to the Dewey decimal classification system.

Bhattacharjee\(^{175}\) (2010) in his study has clearly pointed out that there exists several classification theories for indexing library materials like books, periodicals, journals, CDs etc. Amongst them, Dewey Decimal Classification (DDC) theory is the most popular one and expanded through 22 major revisions, the most recent one is 2003 A.D. revision. The DDC system was developed by Melvil Dewey in 1873 A.D. This system organizes library materials (Books, Periodicals, CDs etc) on shelves in a specific and repeatable order that makes it easy to find any material and return it to its proper place. Libraries in more than 135 countries in world use the DDC to organize and provide access to their collections. DDC is basically hierarchical in notation; the DDC is divided into ten main classes, spreading over the entire world of knowledge. Each main class is further divided into ten divisions and each division into ten sections. In DDC theory, same type of materials (books, periodicals, CDs etc) in a particular field has the same notation, but Library automation and identification needs different notation for each different title and copy of the library material. In this paper a Modified Dewey Decimal Classification (MDDC) theory is proposed in which all library materials can be accessed easily by individual indexing as well as environment of library (stock, quantity, title, publication etc) can be gazed and analyzed automatically.
Sharda and Kumari\textsuperscript{176} (2011) in their study looks at the importance of classification in the present digital environment with special reference to collection of books and multimedia materials in the field of linguistics and in multiple Indian languages. Based on our experience, suggest improvements in the existing classification themes, especially the Dewey Decimal Classification (DDC). Discusses online classification issues. The added descriptors can be adapted to other classification systems.

Majumdar and Sarma\textsuperscript{177} (2007) in their article has described the Dewey Decimal Classification system is continuously revised to keep pace with knowledge. This means accommodating new topics, as well as revising the old one. Today the Dewey Decimal Classification has undergone 21 revisions to keep itself abreast of the ever advancing frontiers of knowledge and to cater the increasing demand of its users. Edition 22 is the first edition of the Dewey Decimal Classification to be produced in the context of the web environment known as Web Dewey. It is updated regularly (quarterly) to cope up with the pace of increasing universe of knowledge. This article gives a brief idea about the online version of DDC and its features, updates and subscription information etc.

Satija\textsuperscript{178} (2004) in his study has discussed about organization, features and new changes in the \textsuperscript{22}nd editions of Dewey Decimal Classification are explained.

Shokeen and Kaushik\textsuperscript{179} (2004) in research paper highlight the different milestones in the journey of DDC from its first edition to twenty second edition. The new features of DDC XXII and major changes have also been discussed in this paper.

Gangu and Rao\textsuperscript{180} (2002) in their paper discusses the problems faced by librarian and classification experts who have to deal with the limitations and inadequacies of Dewey Decimal Classification-\textsuperscript{18}th edition, while handling with book dealing with new developments in human knowledge. Tries to analyze the problems and suggests solutions to overcome these problems.
Shailendra Kumar and Jha\textsuperscript{181} (2002) in the research article has described classification work as mandatory for organizing the knowledge containers according to hierarchy of subjects for easy retrieval or access to the documents. Acknowledges the DDC as the most widely used library classification system in the world. Informs that the 21\textsuperscript{st} edition of DDC published in 1996 runs into 4 volumes, has two schedules, one table and a relative index volume, and is updated via, CD-ROM through web Dewey, supplied through OCLC. Describes certain features in DFW version 2.10 of DDC 21\textsuperscript{st} edition, using a variety of windows to explain the steps for search and building a class number with Dewey for windows. Discusses the common features of DDC, DFW and Web Dewey formats. Concludes that E-Dewey is high priced product to be afforded only by large libraries.

Krishan Kumar and Sharma\textsuperscript{182} (2000) in research paper described the two formats of DDC 21. Mentions about the related tools, describe the changes (complete revisions, extensive revisions, expansions and modifications) in DDC 21. Mentions the changes incorporated to remove the bias towards the Western World and the United States. Describes the steps taken towards the internationalization. Concludes that one of the reasons for its survival is its continuous revision and predicts its bright future.

Krishan Kumar and Singh\textsuperscript{183} (1998) in their article describes the availability of DDC21 in two formats. Enumerates the related tools. Discusses the organization of the scheme, major changes, editorial process and cooperation as a basis. Describes changes in standard subdivisions, use of faceted approach, change in terminology, user convenience, use of information technology and use of scheme. Mentions some of the weaknesses in the system along with suggestions for improvement. Concludes that the system has not only survived but is now pulsating with new dynamism.

Krishan Kumar and Sharma\textsuperscript{184} (1990) in their study describes the general format. Discussing the major changes, important areas of revision tables and schedules. Mentions changes in the relative index. Enumerates the aims of the manual forming part of the set.
Describes revision policy, its use in libraries and glossary. Concludes that the new edition is better organized and more convenient to handle as well as more modern in its approach.

Jayarajan\textsuperscript{185} (1978) in his article has pointed out that the schedule of "658 General Management" of the 18th edition of Dewey Decimal Classification, is a slightly modified one, from the 17th edition. There are few additions to the schedule, and there are few relocations. In this paper, another major relocation is suggested. The result of the suggested relocation will be a more helpful sequence at the "Shifted-From" place as well as at the "Shifted-To" place.

**Universal Decimal Classification**

Singh and Singh\textsuperscript{186} (2011) in their paper has discussed that universal decimal classification (UDC) by defecto became a knowledge organization tool, particularly in S&T libraries all over the world. Like DDC up-dations and revisions, the UDC has also been revised from time to time and incorporates many new classes and changes in the changing context. The third revised edition of UDC in 2005 has many changes. But unfortunately, the common auxiliaries of places, particularly India and its states, are very inadequate even in the recent published edition of UDC. Hence, classifiers and LIS schools all over the country are facing sever problem in assigning the numbers of newly formed states and districts of India. Therefore, this study is an attempt to provide a solution to the above problem by giving a depth schedule for common auxiliaries of places for Indian states, districts, and historically significant entities.

Satija\textsuperscript{187} (2008) in article has discussed that Dewey’s Decimal Classification was introduced in India in 1915 by Asa Don Dickinson (1876-1960), a student of Melvil Dewey, on his appointment as Librarian in Punjab University, Lahore. Soon after, India became its largest user of the system in Asia. It is, however, unknown when and how UDC was first used in India. The earliest reference to UDC can be found in Ranganathan’s classic *Prolegomena to library classification* (1937), wherein he made a
comparative study of the then existing classification systems in order to derive some
normative principles of classification, but more so to demonstrate the supremacy of his
own system, Colon Classification (CC). Nevertheless, it is known that some libraries
were using UDC by the early 1950s.

Satija\textsuperscript{188} (2008) in paper has described that Universal Decimal Classification (UDC) is
the first internationally classified retrieval tool designed for bibliographic information
and documentation. This paper discusses the history and the salient features of the UDC,
and what is the future for the software.

Singh\textsuperscript{189} (2008) in the research article explores the use of UDC in libraries and
information centers of Delhi. The information presented here is part of the larger data set
collected by the author while compiling the Delhi libraries web directory. The survey,
conducted through library visits and questionnaires, shows that in Delhi there are sixty
four libraries using various editions of UDC. These include libraries of Defense Research
and Development Organization (DRDO), Council of Scientific & Industrial Research
(CSIR), Indian Council of Agricultural Research (ICAR), as well as libraries of the
Judiciary system situated in Delhi such as Supreme Courts of India, High Courts of Delhi
and Districts courts of Delhi. Some libraries of national importance such as Indian
Institute of Technology, National Agricultural Library, National Medical Library,
National Science Library, are also using the UDC.

Satija\textsuperscript{190} (2000) in his study describes the salient features of universal decimal
classification and its use in the special libraries.

Sharma\textsuperscript{191} (1990) in the article describes the background of UDC. Discusses the structure
of UDC. Explains the concept of principal divisions and special auxiliaries. Mentions
some cases of inappropriate allocations of concepts to special auxiliaries. Mentions the
examples of inappropriate allocation to hyphen series and point naught series. Give suggestions for improvement.

Sen\textsuperscript{192} (1987) in his work had observed that during the last half a century, UDC has become more comprehensive on the one hand and more complex on the other; more class numbers have been vacated than filled up; verbal expressions (verbexes) of class numbers in large number of cases are riddled with superfluous words, sentence-like expressions, out-of-date headings, unnecessary clusters, inappropriate, confusing and misplaced headings. As a result many of them are not index-friendly, not even index-worthy. Suggestions have been put forth to ensure more simple class numbers, relocate some classes to more logical positions, reduction in the length of many class numbers, and index-friendly subject headings.

Bhattacharyya\textsuperscript{193} (1972) in his study discussed about a classified catalog must be based on a scheme for classification. UDC is primarily meant to serve as a basis for designing a classified catalog. Classifying according to UDC is examined in the light of the postulates for facet analysis and the principles for determining facet sequence. Each distinctive feature of UDC for classifying in conformity with its the devices prescribed by UDC for classifying in conformity with its basic principles are discussed with illustrative examples. Classifying according to UDC, for designing a multiple entry classified catalog, is demonstrated and the disadvantages of the latter are mentioned. The single entry system prescribed by the guide to UDC (1963) is discussed. The principles for determining the facet sequence in a compound subject, prescribed by the guide, are examined. It is shown that each of these principles has a corresponding postulate or principle, as the case may be, in the general theory of library classification developed by Ranganathan. This general theory may be adopted by any scheme for classification method its design and development. For example, colon classification has adopted this. This general theory has prescribed the postulational method of classifying. An examination of the principles for determining the facet sequence in a compound subject,
as prescribed by the guide, indicates that it intends to recommend the postulational method of classifying, though inadequately, as prescribed by the necessary 'flexibility' for being it is shown that UDC has the necessary 'flexibility' for being adapted for this purpose, though at the cost of some economy and effectiveness. To ensure economy and effectiveness, much rethinking on the design and development of UDC will be necessary. The use of the postulational method of classifying by UDC is demonstrated with an example.

Mukhopadhyay\textsuperscript{194} (1968) in his paper has discussed about the field of social psychology has only been cursorily glanced at by the critics of UDC, including Miss Kyle who took 301.151 for the whole of socio-psychology and overlooked the fact that many of its subordinate concepts remain scattered all over the facet 30 sociology. The English abridged edition, in comparison with the French 2nd edition, offers a more restricted idea plane under 301.151 shared by two terms: ‘social psychology’ and ‘instinct’ eliminating the other ‘qualités socialement importantes d'individus’. The remaining terms transposed, too, having offered social psychology the first position in the sequence. Thus, the former may be assumed to have either an equal or a superior status or even the terms may be supposed to be nearly identical. The last one particularly has its base on the twenty-one subclasses enumerated under 301.151 which represent nothing but varied instincts. These instincts had been respected once as the only basic units of social psychology similar to the definitely agreed upon units of any firm sciences.

\textbf{Colon Classification}

Satija\textsuperscript{195} (2008) in his paper defines knowledge as sum total of ideas, emotions, beliefs, and experiences conserved by the society. Enumerates its properties as being social, ever growing, multidimensional, and fragmentary. Explains in brief social epistemology. Lists the growth of knowledge by specialization, interdisciplinary and multidisciplinary modes. Views classification as impermanent maps of knowledge which change with society and time. Explains the four principles of the mapping of knowledge as given by D W
Langridge, namely, ideological, social purpose, taxonomic, and disciplinary. Defines the field and scope of social sciences and briefly introduces the Colon Classification, its method, structure and kind of subjects therein. Further outlines and critically evaluates the order of basic subjects as divided in to major disciplines of sciences, humanities and social sciences. Lastly it dwells minutely on the order of social sciences main classes, namely education, geography, history, political science, economics, sociology and law. Ranganathan claimed this order to be of increasing artificially of their laws. Refutes Ranganthan’s concept of artificiality of social laws. This paper by analysis argues the order of CC-6 (1960) main classes to be of serial dependency as given by August Comte and already practiced by the Library of Congress Classification.

Panigarhi\textsuperscript{196} (2007) in his article had identified the method of identification of facets from the title of documents. States the technique of selecting respective category-name of facets to follow the facet formula in general. Also includes the scope of defining the specific facet formula for any specific subject. Illustrates steps followed in analyzing titles (i.e. in the form of natural language sentence) of documents for finding out noun phrases and picking up isolate numbers, symbols, basic subjects from the frame based knowledge base designed for this purpose. Emphasizes on integration of expert system and natural language processing components to proceed towards a successful automatic classification system.

Panigarhi\textsuperscript{197} (2007) in his paper discusses briefly the need of form divisions in library classification. Mentions the nomenclature of form divisions in different schemes, for instance it is called Anteriorising Common Isolates (ACI) in Colon Classification. Describes the procedure of knowledge representation for ACI and their respective notations, symbols etc. States the technique of selecting their respective category names to follow the facet formula. Also includes the scope of defining the specific facet formula for ACI. Illustrates steps followed in analysing titles (i.e. in the form of natural language sentence) of documents for finding out noun phrases and picking up isolate numbers,
symbols, basic subjects from the frame based knowledge base designed for this purpose. Includes the treatment of three types of ACI to prepare a suitable knowledge base in the automated environment. Facet formula for ACI of Colon Classification is also included to handle it successfully following postulates and principles.

Panigarhi and Prasad\textsuperscript{98} (2007) in their article aims to demonstrate the techniques of fixing the facet sequence in developing an automatic classification system to construct classification numbers for document titles, which appear in natural language. Describes the procedure of knowledge representation for basic subjects and their facets with regard to five fundamental categories, their respective notations, symbols etc. States the technique of selecting their respective category name to follow the facet formula in general. Discusses the method of identification of facets from the title of the document. Also includes the scope of defining the specific facet formula for any specific subject. Facet formula for ACI of colon classification is also included to handle it successfully following postulates and principles.

Prasad and Panigrahi\textsuperscript{99} (2005) in their paper has elaborately discusses the treatment of the time isolates of Colon Classification (CC), 7th edition in the automatic environment. From the very beginning CC has separately specified isolate numbers for time, which is one of the five fundamental categories. As the time isolates can appear with any one of the Main Classes enlisted in the schedule of basic subjects, the schedule for time isolates is mentioned as a common schedule. This research paper describes the importance of time (i.e. Meteorological time, Civil time, etc.) in classifying the thought content of any document. It also discusses the structure of the schedule of the Common Time Isolates including all divisions and subdivisions. Discusses the rules of expert systems developed using Prolog to handle the procedure of picking up numbers from other schedules and forming the special components to build compound time isolates. Describes the procedure of developing knowledge base in respect of time isolates. Some special techniques of defining lexical knowledge regarding time isolates are also discussed.
Working procedure of different program segment of inference engine is illustrated. Includes the scope of forming compound time isolates according to CC7. Illustrates the specific techniques used for different groups to follow the instruction of the schedule.

Panigarhi and Prasad\textsuperscript{200} (2004) in their paper presented the use of various devices enunciated in Colon Classification (CC) to sharpen any isolate idea, especially when a new subject enters into the universe of subjects. Discusses their helpfulness in the automatic classification system, Vishwamitra designed using artificial intelligence techniques with the help of PROLOG language. Discusses the procedure of building number for compound isolates using superimposition devices, alphabetical devices, geographic devices etc. Some suggestions are also made to rethink about the rules for alphabetical devices. For example the system suggests to pick the first three letters of a single worded term, first two letters from each word of a binomial term, first letter from each word of a multi-nominal term to build isolate number using alphabetical device. Suggest some modifications in colon classification so that the concept of Analytical Synthetic Classification is used elaborately for information retrieval in the age of ontology.

Shah and Kumar\textsuperscript{201} (2002) in article has discussed the salient features of common isolates in CC6 and CC7. Suggests for the expansion of these isolates in both the editions.

Singh\textsuperscript{202} (2000) in his study discusses the use of classification by various libraries in India and the scope of CC in future. Discusses also about computer compatibility and online environment. Whether it is useful for computerization of library services or not in terms of resource sharing.

Thakur\textsuperscript{203} (1997) in his article discusses the nature of an Electronic Media Library and how it is different from traditional libraries. Makes an effort to suggest some handy tips to make use of the concept of PMEST for storage and retrieval of specialized material of these libraries. Mentions the criteria being used for classification of material in the
absence of suitable scheme of classification. Describes the peculiar problem of retrieving the information from audio-video tapes. Suggests the solutions to meet them.

Krishan Kumar\(^{204}\) (1992) in his article describes S R Ranganathan's contribution to library and information science in general. Mentions about his library education at London and influence of W.C Berwick Sayers. Describes the seeds of Colon Classification, edition 1 (CC1). Discusses the salient features of CC1. Brings out the indebtedness of Ranganathan to Melvil Dewey. Describes the influence of UDC on CC. Discusses the growth and development of the concept of 'categories'. Mentions the influences of W Hulme, W S. Biscoe and others. Concludes that he possessed an amazing degree of ingenuity to apply old ideas in such a way so as to look distinctive and original.

Jyotirmaye\(^{205}\) (1989) in the study conducted has discussed about the Colon Classification from edition one to seven. The study gives the various stages of development of CC and discusses the new features incorporated into the scheme from time to time. Study analyses the Theoretical background that has gone into the making of the various editions and gives guidelines for future research on revising and improving the scheme without bringing radical changes.


Sangameswaran and Gopinath\(^{207}\) (1985) in their case study in National Information Centre for Food Science and Technology (NICFOS), which is being developed in CFTRI Mysore, ahs a significant collection of document acquired over a period of 35 Years. The classification scheme in this centre is colon classification and the documents have been
classified over the long period using different editions of the scheme, thus resulting in inconsistencies. Reclassification of document has therefore been taken up on the basis of Law of Osmosis. The problem confronted includes the absence of complete seventh edition of scheme. Therefore, various devices prescribed are being used to form isolates or sharpen the facet. Describes the aspects particularly in newly emerging basic subject like Energy, Science, Bio-technology and Microbial Technology, giving examples.

Seetharama\textsuperscript{208} (1975) in his study has talked about a depth classification version of colon classification for compound subjects going with the host subject 'l, 2, human digestive system' is given. The methodology for the design of a freely scheme for classification and the current version of the notational system of CC have been used. An alphabetical index to the schedules, a list of 33 examples classified according to the scheme for classification, and an alphabetical index to the subjects are given.

Gopinath\textsuperscript{209} (1973) in his work enumerates the objectives and the methodology for the revision of colon classification (CC) schedule for the classification of subjects going with history, with scope notes and working rules. An index to schedules and one hundred and twenty-three examples of subjects classified according to the scheme, and an alphabetical index to these subjects, are given.

Gopinath\textsuperscript{210} (1973) in his article has stated that a schedule of basic subjects proposed for inclusion in colon classification, edition 7, is given. An alphabetical index to the schedule is also given. The variety of sources of information used in developing the schedule are mentioned. The work in the notational plane and the devices used in constructing class numbers are briefly explained.

Neelameghan and Seetharama\textsuperscript{211} (1973) in their paper enumerates the objectives of revision of the colon classification (CC) schedule for the classification of subjects going with the basic subject 'B Mathematics.' the methods adopted for implementing the prescriptions of the law of parsimony, and improving the facet structure are briefly explained.
discussed. A revised schedule of CC for mathematics for subjects embodied in macro-documents, such as book taken as a whole, is given. An index to the schedule, 134 examples of subjects classified according to the scheme, and an alphabetical index to these subjects, are given.

Seetharama\(^{212}\) (1973) in his essay has stated that a depth classification version of colon classification (CC) for compound subjects going with the host subject 'l, 7 nervous system' is given. The methodology for the design of freely-faceted scheme for classification and the current version of the notational system of CC have been used. A schedule of special components for forming compound isolates is also given. An alphabetical index to the schedules, a list of 50 examples classified according to the scheme for classification, and an alphabetical index to the subjects are given.

Jayarajan\(^{213}\) (1972) in the article has discussed that in Edition 7 of the colon classification, ninety-nine new main subjects-including partial comprehensions-have been provided in its schedule of main subjects.

Ranganathan\(^{214}\) (1972) in his study recapitulates the terminology in use, the progress made in the theory of library classification, and the increase in the versatility of the notation system of colon classification. Emphasizes the need for a planned use of the rich versatility of the notational system. Describes a new method of the rich classification. Considers the allocation of sectors to different levels and the advantages thereof. Emphasizes the need for cooperation between the documentation research and training centre and the librarians in industries in applying the new method of design for constructing depth schedules for the classification of commodities and their parts.

Rao and Rawat\(^{215}\) (1972) in their paper has discussed about a depth classification version of colon classification for compound subjects going with the subject '9s.8 computer programming language' is given. The methodology of design is based on that for freely
facet classification. Computer programming language is deemed to be a personality isolate going with the main subject '9s computer science.' the principles used in arranging the speciators derived on the basis of different quasi-isolates are mentioned. An index to the schedule, a list of twenty-four examples classified according to the depth version, and an alphabetical index to the subjects in the classified list of examples, are given.

Ranganathan\(^{216}\) (1970) in the essay has talked about the increase in the new subjects with literary warrant in the library science makes the schedules in Ed. 1 to Ed. 6 of CC inadequate. Many of them are easily accommodated by the formation of compound isolates. Proliferation is greatest in isolates. Therefore, quasi isolates are used to form isolates. Advantage is also taken of the recent results in making the digits of an array range from A to (Z). Illustrations are given. The use of the specials division, '9d documentation,' in the schedule of property isolates is illustrated. Examples of call numbers of some recent books are also given.

Ranganathan\(^{217}\) (1969) in his article has pointed out that the field of library classification is the universe of subjects. Its purpose is to arrange subjects in a linear sequence helpful to the majority of readers and to mechanize the arrangement by representing each subject by a unique ordinal number. The increase in the extension, depth, and proliferation of universe of subjects is now accelerating at a great rate. Twelve modes of formation of subjects are described. Six species of schemes are defined, beginning with a purely enumerative one and ending with a freely faceted analytico-synthetic one.

Gupta\(^{218}\) (1968) in his study defines the necessary technical terms. Points out the need for provision for the interpolation in the schedule of basic subjects (BS) in a scheme for classification. Describes the various devices used by CC for such interpolation - Greek letters, sector device emptying digit, and empty and emptying digits - at different times. Points out the resulting problems in the coordinate and subordinate status of BS with particular reference to the canonical BS of the ms 'm useful arts' and the ms 'n fine arts'.
Shows, with the help of the mimamsa principle of 'burnt-chariot losthorse', that these problems are apparent but not real when examined at a deeper level. Explains the use of the digit-pair '-z' (hyphen z) for interpolating a partial comprehension of the canonical BS between a ms and its first canonical division, and discusses the possible alternatives to this device.

Neelameghan\(^{219}\) (1968) in his essay has mentioned that in an entry in the catalog-on-tape, slightly over 50 per cent of the space is taken up by the feature headings. Omitting the featuring headings in the entries increased the number of entries scanned by the computer from about 6,000 per minute to 9,000 per minute. However, the provision of feature headings in the list of entries selected in responded to a query facilitated scanning and picking out, by the reader, the entries for the most appropriate documents. To serve all these purposes, the kernel ideas of the subject of the documents. Expressed in standard terms were fed into the computer when making the entry for a document forming the input. On the basis of a depth version of CC made available to the computer, it picked out and synthesized into a class number the corresponding basic facet number and isolate numbers. Each entry in the catalog-on-tape thus contained only the class number and the specification of the host document. The class number for the query was similarly synthesized by the machine, and compared it with the class numbers in the entries on the catalog-on-tape. For each of the entries selected, the basic facet number and each of the isolate numbers in the class number is to be translated by the machine into the corresponding terms on the basis of the depth version of CC made available to it. These form the feature heading for the entry. The steps and the flow-charts for the synthesis of the class number alone are given. It is shown that, although classification as a whole is deemed in intellectual process, there are a number of steps which are of a clerical nature, and therefore, could be performed by the machine more efficiently and quickly. The particular advantage of a freely-faceted version of CC in facilitating the synthesis of class number by the machine is pointed out.
Comparative Study of the Library Classification Schemes

Sah\textsuperscript{220} (2010) his article has described about the facet indicators and its role. Identified the notation of facet indicators of classification schemes and role of facet indicators for classification schemes.

Kashyap\textsuperscript{221} (2001) his paper describes the theoretical framework of Ranganathan's postulates for designing a scheme for library classification and Peter Pin-Sen Chen's entity-relationship approach to data modeling and analysis techniques to see the similarity between their concepts and applications, in their respective domains. It also emphasizes the importance of Ranganathan's postulates in organizing and searching the World Wide Web resources.

Herla and Baradol\textsuperscript{222} (1997) in the paper have presented a comparative study of physics schedule in the Seventh Edition of CC and Twentieth Edition of DDC. The various characters such as placement of physics among other subjects, the neighborhood relations, terminology used, the arrangement of schedules, notations, and mnemonics are compared. The efficiencies and deficiencies have been studied in detail and several suggestions have been provided for improvement.

Gunapala\textsuperscript{223} (1983) in his article defines Geography and states its special features. Critically examines the provision for the classification of Geography as given in the Universal Decimal Classification, the Library of Congress Classification, and the Association of American Geographers Classification. Concludes with the remark that none of the schemes is perfect for the classification of Geography and states the good as well as weak points of the three classification schemes.

Neelameghan\textsuperscript{224} (1970) in his article has discussed about five types of compatibility studies are possible between document-finding systems. A basis of reference for compatibility studies is given, in terms of the dominant purpose and of the factors in the
mental set of the majority of the readers seeking the service of the system. A document-finding system should have an efficient scheme for classification built into it. The latter should be based on a sound and dynamic theory of classification. The essential features of the current general theory of classification are indicated. The extent to which colon classification (CC) and UDC conform to it is examined. Illustrates, with examples, the compatibility of CC-in-theory with UDC-in-theory and of CC-in-action with UDC-in-action. Even though UDC-in-theory may not be fully compatible with CC-in-theory, UDC-in-action can be made compatible with CC-in-action and with the basis of reference, with the aid of the guiding principles given in the guide to UDC (1963). These principles are in conformity with the general theory of classification. The advantages of basing an electronic document-finding system on an efficient scheme for classification and the compatibility of CC and UDC for the purpose are mentioned. The additional advantage of using CC is indicated.

**Library Classification Schemes and ICT**

Rao and Gupta\(^{225}\) (2011) their article has mentioned that classification is a primary method of information organization, as it meets the most important objective of information organization, which is to bring essentially like information together and to differentiate what is not exactly alike. Classifications may be used for categorizing and representing entities (or their labels)/concepts and their relationships. The article discusses different terminologies; concepts and definitions used in applied classification with regard to web knowledge management and conclude with a look at some ideas for the future of classification on the Internet.

Markey\(^{226}\) (2009) in his paper examines the forty-year history of online use of classification systems. *Enhancing subject access* was the rationale for obtaining support to conduct research in classification online and for incorporating classification into online systems. Cataloguers have been the beneficiaries of most of the advances in classification online and operational online systems are now able to assist them in class number
assignment and shelf listing. To this day, the only way in which most end users experience classification online is through their online catalog’s shelf list browsing capability. The author speculates on the reasons why classification online never caught on as an end user’s tool in online systems. Both the information industry and the library and information science community missed the opportunity to lead the charge in the organization of Internet resources; however, OCLC, the publisher of the Dewey Decimal Classification, has made substantial improvements to the scheme that have increased its versatility for organizing Internet resources. Because mass digitization projects such as Google Print will solve the problem of subject access, the author makes recommendations for classification online to solve these vexing problems of end users: staging of access, retrieving the best material in response to user queries, and automatic approaches to finding additional relevant information for an ongoing search.

Satija\textsuperscript{227} (2006) in his paper has described internet, WWW, search engines and their components. The importance of classification and indexing in organizing the Internet resources is justified. The problems in organizing these resources are discussed.

Kumbhar\textsuperscript{228} (2005) in his study narrates the experience of constructing a thesaurus of LIS terms by using speciator based faceted depth classification schedule. It also explains the advantage of this method in establishing various thesaural relationships.

Chudamani\textsuperscript{229} (2004) in his paper has pointed out that there is lot of research carried out about the models of classification suitable for libraries in digital environment. UDC, CC, DDC, LCC are used in libraries all over the world. People are using existing Classification models and automating them for use in the digital environment. Though this is a right step, one has to look at the operational requirements of the digital environment. Keeping this fact in view, this paper analyses the requirements of the digital environment and points out the adaptations required for the traditional schemes to suit the digital environment.
Panigrahi, Prasad and Basu\textsuperscript{230} (2003) in their research had made numerous attempts to design powerful automatic classification system, but those could not bring any well-accepted results. The main problem was successful automatic analysis of title of documents and finding out subject propositions. Because being a purely mental process, classification demands human intelligence for analyzing the title to find out its basic subject and other facets, if any, along with its category and also synthesizing those facets according to principles, postulates and canons to construct classification number. In other words, the document title, which is in natural language, is analyzed carefully to pick up relevant words (i.e. subject propositions) and those are synthesized using classifiers expertise to build the classification number. Emergence of Artificial Intelligence (AI) could bring the solution to this problem. Use of Natural Language Processing (NLP) techniques would help in automatic analysis of titles and an Expert System be developed to work exactly in the same way as a classifier does to build classification numbers being guided by canons, principles and postulates. This paper is based on the research work in this line of thinking. Semantic and syntactic components of an AI based system for automatic classification is described. The methodology of building lexicon, parser based on Definite Clause Grammar, knowledge-base based on frame based and rule based knowledge representation model is given with a brief discussion on those knowledge representation model. Needs of developing inference engine is also discussed with example. Shows the way an expressive title is analyzed to pick up noun phrases.

Matveyeva\textsuperscript{231} (2002) in his study explores a number of theoretical and practical issues concerning classification of remote electronic resources. The necessity to catalogue electronic resources has raised questions regarding including and classifying them in library catalogs. Analysis of current cataloguing decisions indicates that there is no single standard that has been formed. Some libraries assign classification numbers to remote electronic resources and others do not. Theoretical discussions of cataloguing librarians show that there are a number of important issues related to using classification for the cataloguing of electronic materials. The traditional purpose of classification for locating
physical objects on the shelves loses its function in the case of remote electronic resources. The other function of classification, categorization, is more useful in the case of electronic resources, as it promotes the role of classification as a subject-organizing tool. Attempts at using library classification schemes in order to organize electronic resources has moved beyond the realm of libraries and their catalogs. Information scientists, database developers, and specialists in information retrieval have explored library classification abilities in organizing information on the Internet, in order to improve browsing and subject searching. Several projects have proven that such classification systems as Dewey Decimal Classification, Universal Decimal Classification, and Library of Congress Classification can be useful in describing, organizing, and retrieving electronic resources.

Suman and Karmakar\textsuperscript{232} (2002) in his article has discussed that Information Retrieval in the Web remains a puzzling challenge despite the development of so many search engines and meta-search engines. Library classification schemes have been devised with the aim of organizing the collection to make the retrieval easier. As there is a shift in the focus of libraries the role of classification schemes are also changing. Can they be used in organizing the Web? What are the key advantages? And what are the current practices? The paper tries to explain these issues emphasizing on the use of Dewey Decimal Classification.

Gopinath\textsuperscript{233} (2001) in his paper has talked about digital technologies and telecommunication systems have revolutionized developments in information systems. Under these circumstances, how a flexible classification system can influence the knowledge organization and decision support systems is discussed in the paper. It is also shown how the classification and indexing may be like beyond 2001 AD.

Jaiswal\textsuperscript{234} (1999) in her study has pointed out that a computer cannot determine the subject content of a document the way the librarians do. Automatic classification is concerned with the procedures and systems that can make comparison between terms
used. Using the computer to provide automatic indexes can only be considered for the automatic production of title indexes or the keyword enhanced index. Classificatory techniques, in fact, can be used for improving the efficiency of these title indexes. This paper attempts to trace solutions to the problems, such as truncation, stemming, etc. Automatic keyword classification is only an attempt. The use of automatically constructed classification is still a subject for investigation.

Gopinath (1985) in his study has discussed that decision support systems are a kind of collective expert systems. Such systems have knowledge base inference base and decision alternatives presented in their data base management system. Presents classificatory frameworks based on a Conceptual Scheme Definition Language (CSDL) for the design of data base applications and HOLMES-a deduction augmented data base management systems. Describes the universal feature of classification systems.

Kaula (1985) in his article states the various patterns of classification systems and the introduction of depth classification pattern. Describes the universal applicability of faceted pattern. Observes the challenge posed by information revolution to existing classification systems and their limitation in communication. Refers to the emergence of new patterns-computer-aided system and compatibility of existing schemes. Describes the theory based classification system and compatibility of existing schemes. Describes the theory based classification system for communication and its advantages. Examines the development of UDC relating to its revision, radical changes, application to mechanization, restructuring of schedules. Puts forth the alternatives for the future development of classification for information retrieval. These include fundamental, reconstruction of schedules, development in common isolates and theseauro-facet. Suggests that work on these lines be taken up by FID/CR, FID/CCC and FID/CCC-SN.

Navlani (1985) in his study discusses the need of classification in the changed communication context. Examines some of the opportunities provided by the new information communication technologies for making classification user oriented, helpful,
and adopted to his needs, as also more flexible, dynamic, with better browsing capacities and improved research facilities.

Gopinath and Prasad\textsuperscript{238} (1975) in their article has stated that the performance of an Information Retrieval System can be improved by the use of controlled vocabularies, such as, classification schemes, subject authority lists and thesauri. Recent trends in the field of design of different types of controlled vocabularies have developed exclusively, principles and rules for each one of these \textit{devices}. While it is admitted that there are certain essential differences in each of these types of controlled vocabularies, there are also certain features which emphasize basic similarity, inter convertibility and compatibility among them. This paper discusses the compatibility of the guiding principles provided by the ISO for the construction of a thesaurus and the principles available in the General Theory of Library Classification. It is found that there are several initial steps which are common for construction of both a thesaurus and a classification scheme. The thesaurus usually confines itself to two planes of work, the idea plane and the verbal plane, whereas the classification system spreads into three planes of work, idea plane, verbal plane and the notational plane. The verbal plane of thesaurus actually takes some of the roles of the notational plane of a classification scheme. It is found that the role of thesaurus, classification scheme and that of a subject heading. list \textit{can coexist and used} harmoniously in an integrated library and information system.
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