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Library and Information Science (LIS) Research in India vis-a-vis Research Methodology in LIS Curricula

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Highlights some important trends of library and information science (LIS) research in India in the larger backdrop of the same in the West. Attempts to test the proposition that 'introduction of research methodology in the curricula is a means of improving skills of the researcher' through a study of 15 syllabi of mainly university-based LIS schools. The study concentrates on title, course contents, and teaching methods used in respect of the research methodology paper in the master degree programmes. Concludes that in spite of LIS educators' best efforts to enhance the theoretical and practical skills of students through inclusion of research methodology and dissertation papers in the syllabi, LIS research in India is yet to reach to its desired heights in terms of quality, if not quantity. Suggests that further introspection into the pedagogies of research methodology in LIS curricula is essential.

Introduction

The discovery and dissemination of new knowledge has always been a source of excitement and social benefit to society. Progress made by mankind in the twentieth century is largely due to the research and the resultant new information. Information is the life-blood of the 'information society', which is only generated by research (21). Research is an investigation which seeks to increase one's knowledge of a given situation or problem. It is the pursuit of truth with the help of study, observation, comparison and experiment. More specifically, the term 'research' refers to the systematic method consisting of enunciating the problem, formulating the hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusions either in the form of solution(s) towards the concerned problem or in deduction of some broad principles or laws.

Research is for new knowledge and for further expansion of a discipline. It endows a discipline with the ability to utilise the knowledge generated in other disciplines and makes use of scientific method, etc 15). Research in any subject field, whether theoretical or applied in nature, is carried out to develop and evaluate the existing concepts, theories and practices. But, "Research in the field of applied sciences and professional disciplines has an added significance, since through research they develop better and advanced tools and techniques for their works which ultimately lead to improvement in service to and

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living condition of human being”(5). However, it must be borne in mind that a research may not always lead to an ideal solution of the problem. In fact, a good piece of research must give rise to some problems requiring further research(26).

Being an emerging professional discipline, library and information science (LIS) cannot claim to be gifted with a very long and exciting research tradition. Librarians somehow remained unconcerned for a long time towards research activities in their own profession, although, they have been faithfully performing their role as the provider of valuable information to generations of researchers. But to develop as a discipline, a subject field requires continuous research support. Distinctive criteria of any profession, including LIS is to, “incorporate the ability of its members to develop a structure of theoretical and practical knowledge to generate and test hypothesis relevant to practical variables or theories, and to conduct both basic and applied research utilising effective methods of inquiry”(12).

Though nineteenth century witnessed some individual and isolated research inquiries in the field of librarianship (as it was then called), specially conducted by some English and American librarians, it was not until the 1930s did a substantial number of professionals begin to realise the need for carrying out systematic studies pertaining to their field of activities. For example, in the very first issue of *Library Quarterly*, Williamson (32) suggested that “if the library is to rise to its opportunity as a social institution and educational force it must, it seems to me, begin very soon to attack its problems by a thorough going application of the spirit and methods of research that are being found so effective in every other field”. The University of Chicago, Graduate Library School took up the first institutionalised effort towards a formal research programme like the Ph.D. in LIS, in 1928. In UK, similar effort went to the credit of University of Sheffield in 1963. Increasing realisation of library’s role in furthering education and research in any field, compelled the professionals to look for more innovations and applications of new techniques and technologies in acquisition, processing, storage, retrieval and dissemination of information for providing more value-added information services to the user community. On the other hand, changes in the post World War II socio-economic scenario raised doubts like ‘Do we need libraries?’, ‘Are librarians essential to run the libraries?’, ‘Will librarianship develop, or even survive as an academic discipline?’, etc. The latest addition in the series is ‘Could there be life [for the librarian] after IT (information technology)?’ Answers to such questions were either over enthusiastic or pessimistic in majority situations, but a few were balanced and farsighted. One of them was of Wilkinson (31), who suggested that if librarianship aspires to become a true scholarly discipline, it should be based upon researched knowledge and theory. The role of research in LIS in the past might have been considered mainly to provide a theoretical foundation to professional practice, which may still partly hold true today. Feather and Sturges (6) observed that “the role and status of LIS research have been the subject of controversy. As a professional field with an emphasis on practice rather than theory, LIS research has been criti-

cised for its lack of rigorous theoretical base for the significance of the research questions addressed and the quality of research methodology employed". At the same time, the research conducted in library schools is also condemned as "merely intent on exploring the esoteric and peripheral realms of libraries feeding the personal interests of the research workers, but having so little practical application (3). But, despite this, the profession as well as the discipline have made considerable progresses both in terms of quantity and quality. With the passage of time, the professionals have increasingly realised the value and effectiveness of research. The reasons, cited by experts, are mainly.

- i) increased recognition of information as an important national resource,
- ii) social pressure and self-awareness among the professionals,
- iii) better remuneration package,
- iv) financial support for research activities,
- v) pressure of fast changing computer and communication technologies, and above all,
- vi) the founding and growth of doctoral programmes in library schools (9, 12).

The present scenario could not be more succinctly characterised by anything else than the following words of Hancock-Beaulieu (7):

"The challenges of the information society require research to respond to more widespread and pressing needs. The automation of library operations, electronic information sources, performance measures, the need for management information, charging for services, resource sharing and networking, and new information markets are but a few examples of the range of developments in information and library work. The issues and problems being raised in these various areas require a better understanding of fundamental information processes, a more systematic approach to problem analysis as well as more empirical data to form the basis for decision-making. Research and in particular research skills could thus play an important role in making our profession better equipped not only to manage current changes but also to initiate and plan further innovation".

Trends of Research in LIS in India

Formal LIS education in India began as early as 1911. It was only after independence of the country, LIS was gradually recognised as a full-fledged discipline. Separate departments were established in universities offering courses leading to graduate and post-graduate degrees, eventually setting the stage for formal research activities in the subject. Ranganathan championed the cause of both informal and formal research in LIS through his solo efforts. On the one hand, he single-handedly conducted research in virtually every area of LIS, while on the other, it was he who was also responsible for instituting master degree and doctoral programmes in LIS for the first time in Delhi University in the

1950s. D.B. Krishna Rao was the first person to be awarded a Ph.D. degree in 1957. The profession took 20 more years to award a second Ph.D. degree, this time to Pandey S.K. Sharma by Punjab University. There are many qualified practising librarians and information scientists in India. But still in quality and quantity the research output is far from the desired. Some problems in this regard have been identified as follows:

- i) lack of proper knowledge and skills to conduct independent research;
- ii) Ph.D. or any research degree was not an essential requirement for job opportunities, not even for senior positions for a considerable period of time;
- iii) lack of identification of researchable areas in the subject;
- iv) lack of financial support in the form of research project funding, research fellowships, scholarships, etc.;
- v) lack of determination of high standard entrance requirements as pre-requisite for a mittance to the master's degree programme;
- vi) lack of sufficient strength of the faculty and their heavy work load, due to which there is little scope of more than classroom teaching;
- vii) non-availability of enough time as a result of participation in academic and professional activities;
- viii) lack of adequate number of competent research supervisors;
- ix) lack of adequate research and infra-structural facilities available to research scholars; and
- x) non-availability of essential data from libraries and parent organisations (8, 9, 18, 29).

According to Kawatra (8), "Research in LIS in India may be characterised as typically traditional". To justify his statement he put forward three important trends, which are as follows:

- i) Interest in research in LIS was negligible till 1980s. There were only four doctorates till 1979 (as per one bibliographical survey cited by him).
- ii) The areas of research are highly concentrated on library and library science component rather than information and information science component.
- iii) A majority of MLIS (Master of Library and Information Science) dissertations and doctoral theses are descriptive rather than analytical in nature.

Mainly the practitioners particularly in academic libraries, faculty and students of LIS schools carried out the research studies. Lahiri (12) presented a broad view of the LIS research in India. Similar to other disciplines, he observed that the level of research in

LIS extends from book writing to project-preparation, from Master degree to post doctoral courses. The persons engaged have been carrying out these research programmes either in their individual capacities or jointly under the aegis of various agencies (like University Grants Commission (UGC), Indian Council of Social Science Research (ICSSR), Indian National Scientific Documentation Centre (INSDOC), etc.), universities and library associations. Chatterjee, et al. (5) have grouped research work conducted by Indian library and information personnel into the following four categories:

- i) those conducted in LIS schools in India on LIS topics or inter-disciplinary topics related to LIS;
- ii) those conducted in non-LIS university departments on LIS topics or inter-disciplinary topics related to LIS;
- iii) those conducted in LIS schools abroad on LIS topics or inter-disciplinary topics involving LIS; and
- iv) those conducted in Indian universities on non-LIS subjects.

At present, formal research in LIS is conducted at four levels, viz., MLIS, M.Phil., Ph.D. and D. Litt. According to the Association of Indian Universities (AIU) Handbook (2), research programmes in LIS leading to the award of M.Phil. and Ph.d. degrees are offered by 13 (10 FT, i.e., full-time and 3 PT, i.e., part-time) and 39 (32 FT and 7 PT) universities, respectively, in India. But there seems to have some confusion regarding the recording procedure used in the Handbook. Some universities have mentioned their research programmes as simply M.Phil., Ph.D., etc., while some other has separated them as M.Phil.(FT), M.Phil.(PT), Ph.D.(FT), Ph.D.(PT), etc. Those not mentioning whether their programmes are full-time and/or part-time, in fact, offer both (at least a large majority of them).

As early as 1967, Ranganathan (19) gave a detailed description of different branches of LIS as well as of fringe subjects still requiring research. A decade later, Krishan Kumar and Sardana (9), while suggesting the broad areas for research in various aspects of LIS opined that the choice of areas should be made keeping in view the environment, local traditions, specialisation of supervisors, qualifications and academic background of the candidate, aptitude for research, library resources, and national priorities. To this date, several studies have been carried out to map the subject perspectives of LIS research in India (5, 10, 12, 13, 24, 28). It is not very easy to consolidate their findings, because their choice of subject categories differed. The main focus of research has been the academic libraries, particularly the university libraries, which was quite natural on the ground that either the senior professionals attached to the university libraries were the Ph.D. candidates or the faculty members in LIS schools willing to have a doctoral degree found it convenient. The other topics ranged from classification to library legislation, user surveys to citation analysis. Classification and indexing have formed the single largest topic

of doctoral research, again a legacy of Ranganathan's pioneering works in these areas. The obvious gaps are special libraries, cataloguing, and experimental research in library management. However, it is an encouraging sign that since 1985 there has been a gradual shift to information and information science-oriented subjects/topics and the works are based on field surveys adopting analytical approach. The last two decades of the 20th century also experienced a spurt of Ph.D. in bibliometrics. Of late, computer application in LIS-oriented topics are becoming favourite hunting ground for prospective research candidates. A special mention may be made of research work done at the Documentation Research and Training Centre (DRTC), Bangalore, under the guidance of Ranganathan and some of his disciples.

There is no single bibliographical source documenting the research degrees awarded by Indian universities. One has to depend on a number of sources, most of which are deficient in coverage and continuity, and overlap with each other (20, 22). At present, there is a turnout of about 10 Ph.Ds a year. The total number of Ph.Ds awarded would also be somewhat between 350 and 400. Experts have traced some factors, which contributed towards this increased interest in LIS research as:

- i) rapid changes in information technology,
- ii) problems faced in proper management of libraries,
- iii) increasing importance being attached to this degree for the purpose of employment, such as UGC norms for career advancement,
- iv) changing pattern of reading habits of users,
- v) desire for recognition and faculty status among the professionals in the society, and
- vi) moreover, increased opportunity for Ph.D. work (5, 17).

The increased research activities in the field have raised the status of the discipline in the eyes of the scholars and the public (4). But, all is not well. We too in India, like our brethren in USA and other developed countries, may have fallen victim of 'the Ph.D. syndrome or octopus' with its virtues and vices together (25). Many believe that increase in production in any field is also responsible for decreasing quality and standard. The LIS research also suffered from this aspect, particularly in the later part of 1980s and during 1990s when there was a spurt in the number of Ph.Ds being awarded. Moreover, "Indian library research seems to have no groundings in prevailing ground realities. Topics are ideal, superficial and bookish" (23). Factors that contributed to this dismal situation are as follows:

- i) The cut off date of December 1992 (later advanced to December 1993) for obtaining Ph.D. degree for getting exemption from the National Eligibility Test (NET) for teaching jobs in universities/colleges and lately to senior professional positions.

- ii) Introduction of Ph.D. programme by institutions without paying any heed to resource requirements in terms of men and/or material.
- iii) Lack of perception of both supervisors and researchers to visualise and identify valid problems for research. Some of the research topics selected are trivial and non-challenging.
- iv) Unhealthy practice among supervisors and examiners in obliging on reciprocal basis and then manipulating the evaluation process.
- v) LIS researchers have so far neglected basic (theoretical) research and rather concentrated on repetitive survey type of descriptive research.
- vi) Paucity of data and reference works.
- vii) Results of research embodied in dissertations are not adequately used by researchers, teachers, textbook writers and working librarians.
- viii) LIS research has become divorced from reality, since, there is no cooperation between the librarians and researchers regarding problem selection and its solution through the findings of the research project (23, 24).

To many of us, some of the above criticisms may appear too harsh, especially the one of mutual compromise between supervisors and examiners resulting into a biased evaluation of the research work. But we feel that it is unfair to raise the finger towards LIS only. It is an open secret that such practices are not confined to any particular discipline or institution or region of the country.

While appreciating this growth of Ph.Ds in LIS, experts have suggested some measures to ensure quality of the research output, such as:

1. LIS schools having proper infra-structural facilities and competent guides should operate Ph.D. programmes.
2. Research topics should be of high standard, so that, these can genuinely lead to creation of new knowledge or new tools and techniques for effective library and information work.
3. The areas requiring special attention for research work should be identified and taken up for conducting further research.
4. There should be limitation regarding the number of candidates enrolled under a particular guide.
5. Emphasis on interdisciplinary research is necessary and joint guidance should be encouraged for interdisciplinary subjects.

6. Proper and regular bibliographical control of both the completed and on-going research projects is not only essential from the viewpoint of avoiding wasteful research-in-parallel, but also for linking the present work with its predecessors.
7. The supervisors, evaluators, and the funding/sponsoring institutions should play their roles effectively in controlling the quality of the research output and the degrees, if any, awarded for it.
8. More interactions between librarians and researchers is needed to integrate the research findings to the areas relevant to the respective libraries.
9. An aspirant to research work should have an opportunity for apprenticeship for a period ranging from two to three years in an institution doing research in the subject.
10. Serious thoughts should be given in dissociating the academic position from the number of publications. Otherwise, getting a job or promotion in job and not 'the spirit of inquiry' will become the motivating factor.
11. Publication of results of the research work is also recommended, as it will certainly help to earn the approval of 'wider audience' and prevent duplication of research (5, 12, 16, 28).

Introduction of 'Research Methodology' at the MLIS Level

Introduction of 'research methodology' as a subject at the MLIS level is certainly a way of getting rid of the problem of 'lack of proper knowledge and skills to conduct a research inquiry', as mentioned above. But, completion of master degree course in LIS is not an end in itself. It is not only desired as something like developing skills to operate one set of processes. It is also important to evaluate implications of the information systems and services, to correct errors, to cope with the new situation in a more fruitful way, to understand the problems and ways to further develop the media of communication the organisation of knowledge with the advancement of information technology, and the information services to the society of research. Therefore, understanding the problems of professional job, efficiency of investigation, and application of ideas and techniques of many disciplines to the improvement of information services are also concerns of the MLIS programme. The study of research methodology in the MLIS programme has a relationship with the expectation.

Besides introduction of research methodology at the MLIS course, some other avenues for developing necessary research skills of would-be researchers may be :

- i) organisation and conducting of refresher courses, orientation and training programmes, etc. on research methodology by universities and professional organisations; and

- ii) arrangement of special lectures on research topics by the experts in the field (13).

Basis of the Study

According to the AIU Handbook (2), out of 107 university-based LIS schools in the country, 67 were offering master degree programmes. The present study made an attempt to explore the efficacy of teaching 'research methodology' as a subject in MLIS programme, so that, it could yield quality research workers of future. Fifteen syllabi, collected at different times and at random, have been analysed to provide a perspective view of the subject research methodology taught at the master degree programmes of some of the universities listed in the Handbook as well as couple of national level institutions. The study was confined mainly to the title, course contents of the subject, and teaching methods used, respectively. However, it would be fair to acknowledge at the outset that the study based on the syllabi of 15 universities and institutions only may not give a clear picture of the present situation.

Objectives of Teaching Research Methodology

The UGC Subject Panel of Library and Information Science (27) in one of its zonal meetings for curriculum development has identified of the paper on 'research methodology and statistical techniques' as :

1. To introduce students of different research methodologies.
2. To familiarise students with statistical techniques.
3. To develop research skills among students.

But, a more comprehensive and holistic view of the objectives in introducing the paper in MLIS programme may be enunciated as :

- i) to develop a basic understanding of scientific and rational principles and procedures of research among the students who are undergoing the course; and
- ii) to grow professionals into such an advanced state that they will be able to conduct research, to face the problems in view of contributing to the discipline and to the betterment of information services.

A first-hand test of this expectation of educators is reflected in the inclusion of a minor research project in the form of a dissertation paper in most MLIS programmes conducted by LIS schools in India. The research projects at this level aim at providing hand-on training in application of research methodology and involves elementary research work.

Nomenclature and Course Content

Though this study is based on the syllabi of 15 LIS schools only, it can be safely presumed that in most LIS schools in the universities in India, research methodology is taught as part of a compulsory paper under one or the other form of the titles as shown in Table 1. It is also unlikely that the pattern is going to be much different elsewhere. It should be stated here that in some of the above-named universities and institutions some changes regarding title of the paper and contents might have occurred in recent times, which we might be unaware of. Changes in syllabus are likely to happen from time to time.

In general, research methodology does not constitute a full paper of 100 marks. For example, one part is comprised of research methodology, while the other part consists of quantitative methods. Some dissertations at MLIS and M. Phil. programmes in university-based LIS schools and guided research projects in INSDOC and DRTC bear a research component or have research potentiality. In fact, it is at this level of learning, a student receives necessary guidelines, a lesson, and an assignment for conducting research at least to some extent.

Course contents of the paper on research methodology generally include the following :

- i) concept, need, objectives and types of research;
- ii) identification of problems, formulation of hypotheses, literature search and other elements of research design;
- iii) different research methods and their relation to the nature of study;
- iv) organisation, analysis and interpretation of data;
- v) writing of research report; and
- vi) status of research in India with special reference to research in library and information science.

Syllabus of Delhi University covers organisation of research in different developed countries also.

Table 1 : Institution-wise titles of the paper

	University/ Institution	Title of the paper	Remarks
1	Delhi University	Universe of Subjects : its Development &	Besides methods & development of research, unlike many syllabi it includes organisation of research in different countries like UK, USA & USSR. A separate paper on opera- tion research and systems analysis/ design.
2.	North-Eastern Hill	Do	More emphasis on universe of University knowledge.
3.	Calcutta University	Research and Quantitative Methods	
4.	Jadavpur University	Do	The paper was earlier called as Universe of Subjects and Research Methodology
5.	Kalyani University	Do	
6.	Burdwan University	Universe of Subjects and Research Methodology	Syllabus is to be restructured soon
7.	Vidyasagar University	Do	
8.	Sambalpur University	Do	
9.	Mysore University	Research Method	Unlike other universities, it is a full paper of 100 marks, under this title. No mention of statistical methods is in it.
10.	Osmania University	Do	A full paper under the title, mention- ing statistical methods in it.
11.	Indira Gandhi National Open	Research Methodology	Includes sociometric techniques, statistical study.
12.	Utkal University	Research Methodology & Management Techniques	Under Management Techniques - — Operations Research & Systems Analysis.
13.	INSDOC	No paper under any of the titles mentioned above.	Research methodology, as the relevant selection from other disciplines, forms different parts of other appropriate papers for the curriculum. Research methods & statistical methods are assumed as supporting subjects.
14.	DRTC	Do	Do
15.	UGC	Research Methods & Statistical Techniques	Proposed as a core module; in- cludes units on statistical techniques and bibliometrics.

Teaching Method

Communicating knowledge is the teachers' special function. To make this communication effective, various teaching techniques need to be adopted. In an advanced professional course, it is further necessary to adopt such teaching techniques so as to

- a) enable the student to take the first steps into research,
- b) build in him the ability for such work, and
- c) highlight the management aspects of the different jobs involved in practice (1).

Our teaching methodology, irrespective of disciplines and institutions where these are being carried out, is inhibited by the century old British tradition in which students are obliged to listen and memorise the lectures, and train their mind to possess the quality of passive learning through readymade notes rather than through books and periodicals. Like other fields of learning, teaching method in LIS schools is also infested by classroom-oriented, textbook-based lecture method, aimed at enabling the student to cram and pass the examination or get a professional degree. There is little emphasis on seminars and tutorials, group discussions or library-centred educational process (30). The use of audio-visual materials and modern information technology based techniques are virtually non-existent. But there is a growing awareness among educators of the proper association between course content and methods of instruction.

As per our knowledge, teaching research methodology in Indian LIS schools generally involves;

- i) lecture method;
- ii) discussion method (class discussion, colloquium, symposium, tutorial, etc.); and
- iii) assignment method (Though it is a student centred activity, it gives an opportunity to search literature following suggestions by teachers, to get clarification by the teachers of the problem to be worked on, to receive necessary instruction from the teachers even outside the classroom, if necessary, in accomplishing the assignment.)

Conclusion

It is needless to say that the syllabus of any course needs to be revised and restructured recognising the need of the time and professional competencies. The LIS discipline is developing significantly demanding more operational skills and energy for research. The LIS schools have to come up to meet the change and expectations. In restructuring the syllabus this trend and need should be taken care of

Regarding the contents mentioned above, questions could be raised in respect of

accepting some elements under the paper, e.g., knowledge and society; dissemination of knowledge and information (Delhi University) or the developments of subjects - growth of new subjects (Burdwan University). The question is that in which paper or papers these should find their place. 'Universe of subjects: its development and structure' may be considered under 'universe of knowledge and knowledge organisation', instead of placing it with 'research methodology'. Research methodology and statistical methods seem to have close relation between them. Therefore, they may form a full paper, as seen in some syllabi. It is also seen that topics like 'operations research', 'systems analysis' being taught in one of the LIS schools under 'management techniques'. This could have been placed under research methodology as well, since, both could be used as research tools. Similarly, bibliometrics, informetrics, statistical techniques, etc. could also be considered as part of the paper on research methodology, because all of these are in close association. Segments of research methodology, however, may be stated in more detail, e.g., need of research and social objectives of research in library and information science, or writing of research report including style of citation. However, at this stage it may be necessary to contemplate over the size of the resultant paper.

For research methodology, there can be a wide scope for the use of different teaching methods, e.g.,

- ❑ Demonstration method, as it can involve manipulation of facts, data, etc. or
- ❑ Workshop method, as it can encourage a problem solving approach, can develop certain
- ❑ Skill, such as problem identification and report writing, or Field trip to research organisations, which can be informative for many purposes.

However, use of various teaching methods depends not only on the numerical strength of the faculty, but also on their capability and willingness, resources available at their disposal and effective planning above all.

We have already mentioned in Section 2 that one of the major deficiencies of LIS research in India is the researchers' lack of proper knowledge and skills to conduct a research inquiry. Accordingly, LIS curriculum designers incorporated the research methodology as a subject to be taught in the syllabi to alleviate this problem. So far as our knowledge goes, such provision is virtually non-existent in the syllabi of master degree courses in order disciplines. Also, the LIS educators' expectations to have a pragmatic test of the students' research skills through the MLIS dissertation paper have very few parallels in other disciplines. In spite of these, reviewers of LIS research in India have all through lamented on the absence of appropriate research skills among the researchers in both master and doctoral programmes. We are also aware of the contra-opinions of many of our colleagues in LIS schools regarding the justification of keeping the dissertation paper in the MLIS syllabus. One complaint made by students of MLIS programmes

in university-based LIS schools is the insufficiency of time available to prepare the dissertation, which is 60/90 days in most cases. Compared to this, the INSDOC/DRTC pattern seems to be a better one, where the candidates get at least one year for this purpose. But, it is not known how much improvement in quality is effected due to this. Occasionally, experts have expressed the view that candidates enrolled for Ph.D. degree should be required to undertake a formal course in research methodology, as it is the usual practice in most North American LIS schools (9). We may give it a thought as well.

We are living in an 'information society', where 'information' is playing the key role in research and development, ahead of money, manpower and materials. Libraries/Information centres are still the main sources of information availability and the LIS profession can contribute a big way towards the development of an adequate information infrastructure of a country. Without quality research it is neither possible to develop nor feasible to sustain such an information infrastructure (14). Considering the tremendous changes in the nature and provision of library and information services in our time, it is quite likely that the profession will tend towards more research growth. Kumar (11) has rightly opined that "The LIS schools, should devote more time and energy for research. The faculty should try to identify the problems of library and information centres; and conduct study and research on these problems. They should assign some of these topics for thorough investigation to full-time research scholars".

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Acquisition of CD-ROM Databases and Managing CD-ROM-Based Information Services

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Discusses the major issues relating to the acquisition of CD-ROM databases and furnishes a checklist for their selection in the libraries and information centres. The organisation and management of different CD-ROM-based information services are discussed.

Introduction

Information explosion is a challenge to information management. Lack of faster and timely access to information is one of the major handicaps of our scientists and engineers in computing with their counterparts in the developed world. The technologies are becoming smart and information is becoming highly complex. This is resulting in wide variety of media, which were not available earlier. The Compact Disc Read Only Memory (CD-ROM), which can store approximately 650 Mega bytes of information equivalent to 2,75,000 pages of text (A4 size) is one of the technological solutions for information storage and access. CD-ROM has revolutionized publishing and networking of information. The number of CD-ROMs were increased from 2900 in 1992 to 13,000 in 1998. The growth of CD-ROM as per SIMBA reported that in the United States total CD-ROM unit sales had increased from 2 million to 8.5 in 1993 and 27.8 in 1994. Forester Research predicted that retail CD-ROM sales would nearly triple from 584 million in 1994 to 1476 million in 1996 and almost 4000 million in 1999. Some 95% Pcs come equipped with CD-ROM drives; this provides an enormous installed base of CD-ROM drives. The bibliographic databases provides abstracts of technical reports, conference papers, journal articles, standards and specifications, patents etc.. The full text databases are mainly IEL e.g.IEEE, IEE Conference Proceedings, Standards etc. in the field of science and technology. The other major collections are reference resources like, Encyclopedia, Directory, Year books, Hand Books etc. and some software.

The Information Media

Information available on the following media:

Print	Tangible Mode
Floppies	Partially Tangible
CD	Partially Tangible
On-line	Intangible

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Print vs. Digital

The distinguishing features are as follow:

- Print media still a cheaper solution
- Digital – yet costlier
- Print – Single User
- Digital – Multi user access
 - Simultaneous access
 - Network access
- Print – Comfort pleasure
- Digital – Electronic convenience

Selection of CD-ROM Databases and Publishers

A number of foreign publishers publish monographs, periodicals, patents, standards, etc in the form of CD-ROM format. One should first choose the database and its publisher because the same database may be available from a number of different CD-ROM publishers. They may all have collected information from the same information sources. Most of the CD-ROM publishers have some sort of Try and Buy scheme whereby the library can have the ample opportunity to choose the correct databases along with their retrieval softwares.

Acquisition Mode of CD-ROM Databases

CD-ROM databases can be acquired through anyof the following mode of procurement :

1. One- time Procurement

Some CD-ROM databases are available on one-time procurement. The procurement procedures are also similar to the acquisition of books and monographs.

2. Subscription Mode

CD-ROM publishers offer databases to libraries on subscription basis. Subscription cost of databases is charged by the publishers in advance as in the case of journals. Once a library enrolled by the publishers as a subscribing institution, it gets all updates of the databases periodically. After the expiry of the subscription, the library can retain all back files of discs. These databases can also be subscribed to through local vendors against the payment in Indian currency. An agreement has to be made with the vendor regarding replacement/refund of proportionate cost of missing / non-supplied discs. Procedures are similar to those acquisition of journals.

3. Lease / License Mode

CD-ROM publishers require subscribing libraries to enter into a formal lease or license agreement which specifies the terms and conditions for the use of databases. These usually cover the following aspects :

- The users in the organization /laboratory/establishment who are allowed to use the database,
- License Grant
- License Fee
- Limited warranty
- Termination
- Governing Law
- Enforceability
- The internal and external use of the data by the library
- The number of copies of particular records that a library is allowed to make.
- Single or multi- user right, the library wishes to have
- Nature of restriction on the use of the databases
- The amount and level of technical support that the library can expect from the publishers
- The number updates that the library receives during the period of subscription
- Updates of software
- What the library can expect from the publishers if discs supplied are faulty
- Any restrictions or rights for specific database
- Accepted and agreed to
- Name of the Organization, Name and title, Signature, address

These discs are required to be returned to the publisher after the lease period is over. Sometimes, publishers ask for a certificate that all discs have been destroyed by the library. This type of agreement, MOU, lease or license mode should be discouraged by the libraries as it creates audit problems.

Techniques to procure appropriate CD-ROM databases

There are two types of subscription mode:

1. Direct subscription from the Publisher

Procurement of CD-ROM databases directly from the publisher is not advisable if no authorized agent is available in India. The problems like payment, missing issues, computer assistance etc., are to be solved by the vendor on behalf of the publisher.

2. Subscription through authorized vendor

Subscription through authorised vendor for India is preferable. The library in charge should ask the vendor to submit the authorization letter issued by the publisher and name of the Institution where such vendors are supplying the databases. After getting the above information the library in charge should send a letter asking the supply status of that vendor. Once the library in charge received a satisfactory letter from the various institutions then he should ask to the vendor for publisher catalogue and specimen copy of CD-ROM databases for evaluation in terms of hardware, software requirements, coverage, cost, etc. through checklist.

Criteria for the Selection of Databases on CD-ROM though Checklist

Libraries may subscribing some databases may be available from the different publishers with different retrieval software, different coverage, different price etc. This situation calls for the study of the following features through checklist while subscribing the particular CD-ROM database :

1 Database contents

Coverage, and whether illustrations and other details like bibliographical, full-text database and networking version etc., are there.

2.Currency

It implies the time period covered by the database. How much up-to-date is the information, and how frequently updates are issued? On-line databases have the potential to be more current than that of their equivalent CD-ROM databases.

3.Backfiles

Backfiles of a large database may occupy a number of CD-ROMs discs. Are all backfiles available? How are back files split between disc?

4.Installation

- System requirement for single workstation
- Backfile installation
- Networking workstation installation
- Server installation

5. Retrieval Software and Indexing

- a) The version of the software for Macintosh, Windows and DOS,
- b) On-screen help
- c) Boolean operations searching
- d) Free text searching
- e) Field-specific searching
- f) Multi-disc searching
- g) Phrase searching
- h) Marking records for later printing or downloading
- i) Wildcard or truncation searching
- j) Proximity or adjacency searching
- k) Author and keyword indexes
- l) In-built thesaurus
- m) Large number of search statements held in a search history screen for later re-use
- n) Storing of search results
- o) Downloading
- p) Browsing
- q) Easy installation either for a single user workstation or onto a network
- r) Data security

6. User interface

One aspect of the retrieval software will be the user interface that it offers. The retrieval software must be not only powerful but also easy to use.

7. Post-processing

Once information has been retrieved and displayed on screen, it may be desirable to transfer the information to paper or another disc. Such facilities must be available so that data can be downloaded and printed, and possibly also integrated with information from other sources.

8. Data access time

CD - ROM searching can appear to be slow since CD-ROM players operate more slowly than hard drives, and in addition there may be network delays in transmitting graphical data.

9. Cost

There are two types of cost associated with CD-ROM: set-up cost arising from the acquisition of hardware, and subscription cost arising from the acquisition and updating of discs. The fixed costs associated with subscriptions can be easier to manage than the pay-as-you-go costs associated with access to on-line search services. Pricing strategies for CD-ROMs are designed to reflect the extent of use

of the databases. There are usually different prices for standalone users, single network user, other size user group (e.g. 208 users, 9-12, 4-6 users) and site licenses.

10. Standardization

Standards for CD-ROM appear to be a serious problem, and difficulties still arise if a number of discs from different suppliers are being run on the one workstation or network. It is important to check that all hardware and software components work satisfactorily with one another.

Information Retrieval Features of CD-ROM

The information retrieval features of CD-ROM are as follow:

1. Index

- browse index
- number of posting
- cross references
- thesaurus

2. Search structure

- term selection from index
- term selection from record
- case sensitivity
- search type
- combine searches
- Boolean
- truncation
- adjacency / proximity
- position
- arithmetic

3. Search profile management

- speed of performance
- save searched
- purge old searches
- set query management

- number of search sets
- search history display
- search modification
- search selection
- statistic gathering

Interface Features of CD-ROM

The interface features of CD-ROM are enumerated below :

1. Operational

- break
- escape / exit / abort
- input option (e.g. keyboard, mouse, other).

2. Navigational

- navigation between record
- navigation within records
- standard options

3. Communication

- screen titles
- terminology
- screen layout-genial appearance
- instruction/ prompts
- flexible dialogue tailored according to user level
- consistency in prompts, menus and help messages
- consistency in use of color, typography and graphics
- consistency in use of terminology

4. Support

- on-line tutor
- on-line help
- error messages

After satisfactory evaluation of the databases through checklist for each product the librarian will make an agreement with the vendors on selected CD-ROMs.

Agreement with Vendors

The following points are to be considered before executing agreement for subscription of CD-ROMs through Vendors:

1. The supplier, on receipt of a purchase order, shall subscribe for CD-ROMs as per the enclosed list on behalf of the library within four weeks from the date of the issue of the order or from their own funds and shall submit the invoice with the proof of remittance of subscription to the publishers along with valid price proof etc.

If supplier fails to subscribe for any title(s) for whatsoever be the reason within the stipulated period (say, 30 days) without sufficient reason the order shall stand automatically canceled and the library will be free to procure such title(s) from other sources without any reference to the supplier.

2. The library shall check the invoices, relevant documents in support of remittance, bank conversh certificate etc. and passed the invoices for payment of 90% of subscription. The foreign currency shall be converted to Indian currency at the bank rate of exchange applicable on the date of issue of the draft. The supplier shall submit the acknowledgments from the publishers to the library within six weeks of payment.

In case any such acknowledgments are not provided within stipulated time and or supplies, the supplier will be liable to refund the payment made by the library in this regard along with 10% simple interest for the period the money is lying with them.

3. The balance 10% amount will be reimbursed after satisfactory completion of all supplies.
4. Apart from the prices of the CD-ROMs as fixed by the publishers, the postage charged by the publishers to the Vendors (Ordinary/ Surface mail, if there is any option from publishers) will be paid on the basis of documentary evidence. The library shall not be liable to pay any other charges except postal charges.
6. The supplier shall follow-up on those issues of CD-ROMs which are delayed and/ or not received from the publishers within two months from the date of publication, with due intimation to the library. The supplier shall also provide monthly status report on the supply position to the library.
7. If the missing issues of the CD-ROMs are not replaced by the publishers the suppliers may be given the option of refunding the proportionate cost of missing issues in settlement within six months from the date of publication, as deemed fit by the library.

8. The agreement shall remain valid for 15 months from the date of execution of the agreement.
9. In the case of any dispute or misunderstanding arising out of this agreement, the decision of the librarian shall be the final and binding on the suppliers including fixing of penalty for any violation of this agreement.

Exemption of Customs Duty

Certain items like computer software, CD-ROMs, magnetic tapes, microfilms and microfiches are being exempted from custom duty as per Customs Notification No. 51/96 dated July 1996 (Appendix M). This was further amended vide Notification No. 93/96 dated 11 Dec. 1996 (Appendix N). In order to facilitate laboratories / establishments to get Customs Duty Exemption Certificate (CDEC) libraries may place their supply order either directly to the publishes or through local vendors. A Custom Duty Exemption Certificate (CDEC) may be obtained from the office of the CCR & D ® for getting clearance of items from Foreign Post office. A Specimen of certificate is given below:

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
Department of Scientific & Industrial Research
Technology Bhavan, New Mehrauli Road, New Delhi- 110016

Regn. No TU /V/RG- CDE (344)/96

20 December 1996

Registration of a public funded research Institution or a University or an Indian Institute of Technology or Indian Institute of Science, Bangalore or a Regional Engineering College, other than a Hospital for the purposes of availing customs duty exemption in terms of Government notification No. 51/96 Customs dated 23 July 1996.

CERTIFICATE OF REGISTRATION

This is to certify that VIDYASAGAR UNIVERSITY is registered with the Department of Scientific & Industrial Research (DSIR) for the purposes of availing customs duty exemption in terms of Government Notification No. 51/96 Customs dated 23 July 1996.

This registration is valid upto 31.08. 2001

SD/-
[Dr. V.V.Subba Rao]
Adviser

Managing a CD-ROM-based Information Service

A library and information centre that offers information services based on a number of CD-ROM products will need to consider all the factor listed in checklist in selecting the databases for the users. Librarian should consider how the CD-ROM service integrates with other information services available to the library's users in terms of the following factors:

1. Term use

Many CD-ROMs are only leased from the suppliers. Thus, if a subscription is cancelled, a library loses not only its current file, but also any back-files. There may also be restrictions on the downloading of data.

2. User Training

Library and information centre staff are likely to find themselves involved in training end-users to perform their own searches. The interfaces on CD-ROM are relatively user-friendly, but most end-users still benefit from some support. If many end-users can be expected to use a service, a program for end-user training must be planned and executed.

3. Housekeeping

All CD-ROMs need to be acquired, accessioned, catalogued and indexed by subjects. Different registers for different databases are to be made for booking the time of the users.

4. User Manual

The library / information centre should prepare user manual (on-line/ web-based) furnishing information regarding how to use database, how to take print-out, how to download, etc. in order to facilitate the users to use the databases independently.

Web-based Current Arrival Services (CAS)

Most of the scientists normally stay in their own chosen field of interest throughout their entire career. They devote a quarter of professional man-hours in technical communication, attending seminars, lectures and technical meetings for exchange of scientific ideas. With the exponential growth of information in the field of science and technology, it has become almost impossible for any scientist to scan through literature in his/her area of research. The library should help him/her by providing CAS on regular basis. A package-type CAS can help the library to cover a broad spectrum of users. The creation of a web page containing the information like name of the databases, year, month, subjects area etc. would help the user to know the current available databases in the library through Web.

Selective Dissemination of Information (SDI) Services

Scientist working on research projects/teaching always face problems of identifying relevant literature pertaining to their research endeavour. They are always concerned not only with getting relevant information but also with availability of publications for their study. In case they do not get what they need in time, the information is literally of no use to them. Lack of bibliographic information about relevant documents often leads to either wrong direction or duplication in research work. Libraries are assigned to take the responsibility of providing selective information to project leaders and team members on a regular basis. Subject profiles are to be created for each project in the laboratory/establishment, and information can be searched and sent to them regularly. The following are the techniques to provide electronic SDI service.

- User should send their request with area of study and key words by e-mail to the library in charge who is looking the SDI services.
- User profiles are to be prepared for individual user.
- The library in charge will select the CD-ROMs where the information needed by the user is available
- Then he will insert the CD-ROM databases into the CD-ROM drive and will match the key words given by the users for getting the SDI service. After matching the key words a separate file is to be created. The search result will be stored and saved in the file say *jvu.txt* for individual user. There will be several files for several users
- After saving the search result in the file *jvu.txt* , the file *jvu.txt* will be mailed (through e-mail) to the user who has requested for the SDI service.

CD-Networking Services

A CD-ROM Network can be installed in the library for multi-user and multi-CD searching. For this, database producers charge some additional subscription amount which can be paid during the time of subscription. Essential requirements for CD-Networking services are :

1. CD-Servers

CD servers are today's most popular CD-based storage archival systems. With CD servers CD-ROM drives are arranged in towers of racks where each drive holds only one CD. CD servers are the independent device on the network and have their own processing capabilities.

2 Towers

Towers provide real time read access to a number of disks by keeping them constantly loaded and ready to go, because the CD is dedicated to the CD-ROM drive. CD-servers are available from a seven drive tower model to drive cabinet. These systems offer a power model

to drive cabinet. They also offer a powerful solution for on-line data management and can be easily linked to other towers or to other storage media such as CD Jukeboxes.

3. CD Jukeboxes

CD Jukeboxes, on the other hand, provide a near on-line solution in which the time between user's requests and data delivery is as little as seven second. Jukeboxes utilise both CD-ROM and CD-R media and can accommodate 60-150 CDs. CD Jukeboxes are fully scalable and can be configured to provide automated CD production and /or high speed data access. Some specific of the newer jukeboxes are built for application specific access in which the user selects the configuration best suited for their application- from a very high capacity system with 88GB of storage capacity to a high access system with a 12:1 disc to drive ratio (System cost is approx Rs. 9 lakhs).

Some important producers of CD-Networking services along with their internet addresses (Web sites) are furnished below :

Name of Producers	Internet Address (Web sites)
Advanced Media Services	http://www.amsstorage.com
Auto Graphics, Inc.	http://www.auto-graphics.com
Excel Computer	http://www.excelcdrom.com
Data Access Technologies, Inc.	http://www.dati.com
Meridian Data, Inc.	http://www.meridian-data.com
SciNet, Inc	http://www.sciencetcorp.com
Optical Storage Systems, Inc	http://www.oss.ca
Pioneer New Technonogies, Inc	http://www.pioneerusa.com
Palinet etc.,	http://www.palinet.org.com

The dastabases on CD-ROM enable the users to know the existence of their required documents. These documents can be acquired through inter-library loan and document delivery services. Internet addresses (Web sites) of these services are given below :

Document Delivery Services	Interlibrary Loan Services
CARL : http://www.carl.org	CARL Corporation : http://www.carl.org
ERIC : http://edrs.com	Internet system, Inc: http://www.pwl.com/Internet
Faxon Canada: http://www.faxon.ca	CASPRLibrary Sys., Inc: http://www.caspr.com
Infortrieve : http://www.infortrieve.com	SeaChangeCorponation : http://www.bookwhere.com
UnCover: http://uncweb.carl.org	Ameritech Library Services: http://amlibs.com
	Endeavorinfor.Sys., Inc : http://www.endinsofys.com

CD-ROM Search Service

CD-ROM, the Compact Disc Read-Only Memory, is a high density optical disc in which a large volume of data can be recorded. A good number of bibliographic as well full-text databases are now available in CD-ROM format. These databases can be acquired and searched in the library using search software. There is no need for communication links, as is required in the case of on-line searching of external databases. A library may subscribe to some of the following and other CD-ROM databases for rendering information services to their users, depending upon the availability of funds and types of information required by the users.

Some Bibliographical databases :

<u>Bibliographic databases</u>	<u>Subject areas covered</u>
INSPEC	Physics, Electronics, Computers
COMPENDEX	Engineering
METADDEX	Metallurgy and Materials Science
CAB	Agricultural Engineering
BIOTECH AND BIO ENGINEERING	Biotechnology, Bio-engineering
CAS	Chemistry and Chemical technology
ISI	Information Science
MEDLINE	Medical Sciences
NTIS	US Government-funded reports in all fields
BIOSIS	Biosciences
ERIC	Education

Some Full-text Databases :

<u>Full-text databases</u>	<u>Subject areas covered</u>
Derwent patents	Patents in all fields
IEL	IEEE/IEE, Standards, Conference proceedings in the field of science and technology
Compuselect	Computer science

On-line Searching

An on-line search means search of remotely located databases in interactive mode with the help of computer and communication links. The databases can be accessed by the user directly or via a vendor through a network. The following are the major components of an on-line search service :

- Databases producers, who provide databases to be accessed in on-line mode
- Host, which provides access to the databases
- Communication links, which connect the user with the host and the actual databases
- A computer terminal or workstation through which the user is linked to the host

Some major on-line search services are as follow :

Academic Pr.	Ask Sam	ERIC	SIRS, Inc	HW Wilson	Faxon, Canada
Knight Ridder (Dialog) Information service	Ovid Technologies	Silver Platters Electronic Reference Libraries (ERL)	EEEE Electronic Librasry (IEL)	Elsevior Science Direct etc.	SIRS, INC

Conclusion

The provision of a CD-ROM-based information service has been seen to have positive benefits for the image of the library as the provider of information. The CD-ROM can be integrated within a networking environment. The price of CD-ROM discs and equipment is now extremely competitive. For a small investment, information can be distributed widely as well as locally via CD-ROM discs. There are little doubts regarding the role that CD-ROM could play in to-day's libraries and information centres. We have come a long way from the print media to the electronic media, but the journey has been as interesting in retrospect as it was at the time, and as the library and information field is now.

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3. Pack (Thomas). Greater than the sum of their parts: CD-ROM / Online Hybrid (Online. 20, 2; 1996, Mar-Apr; 70-74).
4. Sherman (Chris), *Ed.* CD-ROM hand book. 2nd ed. New York : McGraw -Hill, 1994.

Appendix - 1

CD- ROM Databases Publishers and Addresses

Name of publishers	Addresses
Academic Press	525 B St., Suite 1900 San Diego, CA 92101-4495 jelliott@acad.com http://www.academicpress.com
Auto-Graphics, Inc.	3201 Temple Ave. Pomona, CA 91768 info@auto-graphics.com http://www.auto-graphics.com
Bibliographical Centre for Research	14394 East Evans Ave. Aurora, CO80014 jhensing@bcr.org
Blackwell's Information Services	22Cotland St. New York, NY10007-3194 shawn.herman@blackwells.com http://www.blackwells.com
Brodart Co.,Automation Division	500 Arch St. Williamsport, PA 17705 salesmkt@brodart.com , http://www.brodart.com
Canada Law Book,Inc.	240 Edwart St. Aurora. ON L4G3S9 CANADA
Columbia University Press	562 West 113 th St. New York, NY 10025 http://www.columbia.edu/cu/cup
Conversational Computing Corp. (Conversa)	8522 15 th Avenue NE Redmond, WA 98052 conversa@conversa.com , http://www.conversa.com
Cultural Resources, Inc.	30 Iroquois Rd..Cranford, NJ 07016 culture@aol.com , http://www.culturalresources.com
Delorme Mapping	2 DeLorme Dr., Yarmouth,ME 04096 sales@delorme.com , http://www.delorme.com
Dialog Corporation, The	1100 Regency Parkway, Suite 10, Cary, NC 27511 contact@dialog.com , http://www.dialog.com
Dun & Bradstreet	1 Diamond Hill Rd., Murray Hill, NJ 07974 dnbmdd@dnb.com , http://www.dnb.com

Acquisition of CD-ROM Databases and Managing CD-ROM-Based Information Services

Dynamic Graphics, Inc.	6000 North Forest Pard Dr., Peoria, IL 61614 service@dgusa.com , http://www.dgusa.com
EBSCO Publishing	10 Estes St., Ipswich, MA 01938 ep@epnet.com , http://www.epnet.com
EOS International	5838 Edison Place, Carlsbad, CA 92008 info@eosintl.com http://www.eosintl.com
Financial Information Services (FIS)	60 Madison Ave., 6 th Floor, New York, NY 10010 fis@fisonline.com , http://www.fisonline.com
Gale Group, The	27500 Drake Rd., Farmington Hills, MI 48331 galeord@gale.com , http://www.galegroup.com
Gallopade International	200 Northlake Dr., Peachtree City, GA 30269 info@allopade.com
Global Transactions, Inc.	1907 So. Branch Dr., Whitehouse Station, NJ 08889
Gold Standard Multimedia, Inc.	3825 Henderson Blvd, Suite 200, Tampa, FL 33629 info@gsm.com , http://www.gsm.com
Grolier Educational	90 Sherman Turnpike, Danbury, CT 06816 custserv@grolier.com , http://www.publishing.grolier.com
Grolier Interactive, Inc.	90 Sherman Turnpike, Danbury, CT 06816 vschee@grolier.com , http://gi.grolier.com
HEC Reading Horizons	3471 South 550 West, Bountiful, UT 84010 hecsoftinc@aol.com , http://www.hecsoft.com
Inmagic, Inc.	800 West Cummings Park, Woburn, MA 01810 inmagic@inmagic.com , http://www.inmagic.com
Institute for Scientific Information	3501 Market St., Philadelphia, PA 19104 sales@isinet.com , http://www.isinet.com
Internet Systems, Inc	20250 Century Blvd., Germantown, MD 20874 bobw@pwl.com , http://www.pwl.com/Internet
Logos Research Systems	715 S E Fidalog Ave., Oak Harbor, WA 98277 info@logos.com , http://www.logos.com
MacMillan Library Reference USA	1633 Broadway, New York, NY 10019 http://www.mlr.com
Meridian Data, Inc.	5615 Scotts Vally Dr., Scotts Vally, CA 95066 sales@meridian-data.com , http://www.meridian-data.com

Micromedex	6200 South Syracuse Way, Suite 300 Englewood, CO 80111, info@mdx.com http://www.micromedex.com
National Geographic Society Neal-Schuman publishers	1145 17 th St. NW, Washinsgton, DC 20036 http://www.nationalgeographic.com 100 Varick St., New York NY 10013-1506 orders@Neal-Schuman.com
OCLC Online Computer Library Center, Inc.	6565 Frantz Rd., Dublin, OH 43017 oclc@oclc.org , http://www.oclc.org
Orange Cherry Software	69 Westchester Ave., P.O Box 390 Pound Ridge, NY 10576, elvaz@aol.com
Ovid Technologies, Inc	333 7 th Ave, 4 th Floor, New York NY10001 http://www.oviv.com
PEMD Educational Group	P.O.Box 39, Cloverdale, CA 95425 pedm@wdatai.com , http://www.wdatai.com
Primark	5161 River Rd., Bethesda, MD 20816 http://www.disclosure.com
Progressive Technology Federal Systems, Inc.	7315 Wisconsin Ave., Suite 1200W Bethesda, MD 20814, http://www.ptfs.com
Routledge	29 West 35 th St., New York NY 10001 kthomos@routledge-ny.com http://www.routledge-ny.com
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SIRS Mandarin, Inc.	P.O.272348, Boca Raton, FL 33427-2348 custerve@sirs.com , http://www.sirs.com
SMS Data Products Group. Inc.	1501 Farm Credit Dr., McLean, VA 22102-5004 smsinfo@sms.com , http://www.sms.com
Solinet (Southeastern Library Network)	1438 W.Peachtree St., Suite 200. Atlanta, GA 30309-2955, information@solinet.net http://www.solinet.net
Stat!Ref	P.O.Box 4798, 211 E. Broadway, Jackson, WY 83001, sales@startef.com , http://www.statref.com
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Local History : Its Meaning, Source, Collection and Library

*Arun Ghosh**

An attempt has been made to understand the meaning and definition of the term 'Local History'. The concept of local history has its root in the identity and patriotic feeling of the individual human being. In the West local history as a subject received attention after the renaissance and also at the advent of bourgeois revolution due to cultural, political and economic reasons. The local history as an academic subject was introduced in England in early twentieth century. In India, the local history or rural history gained its importance along with the nationalist movement. Attempt has then been made to identify the sources, nature of collection and organisation as well as the role of libraries in the sphere of local history.

What is Local History?

History is the story of the past and mirror of the present. When the word 'local' is prefixed to the word 'history' then the connection changes. 'Local' is a word which conveys a relational concept. For example, Asia as a continent is 'local' to the world and in the same way Boral, a village, is 'local' to Twentyfour Parganas, an administrative district of the State or Province of West Bengal which was Bengal before 15th August 1947. Here 'local' has narrowed down the geographical boundary of a place and also added to it many things such as emotion, patriotism, identity etc. It is our common experience that the migratory people from the East Bengal after the partition of the country are still nostalgic about their own birthplace which is no more a part of his / her own 'country'. We have before us many evidences that the people migrated from Dacca, Mymensing, Barisal or Faridpur have organised many 'Sammilanis' (organisations) and having annual get-together. They are also occasionally publishing souvenir, reprinting the histories of their erstwhile villages or observing centenary of the school which was established in a village, now a territory of Bangladesh.

If we attempt to understand the meaning of the local history in the above mentioned background then the history of a village or a small town has to be considered as a lowest unit. In other words national history of a country can be written in a comprehensive manner talking all the local histories together.

The concept of local history was emerged in the West after the renaissance and received greater attention after the bourgeois revolution, primarily for cultural, political and economic reasons. But local history as an academic subject was introduced in the second-

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ary schools in England only in 1908. In that year, in a circular the Board of Education of England said "It is essential that in each school attention should be paid to the history of the town and district in which it is situated."¹

Rajnarayan Basu, a nineteenth century Bengali educationist and social reformer, wrote the history of his birthplace Boral, a village of South Twentyfour Parganas which was first published in 'Surabhi', a Bengali periodical in 1290 B.S. and subsequently took the shape of a book entitled 'Grammya Upakhayan' in 1914.² Rajnarayan wrote in the preface of his book that one can trace brightest impression of national character of Bengalees from the narratives of own village.³ At the same time Satish Chandra Mitra published his 'Jessore - Khulnar Itihas' (1914), a detailed history of two districts of united Bengal. It also reminds us the work of Cambridge historians who researched on Indian nationalism and the result was published in a volume entitled 'Locality' Province and Nation : Essays on Indian politics 1870 to 1940.⁴ In an essay published in that volume, Anil Seal states "As knowledge has increased, so has confusion. Politics at the base seem different in kind from politics in the province or in the nation".

We have so far cited a few examples only to understand the nature of 'local and 'regional' history. According to the Oxford English Dictionary (OED) local is "Belonging to a town or some comparatively small districts as distinct from the state or country as a whole". On the other hand region is "Administrative division of a city or district" (OED). In the light of the views expressed by Rajnarayan Basu and the meaning of the terms obtained from the OED, the relevance of local, province and region for understanding the history of a country become meaningful.

In the colonial period the British rulers of the country prepared many district report for their own administrative interest which contained valuable material for local history. One of such earliest report is W. M. Sherwin's 'Geographical and Statistical Report of the District of Beerbhoom' (1855). Apart from those reports the works of W.M. Hunter, particularly his book entitled 'The Annals of Rural Bengal' (1868) may be mentioned.

According to one contemporary economic historian, Kalikinkar Datta did the pioneering research work in the field of local history which was published by the University of Calcutta in 1940 under the title 'The Santal Insurrection of 1855-57'.⁵

During the last two three decades a number of district histories of West Bengal and also history of selected villages have been published. A few little magazines and the Government of West Bengal sponsored journal 'Paschimbanga' are also taking interest in publishing special numbers or articles on local history of West Bengal districts and villages in recent time.

Sources of Local History

Sources of local history may be categorised according to their form as well as content. So far as the form is concerned it may be of following types : (a) Printed books, journals, reports, newspapers etc., (b) Manuscripts (Punthi etc.); (c) Private papers (family history, land and business documents, correspondences etc.); (d) Oral evidence (tape recorded or handwritten versions of important people of the locality on any topic considered relevant; (e) folk Tale and Songs (collected from oral tradition); (f) Visuals ('Pat' scroll, local paintings, photography of local temples and buildings, maps etc.); (g) Archaeological remains of the locality, if available; (h) Museum objects (local dress, handicrafts, musical instrument etc.). Elaboration of the sources are not considered necessary here since Prabir Raychaudhuri ⁶ and Tarapada Santra ⁷ from the fields of librarianship and museum organisation respectively have written two very important articles on the subject which contain necessary direction towards collection of source materials of local history.

As regards oral sources the experiences of Satyajit Chowdhury who worked on the reconstruction of local history of a small area of Tewntyfour Parganas is worth-mentioning. ⁸ There are many other local historians who are also working in their respective areas and publishing the findings from time to time in journals.

The District Gazetteers, compiled by the Government of West Bengal are also useful so far as the grassroot historical information are concerned.

It should be mentioned here that our present study on local history is limited to Bengal. It is quite possible that in other parts of the country also awareness of local history studies are emerging in recent time. The experiences of the other regions of India in the field of local history could enrich the task of writing comprehensive or 'total history' of India, if writing such history is really possible.

It has been noticed that local history writing in Bangladesh has received great inspiration after the liberation war of that country. The studies being done in Bangladesh are also very useful to us.

Local History Collection

Harrod has defined 'local collection' as "A collection of books, maps, prints, illustrations and other material relating to a specific locality, usually that in which the library housing the collection is situated."⁹ But the 'other material relating to a specific locality' would be treated as most important so far as the local history is concerned. We have already discussed about the sources relevant for the local history. But the difficulty lies in identification and location of such material. The collectors would require necessary train-

ing and expert knowledge in the specific task. It would not be out of place if we quote D. D. Kosambi here. He viewed that the field work is of "Paramount importance" in the study of Indian history. He also observed that "such work in the field fall, into three inter-related classes : archaeology, anthropology and philology. All three need some preliminary knowledge of local conditions, the ability to master local dialect and to gain the confidence of tribesmen as well as peasants." ¹⁰ It seems that Kosambi's observations are also valid and applicable in identifying, collecting and organising local history material in a library of any description.

Identification and location of some material relating to local history may be comparatively easy. But acquisition, organisation and preservation of them would depend on available resources and infrastructure since the activities would necessarily be performed in a rural setting in most cases.

Libraries and Local History

Libraries of all categories (Public and Special) used to collect the materials relevant to local history. Of which Public Libraries are expected to be concerned with the local history collection along with their general interest in popular and informative literature. The public libraries generally cater the need of Local Information Centre. Normally the gazetteer type of information fulfil such demands. The local history collection also supplement that. Hence the role of Public Library in the library system is very important since it is the major institution for educating the common people and also for keeping them informed about their professional interests.

The libraries while collecting the local history material can also undertake the project of compiling 'local bibliography' which has been defined by Harrod as "As bibliography of books and other form of written records relating to a geographical area smaller than a country. It normally includes books by and about the people born in, or who have resided in the area as well as books relating to the geography, natural history, architecture and social history of the area."¹¹

It may be mentioned that some of the research libraries collect information and documents relating to 'area studies', a subject which has some resemblance with the local or regional history but in macro level only. In order to differentiate that concept of area studies from the local history the definition of Bryce Wood may be quoted. Wood states "The basic concept of area studies is that the people of a definable geographical sector, acting in their society and their environment, offer an appropriate unit for scholarly attention". Wood further adds in the same article that "The problem of dividing the world into "areas" is a continuing one, changing as the international situation creates new research

needs'.¹² It appears from Wood's explanation that the area studies as a subject is more concerned with international politics or relations. But the local history has a greater social concern than the area studies.

Finally, it has been noticed that at least one university of West Bengal (Vidyasagar University, Medinipur) has included the history of Medinipur in its undergraduate curriculum of history attaching importance to the local or regional history. It has been discussed before how important is the training for acquiring knowledge and skill of collecting and collating the local history sources and material for the libraries which would ultimately be used by the scholars for understanding the particular locality and also the country as a whole. Can we think of introducing a special paper on local history as a whole. Can we think of introducing a special paper on local collection and organisation in the curriculum of Library and Information Science at the University level?

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Community Information Service (CIS) : A challenge for the public library services in the new millennium

Barun Kumar Mukherji *

Presents the meaning, needs, scope and historical perspective of community information services (CIS). Describes how public libraries can implement the CIS. Mentions what has been done for providing CIS in West Bengal and what are to be done to make a public library "a place to go when you don't know where to go."

No Further Business with the Old Stock

In the new millennium, it is high time for the exponents of public library services to realise that no further meaningful business can be continued merely with the stock of old commodities. Rabindranath Tagore has very nicely given a poetic expression to the idea. Poet Tagore urged people to move forward with new ideas towards the goal of a new destiny. CIS offers such a new dimension for public library services to satisfy the needs of the common people of the locality in a changing environment, CIS is based on a new idea - possibly a departure from the traditional idea of library services based on supply on books only - and in the backdrop of present-day decaying trend of readership in public libraries - promises to offer a novel opportunity for the library organizers to attract more and more people to the premises of the library and satisfy the users' multi-faceted daily information needs of life. With the buzzing of such newly attracted library users, our age-long decaying public libraries with only a handful a fiction-lovers, will get a fresh lease of life and develop into lively socio-cultural public institutions.

Readership Imbalance Causes Narrow User Base

The problem may also be looked from a different angle. It is generally observed that public libraries are mostly middle class oriented. Upper class people generally think it below their status and prestige to call on the public libraries to avail of their services. On other hand, people of lower socioeconomic group generally do not have adequate leisure-time, nor any literary capably appreciativeness to call on the public libraries to avail of their services. As a result of such readership imbalance, the user base is narrowed down.

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Fall in User Base Concerns Library Leaders

Occasional readership surveys in Western countries reveal that about 15% to 25%, and sometimes even upto 33%, of the neighbouring population are covered by the public library service. Whereas, we have not yet been able to develop any such systematic survey in our country. But a preliminary estimate on West Bengal in the Nineties, and our national estimate too, indicates that readership coverage here is hardly 1% of the neighbouring population. Library leaders are quite very concerned about it and the public money spent on our public libraries can not, therefore, be justified in our social context.

Hence the social leaders and public library experts started looking for alternative means to get rid of this imbalance plaguing such vital social institutions and to put them in right track for effective utilization of their resources and widening their users' base. The ultimate result of such worldwide years long thinking is the Information and Referral Service, or more precisely, the CIS - the Community Information Service.

Democratic Values of Community Information Service

The basic objectives of the CIS is to utilize the public libraries not only at the traditional repository of books and journals, but also as Library Resource Centres (LRC) enriched with valuable collections of Audio-visual materials (AVM) and other non-book materials (NBM) and information sources which can reach out to the millions of poor illiterates, helping them in solving their numerous daily life problems and satisfying their needs and demands for 'education, culture and information'. The Community Information Centres at the primary unit public libraries thus enlarge their users' base and in turn, strengthen our democratic foundation. Indeed CIS is now a challenge to us, and its successful implementation throughout the country by the beginning of the 21st century can only ensure fulfillment of our target of developing country wide network of public library services at the grass root level.

UNESCO Manifesto Provides New Guidelines

Rightly representing the trend of world thinking in this line, the UNESCO has also come forward with revolutionary new ideas on how to shape and channelise the public library services in the coming years. Such ideas are depicted in the latest version (3rd edition) of their manifesto, viz, the 'UNESCO Public Library Manifesto, 1994', prepared in cooperation with the IFLA, which incorporates the following along with others, as the key missions of public libraries :

- ensuring access for citizens to all sorts of community information;
- providing adequate information services to the local enterprises, associations and interest groups.

While proclaiming 'UNESCO's belief in the public library as a living force for education, culture and information', the Manifesto asserts that 'the public library is the local centre of information, making all kinds of knowledge and information readily available to its users'. The Manifesto also emphasizes that the public library must provide to 'all age groups' materials relevant to their needs and at the same time, 'high quality and relevance to local needs conditions are fundamental'.

Draft Indian National Policy Also Provides Similar Guidelines

The committee set up by the Govt. of India under the Chairmanship of Prof. D.P. Chattopadhyay for formulating a National Policy on Library and Information system in India submitted its report in May 1986. In its recommendations about our public library system, the committee emphasized on the need to introduce community libraries in rural areas. It states - "A village or a village cluster with adequate population should have a community library which will also serve as an information centre. Resource of different agencies engaged in the work of public health, adult education, local self-government and such others may be pooled to build-up this composite centre." Of course, even after one and a half decade, we are still awaiting a policy declaration and its implementation.

What Mooted the Concept of such a Composite Centre ?

It took decades of many matured deliberations by social leaders and professional experts throughout the World to reach the conclusion that community information centres, composed of public libraries and information centres of various agencies, could be the best answer to popular and widen the users' base of the rural public libraries and at the same time, to provide daily problem solving information needed by the millions of rural poor. In effect, it appears a very logical step to eliminate the multiplicity of information services rendered by various agencies and at the same time, it is a bold step to come out of the traditional idea of library and librarianship based on book-services only.

In Western countries, during the early days of developing outreach programmes in public libraries, community information was also seen as a means whereby the 'quality of life' could be raised. It helped unenterprising helpless poor to take initiatives and widen their sphere of activities to solve their own problems by themselves. This self-help function is very much aligned with the public library ethos of individualised learning. Public library was, therefore, very rightly referred to as the 'poor man's university'. [Allen Bunch, 'Community Information Services'. London : Clive Bingley, 1982.]

With the introduction of CIS, public library thus reached a very coveted position when it can offer something very helpful to the poor, who have no access to any other

resources, and to the 'unlettered who can not read or write of his own, the helpless poor obviously then feel encouraged to visit the community information centre regularly where one day or other he may even feel interest in self-reading after availing of the centre's adult education and literacy programmes. CIS thus provides an unique opportunity for 'winning over the nonuser to the joys of reading'. [Allen Bunch, *ibid*; 'Information from the people to the people', by Arthur Curly : "American Libraries", June 1979.]

The Essence of CIS

In short, community information service is provided to help people 'with daily problem solving or in raising the quality of their lives'; and it services 'those who belong to the lower socioeconomic group or are disadvantaged'.

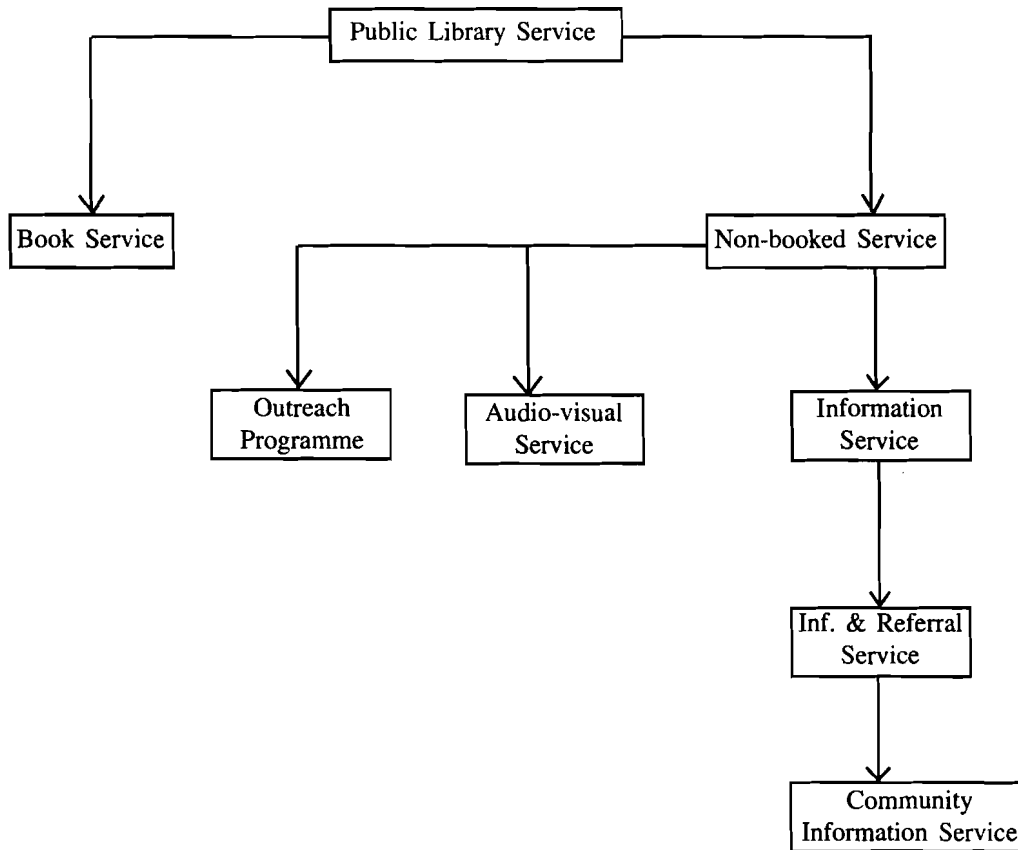
Community Information Services - A Historical Perspective

There is no denying of the fact that C.I centres, may be in different names, originated in western countries, particularly in Britain and the United States, by the end of nineteenth century. But its most significant development took place during the crisis period of the Second World War. In Britain Citizens' Advice Bureaux (CABx) were set up on emergency basis mainly to tackle various war oriented social problems, such as search for missing relations, evaluation and separation of family members, notification of emergency regulations, etc. Many public libraries were also then asked to open such information centres. But the interesting fact is that even after the end of war crisis CABx continued to play its role, rather with more vigour on public demand, in the field of personal and family problems not associated with the war. Eventually, with the emergence of new concept of library and librarianship, the work of CABx was taken over by C.I centres in public libraries.

In the United States, Veterans' information Centres, modelled on the CABx, were set up by the end of second World War to deal with crisis faced by men returning from the front to their communities who were then desperately needing information and advice regarding their rehabilitation and returning programmes of course, with the setting down of the crises within a couple of years, most of these centres, totalling over 3000, were closed by 1949. But the people who once tasted the importance of such social information service urged for setting up C.I. Centres. From the late sixties to early seventies the present phase of development of CIS started. In view of various social needs library leaders came forward, from the seventies onwards, to introduce CIS into public libraries. 'By and large, the introduction of such services has been an act of faith by librarians committed to the idea'. [Allan Bunch, *ibid*.]

CIS - A New Dimension of Public Library Service

Thus in a changing scenario, the public is committed to satisfy the user community's needs and demands for various information. The public library is, therefore, now developed as a Library Resource Centre (LRC) being equipped with various information booklets and other NBM and AVM. Its service patterns may be graphically represented as follows:



The Information service, as mentioned above, is further specified as the information and referral service (I & R.S.) as the expert professional staff, who are trained in the related skills of using reference books and collecting, organising and disseminating non-book information, also very often refer the enquirers to appropriate sources for further help. With the advancement of IT (Information Technology), the smallest neighbourhood branch unit can now be linked in a network of information to other local, regional and national organisation. This I & R service is now-a-days very often briefly referred to as the CIS providing daily problem solving information to all the poor, and even illiterate, members of the local community.

In view of needs and demands for information by the downtrodden people of the society and with the emergence of new concept of public library service, which is no longer dependent on book service only, CIS is now gaining more and more popularity throughout the world. Obviously, India can not remain in view of the fact that India's adult literacy rate is still very poor. In such situation, successful implementation of CIS through our grassroot level public librarians would indeed help us to strengthen the democratic foundation of our country.

What is Meant by CIS ?

We further clarify what is precisely meant by CIS. An expert opinion explains it as - 'a logical response to demonstrated need for non-book information about community resources.' [Claras. Jones, ed., 'Public Library Information & Referral Service'. Gaylored Professional Publication, 1978.]

The Library Association of U.K. has explained CIS as – 'a positive decision to concentrate on enabling people particularly those in lower socioeconomic groups, to act either individually or collectively on their problems in the fields of housing, employment, family and personal matters, consumer affairs, household finance, education, welfare rights and civil rights.' ['Community Information: What libraries can do: a consultative document'. London: The Library Association, 1980]

Type of Community Information and Their Helpful Use

As social being, people have various types of information queries in relation to their problems and needs of day-to-day life. It is the duty of the public librarian to collect meticulously and supply the necessary information booklets to satisfy such queries to their clientele as and when they call on him for the purpose. CI may cover a very wide field of our day to day needs, e.g. information on housing cooperative/bank loans, financial assistance for various social projects, self employment schemes, employment opportunities, location and facilities of rural / agricultural banks, prices and availability of sources of various agricultural inputs (like seeds, fertilizer, insecticide, oil & pump set, tractor etc.) and also fishery and cottage and small scale industry inputs, seed/ soil testing centres, local markets and their products, vocational training for their wards, adult education provisions, family planning / hospital / medicare services, panchayat and cooperative self-help group rules and facilities, legal aids, recent land reform /tax law amendments, saving schemes, sports and tourism, and so on. Of late, information about the central and state governments' current social welfare schemes, viz. 'Swarnajayanti' self-employment scheme, 'Annapura' scheme, 'Sampurna' rural employment scheme, 'India housing project', old-age and widow pension scheme, rural

drinking water project, etc. appear to be of vital importance to rural poor. Current supporting booklets on such varied information should be judiciously collected in C.I. centres. Even collection of almanacs ("Panji"), bus and train timetables, road maps, etc. may prove to be of immense help to the local community.

Public libraries can work as organised resource centres where all the agencies involved in public welfare may be asked to go on supplying regularly and religiously all their update information brochures and publicity materials for proper dissemination of information to the people calling on libraries for aforesaid enquiries.

Trained Library staff can extend the professional assistance to community groups in the work of acquisition and cataloguing, classification and indexing of information materials and obviously, prompt dissemination of there information to the intending users. The CI centers can also be profitably utilised for post literacy drive for the growing number of neo-literates.

Manual of Community Information Service

Once we decide to introduce CIS in our public libraries, we should prepare a manual of CIS incorporating therein a list of all the possible types and varieties of information queries and services that can be offered to users and also a compiled list of available current information booklets that can answer such queries.

This manual can best be compiled based on opinion survey of our target users, group discussions among librarians, joint discussions between library authorities and other government agencies and survey of the publicity and information materials produced by different agencies, like central and different state govt. ministries, departments, directorates and research bodies. Once such manual is prepared, copies of it can be supplied to different public libraries and librarians themselves will be free to make choice from it of the information services that they would like to offer to their clientele fitting the particular needs of the locality and collect accordingly the supporting information booklets published by different govt. and research bodies.

Model Town and Rural Library and CIS

It is hightime now for the library directorates of all the states where public library act has already been introduced to implement the CIS scheme, at least to start it on an experimental basis in one model town and one rural library. Taking lessons from their experiences, full-fledged CIS can be introduced in the second phase in all the public libraries of the states, With the beginning of the 21st century we can thus extend our public librasry services to the grassroot levels.

CLIC - A New Attempt in West Bengal

Incidentally, it may be mentioned that the Department of Mass Education has recently started a project to establish CLICs (Community Library & Information Centers) in panchayat areas which are not yet covered by sponsored libraries. A report says, till September 2000, 341 CLICs have been established under the supervision of Zila Parisads. But in all respect, these appear to serve only as a miniature model of CIS.

CIS Guarantees Popularity and Wider User-base for Public Libraries

For the sake of stronger democratic foundation of the country, we look forward for early implementation of CIS. Once the neighbouring community starts enjoying the advantage of getting all the necessary information from the nearest library-cum-C.I. Center, they need not have to bother where to go for what information. Libraries will thus automatically become popular, with wider user base, and people will very often voluntarily step in the library with the prospect of gradually being attracted to the world of knowledge and recreation through book and non-book media. With the successful implementation of CIS, our public libraries will also become, as a popular slogan once coined in Britain, 'a place to go when you don't know where to go'.

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Progress of Library Management Softwares: An Indian Scenario

*Partha Sarathi Mukhopadhyay**

This paper discusses the development of library management softwares over the past decades, traces out the characteristics and trends of softwares with special reference to packages available in Indian environment and compares services and facilities incorporated in library automation packages available in India against various checklists and with the help of table and appendices.

Introduction

The World is going digital. Libraries are no exceptions. In fact, librarians are one of the most enthusiastic user groups of information technology in general and computer softwares in particular. A software may be viewed as a digital version of human knowledge. Library Management Softwares (LMSs) are now established as an essential tool in the support of effective customer service, stock management and management of services offered by libraries. These are based on knowledge and experience of library professionals over the centuries.

The rapid growth in utility of hardware, software & connectivity and reduced costs gives the development of LMS a vital breakthrough to achieve a remarkable height. Current LMSs are integrated systems, based on relational database architecture. In such systems files are interlinked so that deletion, additions and other changes in one file automatically activate appropriate changes in related files. The market place for LMSs is now a mature one in India. Almost all special libraries and larger academic libraries in India have adopted a computer-based system.

Progress of LMSs over the years :

Software upgradation is a continuous process. LMSs are no exceptions. A critical study of development of LMSs over the years suggests that LMSs may be divided into four generations [1] on the basis of sophistication of their facilities for integration and interconnectivity. The LMSs developed in all parts of the world from mid 1970s to till date may be fitted into one of the above four compartments.

The first generation LMSs were module based systems with no or very little integration between modules. Circulation module & cataloguing module was the priority issue for these systems and were developed to run on specific hardware platform and proprietary operating systems.

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The second generation LMSs become portable between various platforms with the introduction of UNIX and DOS based systems. The LMSs of this generation offer links between systems for specific function and are command driven or menu driven systems.

The third generation LMSs are fully integrated systems based upon relational database structures. They embodied a range of standards, which were a significant step towards open system interconnection. Colour and GUI features, such as windows, icons, menus and direct manipulation have become standards and norms in this generation.

The fourth generation LMSs are based on client-server architecture and facilitate access to other servers over the Internet. These systems allow accessing multiple sources from one multimedia interface.

Thus the progress of LMSs through the generations provides us an effective and straightforward user interface which supports access to multiple sources and services from one multimedia interface. Moreover the latest LMSs allow customized report generation and to manipulate data and investigate various scenarios and therefore they have all the potentials to be a decision support tool [1,2]. A comparative table (table 1) of features and functionalities of LMSs in four different generations may be drawn on the basis of above discussion.

Table 1: Generations of LMSs

<i>Sl. No.</i>	<i>Features</i>	<i>1st Generation</i>	<i>2nd Generation</i>	<i>3rd Generation</i>
<i>4th Generation</i>				
<i>1. Programming Language</i>	<i>Low level Language</i>	<i>COBOL, Pascal, C</i>	<i>4GL</i>	<i>OOPS</i>
<i>2. Operating</i>	<i>In house</i>	<i>Vendor specific</i>	<i>UNIX, MS DOS</i>	<i>UNIX, Windows</i>
<i>3. DBMS</i>	<i>Non standard</i>	<i>Hierachical and Network model</i>	<i>Entity Relation model</i>	<i>Object oriented model</i>
<i>4. Import/Export</i>	<i>None</i>	<i>Limited</i>	<i>Standard</i>	<i>Fully integrated and seamless</i>
<i>5. Communication</i>	<i>Limited</i>	<i>Some interface</i>	<i>Standard</i>	<i>Full connectivity across the Intenet</i>
<i>6. Portability</i>	<i>Machine dependent and hardware</i>	<i>Machine independent but Platform</i>	<i>Multi Vendor</i>	<i>Multivendor and Platform independent</i>

7. Reports	<i>specific Fixed format and limited fields</i>	<i>dependent Fixed format and unlimited fields</i>	<i>Customized report generation</i>	<i>Customised report generation with e-mail interface</i>
8. Colour	<i>None</i>	<i>None</i>	<i>Availabe</i>	<i>Fully available with Multimedia</i>
9. Capacity of	<i>Limited</i>	<i>Improved</i>	<i>Unlimited</i>	<i>Unlimited</i>
10. Module Integration	<i>None</i>	<i>Bridges</i>	<i>Seamless</i>	<i>Seamless</i>
11. Architecture	<i>Stand - alone</i>	<i>Shared</i>	<i>Distributed</i>	<i>Client - Server</i>
12. Interface	<i>Command driven (CUI)</i>	<i>Menu driven (CUI)</i>	<i>Icon driven (GUI)</i>	<i>Icon driven with Web and Multimedia (GUI)</i>
13. User Support	<i>Single User</i>	<i>Limited number of users</i>	<i>Unlimited number of users</i>	<i>Unlimited number of users</i>
14. Multi-lingued Support/ UNICODE	<i>None</i>	<i>Limited (through Hardware support)3.</i>	<i>Standard</i>	<i>Unicode base</i>

Library management softwares in India

The automation of library activities started in India with the introduction of CDS/ISIS. CDS/ISIS is a menu-driven generalized information storage and retrieval system designed specifically for the structured non-numerical databases. NISSAT with the help of other professional bodies organized a number of training courses on application of CDS/ISIS in information activities. As a result, a large pool of trained manpower developed all over the country. Some organizations from the experience of use of CDS/ISIS, MINISIS etc. developed their own LMSs e.g. DESIDOC developed DLMS (Defence Library Management System), INSDOC came with CATMAN (Catalogue Management) and SANJAY was developed by DESIDOC under NISSAT project by augmenting CDS/ISIS (Ver. 2.3) for library management activities.

The LMSs presently available in India may be ranked in 2nd, 3rd and in between 3rd and 4th generation on the basis of their features as listed in the table 1. As far as the origin and application domain is concerned, the LMSs available in India may be grouped (table 2) as below: -

Table 2: LMSs available in India

<i>Origin</i>	<i>Application Domain</i>		
	<i>Large System</i>	<i>Medium Range System</i>	<i>Small System</i>
<i>LMSs of foreign origin</i>	<i>Alice for WINDOWS (OASIS) BASISplus & TECHLIBplus TLMs</i>	NA	NA
<i>LMSs developer LMSs of foreign origin</i>	<i>DELIS (over BASIS plus)</i>	<i>SANJAY (over CDS/ISIS)</i>	<i>TRISHNA (over CDS/ISIS)</i>
<i>LMS of Indian origin</i>	<i>LIBSYS MECSYS SUCHIKA MAITRAYEE SOUL TULIPS WILISYS ULYSIS</i>	<i>GRANTHALAYA DLMS LIBRARIAN KRVGER LIBRARY MANAGER NILIS LISTPLUS NIRMALS LIBRA</i>	<i>ARCHIVES CATMAN GOLDEN LIBRARY LIBMAN LIBRARY MANAGEMENT LIBRARY MANAGER LIBRIS LIBSOFT LOAN-SOFT SALIM SLIM</i>

(Please see Appendix I for details)

As it is not possible to discuss every LMS listed in the table, only ten LMSs are selected for discussion on the basis of their popularity and features.

1. Alice for Windows/OASIS

This LMS developed by Softlink International, Australia is an international software package and is marketed worldwide through a number of agencies based in America, Australia, Britain, Iceland, India, Malaysia, New Zealand and Singapore. This software is marketed under the name of Embla in Iceland, Alice elsewhere in Europe, OASIS in South East Asia & Australia and Annie in America and other parts of the world. Recently Softlink International decided to call the software *Alice for Windows* [3,4] all over the world to maintain consistency in nomenclature.

The main features of Alice are as follows:

- It has four distinct versions – Public library ver. , Special library ver., Academic library ver. and School library ver.
- The package is modular and modules are grouped into one of the three sets –

- Standard Set: Includes Management; Reports & Utilities; Circulation; OPAC
- Advanced Set: In addition to standard set it includes Acquisition; Periodicals; Journal Indexing; Multimedia; Web Inquiry
- Special Set: In addition to Standard & Advanced set it includes Reservation; Interlibrary Loan; Patron self checking; Rapid retrospective conversion; Multilingual features; Self circulation; Union catalogue

- The LMS is backed by a number of support services which include onsite training programs, continued R & D, feedback system through user groups, free newsletters etc.
- Besides traditional library materials, it can be used to manage slides, audio & videocassettes, paper clippings, maps, charts, electronic documents and www sites. Location of documents in library could also be seen with the help of the library map. It is possible to maintain consistency in recording of items through the use of authority files. Alice has a capacity of holding 99 lakhs records.
- It supports a total of eleven search criteria to search the database from any machine (UNIX/MAC/ Apple etc.) through Internet or Intranet. It helps to generate customized reports in addition to 800 preformatted reports available with standard set.
- It supports barcode technology and has in built communication function. As special features, the LMS provides data protection functions, rapid retroconversion facility and online tutorial & help system

2. BASISplus & TECHLIBplus

BASISplus & TECHLIBplus are products of Information Dimensions Inc. (IDI), USA and NIC, New Delhi is the value-added reseller of the packages in India. BASISplus is a client-server relational database system for text and mixed object documents that adheres to fundamental principles of open systems including interoperability, portability and scalability [5,6]. The database engine provides user authentication, document access control, concurrency control, deadlock protection and recovery. The features of the LMS are as below:

- Relational DBMS
- Client-server Architecture
- Active data dictionary
- Enhanced security feature

- Complete backup & restore capabilities
- Power search facility
- Full text retrieval
- Mixed object management
- Thesaurus and controlled vocabulary
- Screen customization
- Document converters
- Immediate & Deferred updating (online & batch)
- Content based retrieval
- Component-level retrieval & image management
- Networking (LAN & WAN)
- Open Application Programming Interface (API) for heterogeneous client access to BASISplus database server.
- GUI based easy user interface for retrieval, display and data entry
- Intelligent search assistance and thesaurus manager
- Converter technology which allows user to import and export over 30 different word processors file formats

TECHLIBplus is a comprehensive library automation package developed over BASISplus and customized to perform all the operation and activities of a fully electronic library [6]. TECHLIBplus supports OPAC, Catalogue maintenance, Circulation, Serial management, Acquisition, Processing and MARC cataloguing. The LMS provides direct access to information in Current Contents.

3. DELSIS

DELSIS, developed by DELNET, is basically a library networking software and is suitable for library networks, universities with branch libraries (big campuses) and public libraries in the country. DELSIS [7] is based on BASISplus and handles not only the OPAC but also has the administrative tools for building up the union catalogues on BASISplus. It provides powerful and extensive facilities for online inquiries for books, serials, biographical details about the specialists and supports the cataloguing of books in Indian languages. The important features of DELSIS are as follows:

- DELSIS is a user friendly, menu driven package. It contains the modules for OPAC as well as modules for the creation of databases
- It supports Boolean, phrase and word searching facilities. It generates a dictionary of subject heading while retrieving a subject.

- It displays a record in AACR II format and printout options are also available
- It provides multi-lingual features like creation of the bibliographic records in any Indian languages and transliteration in any Indian language including roman scripts. Printout may be taken in any Indian language and queries may also be formulated in Indian languages.
- It supports import and export of records in ISO format

4. GRANTHALAYA

This CUI based (DOS & UNIX) modular LMS is developed on FoxPro by INSDOC for medium range libraries. It includes all the modules required for day-to-day library operations. The package is made of seven modules – Library administration; Query; Circulation; Acquisition; Serials control; Technical processing and Data administration. The salient features [8] of the LMS are

- Based on object oriented design
- Supports CCF and ISO 2709 for import & export
- Generates a dictionary for various data elements for easy searching
- Supports Boolean operators and range searching
- Provides online help through screen messages

5. LIBSYS

LIBSYS is a fully integrated multi-user library system based on client-server model and supports open system architecture, web-based access and GUI. This indigenous LMS is designed and developed by LibSys Corporation, New Delhi. LIBSYS has seven basic modules – Acquisition; Cataloguing; Circulation; Serials; OPAC; Web-OPAC and Article indexing. The major advantages of using LIBSYS [8,9] are as follows:

- Based on client-server model and TCP/IP for communication and networking
- Provides ANSI Z39.50 compliant web access for making the server accessible through Internet/Intranet
- Supports web OPAC for access of bibliographic databases through Internet/Intranet
- Supports standard bibliographic formats like USMARC, UKMARC, CCF, UNIMARC etc.
- Includes images and multimedia interfaces with LIBSYS search engine
- Supports barcode technology for membership card production and circulation

- Offers SDI, CAS, fine calculation, e mail reminders etc. utilities

6. SANJAY

This LMS is based on CDS/ISIS (Ver. 2.3). It has been developed by DESIDOC under a NISSAT project to meet the requirements of library management activities. It includes a set of 35 Pascal programs and 25 special menus. The features [10,19] of SANJAY are –

- More user friendly than CDS/ISIS for library house keeping operations
- Effective interlinking of databases (it is a great achievement because CDS/ISIS does not support relational databases)
- Interlinks book databases, member databases, vendor databases and budget databases
- Maintenance module restricts the access right to a limited set of users and thereby provides security measures
- User module helps library staff to carryout daily routine in circulation, acquisition and online catalogue

7. SOUL

The story of SOUL (Software for University Libraries) started with the development of ILMS (Integrated Library Management Software) by INFLIBNET in collaboration with DESIDOC. Two versions of ILMS (DOS & UNIX) were developed for university libraries in India. But with the introduction of GUI based system and other revolutionary changes in the field of computer software, INFLIBNET decided to develop a state-of-the art, user friendly, Window based system which will contain all the features/facilities available with other LMSs in the market. As a result INFLIBNET came out with a LMS [11] called 'SOUL'. The package was first demonstrated in February 1999 during CALIBER-99 at Nagpur.

SOUL uses RDBMS on Windows NT operating system as backend to store & retrieve data. The SOUL has six modules – Acquisition; Cataloguing; Circulation; Serial Control; OPAC and Administration. The modules have further been divided into sub-modules to take care of various functions normally handled by the university libraries. The features [12] of SOUL are –

- Window based user friendly system with extensive help messages
- Client-server architecture based system allowing scalability to users
- Uses RDBMS to organize & query data

- Multi-user software with no limitation for simultaneous access
- Supports bibliographic standards like CCF & AACR II and ISO 2709 for export & import facility
- User friendly OPAC with web access facility
- Provides facility to create, view & print records in regional languages
- Supports LAN & WAN environment
- Affordable cost

8. SUCHIKA

This LMS is developed by DESIDOC for libraries/technical information centres of DRDO laboratories (around 42 Labs.). Presently two versions (DOS & UNIX) are available for small and big libraries respectively. The package supports CCF, AACR II, ISO 2709 and allows data conversion from CDS/ISIS. SUCHIKA has four modules – Acquisition; Circulation; OPAC & Serial control and also has in built facility for data validation and data duplication checking. SUCHIKA [8,13] has powerful retrieval facilities with the help of free text searching, Boolean searching and various indexes created automatically on searchable fields.

9. TLMS

TLMS (Total Library Management Service) is developed in Germany by TRANCE [14] group and marketed and distributed in India by OPAC Infosys Pvt. Ltd., Pune. It is SQL based client-server system with fully integrated library management systems. It supports CCF, USMARC and Indian UNIMARC (as recommended by Central Secretariat Library, New Delhi) and Z39.50. The package also provides various additional facilities like member card generation, email reports, virtual library, audio, video and scam management within the database and use of digital camera. The features of TLMS [15] include following supports –

- Printing of accession register; AACR II card generation; Article scan management; Authority files creation; Auto cataloguing from web sites; Auto export & import; Auto keyword generation; Automatic barcode generation; Letterhead creation; Dropdown matching etc.
- Barcode based issue & return and serial control; Auto status generation for progress of processing of documents; Bulletin board facility; Kardex generation for serial control; Complete Intranet support; Automatic claim generation for overdue & missing journal issues
- RTF, Dial-up networking, E mail and Printing of gatepass; GIST card facility; ID card generation; Arrival list generation; Multi-lingual support, Web access of OPAC; Power search facility; Fine calculation and receipt generation; Reserva-

tion of books; Retrospective data conversion; SDI service; Search refining; Security enhancement; Statistics & graphs; Stock verification

- UNIMARC input sheet generation; UNIMARC cataloguing; Virtual library creation; Z39.50 client & server; UNICODE support etc.

10. TRISHNA

TRISHNA [16] is developed by NISTADS, New Delhi by using CDS/ISIS (ver 2.3) under a NISSAT project. It supports data creation, storage and retrieval in Indian language scripts namely Assamese, Bengali, Gujrati, Devnagari, Kanada, Malayalam, Oriya, Punjabi, Tamil and Telegu. NISSAT provides this package at no cost with nominal charges for training and free technical support. The computer system must have a GIST card for the effective running of TRISHNA

Comparative Study of Selected LMSs

Now, we may go for a comparative study of ten selected LMSs on the basis of the discussion made in the sections 2 and 3. The comparative study may be done by taking into account five aspects – hardware requirements, intrinsic features of packages, available services & facilities, customer support service and price

1. Hardware and backend software requirement for LMSs

Any LMS is application software, which requires some system software and hardware support for proper functioning. Thus the selection of LMS should be done on the basis of careful analysis of the basic hardware and software requirements for the package. The essential backend softwares and minimum hardware requirements for the selected packages are given in the appendix II (Column 2 &3).

2. Intrinsic features of LMSs

The factors like data storage techniques, programming language(s) used in the development of software, database structure, file organization etc. must also be taken into consideration for the comparative study because these factors will determine very important issues of maintenance, upgradation and customization in future [17].

3. Services and Facilities available with LMSs

The suitability and superiority of any LMS depends on the available services, facilities and coverage of library/information activities in various modules. The whole range of

services available in selected LMSs may be divided into three groups – Core services, Enhanced services and Value added services.

a) Core services

These are the basic services [18] necessary for day-to-day library activities and must be available with LMSs. These services may be tabulated for the comparative study as follows: -

Table 3: Core Services

SL. No.	Core Services	LMSs (1 represents presence and 0 indicates non-availability of service)									
		Alice for Windows	Basis Plus & Techlib Plus	Delsils	Grantha-laya	Libsys	Sanjay	Soul	Suchika	TLMS	Trishna
1.	ACQUISITION	1	1	0	1	1	1	1	1	1	0
2.	CATAOGUING	1	1	1	1	1	1	1	1	1	1
3.	CIRCULATION	1	1	0	1	1	1	1	1	1	0
4.	OPAC	1	1	1	1	1	1	1	1	1	1
5.	SERIAL CONTOL	1	1	0	1	1	0	1	1	1	0
6.	BIBLIOGRAPHIC										
	FORMAT SUPPORT	1	1	1	1	1	1	1	1	1	1
7.	DATA EXCHANGE										
	FORMAT SUPPORT	1	1	1	1	1	1	1	1	1	1
8.	ARTICLE INDEXING	1	1	1	0	1	1	1	0	1	1
9.	RETROCONVERSION	1	1	1	0	1	1	1	0	1	1
10.	STANDARD REPORT/ ADMINISTRATION	1	1	1	1	1	1	1	0	1	1
	TOTAL NO. OF SUPPORT	10	10	7	9	10	9	10	8	10	7

It is clear from the above table (table 3) that DELSIS and TRISHNA do not support all the basic requirements of library management activities. It is very much natural because these two packages were designed keeping in view the purposes different from the library management. DELSIS developed as library network support software and TRISHNA designed to facilitate database creation in Indian language scripts.

b) Enhanced services

These are the additional set of services [20] which will make the work of a librarian easy, smooth and seamless and at the same time these will help users in efficient information retrieval, cross-domain searching and easy navigation. A comparative table may be

drawn as below: -

Table 4: Enhanced Services

SL. No.	Enhanced Services	LMSs (1 represents presence and 0 indicates non-availability of service)									
		Alice for window	Basis plus & Techlib plus	Delsis	Grantha laya	Libsys	Sanjay	Soul	Suchika	TLMS	Trishna
1.	CUSTOMIZED REPORT GENERATION	1	1	0	0	0	1	1	0	1	0
2.	GUI BASED USER INTERFACE AND COLOUR	1	1	1	0	0	1	1	0	1	0
3.	RESERVATION FACILITY	1	1	1	0	0	1	1	0	1	0
4.	INTER LIBRARY LOAN MODULE	1	0	1	0	0	0	0	0	1	0
5.	MULTILINGUAL SPORTS	1	0	1	0	0	0	1	0	1	1
6.	UNION CATALOGUE	1	1	1	0	0	0	0	0	1	0
7.	AUTHORITY FILE SUPPORT AND CONTROLLED VOCABULARY	1	1	1	1	1	1	1	1	1	0
8.	ON LINE HELP	1	0	0	0	0	0	1	0	1	0
9.	ON LINE TUTORIAL	1	0	0	0	0	0	0	0	0	0
10.	POWER SEARCH FACILITY	1	1	1	0	1	1	1	1	1	0
11.	INTERNET SUPPORT	1	1	1	0	1	0	1	0	1	0
12.	INTERNET SUPPORT	1	1	1	0	1	0	1	0	1	0
13.	WEB ACCESS OPAC	1	1	1	0	1	0	1	0	1	0
14.	MULTIMEDIA INTERFACE	1	1	1	0	1	0	0	0	1	0
15.	BARCODE SUPPORT	1	1	1	0	1	1	1	0	1	0
16.	BACK UP	1	1	1	0	1	1	1	0	1	0
TOTAL NUMBER OF SUPPORTS		16	12	12	1	10	4	11	2	15	1

Most of these services are features of the third generation LMSs. The table (table 4) shows that four packages namely GRANTHALAYA, SANJAY, SUCHIKA and TRISHNA provide very little support for enhanced services and obviously belong to the second generation LMSs. Alice for Windows topped the list with TLMS at the next position. SOUL performed well in this service area. It is the only Indian LMS from the Govt. sector with third generation features and facilities.

c) Value added services

These are the essential work and services [21] of library management though generally not included within the scope of a LMS. But with the development in hardware, software and connectivity, presently LMSs are trying to provide software solution for this type of work and services. The table 5 compares selected LMSs against such work and services.

Table 5: Value Added Services

SL. No	Value Added Services	LMSs (1 represents presence and 0 indicates non-availability of service)									
		Alice for Window	BASIS Plus & TECHLIB Plus	DELSIS	GRANT HALAYA	LIBSYS	SANJOY	SOUL	SUCHIKA	TLMS	TRISHNA
1.	PATRON SELF SERVICE(self circulation, self reservation etc.)	1	0	0	0	0	0	0	0	1	0
2.	ON LINE USER TRAINING ORIENTATION	1	0	0	0	0	0	0	0	1	0
3.	STOCK VARIIFICATION FACILITY	0	0	0	0	0	0	0	0	1	0
4.	MEMBERS PHOTO ID CARD GENERATION	0	0	0	0	0	0	0	0	1	0
5.	BARCODE GENERATION	1	1	0	0	1	0	0	0	1	0
6.	FINE CALCULATION & RECEIPT GENERATION	0	0	0	0	1	0	0	0	1	0
7.	GATEPASS GENERATION	0	0	0	0	1	0	0	0	1	0
8.	BULLETIN BOARD SERVICES & E-MAIL REPEATS	0	1	1	0	1	0	1	0	1	0
9.	ELECTRONIC SDI, CAS & CAL SUPPORT	1	1	0	0	1	0	1	0	1	0
10.	DIGITAL CAMERA SUPPORT	0	0	0	0	0	0	0	0	1	0
TOTAL NO. OF SUPPORT		4	4	1	0	5	0	3	0	10	0

In this service sector, TLMS topped the list with a perfect 10 score. LIBSYS is the only LMS of Indian origin performed well against the checklist.

d) Customer support services

The support service from the software developers/agent at the right time and at the right place is a critical factor to be kept in mind at the time of selection of any LMS. The mode of support for selected LMSs may be compared from the table 6

Table 6: Customer Support Service

SL. No.	Customer Support Services	LMSs (1 represents presence and 0 indicates non-availability of Service)									
		Alice	BASIS	DELSIS	GRANT	LIBSYS	SANJOY	SOUL	SUCHIKA	TLMS	TRISHNA
		for Window	Plus & TECHLIB Plus		HALAYA						
1	ON CALL & ON SITE SUPPORT	1	1	1	0	1	0	0	0	1	0
2	CONTINUED R & D AND SOFTWARE UPDATION	1	1	1	0	1	0	0	0	1	0
3	LIVE INTERNET SUPPORT AND UPDATE	0	0	0	0	1	0	1	0	1	0
4	TRAINING	1	1	0	1	1	0	1	1	1	1
5	USER GROUP AND NEWS LETTER SERVICES	1	0	0	0	0	0	0	0	0	0
TOTAL NUMBER OF SUPPORTS		4	3	1	2	4	1	3	2	4	1

It is clear from the above table that support services from private agencies are better than the government organizations for obvious commercial reasons.

f) Price

Lastly but not leastly, we have to take the price of the packages into active consideration for cost-benefit analysis of available services in the selected LMSs. This factor plays an important role in our country because financial crunch is a regular feature in Indian libraries and information centres. As a general trend, commercial LMSs are costlier than the packages developed by government organizations. The price of the software rises with the number of value-added services and enhanced services incorporated in the software. In general, the pricing model of commercial LMSs may be divided into three options –

Basic ver. (Price range: Rs. 30,000/- to 80,000/-), Standard ver. (Price range: Rs. 1,25,000/- to 2,20,000/-), and Full ver. (Price range: Rs. 2,90,000/- to 3,50,000/-). The basic version supports limited collection size and does not have networking features. The standard version supports unlimited collection size and limited number of network users. The full version supports unlimited collection size and unlimited users. Moreover, commercial LMS designers also claim additional charges for customization, onsite training, data conversion (from other DBMS), software updates (after warranty period) and post warranty annual maintenance charges. But LMSs developed by government organizations are cheaper and sometimes available only against some registration charges (e.g. SANJAY). The Indian LMS SOUL, which includes most of the third generation features, is available at the cost of Rs. 50,000/- only i.e, at much cheaper rate than other similar commercial LMSs.

Conclusion

This study is based on author's experience of using some of the LMSs mentioned above, technical literature/brochure of packages, comments and advises of professional colleagues having working experiences of using the LMSs and attending demonstration of LMSs arranged by the agencies. It is clear from the above study that LMSs has got enough maturity to provide software solution to most of the problems of library management activities. Packages are also becoming more and more user friendly through incorporating various features like easy and integrated access interface, cross-domain searching and self service facilities.

The selection of right LMS is always a difficult task for library managers. The present need, long term requirements, hardware & software requirements, financial resources of the library and customer support from software developers must be kept in view at the time of selection of any LMS. The LMSs designed and developed by the commercial software houses are costlier than packages developed by government organizations such as INSDOC, DESIDOC, INFLIBNET etc. Moreover after the warranty period, the services like software updating, trouble-shootings and annual maintenance etc. are also highly priced and naturally place heavy recurring financial burden on the already strained library budget.

Indian libraries need a LMS with all the third generation features at affordable cost, backed by strong customer support services. The present study indicates that the SOUL developed by the INFLIBNET has most of the features of a third generation LMS. Although looking at the name of the software, one may think that it meant for university libraries only, but in fact, it is flexible enough to be used for automating any type or size of library. It is available at an affordable price and much cheaper in compare with other similar commercial LMSs. The customer support service is not comprehensive enough but this difficulty may overcome by forming user group and discussion forum for the

mutual benefit of each user. The forum may approach INFLIBNET for active support, guidance and advise. Moreover, SOUL is supported by continued R & D from INFLIBNET ensuring release of newer versions of SOUL incorporating exciting features e.g. the efforts are already underway at INFLIBNET to create next version of SOUL on Linux platform.

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APPENDIX I: LIBRARY MANAGEMENT SOFTWARES AVAILABLE IN INDIA

SL. No.	LMS	Software Developing Group	Availability Status	Marketing & Distribution agent in India
1	Alice for Windows	Softlink International, Australia	C	Softlink Asia Pvt.Ltd., New Delhi
2	Archives (1,2,3)	Microfax Electronic Systems, Mumbai	C	Direct
3	BASIS plus & TECHLIB plus	Information Dimension Inc.,USA	C	National Informatics Centre, New Delhi
4	CATMAN	INSDOC, New Delhi	C	Direct
5	DLMS(Defence Library	DESIDOC, New Delhi	C	Direct
6	DELSIS	DELNET Society, New Delhi	C	Direct
7	Golden Libra	Golden Age Software Technologies, Mumbai	C	Direct
8	GRANTHALAYA	INSDOC, New Delhi	C	Direct
9	Kryger Library Manager Management System)	Blitz Audio Visuals, Pune	C	Direct
10	Libman	Datapro Consultancy Service, Pune	C	Direct
11	Libra	Ivy Systems Ltd., New Delhi	C	Direct
12	Librarian	Soft-Aid, Pune	C	Direct
13	Library Management	Raychan Sysmatics, Bangalore	C	Direct
14	Library Manager	System Data Control Pvt. Ltd., Mumbai	C	Direct
15	Libris	Frontier Information Technology	C	Direct
16	Lib Soft	ET & T Corp., New Delhi	C	Direct
17	LIBSYS	Softlink Asia Pvt. Ltd., New Delhi	C	Direct
18	ListPlus	Computer systems, Bangalore	C	Direct
19	Loan Soft	Computek Computer Systems, Hyderabad	C	Direct
20	Maitrayee	CMC Kolkata in collabo- ration with CALIBNET	NA	NA
21	MECSYS	MECON, Ranchi	C	Direct
22	NILIS	Asmita Consultants, Mumbi	C	Direct
23	Nirmals	Nirmal Institute of Computer	C	Direct
24	Salim	Expertise, Tiruchirapalli Uptron India Ltd., New Delhi	C	Direct

25	SANJAY	DESIDOC in collaboration with NISSAT	F	Direct
26	Slim	Algorithms, Mumbai	C	Direct
27	SOUL	INFLIBNET	C	Direct
28	SUCHIKA	Direct	M	Direct
29	TRISHNA	NISTADS, New Delhi in collaboration with NISSAT	F	Direct
30	TLMS	TRANCE Group, Germany	C	OPAC Infosys Pvt. Ltd., Pune
31	TULIPS	Tata Unisys Ltd., Mumbai	C	Direct
32	ULYSIS	WIPRO Information Technology Ltd., Seccunderbad	C	Direct
33	WILISYS	Wipro India, Bangalore	C	Direct

(C: Commercially available; F: Free against registration; M: Moderately priced; NA: Not available commercially)

APPENDIX II: HARDWARE & SOFTWARE REQUIREMENTS AND INTRINSIC FEATURES OF SELECTED LMSS.

SL NO	LMS	INTRINSIC FEATURES		SOFTWARE & HARDWARE REQUIREMENT	
		Programming Language(s)	Data Storage Techniques	Software Requirement	Minimum Hardware Requirement
1	Alice for Windows	C++	Relational Model	WIN 95/98	Pentium I Processor 32 MB RAM 2.1 GB HD SVGA (640x480x256) CDROM Drive (48x) Sound Card
2.	BASIS plus TECHLIBplus DELSIS	Visual Basic	Relational Model	Server Unix SVR 4.0 or UNIXWARE Client WIN 3.11 or above TCP/IP & PC-NFS (for network and shared file services)	Server Pentium II 16MB RAM 170 MB HD 150 MB Cartridge Client Intel 80386 4 MB RAM (8MB recommended) 20 MB HD
3.	GRANTHALAYA	4 GL/FoxPro	Relational Model	MSDOS Ver.6.0 & above SCO UNIX Ver 5.32	PC-AT 486 8 MB RAM 540 MB HD
4.	LIBSYS	C,Java	B-Tree and Inverted File	Server WIN NT/SCO UNIX/ LINUX/UNIXWARE Novell Client WIN 95/98/NT or X-Windows	Server Pentium II 16 MB RAM 640 MB HD Client PC-AT 486 8 MB RAM
5.	SANJAY TRISHNA	PASCAL (CDS-ISIS)	Inverted File	MSDOS Ver 3.0 & above CDS/ISIS Ver.2.3 & above	PC-AT 640 KB RAM 540 MB HD GIST Card (for TRISHNA only)
6.	SOUL	Java	Relational Model	Server WIN NT MSSQL Server (6.5) Client WIN 95	Server Pentium II 64 MB RAM 1.2 GB HD 32X CDROM Drive Ethernet Card (10/100 MBPS) Client Pentium I 32 MB RAM 1.2 GB HD Ethernet Card (10/100 MBPS)
7.	SUCHIKA	C++	B-Tree	MSDOS 6.0 or higher Or	PC-AT 486

				UNIX (depending on the version of the package)	8 MB RAM 540 MB HD
B.	TLMS	C++, Java	Relational Model	Server WIN NT Client WIN 98	Server Pentium III 64 MB RAM 6 GB HD Multimedia Kit & CDROM Drive Client Pentium Celeron 32 MB RAM 4 GB HD Multimedia Kit & CDROM Drivecccc

Designing Newspaper Information Retrieval System Using HTML: A case study with “Letters to Editor”

Nakul Chandra Maity*
Goutam Maity**

Discusses the importance of ‘letters to editor’ of newspapers as important sources of information and finds that information retrieval from these sources is being hampered due to absence of proper organisation and control. Attempts to design a prototype Newspaper Information Retrieval System as HTML formatted web document for organisation and control of the letters appearing in newspapers. Discusses objective and scope of the work and the methodology adopted to design the retrieval system. Findings obtained from the work are discussed and suggestions and conclusion are made.

Introduction

Internet is popularly known as network of networks over the world. It is an extremely large, globally distributed and interconnected store houses of information and can provide services to all the users who have access to Internet. Internet services are spanning from electronic mailing to document publishing over the World Wide Web in the form of Web page. A Web page is a single unit of information often called a document that is available via World Wide Web. Web pages are prepared using Hypertext Markup Language (HTML). Using HTML the document’s author can specially code sections of the document to point to other information resources. These specially coded sections are referred to as hypertext links. Hypertext is concerned with the non-linear or non-sequential presentation of information. Unlike paper texts where information is generally expected to be read in a sequential/linear manner, hypertext allow readers to navigate their own path through the information. This exploits the interactive nature of the electronic media and open up many new possibilities, but demands careful design by the author and degree of discipline by readers. In other words, the author provides links between the related pieces of information in a manner that allows and enable readers to choose which links they wish to explore. Links may be used to direct readers to additional information the same way that footnotes, glossaries do in paper texts. Also they may provide more direct links between related pieces of information. Mechanisms are generally provided to allow readers to backward to their original position or to follow further links. HTML ensures plenty of structuring and layout controls to handle the presentation and linkage mechanism necessary to provide hypertext capabilities. HTML has numerous tags that are specially identified set of characters responsible for presenting the information with required structure and layout. Some of the tags are useful to establish links to other documents and to indicate support electronic indexing capabilities. They are very important for developing a well designed

Web document (5).

The present work of designing a prototype Newspaper Information Retrieval(IR) System as web document for organisation and control of "Letters to Editor" of newspapers is carried out using HTML.

Objectives

It has been observed that almost all the newspapers earmark some space (mostly on the editorial page) for publishing readers' opinion on different issues appeared on the newspapers. These usually appear under the column(s) entitled "Letters to Editor". It is to be noted that a considerable number of readers regularly scan these columns for knowing what other readers think, and they rate these columns as very much informative and useful. Thus, these letters may be considered as valuable sources of information in study, research as well as various application activities to the information seekers engaged in said activities (3). But there is no suitable Newspaper Information Retrieval System that can retrieve information from these letters for retrospective as well as current use. It is felt that due to absence of proper organisation and control, the retrieval of information from these letters is being hampered and the study, research and application activities are affected by the same. It is evident from the above discussion that a Newspaper Information Retrieval System is necessary for organisation and control of these letters by which maximum number of information seekers can retrieve information from these letters (1).

Therefore, this project aims to design a prototype Newspaper Information Retrieval System for organisation and control of the "Letters to Editor" of newspapers. Besides, this project wishes to implement this Information Retrieval (IR) System on Internet based environment so that maximum number of users on global basis can get access to these information. Thus, it has been intended to design the IR System as HTML formatted web document.

Methodology

Since the number of letters to the editor of newspapers published even in a single newspaper is very large, a sample population is usually considered for any study. But as our purpose in this present context is to design a prototype Newspaper IR System on web as mentioned earlier, the letters of three newspapers, namely Ananda Bazar Patrika, Bartaman and Pratidin were considered. These papers were considered in view of the fact that these three are highly circulated Bengali daily newspapers published from West Bengal (6). However, because the number of letters appearing in these newspapers are also

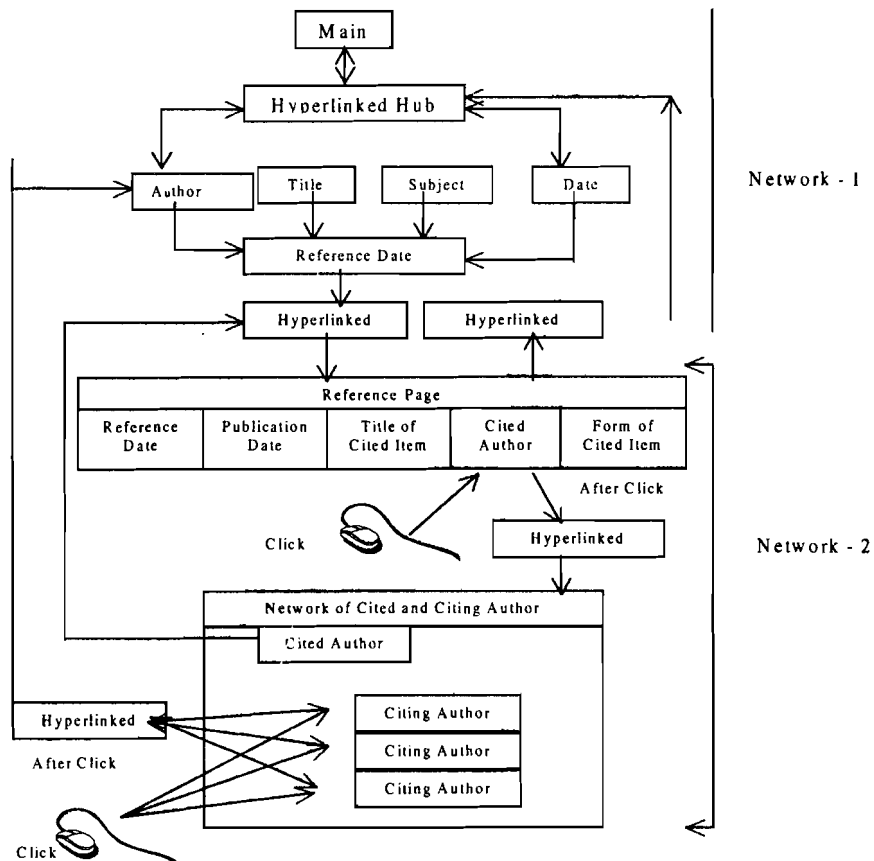
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very large, so a sample consisting of the letters appearing only in the month of December, 2000 were selected. It is to be noted that a total number of 124 letters were found from the sample mentioned above, out of which Ananda Bazar Patrika contributed 47 letters, Pratinidin contributed 43 letters and Bartaman contributed only 34 letters. Necessary and relevant data were collected from those letters.

The data so collected were organised and presented in the form of web pages keeping in view the objectives of the work. And thus, a prototype Newspaper IR System entitled 'LENET: Network of Letters to Editor of Newspaper' has been designed. 'LENET' is based on certain key elements which may identify and locate Item(s) entered into the network. All items are sorted according to certain fixed number of attributes which will uniquely identify the entry. In order to retrieve the desired Item(s) the network allows selection from the data Items like Author, Title, Subject and Date. In addition, this network provides a link of cited and citing author. All nodes in the network are hyperlinked allowing the users enough scope to navigate between the nodes. The network has been built as HTML formatted web document so that it may be available on internet. The methodology of the 'Design of Network' and 'Creation of Each Node' (2, 4, 5, 7) is as follows.

Graphical presentation of the structure of LENET



Network 1:

This network structure consists of the Main (Home) Page, Author Page, Title Page, Subject Page and Date Page. Each individual page is hyperlinked to each other. So, this is the Hyperlinked Hub. Each Reference Page as well as Network of Cited and Citing Author Page is connected to this hub. The structure of Network 1 is shown by the above diagram. The upper portion of the structure is indicated by Network 1.

Network 2:

It is found from the structure of the network that 'Network-2' consists of the Reference Page as well as the Network of Cited and Citing Author Page. Each individual Reference Page is designed for each cited item. Similarly each Network of Cited and Citing Page is developed for each cited item followed by citing item(s). Network 2 is indicated by the lower portion of the above diagram.

Details of Networks are as follows:

NETWORK - 1

2.1 MAIN NODE

Main Node is node which is connected by the other nodes directly or indirectly. It is found from the structure of LENET that almost all the nodes are connected with the main node. The Author Node, the Title Node, the Subject Node, the Date Node and also the Reference Node are connected with the Main Node. Only Network of Cited and Citing Author Nodes are connected with the Main Node indirectly through the Reference Node. The interlinking among the Author Page, Title Page, Subject Page and Date Page are shown by the Hyperlinked Hub. It is called 'Hub' because all the connections are joint in this station and connected with each other.

a1: Kind of Information

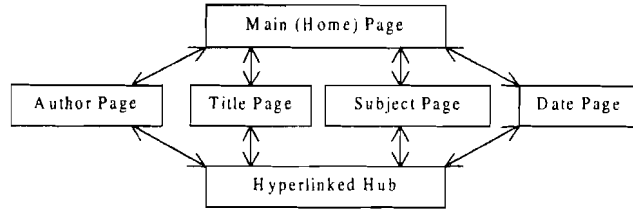
This web page is often used to refer to the first page in a collection of pages that make up a web site. Therefore this page acts as the table of contents for rest of the site. It is found from the structure of LENET that this Main (Home) Page contains Author Page, Title Page, Subject Page and Date Page.

a2: Organisation of node

The sequence of the contents of the Main Page are By Author, By Title, By Subject and By Date. It is followed neither alphabetical order nor chronological order.

a3: Links generation

The Main (Home) Page is hyperlinked with the Author Page, the Title Page, the Subject Page and also the Date Page. The structure Main Node is as follows:



*Selected Source Code for Main(Home) Page and display of Home Page are available in

ANNEXURE – A.

2.2 AUTHOR NODE

a1: Kind of Information

This web page contains list of Citing authors, Title of citing items, Subject of citing items, Reference date, Name of the newspaper and also the Date of publication. These are available in the following form.

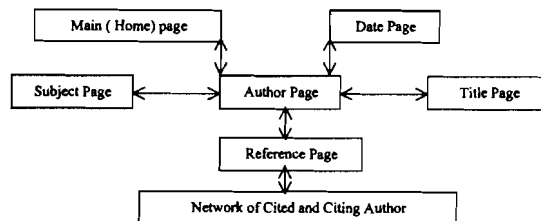
Citing author	Title of citing item	Subject of citing item	Reference date	Name of the newspaper	Date of publication

a2: Organisation of the nodes

List of authors are organised according to alphabetical order by surname.

a3: Links generation

This web page is hyperlinked with other pages such as the Title Page, Subject Page, Date Page, Main (or Home) Page and also with each Reference Page. Each Reference Page is also hyperlinked with corresponding Network of Cited and Citing Author Page. The structure of Author Node is as follows:



* Selected Source Code for Author Page and display of Author Page are available in ANNEXURE – B.

2.3 TITLE NODE

a1: Kind of Information

This web page contains list of Title of Citing items, Citing authors, Subject of citing items, Reference date, Name of the newspaper and also the Date of publication. These are available in the following form.

Title of citing item	Citing author	subject of citing item	Reference date	Name of the newspaper	Date of publication

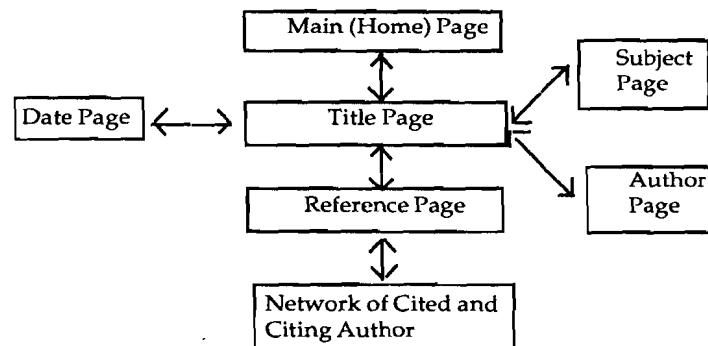
a2: Organisation of Nodes

The list of titles are organised according to alphabetical order. Title of citing items are available in English transliterated form. English translation of each title is provided with each transliterated title within circular bracket.

a3: Links generation

This page is hyperlinked with the Author Page, Subject Page, Date Page, Main (or Home) Page, and also the Reference Page. Each of the Reference Page is hyperlinked with the Network of Cited and Citing Author Page.

The structure of Title Node is as follows:



* Selected Source Code for Title Page and display of Title Page are available in ANNEXURE – C.

2.4 SUBJECT NODE

a1: Kind of Information

This web page contains Subject of citing item, Title of citing item, Citing author, Name of the newspaper, Date of publication and Reference date.

These informations are available in the following form

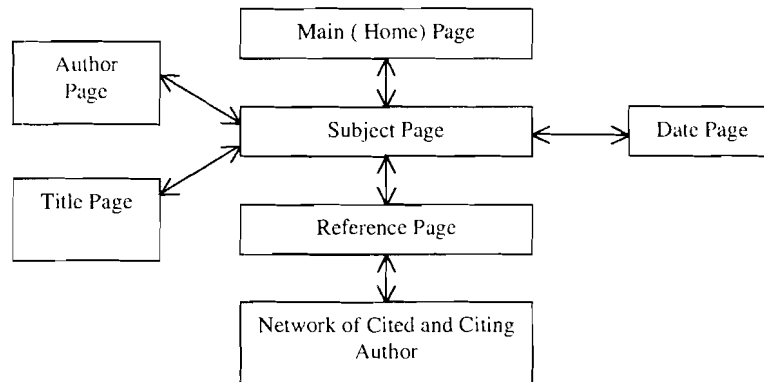
Subject of citing item	Title of Citing item	Citing Author	Name of the Newspaper	Date of publication	Reference Date

a2: Organisation of Nodes

The subjects are arranged according to alphabetical sequence.

a3: Links generation

This web page is hyperlinked with Author Page, Title Page, Date Page, Main (or Home) Page and also Reference Page. Each Reference Page is also hyperlinked with the corresponding 'Network of cited and Citing Author' page. The structure of Subject Node is as follows:



* Selected Source Code for Subject Page and display of Subject Page are available in ANNEXURE-D.

2.5 DATE NODE

a1: Kind of Information

This web page contains the following information:

Publication date, Name of the newspaper, Title of the citing item, citing author, Subject of citing item and Reference date. These information are placed in the following form.

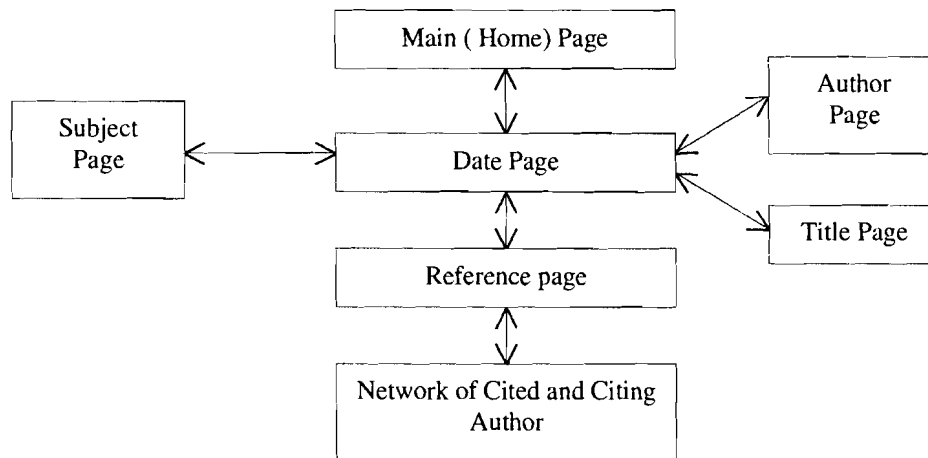
Dare of publication	Name of the newspaper	Title of citing item	Citing author	Subject of citing item	Reference date

a2: Organization of the Node

The list of Dates are organised according to chronological order.

a3: Links generation

This web page is hyperlinked with the Author Page, Title Page, Subject Page, Main (Home) Page, and also hyperlinked with the Reference Page. Again each of the Reference Page is also hyperlinked with the corresponding Network of Cited and Citing Author Page. The structure of Date Page is as follows:



* Selected Source Code for Date Page and display of Date Page are available in ANNEXURE – E.

NETWORK – 2

It is found from the structure of LENET that Network-2 consists of Reference Page and also Network of Cited and Citing Author Page. Reference Page is denoted by Node-5 and Network of Cited and Citing Author Page is denoted by Node – 6.

2.6 REFERENCE NODE

a1: Kind of information

This web page contains the information about the Reference date, Name of the newspaper, Date of publication, Cited author, Title of cited item, Form of cited item. These informations are available in the following form.

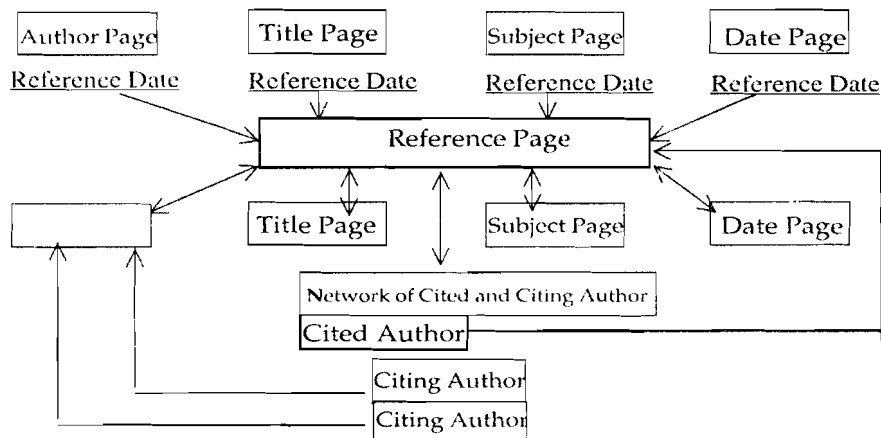
Reference date	Name of the newspaper	Date of publication	Cited author	Title of cited item	Form of Cited item

a2: Organization of the Nodes

This web page contains only single information of each item. So, it is not necessary to arrange.

a3: Links generation

This web page is hyperlinked with the Author Page, Title Page, Subject Page, Date Page, Main (or Home) Page and also with the Network of Cited and Citing Author page. The structure of Reference Page is as follows:



Selected Source Code for Reference Page and display of Reference Page are available in ANNEXURE – F.

2.7 NETWORK OF CITED AND CITING AUTHOR NODE

a1: Kind of Information

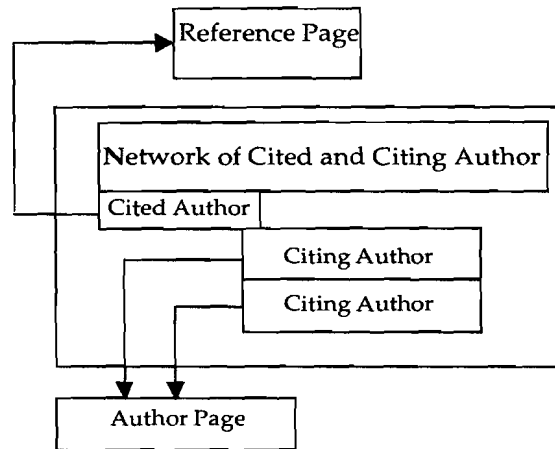
This web page provides information about Cited author and Citing author(s) only.

a2: Organisation of the Node

Each entry contains name of Cited author followed by the name of Citing author(s).

a3: Links generation

This web page is hyperlinked with the Reference Page as well as the Author Page. The structure of Network of Cited and Citing Author Page is as follows:



* Selected Source Code for Network of Cited and Citing Author Page and display of Network of Cited and Citing Author Page are available in ANNEXURE – G.

FINDINGS

In view of the purpose of the present work, a prototype Newspaper Information Retrieval System for organisation and control of "Letters to Editor" of newspapers as HTML formatted web document has been designed, the findings of which may be summarised as follows:

- a) it can be used as a traditional information retrieval tool like catalogue, indexes etc. for finding information from letters providing users approach by author, title, subject etc;
- b) it can be used to some extent as a citation index through the 'Network of Cited and Citing Authors';(8)
- c) it can be used as a current awareness tool for retrieving information from letters on recent events of local, national and international importance;
- d) it can be used as a tool for multidisciplinary literature search to get an overview on a particular subject field;
- e) it can be used by the researchers, mainly by the Social Scientists to determine

how an idea, event or opinion has been treated, used or criticized by others. Thus, it can be utilised to draw responses on various research questions;

- f) it can be used to identify persons working currently on special problem/ area or to determine whether an item has been cited;
- g) it can be used to trace the history of an idea or event;
- h) it can be used as a tool for evaluating letters, contributors etc.;
- i) it can be used as a tool for conducting impact studies on various issues and personalities;
- j) it can be used to determine and identify the citation practices of letter writers;
- k) it can be used as a tool to determine and identify the information seeking behaviour of the users (letter writers);
- l) it can be accessed by the users at remote places, if the system is being connected with Internet.

Based on experiences in designing this prototype Newspaper Information Retrieval System, it has been felt that these data may be organized in a database and HTML may be used as front end retrieval tool. And if the retrieval system is designed so, it may save time and labour without losing benefit of the present retrieval system.

CONCLUSION

Letters to editor of newspapers are considered as valuable sources of information. Information retrieval from these sources can be made only by building a Newspaper Information Retrieval System. This organisation of letters to editor of newspaper as HTML formatted web document is found to be an independent and fully integrated Newspaper Information Retrieval System. Further, it can perform important evaluative, analytical and predictive roles. Thus, it can be claimed as an effective library and information science tool. But it is to be noted that the sample taken for this project was very small in comparison with population. If the sample is taken a large, the validity of the findings of this present work can be justified on a firm basis. Further research may be conducted to prove the validity of the findings drawn by this research work.

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Leon Tech World; Chennai. 21.1-21.4, 21.14-21.17.

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ANNEXURE – A

[Source Code for Main(Home) Page of the network]

```
<html>
<head>
<title>LENET</title>
</head>
<body>
<center><h2><b>Display of Main(Home)Page of the Network</center></h2></b>
<center><h2><b>WELCOME TO<center><h2><b>
<center><h2><b>LENET<center><h2><b>
<center><h2><b>(NETWORK OF LETTERS TO EDITOR OF NEWSPAPERS)</center></h2></b>
<center><h2><b>INSTRUCTION FOR U</center></h2></b>
</pre><b>
```

Please click the following hyperlinks(where mouse pointer arrow sign changes to hand sign) to see information in the specified domain.Each link will take you in the respective domain where you will find another set of hyper-links for area related to domain. From every hyperlink you can move back to the home page by click the line “ Go TO MAIN “.Kindly Note that the Ananda Bazar Patrika has been abbreviated at ABP

```
</b></pre>
<b><center><h3><bg color="green"><a href="author.html">BY AUTHOR</h3></a></center></b>
<b><center><h3><bg color="green"><a href="title.html">BY TITLE</h3></a></center></b>
<b><center><h3><bg color="green"><a href="subject.html">BY SUBJECT</h3></a></center></b>
<b><center><h3><bg color="green"><a href="date.html">BY DATE</h3></a></center></b>
</body>
</html>
```

[Display of Main(Home)Page of the Network]

WELCOME TO LENET
(NETWORK OF LETTERS TO EDITOR OF NEWSPAPERS)
INSTRUCTION FOR U

Please click the following hyperlinks(where mouse pointer arrow sign changes to hand sign) to see information in the specified domain. Each link will take you in the respective domain where you will find another set of hyper- links for area related to domain. From every hyperlink you can move back to the home page by click the line has been abbreviated at ABP.

BY AUTHOR
BY TITLE
BY SUBJECT
BY DATE

ANNEXURE - B

[Selected Source Code for Author Page(first page) of the Network]

```
<html>
<title> By Author(alphabetical by surname)</title>
<b><center><h2>Display of Author Page of the Network </center></h2></b>
<center><h3><b>(Arranged alphabetically by surname of author)</center></h3></b>
```

<center><h3>SEARCH BY AUTHOR NAME BY USING CTRL+F KEYS</h3></center></pre>

Citing Author	Title of the Citing Item	Subject of the Citing Item	Reference Date	Name of the Newspaper	Date of Publication
Achariya, Santi Ranjan Institute of Cost and Works Account of India Employees Association	ICWAI: 'Nairajyer Abhiyog' (Institute of Cost and Works Account: Disorder Objection)	Education	24/11/2000	ABP	19/12/2000
Agasti, Sangram Dhalipara Road Behala Calcutta-60	Kendriya Sarkarer Niti (Education devastation law of central govt)	Education	Not available	Pratidin	04/12/2000
Alam, Samsual 03/12/2000 Baker Govt. Hostel CalCtta-13	Dharmanirapekhatar Artha Ki (What is secular?)	Religion	28/11/2000	Pratidin	
Ali, Mira Ashraph Ketugram, Burdwan	Daler Upare Manus satya (Men is over party)	Politics	9/12/2000	Pratidin	15/12/2000
Badruddin, S.M Advocate Krishnanagar Nadia	Muslim Bibaha (Muslim Marriage registration)	Law	2/12/2000	ABP	27/12/2000

<center><h3>By Title</h3></center>
<center><h3>By Subject</h3></center>
<center><h3>By Date</h3></center>
<center><h3>GO TO Main</h3></center>
</pre>
</body>
</html>

[Display of Author Page (first page) of the Network]

(Arranged alphabetically by surname of author)

SEARCH BY AUTHOR NAME BY USING CTRL+F KEYS

Citing Author	Title of the Citing Item	Subject of the Citing Item	Reference Date	Name of the Newspaper	Date of Publication
Achariya, Santi Ranjan Institute of Cost and Works Account of India Employees Association	ICWAI: 'Nairajyer Abhiyog' (Institute of Cost and Works Account: Disorder Objection)	Education	24/11/2000	ABP	19/12/2000

Agasti,Sangram Dhalipara Road Behala calcutta-60	Kendriya Sarkarer Siksha Dhansha Niti (Education devastation law of central govt)	Education	Not available	Pratidin	04/12/2000
Alam,Samsual Baker Govt. Hostel CalCtta-13	Dharmanirapekshatr Artha Ki (What is secular?)	Religion	28/11/2000	Pratidin	03/12/2000
Ali,Mira Ashraph Ketugram, Burdwan	Daler Upare Manus satya (Men is over party)	Politics	9/12/2000	Pratidin	15/12/2000
Badruddin, S.M Advocate Krishnanagar Nadia	Muslim Bibaha Nathibhukta (Muslim Marriage registration)	Law	2/12/2000	ABP	27/12/2000

By Title
By Subject
By Date
GO TO Main

ANNEXURE - C

[Selected Source Code for Title Page (first page)of the Network]

```
<html>
<head>
<title>By Title</title>
</head>
<body>
<h2><b><center>Display of Title Page of the Network</center></b></h2>
<h3><b><center>(Arranged alphabetically)</center></b></h3>
<h3><b><center>SEARCH BY TITLE BY USING CTRL+F KEYS</center></b></h3>
<pre><b>
```

Title of the Citing Item	Citing Author	Subject of the Citing Item	Reference Date	Name of the Newspaper	Date of Publication
1. Banker Grahak 19/12/2000 Parisebar Man (Bank Customers' Service standard)	Satyen Debroy Member, Hooghly Chuchura Grahak Pariseba Samiti, Hooghly	Banking Service	Not available		Pratidin
2. Chhai Samasya: 13/12/2000 Kichhu Samadhan (Ash Problem)	Subrata Pal Salbani Bankura	Air Pollution	Not available		Pratidin
3. Ritimata Jibanta 2000 (Absolutely Living)	Achinta Biswas Jadavpur University	Industry	11/11/2000	ABP	04/12/

Dept. of Bengli

4. Sab Dal E Pranta Gupta Politics 26/11/2000 Bartaman 17/12/2000
 Sampradayik, Calcutta-29
 Dosh Hay Shudhu
 BJPir
 (All parties are Communal,BJP Blamed only)
5. Sukantar Janmasthan Sajal Roychoudhuri Biography 27/11/2000 ABP
 04/12/2000
 (Birth Place of Cal-90
 Sukanta)

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[Display of Title Page(first page) of the Network]

(Arranged alphabetically)

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1. Banker Grahak Parisebar Man (Bank Customers' Service standard)	Satyen Debroy Member, Hooghly Chuchura Grahak Pariseba Samiti, Hooghly	Banking Service	Not available	Pratidin	19/12/2000
2. Chhai Samasya: Kichhu Samadhan (Ash Problem)	Subrata Pal Salbani Bankura	Air Pollution	Not available	Pratidin	13/12/2000
3. Ritimata Jibanta (Absolutely Living)	Achinta Biswas Jadavpur University Dept.of Bengli	Industry	11/11/2000	ABP	04/12/2000
4. Sab Dal E; Sampradayik, Dosh Hay Sudhu BJPir (All parties are Communal,BJP Blamed only)	Pranta Gupta Calcutta-29	Politics	26/11/2000	Bartaman	17/12/2000
5. Sukantar Janmastan (Birth Place of Sukanta)	Sajal Roychoudhuri Cal-90	Biography	27/11/2000	ABP	04/12/2000

By Author
 By Subject
 By Date
 GO TO Main

ANNEXURE - D

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Subject of the Citing Item	Title of the Citing Item	Citing Author	Name of the Newspaper	Date of Publication	Reference Date
Agriculture 11/2000	Tulo Chasir Sankat (Dilemma of Cotton Farmer)	Sankar Ghosh Harba 24-Paragana (N)	ABP	07/12/2000	28/
Air Pollution 11/2000	Dusan:Amara O Atistha (Pollution:We too affected)	Tapan Kumar Jana Howrah-9	ABP	26/12/2000	03/
Air Pollution 11/2000	Dusan:Amara O Atistha (Pollution:We too affected)	ShriKrishan Das Cal-34	ABP	26/12/2000	03/
Air Pollution	Chhai Samasya: Kichhu Samadhan (Ash Poble: Some Solutions)	Subrata Pal Salbani Bankura	Pratidin	13/12/2000	Not available
Biography 11/2000	Sukantar Janmasthan (Birth Place of Sukanta)	Sajal Roychaudhuri Cal-90	ABP	04/12/2000	27/

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(Arranged alphabetically)
SEARCH BY SUBJECY BY USING CTRL+F KEYS

Subject of the Citing Item	Title of the Citing Item	Citing Author	Name of the Newspaper	Date of Publication	Reference Date
Agriculture 2000	Tulo Chasir Sankat (Dilemma of	Sankar Ghosh Harba 24-Paragana		ABP	07/12/2000 28/11/

Air Pollution 11/2000	Cotton Farmer) Dusan:Amara O	(N) Tapan Kumar Jana	ABP	26/12/2000	03/
	Atistha (Pollution:We too affected)	Howrah-9			
Air Pollution 03/11/2000	Dusan:Amara O	ShriKrishan Das	ABP	26/12/2000	
	Atistha (Pollution:We too affected)	Cal-34			
Air Pollution Not available	Chhai Samasya:	Subrata Pal	Pratidin	13/12/2000	
	Kichhu Samadhan (Ash Poble: Some Solutions)	Salbani Bankura			
Biography 27/11/2000	Sukantar Janmasthan	Sajal Roychaudhuri	ABP	04/12/2000	
	(Birth Place of Sukanta)	Cal-90			
		By Author By Title By Date Go TO Main			

ANNEXURE - E

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Date of Publication	Name of the News Paper	Title of the Citing Item	Citing Author	Subject of the Citing Item	Reference Date
01/12/2000	Bartaman	Gota Samajke Kathgaray Tola Bodh Hay Uchit Habe Na (Not to blame the doctor fully)	Krishnendu Mukharjee 26,Bidhan Street	Public Health and Sefety	Not available
01/12/2000 	Pratidin	Musalman Sampraday O OBC (Muslim Community and OBC)	Satyapriya Nandi 86/1 South Baksara Howrah	Muslim	20/11/2000
01/12/2000 11/2000	Pratidin	Swagatam Durniti Birodhi Abhijan	Safikur Rahaman Khan Ketugram,Burdwan	Criminology	20/11/2000

(Welcome the expedition against Corruption)

02/12/2000 Pratidin Railer Pad Tule P.K. Thampi Employment 24/11/2000

Deoyar Khabar Information Officer
Vittihin Rail Authority
(False reports of Delhi
Removing Railway Post)

03/12/2000 Pratidin Ramkrishner Janmadin Amrendranath Biography 11/11/2000

Jatiya Chhuti Nay Kena Bardhan
(Ramkrishna's Netaji Nagar
birth Day Why Cal-92
Not a Natinal holly Day)

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[Display of Date Page(first page) of the Network]

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SEARCH BY DATE BY USING CTRL+F KEYS

Date of Publication	Name of the News Paper	Title of the Citing Item	Citing Author	Subject of the Citing Item	Reference Date
01/12/2000	Bartaman	Gota Samajke Kathgaray Tola Bodh Hay Uchit Habe Na (Not to blame the doctor fully)	Krishnendu Mukharjee 26,Bidhan Street	Public Health and Sefety	Not available
01/12/2000	Pratidin	Musalman Sampraday O OBC (Muslim Community and OBC)	Satyapriya Nandi 86/1 South Baksara Howrah	Muslim Reservation	20/11/2000
01/12/2000	Pratidin	Swagatam Durniti Birodhi Abhijan (Welcome the expedition against Corruption)	Safikur Rahaman Khan Ketugram,Burdwan	Criminology	20/11/2000
02/12/2000	Pratidin	Railer Pad Tule Deoyar Khabar Vittihin (False reports of Removing Railway Post)	P.K. Thampi Information Officer Rail Authority Delhi	Employment	24/11/2000

03/12/2000 Pratidin Ramkrishner Janmadin Amrendranath Biography 11/11/2000
 Jatiya Chhuti Nay Kena Bardhan
 (Ramkrishna's Netaji Nagar
 birth Day Why Cal-92
 Not a Natinal
 holly Day)

By Author
 By Title
 By Subject
 Go To Main

ANNEXURE F
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of	Date	Newspaper	Date	Author	of	of
Cited					Cited	Cited
Item					Item	Item

18/11/2000 Bartaman 16/12/2000 [Ghoshal Jayanta](c14.html) Politics Mamatar
 Rajnitiir Essay
 Chamak,
 Muslimder Jay
 karite Sanrankshan
 (Mamata
 for Muslim
 reservation)

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<a href="date.html">By Date </a>
<a href="author.html">By Author</a>
<a href="title.html">By Title </a>
<a href="subject.html">By Subject</a>
<a href="main.html">Go To Main </a>
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[Display of a sample Reference Page]
 Reference Page

Reference	Name of the	Published	Cited	Subject	Title	Form
Date	Newspaper	Date	Author	of	of	of
				Cited	Cited	Cited
				Item	Item	Item
18/11/2000	Bartaman	16/12/2000	Ghoshal Jayanta	Politics	Mamatar Rajniti	Essay
			Chamak	Muslimder Jay		

karite Sanrankshan

(Mamata

for Muslim
reservation)

By Date
By Author
By Title
By Subject
Go To Main

ANNEXURE G

[Source Code for a sample Cited Citing Author Page]

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center>
<body><head><h2><b><center>NETWORK OF CITED & CITING AUTHOR</h2></head></b></center>

<pre><b>
                <a href="18nb1.html">Ghosal Jayanta</a>

                <a href="author.html">Kanungo Mihir</a>
                <a href="author.html">Dhar Santi</a>

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</body>
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[Display of a sample Cited and Citing Author Page]

NETWORK OF CITED & CITING AUTHOR

Ghosal Jayanta

Kanungo Mihir

Dhar Santi