DETERMINING PRIORITIES FOR COMPUTERISATION IN LIBRARIES

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Availability of fairly advanced micro-computers and application softwares at affordable prices is now encouraging libraries to introduce computerisation in various services and in the management of house-keeping activities. A major problem faced while undertaking the computerisation, especially by large libraries, concerns deciding the sequence of activities to be computerised so as to satisfy the expectations of various groups working in the library. This issue is addressed here by an application of the Interpretive Structural Modelling method to determine priorities among numerous areas of work in the library of the University of Bombay.

INTRODUCTION

The capacity to store a large volume of information in a cost effective manner combined with accuracy and consistency in processing and efficiency in the retrieval of desired information have made computer an essential tool for library management. With rapid advances in computer and telecommunication technologies, the power of older generation mainframe computer systems is now available in the micro-computers at a price affordable to even small organisations. No wonder, libraries of all sizes are attempting to computerise many of their activities. Realizing these possibilities, a few suggestions are made here in regard to the introduction of computer based operations and services in different libraries in the country and linking them to form a network in future [1]. However, there cannot be a computerisation plan universally applicable to all the libraries. The developmental stage of a given library, generally, guides this process of computerisation.

The promise of computer technology raises the expectations of all those connected with a library. For example, the different user groups want more extensive services, professional staff members expect shift in work load, management and authorities see it as an instrument to tone up the administrative control and so on. It is obvious that taking up simultaneously all such activities for computerisation is not possible in practice. Therefore, it becomes necessary to determine priority among various activities so that the demands are met reasonably. In a library situation, the task of deciding priority should generally not be entrusted to a single person because the resulting ranking may prove to be lop-sided and resented by other colleagues whose co-operation is crucial for the successful and meaningful computerisation. What is needed is consultation among all the groups to arrive at a plan reflecting the collective thinking and viewpoint.

Developments in operations research/management offer a number of interactive methods which combine the subjective judgement of multiple groups with appropriate analytical techniques to derive priorities for the given set of objectives or activities [2], [3]. One among these is the Interpretive Structural Modelling (ISM) method which is presented in this paper in the perspective of its application for determining priorities for computerisation of various areas in the library of the University of Bombay.

THE UNIVERSITY LIBRARY SCENARIO

The library of the University of Bombay is a large academic library of more than one
hundred year's standing. The document collection is spread in the libraries at Fort, Churchgate and Vidyanagari, Santacruz (East). The collection comprises books (exceeding 6,00,000), rare books (10,000) manuscripts (9,000), theses (20,000) and non-book materials (1,800). The library receives more than 1,200 serials and has a huge stock of back-volumes. It is also a depository library for publications of the United Nations and World Bank. Yearly addition of books to the library is of the order of 12,000. The library is serving more than 16,000 users comprising post-graduate students, research scholars, teachers from the University Departments and affiliated Colleges and workers in other walks of life. The library services and house-keeping tasks are managed by the total staff of 110 out of which the professional staff numbering 46 is organised in different sections.

Continuous growth in library material and increasing number of users making a variety of demands were the factors which led to the idea of computerisation of certain work areas. It is clear that a very large computer system is needed to cope with the volume of material in the Bombay University Library. The amount of financial resources and trained manpower necessary to operate such a system are simply not available with the University. It was, therefore, decided to follow the 'incremental' approach i.e. to start with a microcomputer system and general purpose applications softwares to cover a few library areas, train the professional staff and, most importantly, to introduce a new work culture consonant with the computer induced changes and then expand in terms of a bigger system and/or networking.

The credit for the development of ISM method goes to Warfield [6] and it has been applied in a number of real life situations. [7], [8], [9], [10] & [11].

The following steps describe the method:

i). Identification of activities, say A1, A2, ...An among which priorities are to be determined.

ii). construction of an appropriate contextual relation, say 'R', to compare any two activities at a time. For example, A1 “is less important than” A2, A1 “is more useful than” A2 or A1 “does support” etc.

iii). Comparison of each activity with all the remaining activities using the above contextual relation to generate a comparison matrix. It means that if the answer to the question “Is A(I) more important than A(J) ?” is “yes”, then value 1 is entered in the (I,J) cell of the matrix, otherwise, the value entered is 0; this process is continued to cover all the activities.

iv). Construction of a directed graph (di graph) establishing structural relationship among the activities on the basis of the comparison matrix.

v). Modification of the comparison matrix if review of the digraph indicates any glaring inconsistency.

PRIORITY STRUCTURE FOR LIBRARY AREAS

The University Librarian and his professional staff participated in the process of deciding the sequence of areas to be taken up for computerisation, using the ISM method. The method was initiated by examining all the major activities of the library and the following broad areas were identified:

A 1 : Book collection development
A 2 : Serials procurement and control
A 3: Management of non-book materials  
A 4: Records of special collection  
A 5: Control of manuscripts and rare books  
A 6: Theses processing  
A 7: Cataloguing and subject indexing  
A 8: Referencing and documentation services  
A 9: Lending services  
A 10: Financial control  
A 11: Personnel administration  
A 12: Dead stock records and inventory control  
A 13: Co-ordination with different libraries  
A 14: Library statistics and research  
A 15: Stock verification.

The next step was to construct a suitable relation to compare the above listed areas with each other. It was framed in the form of the following question: “Is area A(I) more important than area A(J) for the purpose of computerisation?”

The guidelines followed for answering this question insisted on considering the contribution of the given area towards improvement of services to the readers, reduction of paper work for the staff, bringing more areas under bibliographical control, increasing information retrieval efficiency and creation of multi-purpose databases. To begin with the areas A1 was compared with the remaining 14 areas and was judged to be more important than the areas A3, A4, A5, A7, A8, A10, A11, A12, A13 and A15 from the computerisation point of view and so number 1 was entered in the corresponding columns of the first row in Figure 1, while, number 0 was entered in columns 1, 2, 6 and 9 of the first row. All the remaining areas were also suitably compared to other areas to generate the comparison matrix as given in Fig 1.

Using the requisite mathematical technique the comparison matrix was converted into the digraph as presented in Figure 2 where the nodes of the graph are the boxes briefly describing the library areas. The interpretive structure so derived shows the areas to be computerised in order of priority beginning from the top.

The participants in this exercise reviewed the priority structure depicted in Fig 2 and were generally satisfied with the sequence of library areas to be computerised. This helped in formulating a base plan for the computerisation of the library.

**PRACTICAL IMPLICATIONS**

The priorities obtained here by the ISM method can help in phasing the computerisation plan into various stages. The needs of the library and availability of resources are the guiding factors for this purpose. For instance, four stages as indicated in Fig 2 were envisaged for the computerisation of the university library.

It can be seen that the areas to be computerised at the outset (Stage I) are procurement and control of serials, lending services and processing of theses. In Stage II, book collection development, cataloguing and reference service are proposed for computerisation. The areas dealing with management of non-book materials, manuscripts and special collections are suggested for Stage III and the remaining areas of library administration are to be computerised at Stage IV.

It is clear from the above order of areas to be computerised that the librarian and the staff who participated in this exercise have given top priority to these areas which provide the new service to users and which help the professional staff in gaining more control over the transactions. This is reflected by taking up the processing of the theses collection on a priority basis because information retrieval demand in this area is substantial in an academic library like that of the Bombay University, while it is relatively weak in bibliographical control. Similarly, the
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lending section where lots of daily transactions are taking place (issue and return of documents) and the serials control where records are maintained to keep track of the serials received from all parts of the world with varying frequency are the other most important activities.

Since the practice of cataloguing and indexing of books and other materials is fairly well established in this library and the collection is also quite large, the computerisation of these areas is suggested to be taken up at Stage II when, perhaps, a bigger computer system and other resources would also be available. The area of library administration is given the last priority for computerisation because they concern a very limited number of staff and these are the activities which require more of physical efforts such as stock verification.

The major gain of this exercise has been for providing an overall direction to the computerisation of the library activity in areas identified in Stage I. The work started in April 1989 and with the requisite allocation of resources satisfactory progress has been made in the areas of theses collection/processing and serials control. In a few months time all these are expected to be completed by properly managing the available computer time. The students of the Bachelor of Library Science degree course of the university got the training in computer application and helped in data entry processing. All this has been possible due to an advance planning of the computerisation process as described above.

CONCLUSION

The ISM method offers many advantages in the task of priority-setting among a variety of activities.

a) It can be carried out by a single person or a group consisting of members with varied backgrounds providing flexibility in assigning priority to various activities because it allows members to voice their individual opinions about setting up the priority. It is possible that no consensus may emerge while filling up the comparison matrix. In such cases, separate matrices may be generated and the corresponding interpretive structures combined and compared [12].

b) The activity of building comparison matrix is simple and not time consuming.

c) It can be interrupted at any point and resumed later without any methodological problem. The transformation of the comparison matrix into a digraph involves the application of mathematical concepts. The method, however, being logical, is amenable to computer processing. So, the task of priority-setting among even a large number of activities can be handled easily. An interactive computer programme developed by the first author was used in the case presented above. This facilitated a quick review and modification of the priority structure.

The application of the ISM method provides a framework to articulate discussion and minimise arbitrariness. This exercise can be carried out at many levels. For instance, in the Bombay University Library a fresh exercise of revising priorities for the remaining areas was undertaken after completing Stage I. Again, this method can be used for determining the sequence of activities within a particular section of the library by its staff.

The priority structure of activities generated by the ISM can be subjected to the application of project management techniques of PERT (Programme Evaluation and Review Technique) and CPM (Critical Path Method) by treating it as a network of activities. This can help in the allocation of personnel and computer resources for completing all the activities within a stipulated time-frame. Moreover, the possibility of expediting this work through "crashing" of critical activities by deploying more resources can be explored.

Computerisation in large libraries is a long drawn process and its systematic planning and monitoring is crucial for the success. The aid of composite methods which combine analytical tools with subjective judgement like the ISM, as illustrated here, can prove very useful in these efforts.
Fig. 1. The Comparison Matrix for Library Areas
Fig. 2 The Priority Structure for Computerisation of Library Areas
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REFERENCES


