

Measuring Library Effectiveness: A Holistic Approach

* Veena Saraf

**Muhhamad Mezbah-ul-Islam

Libraries are social organisations with a sense of direction. There seems a general consensus that libraries should attempt to be effective but there is lack of agreement on what the concept effectiveness means. Most of the authors take one approach or the other to define the library effectiveness. However some of the authors recently tried to synthesise all major approaches to generate a model of library effectiveness encompassing all its variables. Attempt is made here to review various approaches for measuring library effectiveness with a view to identify multiple construct or variables rather than a single variable which will measure library effectiveness. This is a part of ongoing study conducted by the two authors for measuring library effectiveness.

0 INTRODUCTION

The history of library effectiveness can be traced to 1938 when Walter C Eells wrote "Measurement of the Adequacy of a Secondary School Library: A report on one phase of the co-operative study of secondary school standards." He found out the library having largest percentage of latest published titles is superior to one not having these titles. His main emphasis that time was measuring book collection on the basis of latest publications. However, evaluation of the performance of library and information system became a major concern only during late sixties. Even though the bibliographical control was not significant, still some authors attempted to compile the works on library effectiveness. Major works were done by Reynolds (1970) by publishing "a select bibliography" on

* Head Department of Library and Information Science; North Eastern Hill University (NEHU): Nongthymmai Shillong 7930014 Email: veenasaraf@yahoo.co.uk and bscnehu@sancharnetin

** Lecturer, Department of Library and information Science, Rajshai University, Bangladesh. Presently Ph.D Scholar Department of Library and Information Science; North Eastern Hill University (NEHU): Nongthymmai Shillong 793001 Email: Mezbah2000@yahoo.com

measurement in library and information services" and Ottersen (1971) "a bibliography on standards for evaluating libraries." Morse did ground breaking work on library performance when he published "measures of library effectiveness" in 1968. He applied operational research and presented a mathematical model for evaluating the library services. Most useful measures are obtained by processing the data by means of a mathematical model chosen to represent some part of the operation. These operations can be library use, book use, dependence of circulation on time, prediction of circulation measures, effects of retiring, inactive books, and when to buy a duplicate copy. His mathematical model is based on the data gathered by various libraries on different aspects. The only drawback of this model is that it is dependent on the statistics provided by the library itself. There were other experts also who provided some kind of mathematical model of evaluating library effectiveness.

White (1977) reviewed all these quantity measures of library effectiveness and grouped them as overall measures of effectiveness, public libraries, academic libraries, Zones and Cores, Clapp-Jordan formula, current acquisition model, capability index, failure surveys, other methods of collection measurements, circulation prediction, queuing theory, circulation interference and the Markov process, attitudinal research and benefit evaluation survey. He sums up by saying "though not exhaustive, these quantity approaches are the major statistical methods proposed for library evaluation. Some give rather gross approximation of overall effectiveness while others are more refined measures of various library operations. None however can stand alone. No statistical approach can completely measure the quality of service or the value of information to the user. Further, the method of determining the actual value of the variable is often subject to debate. Even though they are useful, statistical measures leave out the human element of a library operation." Some worth mentioning reviews on library effectiveness are by Evan et al. (1972), Strecher (1975), Du Mont and Du Mont (1979) and Goodall (1988). Goodall reviewed almost 500 articles, books and abstracts identifies that various methods employed to evaluate library performance are essentially the variations of accessibility, cost, user satisfaction, response time, cost/benefit ratio, and use. They conclude that the techniques used are mostly mathematical and not relevant to the qualitative and quantitative factors of the library service. Strecher (1975) reviewed 20 studies on library effectiveness and categorised them into four main approaches, namely, user satisfaction, measure of capability, resource allocation approach and library use.

While summing up, certain questions remain to be answered. For example, how valid are the results and how useful and practicable are the methods and techniques? Goodall (1988) traced the historical performance of library measurement through 1970s and 1980s based on a total of 59 studies. Even though some studies are of importance, yet the research looks circular rather than collateral. There is often a case of old ideas being brought forward with modifications.

rather than improvements. She further, identified some fundamental difficulties in attempting to measure the performance of library services. These reviews were simple reviews and could not lead to general model of assessing library effectiveness. It was only Du Mont and Du Mont (1979) who while assessing and reviewing the literature on library effectiveness suggested an integrated model of library effectiveness based on system theory. According to them there is no lack of material treating the criteria of library effectiveness. However, what is required is integration of viewpoints discussing effectiveness. Library effectiveness is a measure of a number of related factors: (1) goal achievement; (2) the optimization of performance; (3) The degree of user satisfaction; (4) The use of human resources; (5) The ability to survive. They identified that there is a connection between organizational structure and library effectiveness. According to them library effectiveness has been inconsistently related to one variable or another and they suggested a model while integrating behavioural and organizational perspectives into an overall model of library effectiveness. This model is based on inputs (human resources, other resources); library processes and activities and output (satisfied staff, efficient use of resources and some met demands).

Van House et al. (1990) published measuring academic library performance for the Association of College and Research Libraries (ACRL). The measures they included are materials availability and use (Circulation, in-library materials use, total materials use, materials availability and request- materials delay), facilities and library uses (attendance, remote uses, total use rate, service point use and building use) and information services (reference transactions, reference satisfaction survey and online search evaluation).

Evaluative checklist based on the Standards for the College Libraries developed by ACRL has eight factors. This checklist has been validated and field tested. These factors are: objectives, collections, organization of materials, staff, and delivery of service, facilities, administration and budget. According to ACRL, checklist should help in evaluating the library for improving library services.

1 MEASURING 'GOODNESS' (ORR'S MODEL)

Because effectiveness is commonly defined in very general terms as the 'extent to which a system or services achieve its objectives' it has little intuitive meaning and can lead to paradoxical meanings. With this basic premise, Orr (1973) asked simple questions about the library. How good is the library and library services? And how much good does it do? He argued that goodness of library services might be called quality and how much good it does may be called the value. He further translated quality and value into effectiveness and benefit respectively. He postulated (1) the other things being equal, the capability of a service will tend to increase the resources devoted to its increase, but not necessarily proportionately; (2) that, the other things being equal, the total uses made of a service (Utilization) will tend to increase as its capability increase, but not

necessarily proportionately; (3) that, the other things being equal, the beneficial effects realized from a service will increase as its utilisation increases, but not necessarily proportionately; (4) that, the other things being equal, the resources devoted to a service will increase as its beneficial effects increase, but not necessarily proportionately. These postulated relations were depicted by him in a diagrammatic form as cause and effect sequence looped on itself. He further discussed the direct and indirect measures of goodness of the library using closely related management techniques-cost effectiveness analysis, cost benefit analysis, system analysis, and planning-programme-budgeting-systems (PPBS). Orr's classic model generated a lot of interest and many authors and experts followed him either writing theoretically about it or trying to conduct empirical studies. (Stecher, 1975; Buckland, 1982; Ralli, 1987; Line, 1990; Maguire and Willard, 1990; and Mackenzie, 1990). These authors tried to further explain the concept of goodness in terms of quality and value.

According to Line (1990) the library that is able to meet a very high percentage of needs is very capable library and therefore one of high quality. Value on the other hand is defined as beneficial effects. He tried to distinguish between direct and indirect values or direct usefulness versus long term or wider benefits. Short term, direct and usefulness is the effectiveness and long term, wider benefits to the society are termed as benefits. Measuring benefits is very difficult proposition. Finally Line summed up the goodness of the library in the following words "it should be service oriented rather than collection oriented, but in order to achieve good service for, say, a historian there has to be an extensive collection. No collection, however "good" in itself, can constitute a good library unless more attention is paid to the user than is sometimes the case. An academic library that is not easy to use and that does not offer personal assistance as required, possibly to a high level, that does not provide efficient online services and interlibrary access services, cannot in my view to be considered a good library."

Orr offered six desiderata for measures. These are appropriateness, informativeness, validity, reproducibility, comparability and practicality. Thus, we can sum up the Orr's model that the ultimate criterion for assessing the quality of a service is its capability for meeting the user needs it is intended to serve. All other things being equal an increase in resources will lead to an improved capability which in turn will improve utilisation leading to greater beneficial effects which in turn will support more resources.

There is no single measure or variable which can encompass a whole phenomenon known as effectiveness of libraries. Except for few experts (Du Mont & Du Mont, 1979; Van House et al., 1990; Childers and Van House, 1993; and Abbott, 1994), literature does not throw light if any author has viewed library effectiveness in a holistic approach taking integrated view of all the variables of

library effectiveness rather than discussing one or the other variable. Ifidon (1986) discussed that the effectiveness and evaluation of a library's performance depend on the resources, the staff, user satisfaction and the cost. But his discussion of these four factors is theoretical and no empirical study was conducted to find out whether these factors actually influence the library effectiveness. The different approaches of authors for assessing library effectiveness can be identified into following broad categories:

- * Acquisition models
- * Book availability approach
- * Library use and service approach
- * Use satisfaction approach
- * Library staff and performance appraisal
- * System view approach
- * Latest trends of measuring effectiveness of library (SERVQUAL and LibQUAL+)

2 ACQUISITION MODELS

Association of College and Research Libraries (ACRL, 1968) issued a guide to methods of library evaluation in 1968 as an aid in judging the adequacy of an academic library. These were categorised into three components based on descending order of importance. These are (1) prime evidence: books, reading spaces and professional staff (2) secondary evidence: such as budget and planning documents and (3) special activities suggesting excellence: such as student book club and publication. The details about each variable are provided as to how and what is to be included. All the three variables must be adequate for the clientele and its program and no library can be judged to be satisfactory, no matter what other activities or qualities it may offer. This guide emphasised the books and other reading material as the most important component of the library for ascertaining its effectiveness.

Clapp and Jordan (1965) in their pioneering work identified the quantitative criteria for the adequacy of academic library collections. They attempted to establish the minimum core collection of library required for minimum adequacy by establishing a formula based on the size of the student body, size of the faculty, number of departments, methods of instructions, availability of suitable places for study and intellectual climate. The drawback of this formula is that it has not been empirically tested and verified. In 1974, the Clapp and Jordan

formula was revised by Association of College and Research Libraries (ACRL, 1974). This model takes into account the size of students, collection and staff into consideration for assessing the effectiveness of the library. They do not take into consideration (1) different needs of different disciplines; (2) impact of the research in any area; (3) factors like increased cost, decreased budgets, better bibliographical access and online availability of access to the information. It would seem that a model or series of models could be developed that would permit a university or group of universities to establish minimum annual acquisition rates.

The model should provide for continuing acquisition that would change in quantity over a period of years only as variables in the model suggested. Voigt (1975) developed such a model for determining the number of currently published materials an academic library should acquire each year. He identified seven variables of the model. He also suggests that many other factors in education such as student-faculty ratios, space allocations, and administrative support ratios also depend on experience, judgement and comparison with other institutions. Based on the assumption that primary mission of the academic library is to provide support for the instructional program of their parent institutions, Burr (1979) described a method of evaluating library collections which will permit the librarian to assess the adequacy of both the quantity and the quality of library resources available to support specific instructional program offered by the university. He developed a technique based on following criteria (1) it must provide both a quantity and qualitative evaluation of the library resources (2) its conclusions must be meaningful and (3) methodology must be economical without disruption of normal activities of the library. Finally, he sums up "whatever the amount or resources of the financial support available to the library, materials expenditures should accurately reflect institutional needs and priorities. Knowledge of the specific strengths and weaknesses of the library's collections is mandatory to determine those needs and priorities accurately. This method is an effective and economical means of addressing these vital issues." With all this discussions and having acquisition model for libraries, some authors argue if it is necessary to have written collection development policy in the libraries. Written policy can be defined as crystallization of each library's understanding of how its collection can serve its mission. Writing the policy involves one of the librarian's most challenging and confusing tasks of library collection. Snow (1996) argues against it by saying "The written policy represents a significant investment in its creation and maintenance. Its acceptance is by no means universal. Unless a policy is continuously updated to reflect the changes at a college or university, the document retains only its archival value. A better use of the bibliographer's time would be an evaluation of how material in the library is used, and why. He might even find time to select books, periodicals, and computer software and all other materials demanded by today's academic communities."

3 BOOK AVAILABILITY APPROACH

After developing qualitative library collections based on needs of the users, another important factor for evaluating libraries are whether books and other materials are available for use at the appropriate time or not. Many authors have taken material availability and use as the criteria for ascertaining the library effectiveness or one of the criteria (Van House, 1990). Basic premise is that the higher the percentage of book availability better is the qualitative use of the library. Book availability studies indicate generally the success or failure rates of users in locating the books in the library. Certain models were developed to assess the success or failure rate of locating the books (De Prosopo, 1973; Saracevic et al., 1977; Kantoor, 1976, 1976a, 1984).

Kantoor's model of 1984 was adopted by Association of Research Libraries in America. All these models have found that not more than 50% of the users can locate books in the library despite those libraries having acquired about 90% of the materials sought. Therefore it suggests that approximately 50% of the users eventually leave the library without getting a book and thus dissatisfied. Revill (1987, 1988,) reviewed the book availability as a performance measure and used Kantoor's model in his library and made contributions of the practical experience at Liverpool. He found high level of availability. User failures were largely due to incorrect classification numbers and failure to locate oversize and reference materials. Others who used Kantoor model are Ferl and Robinson (1986), Ciliberti et al. (1987), Rashid (1990) and Jacobs (1995). Since Kantoor model generated a lot of interest and literature, it is of importance to discuss it here. He suggests four steps:

- (a) Has the library acquired the desired title?
- (b) If acquired, is it in circulation?
- (c) If not in circulation, is it available on the shelf?
- (d) If available on the shelf, can the user retrieve it successfully?

He used branching technique; the proportions of searches that overcome each of these obstacles represent the probability of success for a category. Ciliberti et al. (1987) made modification on expansion of the steps or branches involved in know item searches and the addition of a parallel series of branches involved in the successful completion of subject searches. Rashid (1990) added three more factors to the initial four factors. These are user bibliographic information, collection development policy, and acquisition policy, user performance at the card catalogue, circulation procedure, library operations / functioning and the user search at the shelf. Further, Rashid identified the status of untraced book titles with one of the following factors; (1) The author / title information as written by the library user and brought to the card catalogue was incomplete or was not

correct (2) book titles written by the user was not owned by the library (3) the call number of the book sought might not be recorded correctly (4) the book was located in a special area as identified in the card catalogue (5) the book was properly shelved but could not be found by the user because of an oversight (6) the book was misshelved (7) the book was currently in circulation or in use in the library (8) the book was kept in the pre-shelving area (9) the book was located in the area not identified in the card catalogue (10) the book was checked out (11) the book was missing (12) the book was not purchased due to the restrictions of the collection development policy and (13) others. However, this evaluation method although providing useful information, is expensive and disruptive to be considered for the regular use in a busy library. But at the same time wealth of data collected enables the library managers to gain insight into the collections (Jacobs, 1995). He, further, in another paper compared the figures from a questionnaire-based book availability survey technique and from computer records of the use of the library's computer catalogue. Although several important differences emerge between the two sets of data, it is concluded that within specific limits the computer monitoring techniques could act as a surrogate for book availability surveys. Metz and Litchfield (1988) tried to measure collection use by bringing together circulation and in-house use along with that of current periodicals by assessing the differences according to kind of use, variations in measurement techniques and time period.

While all the above approaches try to assess success rates, certain authors suggest measuring "failure rates." Major work in this regard is done by Schofield (1971), Seymour and Schofield (1973) and Schofield et al. (1975). Library users were asked to fill out one of the two "failure slips". One failure slip dealt with searches for known items, other with searches by subjects. The authors then searched the items again to determine the proportions of failure caused by:

- (1) Items not owned by the library
- (2) Items owned but not available.
- (3) Items available but not found by the user (Reader failure)

It was found by the authors that 37 % of the user do not find desired item. The authors suggest that failures surveys should be used for determining the need for multiple copies in the library. Thus, through availability/ failure studies, a wealth of information are generated which may shed light on potential improvements in the library services.

4 LIBRARY USE AND SERVICE APPROACH

The ultimate goal or the objective of any library is to provide library services in terms of supplying information as desired by the patrons. This objective can be achieved by both traditional method or with application of latest information technologies. Evaluation of library services will determine the effectiveness.

and efficiency of the library and will further identify limitations and failures of services. Library use and book collection were taken as the factors of evaluating library as early as 1940s besides personnel, budget etc. (Carnovsky, 1959). Among the services, reference services get the maximum attention. Rothstein (1964) reports a large number of studies discussing the measurement and evaluation of reference service. The measurement and evaluation of reference service has been more often discussed than attempted. Much of the literature is repetitive, faltering and inconclusive. The other difficulties faced in measuring various services are that they are ill defined as compared to circulation, acquisition, and cataloguing and with little agreement on its components parts. It is further argued that problem of evaluating reference service in all dimensions has not really been attempted at all.

The problem can be summarised in his own words "In all types of libraries and in all aspects of reference service, investigation has seldom gone beyond the first stage of measurement-description in quantitative terms-to the ultimate goal of full-fledged evaluation-rating or assessment of effectiveness and worth." Elzy et al. (1991) also evaluating reference service with the following objectives: (1) to estimate the probability that a user, walking into the library with a factual question, would receive or be led to a complete and correct answer (2) to identify conditions under which members of the reference staff perform well and conditions under which they perform poorly (3) to determine to what extent student users of the library judge staff members to be responsive and helpful and (4) to identify ways in which the service might be improved. Seay et al. (1996) measured the quality of public library services with a view to improve it by using questionnaire method by analysing patron perceptions about library services. This model presents a method for quantifying and categorising patrons' comments from a standard questionnaire in such a way that the results are organised into seven principal service determinants. These service determinants are reliability, responsiveness, assurance, access, communications, security and tangibles. Twelve types of surveys were used to measure and evaluate users, services and materials and conducted during 1968/1969 at Columbia University Libraries and later evaluated (Mount and Fasana, 1972).

There have been several attempts to devise certain models of evaluating library use and services. Worth mentioning is EQLIPSE (Evaluation and Quality in Library Performance System for Europe). EQLIPSE started as project, is an attempt towards an inclusive methodology for the measurement of in-house use (Wynne and Clarke, 2000). The overall objective of EQLIPSE was to specify, develop and validate an open IT-based system to support quality management and performance measurement in libraries of all types. A comprehensive list of performance indicators, gathered from a number of existing works, was considered but it proved impossible to produce a definitive list of indicators for all the libraries.

5 USER SATISFACTION APPROACH

User studies are on in the most researched areas in library and information science. These studies form a large body of literature in the discipline. Since user studies first started in the late 1940s, their number has constantly increased. In the nineties the implementation of conceptual theories, that flourished during 1980s, grew stronger as an increasing number of researchers acknowledged the value of these theoretical frame works and incorporated them into their research design along with more sophisticated qualitative research methods. The nineties also witnessed the tremendous growth and establishment of the internet as an information provider in the information community. As a result, a number of studies set out to investigate a plethora of issues concerning the impact of internet on the user and the information community (Siatiri, 1999).

One of the important components of user studies is user satisfaction of the library services. Initially, user satisfaction studies started with the literal meaning of explaining the user satisfaction in terms of user fulfilment and later on pursued the study of customer satisfaction in terms of describing customer experiences. Many reviews of user studies have been written (Menzel, 1966; Paisley, 1968; Wilson, 1981; D'Elia and Walsh, 1983; Siatiri, 1999). The literature of user satisfaction is at times confusing. The construct has not been developed and tested in a systematic manner. Rather, it seems simply to have been accepted and used as reasonable measure of library performance. Definitions differ; methods of measurements differ; reasons for using the construct differ. Terminology is ambiguous and sometimes contradictory (D'Elia and Walsh, 1983). They also identified two main approaches to user satisfaction - subjective and objective. In the objective approach, library is the unit of analysis and the proportions of the items supplied by the library on demand is the measurement of satisfaction. It is based on the assumptions that users of libraries experience satisfaction of their demands commensurate with the levels of library performance. While in the subjective approach, the user is the unit of analysis and the user's opinion of how well the library has performed in satisfying the demands is the measurement of satisfaction. It is assumed that user evaluations are valid indicators of library performance. It is very evident that user satisfaction of library service has direct relations with the efficiency of library staff. Andaleeb and Simmonds (1998) identified that library user, especially students, accord significant importance to the demeanour of the library staff. They further suggested that it is a multi-attribute construct that must be instilled and inculcated, much like an attitude, among the library staff. Although instilling the qualities of demeanour among the service providers and gaining their commitment to these qualities can be challenging.

The other important variable for the user satisfaction is the resources and their management in the libraries. Therefore, we can say that library environ-

ment involves three interrelated elements: user expectation, library performance and user satisfaction. What is central to all this is user? User's degree of satisfaction with a service will evolve as the user develops a relationship with service provider (Millson-Martula and Menon, 1995; Calvert, 2001). Brember (1985 and 1985a) applied soft system methodology linking user survey to the practical problems of library management. The outcome of the study was an indication of the content of a useful model of the users and guidelines for deriving criteria for effectiveness based on the model.

Applications of information technologies in the library and the internet has also put lot of pressure on the library services and ultimately on higher levels of user satisfaction. When the user determines satisfaction with computer-based retrieval situations, he focuses on four distinct aspects: users experience satisfaction with the output of the research, Users will be satisfied or dissatisfied with a particular service because of their view of the library; User satisfaction or the dissatisfaction may result from the way the service is provided and user interaction with the staff will affect user satisfaction (Tessier et al., 1977). Further, authors believed in three assumptions for the users' satisfaction. These are: (1) The users' state of satisfaction is experienced within the frame of his own requirements; (2) expectations may affect how a user approaches the service, what he requires of it, how he interacts with it, and his assessment of its adequacy. In other words we can say that user's state of satisfaction is experienced within the framework of his expectations; (3) just as expectations may affect satisfaction, other considerations such as costs in energy, time or money may work to compromise the users' definition of satisfaction. In other words users may seek a solution within acceptable range instead of an ideal or perfect solution. The authors conclude by saying that "we need to measure all the different aspects of user satisfaction and we need to use all available methods to measure user satisfaction. Only then, we can accurately adjust the conditions surrounding computer-based literature services to increase user satisfaction." Since the objective methodologies are yet to develop and involve, it is the subjective methodologies that we will have to depend upon. In other words, we will have to study user to identify his satisfaction levels and thus, improve upon the effectiveness of the libraries.

6 LIBRARY STAFF AND PERFORMANCE APPRAISAL

An important components of the library is library staff. In an effective academic library the professional staff can be the most valuable resource- the more important than any other one component: books, card catalogue, documents etc (Berkner, 1979). Every organization is a social system, a network of interpersonal relationships. A man may do an excellent job by objective standards of measurement, but may fail miserably as a partner, subordinate, superior or colleague. Any library evaluation has to take into consideration its staff as the im-

portant resource of the library. Therefore, assessment of library staffs' contribution and ability in carrying forward its goals and objectives becomes a necessity for any model of evaluation. DeProspo (1971) identified discussions by the individuals and the supervisor on job content, setting of performance targets by the employee, review of these with the supervisor as the evaluative checkpoint for the performance appraisal. "How does one cope with the colleague in the selection department who refuses to buy interdisciplinary material out of his /her departmental book budget, thus keeping carefully within set financial limits, building specialised collection and ignoring cross disciplinary approach?" this question is asked by Berkner and he argues that straight management by objective approach is unlikely to solve the problem. According to him, managerial abilities of the librarians should include the ability to supervise and organizational and leadership qualities.

Organizational and leadership qualities will enable the librarians to be able to make decisions, willing to compromise, be self motivated and self controlled, be able to organise, plan, and communicate the effective use of resources, maintain good relationship with others, that expect that one will keep on growing, improve one's performance and continue to develop. Therefore, assessing the organizational climate, leadership styles and job satisfaction of the librarians becomes the essential component for assessing the overall effectiveness of any library. Librarians' effectiveness will depend on the employee, the job, the supervisor and the work environment and should not be limited to just the employee (Johnson, 1972). Performance appraisals also help in effectively managing the staff, which ultimately leads to effective library. They assist in various aspects and these aspects are: (Hodge, 1983 and Berkner, 1979).

- * To assist in personal planning
- * To guide in job development
- * To make basis for recommendations for promotions salary increase or terminations
- * To serve as basis for modifying or changing the behaviour
- * To provide performance feedback to employees
- * To develop an inventory of human resources for the use of management- a record of available talent and potential among the staff
- * To provide a method of counselling and encouraging staff members to grow and to plan for future development.
- * To give the employee a chance to "know where he or she stands" in the supervisor's estimation

- * To elicit feedback from the employee

7 SYSTEM VIEW APPROACH

System theory approach conceptualises the library as a whole for assessing its effectiveness. It provides a useful way to find out what library is supposed to do, what it does and how it achieves its objectives. The basic model has three components namely input, output and outcomes. Inputs in the library are resources like staff, materials and capital funding. Outputs are direct product of a library's operations or the activities it carries out and outcomes are the uses made by the consumer of a given output and the degree of satisfaction felt with those outputs. The experts who worked on these lines are Du Mont and Du Mont (1979), Childers and Van House (1993), Van House et al. (1990) and Abbott (1994). Although a library is essentially a social institution steeped in human values of all kinds, it can be viewed as a complex communication system charged with the task of transferring information through space and time and such; it is particularly amenable to engineering analysis. Mathematical models thus derived are certain to provide a much better basis for the design and operations of library system (Leimkuhler, 1966) He developed models based on system analysis for acquisition, circulation, storage, loan period, duplication policies, availability and obsolescence. The development was divided into three parts: The first growth model involves a time series analysis of acquisitions, holdings, and circulations. The second part storage model considers several aspects of book storage in a manner that is analogous to modern inventory theory and the third part is availability models that treat the library as a stochastic service system and applies some elementary queuing models to determine the availability and circulation of single and duplicate copies.

Some libraries only recently have been able to move from inputs and outputs into some systematic evaluation of quality of services across institutions at a macro level. Du Mont and Du Mont (1979) suggests synthesised system model for evaluating library effectiveness based on four perspectives. These perspectives are (1) individual library employees and their expectations of the library (2) library itself and its expectations of the environment (3) individual library patron and his /her expectation of the library, and (4) society at large and its expectations of the library. The model suggests the study of inputs, library processes/activities and outcomes. Almost similar model was suggested by Van House et al. (1990) when they prepared a practical approach document for measuring academic libraries performance for the ACRL. This publication discusses the library as general system model (inputs, processes, outputs and outcomes and feedback library's impact on community as environmental factor). The document describes in details what to be included or not included under each category and how to measure them practically.

Later on Van House along with Childers (Childers and Van House, 1993)

described the evaluative method for assessing the public libraries based on the eight dimensions of library effectiveness. AMPLE (Model of Public Library Effectiveness) described by them shows how practically a public library can be assessed for effectiveness. Buckland (1982) 'book is a searching application of system theory to library operations and he uncovers the 'double feedback loop' or 'two feedback mechanisms substantially independent of each other in important ways whereby user feedback loops which determine demand in libraries are separated from the supply feedback loops which controls the provision of library services'. This is based on his premise that library service's ability to control the use made of it, is largely separate from its dealing with the sponsor.

Kyrillidou (2002) discusses library model and user roles in relation to the transformative effects of technology. It explores how these models are changing our conceptualisation of library assessment models from a linear to a more cyclical and dynamic perspective shaping relations among input, output, quality and outcome indicators. He argues that defining outcome of the library is a big problem and the relation between the quality of electronic library services and outcomes is yet another challenging issue where more research is needed and so far evaluation has not been the integral part of the development cycle embedded in the operation of the library.

8 LATEST TRENDS (SERVQUAL AND LibQUAL+)

The experts started using and experimenting evaluating techniques of other discipline in libraries during late 1990s. These techniques were borrowed from management, operational research, economics, commerce and other related subjects. One of the important tool used is "benchmarking". The benchmarking is measurements against standards, against one's own prior progress, or against wherever a peer or competitor happens to be. Benchmarking is production oriented way of talking about statistics. Statistics include more sophisticated analyses than those in a typical compilation of what we call library statistics, most of which are just data elements, singly or in ratios- in a word benchmark (Prichard, 1995). In other words we can say that benchmarking means collecting statistical data and analyzing it using various statistical techniques. There are various methods of benchmarking and is basically derived from total quality management (TQM) and based on following general principles (Garrod & Kinnell, 1996) :

- * A structured or systematic approach to finding improvements and implementing best practice;
- * A continuous process of measuring products, services and practice against leaders;
- * A focus on processes (individual process which are deemed visit to customer satisfaction are suitable choices for benchmarking programmes);

- * An emphasis on learning. Benchmarking should not be regarded simply as a comparative exercise or be totally results oriented.

The empirical studies conducted for measuring performance of the libraries using benchmarking are Creaser (2001) and Garrod & Kinnell (1996). Garrod & Kinnell used benchmarking in UK library and information sector whereas Creaser used the technique for school library services. Interest is growing and few organizations are acting as pathfinders, by testing and evaluating the techniques involved. However, it is too early to assess how successful this method has been and it needs further empirical testing to arrive a general conclusion. Rowena et al. (1995) studied the stake holder perceptions of university library effectiveness by studying their organizational effectiveness. This research is based on the 'multiple constituencies' model identified key performance indicators in university libraries as perceived by six libraries as six separate stakeholder groups. Their main finding was that stake holder groups have different perspective on library effectiveness and knowledge of the expectations of each group provides better information on which to make and justify a shift of resources from one service area to another.. Crawford et al. (1998) applied the stakeholder method to the design of a set of user chosen performance measures to assist the British academic libraries in improving customer service. The study involved 15 institutions and 10 stakeholder groups, consisting of 91 performance measures organised in four categories: assistance from library staff; provision of study space and equipment; access to materials and equipments and management and administration. They further identified similarities and differences within groups and compared the results with the study by Rowena et al. (1995).

In the early 1980s, the impetus to measure and evaluate service quality arose from the marketing discipline. The recognised leaders in this endeavour were Parasuraman et al. (1988, 1991). Their research leads to SERVQUAL instrument for assessing the customer perception of the quality of the service empirically. They postulated that quality could be viewed as the gap between perceived service and expected service and their theory eventually resulted in the gap theory of service quality. The model summarises the five following gaps:

- * Customers' expectations and management's perceptions of these expectations.
- * Management's perceptions of customers' expectations and service quality specifications.
- * Service quality specifications and actual service delivery
- * Actual service delivery and what is communicated to customers about it, and
- * Customers' expected services and perceived service delivered.

The SERVQUAL has 22 items that are factorised into following five factors (Parasuraman et al., 1988 and 1991):

- * Tangibles (appearance of physical facilities, equipment, personnel and communication materials)
- * Reliability (ability to perform the promised service dependably and accurately)
- * Responsiveness (willingness help to customers and provide promote service)
- * Assurance (knowledge and courtesy of employees and their ability to convey trust and confidence), and
- * Empathy (the caring, individualized attention the firm provides its customers)

Library researcher recognised the potential of SERVQUAL to serve as tool a for assessing the quality of library services as provided to the patrons. Association of Research Libraries (ARL, 2000 and Cook, 2002) sponsored a pilot administration of the SERVQUAL instrument in 12 of its member institutions. Cook and Thompson (2000) explored reliability and validity of scores from SERVQUAL measurement protocol for evaluating the perception of library service quality. Nitecki and Herson (2000) also tested the SERVQUAL for measuring service quality at Yale university libraries and Coleman et al. (1997) conducted a survey to measure service quality based on the same method. It is too early to say whether SERVQUAL can answer how to assess the effectiveness of the libraries even though it seems to be the best tool available because libraries are also service-oriented organizations. It needs further evaluation and empirical studies in library setting before any conclusions can be drawn.

The various empirical studies were conducted using SERVQUAL in academic libraries and these studies failed to recover five factors, instead only three factors were consistently recovered. These are tangibles, reliability and affect of service. ARL, who sponsored the research on SERVQUAL tried to answer the question, what other factors, if any should be incorporated into the assessment of service quality in a research library? Answer to this question gave rise to LibQUAL+ to assess the service quality in a research library. LibQUAL+ is based on the same assumption as SERVQUAL that "only customers judge quality; all other judgements are relatively irrelevant." The investigators (Cook and Thompson, 2001; Cook and Heath, 2001) after conducted surveys with faculty, students and others, added 19 items to 22 items of SERVQUAL to measure the additional factors. These 41 items clustered into following five factors, namely, (1) Affect of Service (2) Reliability (3) Library as Place (4) Provision of Physical Collection, and (5) Access to information. It was found that library users simul-

taneously think about library quality at multiple levels. Based on these promising results, a series of articles reporting the research reports about LibQUAL+ were published by ARL (ARL, 2001). LibQUAL+ tries to identify those dimensions and measure the gap between expected service and perceived service in each dimension. The empirical studies are continuing for the validity and reliability of LibQUAL+ as a tool to measure the quality of library services.

Cook (2001) identified more dimensions or factors that are relevant to libraries and which are not in the original SERVQUAL from where it originates. Cook sums up in these words "while the dimensions of service quality established by Parasuraman, Zeithamal, and Berry remerged from the analysis in the library context, three others, perhaps unique to research library context, were compelling: Ubiquity and ease of access to collection, the library as place, subsuming dual concepts of utilitarian space and of the library as a symbol of the intellect and finally, the overwhelming drive on the part of users to be self reliant and confident in navigating the information world. Whether self-reliance is a component of library service quality or a result of service quality is unclear and will be investigated in future research. Ubiquity and ease of access, library as a place and self reliance emerged from the interviews with users as inescapable elements of the construct of quality library service. As such, these dimensions will be explored in further LibQUAL+ evaluation studies in an iterative of building and testing theory of library service quality." Therefore, we can conclude that LibQUAL+ hold promises in assessing service quality in the research library environment. But a lot of research needs to be conducted using LibQUAL+ using different library environment before a generalised tool can emerge which can be used in any library setting. The other characteristic of the LibQUAL+ is that it assesses only the quality of service and can be taken as a holistic indicator for library effectiveness.

9 CONCLUSIONS

This review of literature shows that there is no consensus among the various authors as to what should be included in assessing the library effectiveness. Various authors describe different variables for ascertaining library effectiveness. The various approaches can be summarised as follows:

- * Measurement of "Goodness" of the library. Here the authors argue that goodness of the library should be measured and goodness is translated into value and benefits of the library, which will ultimately measure library effectiveness.
- * Measuring materials availability as an indicator of library effectiveness. The experts expressed the library performance can be evaluated in terms of what the library is acquiring and quality of collection development. Availability of the documents on the shelf when the users desire it, is

also taken as the indicator of library effectiveness. Various models of acquisition and availability for assessing library effectiveness came into existence.

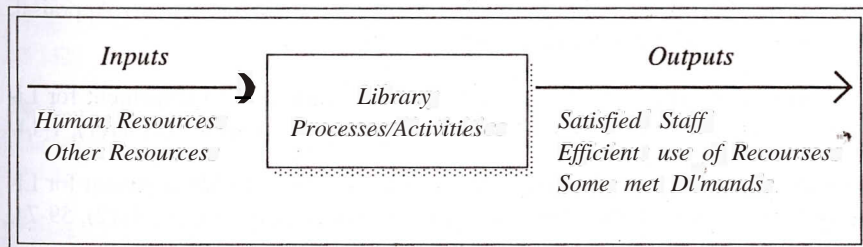
- * The other group of authors took users point of view for assessment of library effectiveness. The library use, type of services provided to the users and the user satisfaction of these services are the criteria for evaluations of library. It is worth mentioning here that majority of authors take the view that it is ultimately user satisfaction and the quality of service that will indicate the effectiveness of the libraries.
- * The various authors see library effectiveness from the perspective of library staff, leadership styles, job satisfaction and performance appraisals are some of the criterias taken which will identify whether the library is effective or not.
- * Certain authors tried to apply various methodologies and models developed elsewhere in social science for assessing effectiveness in libraries. Worth mentioning is the SERVQUAL which was developed as a tool for marketing discipline for assessment of quality of service. The application of SERVQUAL leads to a new modified tool LibQUAL+ to ascertain the quality of library service.
- * Various experts viewed library from the system point of view and described all the components of the library in terms of inputs, outputs, processes and the outcomes. This view differs from others point of views in the sense that experts take a holistic view of evaluating the library effectiveness by evaluating the system as whole and not one component or the other.

Goodall (1988), in his review on performance measurement sums up "It would be wrong to suggest that no real progress has been made in the field of performance measurement but one cannot help feeling that the research has been of a circular nature that although plenty has been written on the subjects, there is a surprising lack of originality in the writings. The research appears to be collateral rather than cumulative; it is too often the case that old ideas are regurgitated with modifications rather than improvements. However, one must not be too critical as there are several fundamental difficulties in attempting to measure the performance of library service." But, he concludes that libraries must be evaluated in terms of the service they provide to the users: It is very clear that systems view is the only approach that takes all the components of the library into consideration for its evaluation. Even though there are various authors who have taken system view approach of the library (Du Mont and Du Mont 1979; Van House et al., 1990; Childers and Van House, 1993 Abbott, 1994), but Du Mont and Du Mont who after summarising the various approaches, presented an integrated

model of library effectiveness. They integrated behavioural and organizational perspectives in an overall model of library effectiveness. Their model is based on following assumptions:

- (1) *The employee's expectation of the library:* The behavioural study of organizations makes it clear that certain organizational structures and/or styles of management are more conducive to fulfilling these needs than others.
- (2) *The library's expectations of the environment:* The library's flexibility and the ability to learn and perform according to changing contingencies in the environment.
- (3) *Individual patron's expectations of the library:* Achieving effectiveness is actually identifying and defining what information needs, and demands and fulfilling these needs and demands, is the ultimate goal.
- (4) *The environment's (Society's) expectation of the library:* Societal groups have expectations of what the library can offer them. It is expected that library should perform efficiently. The quality of these benefits is an intermediate concern, which leads to long-term satisfaction with library service.

These perspectives are combined to make a system model of library effectiveness, which is shown as follows:



Although the integrated approach to judging library effectiveness introduces more complexity into designing systems for assessing the effective library, it also seems to offer the precision necessary, if we are to measure the effectiveness of what they do. Therefore, it is concluded that library effectiveness can not be evaluated on a single criteria and there is a need to assess multiple variable simultaneously to actually know whether library is effective or not. Thus, we can safely conclude that library effectiveness, as an integrated approach of three basic components of the library, namely, library staff, library users and the library itself. Variables which should be included in any study of library effectiveness are: Organisational Structure of the library, leadership styles of the librarians, job satisfaction of the librarians, user needs and user satisfaction of the patrons and the basic library inputs in terms of collection, finances, physical facilities etc.

REFERENCES

- Abbott, C** (1994). Performance Measurement in Library and Information Services. London: Aslib.
- ACRL**, News Issue (1968). Guide to Methods of Library Evaluation. *College and Research Libraries News*, 29(5), 293-99.
- ACRL**, News Issue (1974). Draft: Standards for College Libraries 1975 Revision. *College and Research Libraries News*, 35(6), 284-86.
- Andaleeb, S S and Simmonds, P L** (1998). Explaining User Satisfaction with Academic Libraries: Strategic Implications. *College and Research Libraries*, 59(2), 156-67.
- ARL**, (2000). ARL Bi-monthly Report 207: SERVQUAL and QUEST for New Measures. <http://www.arl.org/newsltr/207/servqual.html> (visited on April 04, 2002)
- ARL**, (2001). ARL Bi-monthly Report 219: A Brief LibQUAL+™ Phase One Progress Report. <http://www.arl.org/newsltr/219/libqual.html> (visited on April 09, 2002)
- Berkner, D S** (1979). Library Staff Development through Performance Appraisal. *College and Research Libraries*, 40(4), 335-44.
- Brember, V L** (1985). Linking a Medical User Survey to Management for Library Effectiveness: I The User Survey. *Journal of Documentation*, 41(1), 1-14.
- Brember, V L** (1985a). Linking a Medical User Survey to Management for Library Effectiveness: J The User Survey. *Journal of Documentation*, 41(2), 59-74.
- Buckland, M K** (1982). Concepts of Library Goodness. *Canadian Library Joltmal*, 39(2), 63-66.
- Burr, R L** (1979). Evaluating Library Collections: A Case Study. *The Journal of Academic Librarianship*, 5(5), 256-260.
- Calvert, P J** (2001). International Variations in Measuring Customer Expectations. *Library Trends*, 49 (4), 732-57.
- Carnovsky, L** (1959). Evaluation of Library Services. *UNESCO Bulletin for Libraries*, XIII (10), 221-25.
- Childers, T A and Van House, N A** (1993). What's Good? Describing Your Public Library's Effectiveness. Chicago: American Library Association.

Ciliberti, A C *et al.* (1987). Material Availability: A Study of Academic Library Performance. *College and Research Libraries*, 48(6), 513-527.

Clapp, V Wand Jordan, R T (1965). Quantitative Criteria for Adequacy of Academic Library Collection. *College and Research Libraries*, 26(5), 371-80.

Coleman, Vet al. (1997). Toward a TQM Paradigm: Using SERVQUAL to Measure Library Service Quality. *College and Research Libraries*, 58(3), 237-53.

Cook, C (2000). LibQUAL+: One Instrument in the New Measures Toolbox. <http://www.art.org/newsstr1212/libqual.html> (visited on April 09, 2002)

Cook, C and Heath, F M (2001). Users' Perceptions of Library Service Quality: A LibQUAL+ Qualitative Study. *Library Trends*, 49(40), 548-84.

Cook, C and Thompson, B (2000). Reliability and Validity of SERVQUAL Scores Used to Evaluate Perceptions of Library Service Quality. *The Journal of Academic Librarianship*, 26(4), 248-58.

Cook, C and Thompson, B (2001). Psychometric Properties of scores from the Web-Based LibQUAL+ Study of Perceptions of Library Service. *Library Trends*, 49(4), 585-604.

Crawford, J *et al.* (1998). Stakeholder Approach to the Construction of Performance Measures. *Journal of Librarianship and Information Science*, 30(2), 87-112.

Creaser, C (2001). Performance Measurement and Benchmarking for School Library Services. *Journal of Librarianship and Information Science*, 33(3), 127-32.

D'Elia, G and Walsh, S (1983). User Satisfaction with Library Service: A Measure of Public Library Performance. *Library Quarterly*, 53(2), 109-33.

DeProspo, E R (1971). Personnel Evaluation as an Impetus to Growth. *Library Trends*, 20(1), 60-70.

Deprosopo, E R *et al.* (1973). Performance Measures for Public Libraries. Chicago, Public Library Association.

Dougherty, R (1972). The Human Side of Library Effectiveness. In A. F. Hershfield and M. D. Cooke eds. : *Approaches to Measuring Library Effectiveness: A symposium*. New York: School of Library Science, Syracuse University, 40-47.

Du Mont, R R (1980). A Conceptual Basis for Library Effectiveness. *College and Research Libraries*, 41(2), 103-11.

- Du Mont, R. R. and P. F. Du Mont** (1979). Measuring Library Effectiveness: A Review and an Assessment. In *Michael H. Harris ed. Advances in Librarianship* 9. New York: Academic press, 103-41.
- Eells, W C** (1938). Measurement of the Adequacy of a Secondary School Library: A Report on One Phase of Co-operative Study of Secondary School Standards. *ALA Bulletin*, 32, 160.
- Elzy, C et al.** (1991). Evaluating Reference Service in a Large Academic Library. *College and Research Libraries*, 52(5), 454-65.
- Evans, E et al.** (1972). Review of Criteria used to Measure Library Effectiveness. *Bulletin, Medical Library Association*, 60(1), 102-10.
- Ferl, T E and Robinson, M G** (1986). Book Availability at the University of California, Santa Cruz. *College and Research Libraries*, 47(5),501-08.
- Garrod, P and Kinnell, M** (1996). Performance Measurement, Benchmarking and the UK Library and Information Services Sector. *Libri*, 46(3), 141-48.
- Goodall, D L** (1988). Performance Measurement: A Historical Perspective. *Journal of Librarianship*, 20(2), 128-144.
- Hershfield, A. F** (1972). Measuring Library Effectiveness: A Challenge to Library Educators: Introductory Remarks. In *A. F Hershfield and M. D. Boone eds. Approaches to Measuring Library Effectiveness: A Symposium*. New York: School of Library Science, Syracuse University, 7-13.
- Hodge, S P** (1983). Performance Appraisal: Developing a Sound Legal and Managerial System. *College and Research Libraries*, 44(4),235-44.
- Ifidon, S E** (1986). The Evaluation of Performance. *Libri*, 36(3), 224-39.
- Jacobs, N A** (1995). The Evaluation and Improvement of Book Availability in an Academic Library. *The New Review of Academic Librarianship*, 1, 41-55
- Johnson, M** (1972). Performance Appraisal of Librarians: A Survey. *College and Research Libraries*, 33(5), 359-67.
- Kantoor, P B** (1976). The Library as an Information Utility in the University Context: Evolution and Measurement of Service. *Journal of American Society for Information Science*, 27(2), 100-12.
- Kantoor, P B** (1976a). Availability Analysis. *Journal of American Society for Information Science*, 27(6),311-19.
- Kyrillidou, M** (2002). From Input and Output Measures to Quality and Out-

come Measures, or, from the User in the Life of the Library to the Library in the Life of the User. *The Journal of Academic Librarianship*, 28(1),42-46.

Leimkuhler, F F (1966). System Analysis in University Libraries. *College and Research Libraries*, 27 (1), 13-18.

Line, M B (1990). The Concept of 'Library Goodness': User and Library Perception of Quality and value. *in Maurice B Line ed. Academic Library Management*. London: The Library Association, 185-95.

Mackenzie, A G (1990). Performance Measurement. *in Maurice B Line ed. Academic Library Management*. London: The Library Association, 196-205.

Maguire, C and Willard, P (1990) Performance Measures for Libraries: Statistical, organizational and Cosmetic. *Australian Academic and Research Libraries*, 21(4),262-73.

Metz, P and Litchfield, C A (1988). Measuring Collections Use at Virginia Tech. *College and Research Libraries*, 49(6), 501-13.

Millson-Martula, C and Menon, V (1995). Customer Expectation: Concepts and Reality for Academic Library Services. *College and Research Libraries*, 56(1),33-47.

Morse, P (1968). *Library Effectiveness: A Systems Approach*. Cambridge: MIT Press.

Mount, E and Fasana, P (1972). An Approach to the Measurement of Use and Cost of a Large Academic Research Library System: A Report of a Study done at Columbia University Libraries.

Nitecki, D A and Herson, P (2000). Measuring Service Quality at Yale University's Libraries. *The Journal of Academic Librarianship*, 26(4), 259-73.

Orr, R H (1973). Measuring the Goodness of Library Services: A General Framework for Considering Quantitative Measures. *Journal of Documentation*, 29(3), 315-32.

Ottersen, S (1971). A Bibliography on Standards for Evaluating Libraries. *College and Research Libraries*, 32(2), 127-44.

Paisley, W J (1968). A Conceptual framework: The Scientist within Systems. *Annual Review of Information Science and Technology*, 3.

Parasuraman, A *et al.* (1985). A Conceptual Model of Service Quality and its Implications for Future Research. *Journal of Reading*, 49(4), 41-50.

- Parasuraman, A et al. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality. *Journal of Reading*, 64(1), 12-40.
- Parasuraman, A et al. (1991). Refinement and Reassessment of the SERVQUAL Scale. *Journal of Reading*, 67(4), 420-50.
- Parasuraman, A et al. (1994). Alternative Scale for Measuring Service Quality: A Comparative Assessment Based on Psychometric and Diagnostic Criteria. *Journal of Reading*, 49(3), 201-30.
- Rahid, H F (1990). Book Availability as a Performance Measure of a Library: An analysis of the Effectiveness of a Health Science Library. *Journal of the American Society for Information Science*, 41(7), 501-07.
- Ralli, T (1987). Performance Measures for Academic Libraries. *Australian Academic and Research Libraries*, 18(1), 1-9.
- Revill, D H (1987). Availability' as a Performance Measure for Academic Libraries. *Journal of Librarianship*, 19(1), 14-27.
- Revill, D H (1988). An Availability Survey in Co-operation with a School of Librarianship and Information Studies. *Library Review*, 37(1), 17-34.
- Reynolds, R (1970). A Select Bibliography on Measurement in Library and Information Services. London: Aslib.
- Rothstein, S (1964). The Measurement and Evaluation of Reference Service. *The Library Trends*, 12(3), 456-72.
- Rowena, J C et al. (1995) Further Dimensions of Public Library Effectiveness: Report on a parallel New Zealand Study. *Library and Information Science Research*, 15, 143-64.
- Saracevic, T et al. (1977). Cause and Dynamics of User Frustration in an Academic Library. *College and Research Libraries*, 38(1), 7- 18.
- Schofield, J L et al. (1975). Evaluation of an Academic Library's Stock Effectiveness. *Journal of Librarianship*, 7(3), 207-27.
- Seay, T et al. (1996). Measuring and Improving the Quality of Public Services: A Hybrid Approach. *Library Trends*, 44(3), 464-90.
- Seymour, C A and Schofield, J L (1973). Measuring Reader Failure at the Catalogue. *Library Resources & Technical Services*, 17(1), 6-24.
- Siatri, R (1999). The Evaluation of User Studies. *Libri*, 49, 132-41.**

- Snow, R (1996). Wasted Words: The Written Collection Development Policy and the Academic Library. *The Journal of Academic Librarianship*, 22 (3), 191-94.
- Stecher, G (1975). Library Evaluation: A Brief Survey of Studies in Quantification. *Australian Academic and Research Libraries*, 6(1), 1-19.
- Tessier, J A *et al.* (1977). New Measures of Users Satisfaction with Computer-Based Literature Searches. *Special Libraries*, 68(11),383-89.
- Van House, N A *et al.* (1990). Measuring Academic Library Performance: A Practical approach. Chicago: American Library Association.
- Voigt, M J (1975). Acquisition Rates in University Libraries. *College and Research Libraries*, 36(4), 263-71..
- White, G T (1977). Quantitative Measure of Library Effectiveness. *The Journal of Academic Librarianship*, 3(3), 128-36.
- Wilson, T D (1981). On User Studies and Information Needs. *Journal of Documentation*, 37(1),3-15.
- Wynne, P M and Clarke, Z (2000). Towards an Inclusive Methodology for the Measurement of In-house Use. *The Journal of Academic Librarianship*, 32(2), 82-90.