RILSAR Bulletin of Information Technology 9 (1- 4), January-June, 1994.

Cost Benefit Analysis of College Library Automation

R. Raman Nair

1. Introduction

Library and information service in the college is a very important constituent that determine the quality of academic activities going on there. Presently our college libraries are not in a position to fulfill their important objective due to various reasons. In a study carried out recently the problems of our college libraries were listed as; lack of good library policy, high rate of unplanned growth, irrelevant collections, poor organization of materials, high cost of collection and storage, unqualified staff, inefficient retrieval systems, diversion or unscientific use of funds etc. Our 'college libraries lack reliability in giving teachers and students the information support they require. Despite the wide-spread awareness of the importance libraries, they remain the most disregarded division in colleges.

It is against this background that we have to plan the future. We do not nave a base required for providing services of a minimum required quality. What we are having in colleges is large quantum of learning materials mostly remaining un catalogued and unclassified looked after by manpower brought up in a tradition of mere custodianship. Revitalization of college libraries has become urgent in the fast changing technological and educational scenario. This paper is an attempt to check how far and in what aspects the computer technology can be used by colleges to strengthen its library facilities to enable improved utilization of information by teachers and students.

1.1. Methodology

This study takes the library of one of the biggest colleges in the State as sample. Evaluates the system in its historical perspective and present status. While discussing the state of each subsystem of the library the paper discusses in comparison the manual techniques, and possibilities offered by computers for operating/improving concerned sub system. Examines how far automated methods can be used for vitalizing such a library at less cost and in a prescribed time limit to provide efficient information support required for teaching learning process in the college.

1.2. Sample System

The college selected as sample; originally a school for Christian girls was opened to all castes and creeds by the Travancore Government in 1864 and in 1897 it became the Maharaja's College for Girls. The college became a postgraduate institution in 1968. Today this college has 22 subject departments, more than 200 teachers and 4300 students on its rolls. It offers all optional subject groupings allowed by the Kerala University. The college is also a Research Centre allowing facility for PhD for many subjects of the Kerala University. In 1993 the Government declared the college as a Centre of Excellence. The evaluation of its library system' and its development and its reorganization for effectiveness can serve as a model for other colleges also.

Up to nineteen forties the college was headed by very famous teachers like Ms. D H. Watts and Ms. F E. Gross who came here with their training and experience from universities of Oxford, Cambridge etc. They were very much aware of the role that students' own exploration of the subject has to play in education and during their period the library remained the most important department of the college. It was well cared. When the college shifted to its present campus in 1923 the most inviting building; old Durbar Physician's Bungalow in the campus was marked for the library by the then Principal Ms. D H. Watts. It consisted of a reading room, which could comfortably seat 100 teachers and students at a time and a stock room, which could stock 75000 volumes. The library reading room and stock room were well ventilated with beautiful arched doors and windows. Tables, chairs, bookshelves and other library equipments as per the standards and specification prevalent in U.K. at that time were provided to the library. Staffs with good academic records only were posted to head the library.

The library records reveal that everything was highly systematic and efficient till the end of the nineteen forties. At that time when scientific cataloguing procedures were yet to be introduced in India this library maintained a catalogue with cards and cabinets prepared according to specifications used by British National Library. These catalogues were not updated since nineteen fifty and were kept away from, use and got destroyed. Later unplanned collection development resulted in dumping irreverent materials and shelves in haphazard manner and also in the loss or destruction of old and rare items due lack of care. The efficiency of the system deteriorated and services came down to mere lending of light reading materials, text books and providing newspaper and periodical reading facilities. Staff with inferior qualification was posted to head the library. Professional staff strength found no increase

The following is a detailed examination of the existing system and services with the view that computers can be used to revitalize the system in a short period to bring the library into live academic environment without taking much time.

2. Library Management

For the use of computers in the functioning of college library a qualified and competent librarian is essential. The librarian should have the minimum qualifications prescribed by University Grants Commission. Additional training and updating of his/her knowledge of computers and currently used library software is to be provided by the college. INSDOC, NICNET, KAU IITs etc are conducting various short term courses that can create capability in the librarian to manage automated library systems. Approximate one month's training cost will come to Rs. 10000.

By library automation, management information for the librarian, which has earlier been characterized by disparate sources presented in a variety of incompatible formats, will become a sophisticated and integrated support system. Establishment of an Automated Library system will require purchase and installation of computer and communications stacks consisting of servers, workstations, switches/hubs, cabling, system and application software. Library application software has been developed and distributed by many commercial firs as well as government organizations like INFLIBNET, NISSAT, INSDOC etc. Approximate cost implementing a Library Network meant for the functioning of different sections of the library as well as for users to access services is provided in Table -1.

Table 1: Cost of Installing a Library Network of Minimum Configuration

	Item	**Cost Rs.**
a	Server	90000
b	132 column printer	27500
c	CD ROM Tower for 100 disks	140000
d	UPS etc.	25000
e	Terminals for users 10	210000
f	furniture and other items	50000
f	Software	160000
g	Cabling/ installation Charges	10000
h	Training	10000
	Approximate cost of installing a computer system.	**722500**

A library network with a server and ten work stations and a CD Tower connected to it will provide 10 terminals of which three can be reserved exclusively for administration/circulation/database development work. The remaining seven systems can be used commonly for office work as well as users access to services/information. The reference collection built up in electronic media also can be kept in the CD Tower and made accessible to staff and users.

3. Acquisition System

Quality of library and information services given in a college depends on the quality of collection that is there in the college library. The college has at present a collection of about 70000 books the approximate cost of which comes to Rs. 2.10 crore. But even five percent of the collection is not relevant or useful to satisfy the day-to-date requirements of students and teachers. The collection lack popular encyclopedias, dictionaries etc. But consists of thousands of textbooks that have gone out of syllabus in dozens of copies, which were of no interest, or use in the context of information services in a college. Even though these duplication and entry of obsolete material has occurred due to a wrong acquisition policy, the role of the lack of a catalogue or database of available materials and resultant in inefficiency of acquisition system in duplicate checking cannot be disregarded.

An efficient book acquisition system in a college should collect information about new publications relevant to the college, classify this information according to subjects and transfer that to concerned subject departments for comments. The titles also should be checked with the catalogue or database of the available titles and the current order file in order to ascertain that the items are not available in the library and that they are not already ordered. The acquisition system should also keep full details of vendors, files of subject interests of the colleges and should be able to create purchase orders and chase the vendors with ease. Using a manual system for all these procedures will require additional staff for which there is no provision at present. So Library automaton can enable computerization of this aspect also and undertaking the above mentioned responsibilities without additional staff.

3.1. Stock Records

As librarian will be responsible for the stock *of* the library. The loss of stock is the only failure for which librarians will be forced to compensate in the existing library environments. Unsystematically maintained stock records of the library consume most of the productive time of the librarians by occupying time for stock verification and related works. The stock records prepared after 1958 by the library under review is improper and highly confusing. The library has used more than ten independent sequences of stock numbers. This creates the possibility for more than ten books with the

same stock number occurring in the collection. Most of the books entered into stock after 1958 contains more than one stock number recorded in the same book; marked by various sections or departments to which the book was transferred. All these make speedy and foolproof stock management/verification work impossible. Every year and also during the joining and relieving of librarians which occurs once in three or four, years the services from the library gets affected due to the need for stock verification. Correcting these errors in stock records and books will require the verification of books with more than ten sequences for each title. Reaching the possible position of a book in the written records is difficult, time consuming and it will take years for correcting these records and markings in the books.

Stock registers of books are also in a badly worn out condition. The pages have become weak for handling due to continuous use and many pages remain broken into pieces and missing in full or part. Copying the stock registers with details of the acquired 70000 books is very important to make sure the safe custody of stock and also its foul-proof verification. So stock records needs to be duplicated and perfected. An n easy stock management/verification system is to be introduced to enable the utilization of limited staff time available properly for information services. A comparative assessment of the work load for duplicating stock records using manual and automated methods is provided in Table -2.

Table 2: Estimate of Work for Duplicating Stock Records

	Item of Work	**Manual**	**Automated**
a	Number of entries to be Copied from stock registers	70000	70000
b	Number of entries that can be copied by a staff per day with necessary corrections etc.	60	240
c	Staff Members required to complete the work in one year	4	1

The comparison shows that manually duplicating the registers will be time consuming unless sufficient staff is posted. Comparative estimate of cost for duplicating stock records using manual and automated methods is provided in Table -3.

At an approximately 27% of the amount required for manually preparing stock records a stock register can be generated using the computer. As per the present rules staff required for manual processing will not be available to the college also.

Table 3: Estimated Cost for Duplicating Stock Records

	Item of Work	Manual Rs.	Automated Rs.
a	Salary of 4 staff for one year at Rs. 1800/- per month for manual ; and one staff for one year at Rs. 2000/- per month – for one year	86400	24000
b	Stationeries	14000	3500
	Total cost for duplicating stock records.	**100400**	**27500**

It is essential to implement a more cost effective method for duplicating and maintaining stock records. While the library gets computerized it has to create a database of the materials availab1e in the library. Fields from this database can be used for examining and correcting the improper book numbers allotted to the items stocked in the library. In automated system computers with barcode systems and scanners can also be used for annual stock verification with speed and efficiency.

Accessioning the item by transferring the order file to the accession file with additional information required is possible. Instead of manually duplicating the earlier stock registers; from the data of available materials fed into the computer for automating library functions; print outs of stock registers can be generated. Registers of newly accessioned books also can be printed with ease.

4. Classification and Cataloguing

All the 70000 books stocked in this college remain unclassified. Completing the work using traditional methods and one professional staff fully devoted to this work will take decades for its completion. With support of computers one or two professionals can clear this work within a very short period. The materials acquired in future also can be classified immediately after their receipt using the computer systems installed.

All the 70000 books acquired by the college also need to be catalogued. Cataloguing them is essential to know what book is available in the college and where. Only if a complete catalogue of books is available the library can satisfy the various approaches through which teachers and students seek books. To utilize the book fund effectively by avoiding duplication and acquiring materials related to the subject gaps in the library a catalogue is unavoidable. Without a catalogue that could satisfy author, title and subject enquiries; tracing out a book asked for will be impossible and the collection will remain unused.

Clearing off this pending processing work within a time limit is essential to make every available book easily accessible to teachers and students.

4.1. Estimate of Work and Cost

The estimated classification and cataloguing work that is pending and a comparative estimate of manpower required to complete the work using manual and automated method is provided in Table-4.

The estimated cost for completing the work in one year by manual methods in comparison with automated methods is provided in the following Table -5.

Table 4: Estimated work for Classification/Cataloguing

	Item of Work	**Manual**	**Automated**
a	Number of books to be catalogued and classified	70000	70000
b	Number of books a professional can process per day	10	1166
c	Years with 290 working days required to complete the work by one professional staff = 70,000/ (10 x 290 x 1) manual and 70,000 /60 computerized	24	1
d	Number of professionals/required to complete the work in one year = 70,000/ (10 x 290 x 1 x 1).	24	1

Table 5: Expected Cost for the Work Using Manual Methods

	Item of Work	**Manual Rs.**	**Automated Rs.**
a	Salary for 24 professionals for 1 year (Manual) 4 staff for four staff for one year at Rs 2500 per month (automated).	720000	120000
b	Cost of catalogue cabinets, cards, indexing slips, and other stationeries(Manual) Computer stationeries	99500	3000
	Total Processing Cost	**819500**	**123000**

By using computers a savings of approximately Rs. 696500 is possible that is at 15% of the cost of using manual methods the cataloguing and classification backlog work can be cleared by applying computers. Using manual methods can take years and huge quantum of labor to complete the work. The work can be automatically cleared at less cost and time using computers.

5. Circulation System.

The circulation system existing in the college cannot efficiently control the issue and return of books for the approximately 4000 users, that the college library will have every year. Issue records of live

users of a time runs through hundreds of volumes of issue registers. For charging and discharging, sending timely reminders for books that are due from users, and for preparing annual dues reports, huge quantum of stationeries, staff time and resources becomes essential. The comparative assessment of work for developing a system for circulation by manual and automated methods is given in Table-6.

Table 6: Work Estimate for Developing Circulation System

	Item of Work	Manual	Automated
a	Books to be prepared (for circulation)	70000	70000
b	Books that a staff can prepare by pasting labels, pockets etc.	80	80
c	Years required to prepare 70,000 books by three staff = 70,000/ (8O x 290 x 3)	1	1

An efficient circulation system has become urgent. Using manual systems like Browne or Newark to control the issue and return of books in such a big college library is not advisable. Alternative is computerized circulation system. The cost comparison for developing an automated circulation system using manual and automated methods is provided in Table -7.

Table 7: Cost for Developing Circulation System

	Item of Work	Manual Rs.	Automated Rs.
a	Salary of three (Manual) unskilled staff for one year one (Automated) at Rs.1200 per month.	43200	14400
b	Cost of book plates, book pockets, due date slips, book cards etc.	70000	23000
c	Cost of borrowers tickets for 4200 users (recurring)	12600	12600
	Total cost for introducing a manual Circulation System	**125800**	**50000**

At 40% cost of manual system an automated system can be established. There is a savings of approximately Rs. 75800 in using automated methods for starting a Circulation system. Considering the limited staff and resources that will be available and the need to computerize other operations automated circulation system will be more cost effective and efficient.

6. Serials Management

The college at present subscribes to only less then a hundred periodicals and newspapers and is supplied by local vendors. The college uses registers for recording the receipt of these items. There is no foolproof system for watching the receipt of all issues, sending reminders for issues not received etc. But the college being a centre for research; when the library services are vitalized according to the

needs of the users it will become essential for subscribing to a minimum number of journals on all subjects taught in the college. To ensure the availability of what is actually required; library will have to subscribe to many journals directly from publishers or their authorized distributors established at different far away places in or outside India. A computerized system can efficiently control the recording of receipt of journal issues, sending reminders for issues not received, renew subscription in time, and maintain details of completed volumes sent for binding etc.

7. Reference Se rvice

At present the collection lacks sufficient source materials for providing different kinds of reference service that will be essential in the environment of a college supporting postgraduate studies and research. So as a part of library revitalization projects a good reference collection consisting of popular dictionaries, encyclopedias, handbooks, yearbooks etc. needs to be acquired. The reference collection of a library is normally built up by the effort and funds of many years. But here due to unscientific collection development methods a reference collection as required has not come into existence. For example the Mc Graw Hill Encyclopedia of Science and Technology which is a basic reference source for which there is no alternate source is not available in the library. Even a Standard English Malayalam Dictionary is not available. A Gazetteer or manual related to the region for example Trvandrum is not available in the collection. The acquisition of materials required for a basic reference collectio n at one instant will be very costly and no college can afford that. But if the library is getting computerized general reference sources or specialized sources in subjects of interest to the college can be acquired for the reference section in non-print mediums at 50 to 75% less cost than in printed material. Building up a select reference collection of approximately 1000 very essential titles as print version only as well as print and digital versions is given in the Table -8.

Table 8: Cost of Improving Reference Collection

	Item	**Print Rs.**	**Hybrid Rs.**
a	Cost of acquiring essential reference sources that library lacks -700 titles.	2100000	700000
b	Reference sources not available in non print mediums. Approx 300 titles	1500000	1500000
c	Cost of technical processing of the documents.	10000	10000
	Total cost in building up a collection of basic reference sources.	3610000	2210000

There is a savings of Rs. 14 lakhs that is approximately 39% of developing printed collection in using computer readable media also for reference collection. Computerized library can provide all types of reference service with speed and efficiency. The same encyclopedia can be used by more than one student at a time subject to the availability of more access terminals in the library network.

8. Cost-benefit Analysis

The evaluation of the Library of the Government Women's College shows that it requires a total reorganization and need based further development if it is to provide any kind of information services required for teaching learning process in a college. All essential subsystems should be reformed. Any lacking subsystem should be established and their function should be clearly defined.

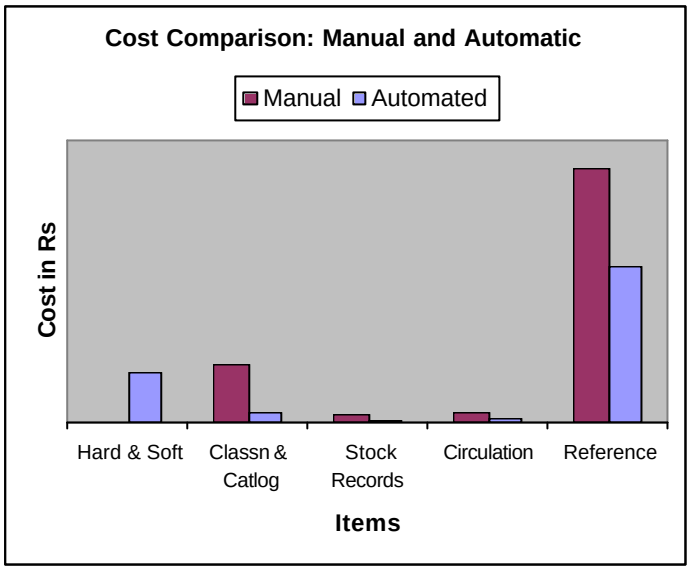
All the arrears of technical processing works accumulated during the last five decades require to be cleared off within a fixed time span say two years. Only after that the library services will become reliable and efficient.

Cost assessment for clearing the pending processing works and revitalizing library services using manual and automated systems have been assessed and the estimates are given in the following Table.

Table 8: Cost Benefit Analysis of Manual and Automated Methods

	Item	**Manual Rs.**	**Automated Rs.**
1	Hardware & software		722500
2	Classification & Cataloguing	819500	123000
3	Stock Register Duplicating	100400	27500
4	Circulation System	125800	50000
5	Reference Collection	3610000	2210000
	Total	4655700	3133000

Infusing into a long existing unscientifically developed system bare minimum efficiency in the traditional way, can cost approximately Rs. 4655700 (Rs. Forty six lakhs fifty five thousand and seven hundred rupees). It is not a considerable amount when we compare it to the expenditure of ten to twenty lakhs annually spent on staff and materials of the college and an amount more than hundred times of that which already has been spent for establishing the facilities for the system and for building up irrelevant inefficient resources. So if barriers exist or much delay is expected for automating the library system; going in for manual methods also is to be considered. If we can go for automated methods the system can be revitalized for less than **Rs. 32 lakhs.** A comparison of cost for different aspects of reviving the library system using manual and automated methods is graphically provided in the following Chart. There is a 33% cost reduction than that is required in a manual system. The amount is also very near to the annual expenditure for the college library. The return is extracting the full utility available and proposed additional resources.



In cataloguing and classification system there is an approximate savings of 85% can be achieved by using computers. These huge costs that occur in traditional systems; we meet unaware of what is actually happening. But when it comes to the installation of a computer system even though the cost is very less compared to manual systems our mind can not get adjusted to approve that.

This evaluation covers only few important library sub systems. The cost assessment is also based on situation prevailing in the college taken as sample for study. So cost may vary according differences in library situations and availability of manpower, machine, service centers and other conditions existing in different regions.

Any how it is a fact that automation can give 25 to 80 percent cost reduction in many library operations especially in rejuvenating inefficient systems.

In the existing college environment; with available finances and limitations the manual system will never complete the pending works or extract even the minimum utility of any material already collected. So using Computers is advisable to clear the pending works and make the college library capable to provide the information services expected from that in the teaching le arning process of the institution. .

9. Conclusion

The evaluation of the existing system and the comparative assessment of efficiency and cost of manual and automated library development projects examined in this study reveal the cost

effectiveness and speed of using computers in library reorganization, functioning and provision of services. Basic requirement of acquiring and installing computer systems and network is a one time investment only. By this library will get computer systems, which can be used for automating all library operations and services without any extra cost. The systems also can be used for accessing information from external sources online as well as starting new services.

References

1. Beeker, Joseph. Libraries, Society and technological change. Library Trends, Vol.27, No.3, 1978.

2. Chandrasekhar, P. Computerized Information Systems -In Proceedings of the Symposium on Bio-Electronics. Ahmedabad, IETE, 1976.

3. Dubey, Yogendra P. Computer and Telecommunication technology: A state of the art. Advances in library and information science. Ed by Sharma and Ojha, Jaipur, RBSA, 1988.

4. Gillman, P. and Peniston, S. Library automation: A current review London, ASLIB, 1984.

5. Joy, V P., Report of the Expert Committee on college libraries. Trivandrum, Govt. 1994.

6. Kumar, P S G. Computerization of Indian libraries, Delhi, BR, l987.

7. Lovely, Ian. Automating library procedures: A survivor's handbook. London, LA, 1984.

8. Nath, P. Computer and information work today. PLIS, Vol.4,1983.

9. Prasad, H N. and Mishra, V.K Information technology: Major technological developments and their impact on libraries. PLIS. Vol. 4, 1983.

10. Rajagopalan, T S. Computer application in library work. Library Automation. Madras, MLA.1986.

11. Raman Nair, R. College libraries and the process of education. International Lib Movement, Vol. 12 (3) 1990.

12. Sewa Singh. Reference Service and automation. Lucknow Librarian, 15 (4), 1993.