AUTOMATED LIBRARY NETWORKING IN AMERICAN PUBLIC COMMUNITY COLLEGE LEARNING RESOURCES CENTERS

by

Abdul J. Miah

Dissertation submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

in

Community College Education

APPROVED:

D. A. Clowes, Chairman

W. R. Sullins

D. M. Moore

P. M. Gherman

P. D. Metz

January 1989

Blacksburg, Virginia

Acknowledgement

I wish to express my sincere appreciation to all those persons who assisted with the preparation of this study.

Some individuals deserve special recognition. I acknowledge with grateful appreciation the careful supervision and excellent guidance given this study by Dr. Darrel Clowes who served as the Chairman of my Dissertation Committee. He painstakingly steered this study for many months toward successful completion. Other committee members, Dr. Robert Sullins, Dr. David Moore, Mr. Paul Gherman, and Dr. Paul Metz, deserve special thanks for their input. My gratitude is also extended to Dr. Glen Lowery, for his constant assistance and encouragement toward the completion of this study.

A special thank you goes to who assisted me with the computer aspect of data retrieval and analysis. Without the tireless efforts of for proofreading and editing and for typing this manuscript, this study would not have been completed as scheduled. I extend my heartfelt appreciation to both of them. Special mention must be made to , Provost-DTC for his continued encouragement and administrative support in completing this study.

Finally, I am very grateful to my wife, , and son, , for their endless patience and incessant support.

TABLE OF CONTENTS

Page

Acknowledgement ii

Table of Contents iii

List of Tables vi

Chapters

I. INTRODUCTION 1

Statement of the problem 4

The purpose of the study 5

Research questions 5

Need for the study 7

Definition of terms 8

Delimitations 13

Limitations 14

Organization of the study 14

II. REVIEW OF LITERATURE 16

Introduction to Learning Resources Center 16

Automation 17

Development of library automation 18

Need for library automation 23

The extent of automation in academic libraries 26

Operational and functional variables 23

Online automated processing systems 28

Integration and turnkey system 30

Network revolution 33

Levels of networks 37

Academic libraries in a network environment 49

Online resource sharing by academic libraries 54

Impact of automated library networking 57

Limitation of networks 60

Summary 61

III. RESEARCH AND METHOD 70

Introduction 70

Population 71

Sample 71

Instrument Development 72

Instrument Validation 75

Collection of Data 76

Data Analysis 78

IV. FINDINGS 82

Introduction 82

Automation 84

Automated library networking 89

Elements affecting participation in ALN 96

Relationship 105

Trends or recurring variables-case studies 114

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 133

Summary 133

Conclusions 138

General Recommendations 145

Recommendations for further study 146

Bibliography 148

Appendices

A. Cover letter and questionnaire sent to community college LRC directors 160

B. Letter outlining the purpose of the site visits with the interview guide 171

C. Letter to panel members for instrument validation 177

D. Follow-up letter to LRC directors 179

E. Tables 16 to 87 181

Vita 254

Abstract

LIST OF TABLES

1. Distribution of responses received from community college LRCs by state 83

2. State of automation and automated library networking in community college LRCs..... 85

3. The extent of present automated functions in community college LRCs 87

4. The extent of functions that LRCs planned to automate 88

5. Functions which were integrated into one automated/turnkey system 90

6. Number of participating LRCs in automated library networking used various types of networks 91

7. Number and percentages of participating LRCs in automated library networking that used the following services through different types of network systems..... 94

8. Number and percentages of LRCs in automated library networking that gained benefits due to participation 95

9. Types of problems encountered by the participating LRCs in automated library networking..... 97

10. Leading factors for participation in automated library networking 99

11. Involvement in network related activities which motivated LRCs to participate in automated library networking 100

12. Amount of funding received from agencies for automated library networking for a period

of one to ten years 102

13. Input provided by groups into decision making process for participation in automated library networking 103

14. Decision making groups that resisted participation of LRCs in automated library networking 104

15. Factors which contributed to non-participation in automated library networking 106

16. Analysis of relationship between automation and the location of the institutions 182

17. Analysis of relationship between automation and level of enrollment of the institutions 183

18. Analysis of relationship between automation and level of LRC collection sizes 184

19. Analysis of relationship between automation and level of LRC annual circulation of materials 185

20. Analysis of relationship between automation and level of LRC staff 186

21. Analysis of relationship between automation and level of LRC annual budget 187

22. Analysis of relationship between the extent of automated functions and the location of the institutions 188

23. Analysis of relationship between the extent of automated functions and the LRC collection sizes 189

24. Analysis of relationship between the extent of automated functions and the enrollment of the institutions 190

25. Analysis of relationship between the extent of automated functions and the annual circulation of materials 191

26. Analysis of relationship between the extent of automated functions and the level of LRC staff 192

27. Analysis of relationship between the extent of automated functions and the LRC annual budget 193

28. Analysis of relationship between automated library networking and the location of the institutions 194

29. Analysis of relationship between automated library networking and the level of enrollment of the institutions 195

30. Analysis of relationship between automated library networking and the level of LRC collection sizes 196

31. Analysis of relationship between automated library networking and the level of LRC annual circulation of materials 197

32. Analysis of relationship between automated library networking and the level of LRC staff 198

33. Analysis of relationship between automated library networking and the level of LRC annual budget 199

34. Analysis of relationship between the types of network participation and the location of the institutions 200

35. Analysis of relationship between the types of network participation and the enrollment of the institutions 201

36. Analysis of relationship between the types of network participation and the LRC collection sizes 202

37. Analysis of relationship between the types of network participation and the LRC

annual circulation of materials 203

38. Analysis of relationship between the types of network participation and the LRC staff 204

39. Analysis of relationship between the types of network participation and the LRC annual budget 205

40. Analysis of relationship between the functions and services used through networks and the location of the institutions 206

41. Analysis of relationship between the functions and services used through networks and the level of enrollment of the institutions 207

42. Analysis of relationship between the functions and services used through networks and the LRC collection sizes 208

43. Analysis of relationship between the functions and services used through networks and the level of LRC annual circulation of materials 209

44. Analysis of relationship between the functions and services used through networks and the level of LRC staff 210

45. Analysis of relationship between the functions and services used through network and the level of LRC annual budget 211

46. Analysis of relationship between the benefits gained due to participation in automated library networking and the location of the institutions 212

47. Analysis of relationship between the benefits gained due to participation in automated library networking and the level of enrollment of the institutions 213

48. Analysis of relationship between the benefits gained due to participation in automated library networking and the level of LRC

collection sizes 214

49. Analysis of relationship between the benefits gained due to participation in automated library networking and the level of LRC annual circulation of materials 215

50. Analysis of relationship between the benefits gained due to participation in automated library networking and the level of LRC staff 216

51. Analysis of relationship between the benefits gained due to participation in automated library networking and the level of LRC annual budget 217

52. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the location of the institutions 218

53. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the level of enrollment of the institutions 219

54. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the level of LRC collection sizes 220

55. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the level of LRC annual circulation of materials 221

56. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the level of LRC staff 222

57. Analysis of relationship between the problems encountered by LRCs due to participation in automated library networking and the level of LRC annual budget 223

58. Analysis of relationship between the leading factors for participating in automated library networking and the location of the institutions 224

59. Analysis of relationship between the leading factors for participating in automated library networking and the enrollment of the institutions 225

60. Analysis of relationship between the leading factors for participating in automated library networking and the LRC collection sizes 226

61. Analysis of relationship between the leading factors for participating in automated library networking and the annual circulation of materials 227

62. Analysis of relationship between the leading factors for participating in automated library networking and the number of LRC staff 228

63. Analysis of relationship between the leading factors for participating in automated library networking and the LRC annual budget 229

64. Analysis of relationship between the involvement in network related organizations or activities and the location of the institutions 230

65. Analysis of relationship between the involvement in network related organizations or activities and the level of enrollment of institutions 231

66. Analysis of relationship between the involvement in network related organizations or activities and the level of LRC collection sizes 232

67. Analysis of relationship between the involvement in network related organizations or activities and the level of LRC annual circulation of materials 233

68. Analysis of relationship between the involvement in network related organizations or activities and the level of LRC staff 234

69. Analysis of relationship between the involvement in network related organizations or activities and the LRC annual budget 235

70. Analysis of relationship between the groups providing input for participation and the location of the institutions 236

71. Analysis of relationship between the groups providing input for participation and the level of enrollment of the institutions 237

72. Analysis of relationship between the groups providing input for participation and the level of LRC collection sizes..... 238

73. Analysis of relationship between the groups providing input for participation and the level of LRC annual circulation of materials..... 239

74. Analysis of relationship between the groups providing input for participation and the level of LRC staff 240

75. Analysis of relationship between the groups providing input for participation and the level of LRC annual budget..... 241

76. Analysis of relationship between the groups resisting participation and the location of the institutions..... 242

77. Analysis of relationship between the groups resisting participation and the level of enrollment of the institutions 243

78. Analysis of relationship between the groups resisting participation and the level of LRC collection sizes..... 244

79. Analysis of relationship between the groups resisting participation and the level of LRC annual circulation of materials 245

80. Analysis of relationship between the groups

resisting participation and the level of LRC staff 246

81. Analysis of relationship between the groups resisting participation and the level of LRC annual budget 247

82. Analysis of relationship between the factors for non-participation and the level of enrollment of the institutions 248

83. Analysis of relationship between the factors for non-participation and the location of the institutions 249

84. Analysis of relationship between the factors for non-participation and the level of LRC collection sizes 250

85. Analysis of relationship between the factors for non-participation and level of LRC annual circulation of materials 251

86. Analysis of relationship between the factors for non-participation and the level of LRC staff 252

87. Analysis of relationship between the factors for non-participation and the level of LRC annual budget 253

AUTOMATED LIBRARY NETWORKING IN AMERICAN PUBLIC COMMUNITY COLLEGE LEARNING RESOURCES CENTERS

Chapter I

INTRODUCTION

Futurist Alvin Toffler (1980), in his book The Third Wave stated that our world is entering into the "electronic and information age." Electronic devices such as computers and telecommunications are changing American society dramatically (Gilley, 1983). The information age brought computer-based information services to center stage and it has profoundly affected information based activities such as education and libraries.

"As we approach the mid-1980s more information is being generated than ever before" (Boss, 1984, p. 1). Each year, between 35,000 and 40,000 books are published in the United States alone. In addition serials, government documents, foreign publications, and an increasing variety of special materials have to be considered by the librarian selecting for a collection (Martin, 1982). Peters (1979) describes this phenomenon in its relationship to libraries as an "information explosion." Each year an increasing amount of information becomes available online, on magnetic tape, on video disc or in some format other than traditional print (Boss, 1984).

In the past, libraries have attempted to serve their users from their own collections as much as possible. That has become impractical. It is clear that even the larger libraries are currently unable to acquire a

sufficient portion of the world's available materials and information to satisfy all of their users (Shaw, 1982). Limited physical facilities, rising costs, insufficient funding and personnel retrenchment have exacerbated this situation. Librarians, therefore, have been forced to seek better and more cost efficient devices to serve and meet the demands of their users. The use of computer-based devices and library networking was first considered to alleviate some of the problems in the area of library management such as resource sharing, acquisition, cataloging, circulation, serials control, inventory, reference assistance and other cooperative activities.

In the 1960s, librarians began adopting computerized technology, originally designed for scientific and business organizations, to library and information science uses (Maliconico & Fasana, 1979). In the 1970s, library networks came into existence, denoting the successful merger of telecommunications with computer data processing in a library environment. Today all automated library functions can be integrated and connected into one or more networks to facilitate sharing of resources and other activities via electronic linkage (Matthews, 1982).

The rise of networks in the library field is viewed by many as one of the great developments in modern library history (Kent, 1979). Basically, networks are online union catalogs of the holdings of member libraries (Becker, 1977). The development of these library networks was seen as a cooperative activity by the library community to alleviate the problems of limited access, slow processing, and unequal distribution of materials

among various libraries. Networks can be of substantial assistance to individual libraries by increasing the efficiency of bibliographic record production and by providing better bibliographic access to the holdings of other libraries.

It is evident that networking activities are an outgrowth of the information explosion, the advancement of technology, the escalating costs of needed resources, and the varying level of services and resources available to individuals by reason of geographic location or socio-economic position. It is also evident that by virtue of institutional variables such as size, budget, staff, and enrollment, larger libraries of the four-year colleges and universities have taken a substantial lead in the development and use of automated library networking activities. Four-year colleges and universities started their automated library operations with internal computer equipment and in-house programming. From an in-house system, the access to external databases and sharing of resources between other libraries were very limited. Recent advances in communication technology have removed these access barriers. Libraries now have a wider scope to conduct their activities through the process of automated library networking. In this process, a number of libraries can be linked via computer-driven telecommunications and may thus have access to external as well as internal bibliographical databases and to resources of other libraries.

The literature of librarianship is filled with information on various aspects of library networking activities in four-year colleges and

universities. In this literature considerable agreement exists on the positive aspects of library networking. However, there is very little published information available on library networking in community college learning resources centers (LRCs).

Statement of the Problem

Very little literature on the extent of community college LRC participation in automated library networking is available. New ways of discharging LRC functions and finding information through automated library networking are available and networking systems will continue to grow in the future. If community college LRCs are to consider automated library networking, there are few sources available to document the experiences of those community college LRCs which have been participating in automated library networking and to identify the problems which they have encountered or the scope of networking as practiced.

It is evident from the literature and from the personal experience of the researcher that the extent of automated library networking activities in community colleges is limited, and that little is known about those institutions which have engaged in significant automated library networking. Virtually nothing is known about the experiences of those LRCs which have undertaken large scale automated library network activities. This lack of knowledge may have inhibited the orderly growth of automated library networking in community college LRCs.

Based on background reading and on many discussions with

knowledgeable practitioners, the study focused on various aspects of community college LRC participation in automated library networking.

The Purpose of the Study

The purpose of this study was to examine the extent and value of community college LRC participation in automated library networking.

Since automation was a prerequisite to an automated library networking system, first the extent of automation, including integrated automation systems in community college LRCs, was examined. Next the major objectives were to identify factors which influenced or inhibited automated library networking participation, to identify the functions and services used with different types of networking systems, to identify benefits gained and problems encountered due to participation, sources of funding, and the involvement of LRCs in network related organizations and activities.

Secondary purposes of the study were to illuminate the influence of college staff in decisions related to automated library networking and to provide a basis for identifying trends and experiences common to LRCs participating in automated library networking.

Research Questions

Specifically the study addressed the following research questions:

1. What is the extent of automation available to support library networking?
2. What functions and services of LRCs are integrated into one

automated/turnkey system?

3. What is the extent of participation in different types of networks?
4. What functions and services of LRCs are used through different types of automated library networking systems?
5. What benefits have been gained due to participation in automated library networking?
6. What problems have been experienced due to participation in automated library networking?
7. What factors influenced the participation of LRCs in automated library networking?
8. What involvement and experiences in network related organizations and activities motivated participation in automated library networking?
9. What sources of funding have been used for developing and deploying automated library networking activities?
10. What groups were involved in the decision to participate or to resist participation in automated library networking?
11. What factors inhibited the participation of LRCs in automated library networking?
12. What relationship, if any, exists between the presence of automated library networking activities and selected institutional variables?

Need for the Study

The literature of librarianship indicated that participation in automated library networking provides relief from the problem of limited access to resources, slow processing of materials, escalating cost of operations, and unequal distribution of materials among the member libraries. Member libraries may derive benefits from resource sharing and bibliographical access to each other's catalogs.

Automated library networks in the United States are evolving rapidly. The Journal of the American Society for Information Science, American Libraries and Library Journal report new developments in almost every issue. An impressive amount of research exists in the broad area of network organization theory, but it hardly refers to the problems of the community college LRCs. Most studies of various networks superficially discuss the advantages and disadvantages of automated and online library networks in large systems (Matthews, 1979).

Given the scarcity of published information regarding automated library networking in community colleges, it appeared that community college librarians needed access to the experience of others if they were to explore the full potential of automated library networking activities to increase productivity and efficiency in LRC operations. National trends toward decreased enrollments and reduced resources (Brenemen & Nelson, 1981) further pointed out the fact that there was little likelihood of getting a significant increase in LRC budgets and personnel. The LRCs, therefore, had to find innovative approaches to utilize available resources more

efficiently and to offer a quality service at an affordable price. One such approach was the utilization of automated library networking systems. There were local, regional, state and national networking systems. These networks were available to community college LRCs. This study, then, was needed to provide data on the extent of automated library networking systems used by the participating community college LRCs.

This study was designed to add to the field of knowledge the extent of automated library networking activities available in community college LRC operations. It was the belief of the researcher and of the library profession that automated library networking systems have great potential benefits to libraries. It was equally obvious that these benefits had not been fully examined at the community college level. To address the problem, specific research questions were posed and yielded data which librarians should find useful when considering automated library networking activities for their LRCs.

Definition of Terms

Automated Library/Automation in Libraries: This term refers to mechanization of library activities that utilized data processing equipment and includes all work presently accomplished through the use of computer terminals (devices) in the library.

Automated Library Networking (ALN): A number of libraries or other organizations are interconnected via telecommunications with computer-controlled message switching and database access (Markuson &

Woolls, 1980). Local, regional, and state library network systems, linked by telecommunications, are designed and divided on the basis of political and/or geographical subdivisions to serve libraries located in a particular area, region or state. The national library networks have a large bibliographic union database and are made up of many members in a time sharing system who use and develop that database. Online Computer Library Center (OCLC), Research Library Information Network (RLIN), Washington Library Network (WLN), and University of Toronto Library Automated System (UTLAS) are some examples of automated library networks. These networks have nationwide application (Rice, 1984).

Community College: Community college, for this study, refers to public community, technical, and junior colleges accredited to award an associate degree in arts, science or occupational programs (Cohen & Brawer, 1982). This definition includes the comprehensive two year public colleges as well as public technical institutions in the 1985 directory of the American Association of Community and Junior Colleges.

Database: This is a collection of information organized into a file or files applicable to a specific need and accessible for use (Rice, 1984).

Electronic linkage: These include (1) Electronic devices which enable the ready sharing of bibliographical data between libraries (Rice, 1984), and (2) A device that facilitates interpretation of two or more systems, such as between data communications equipment and data processing equipment or terminal (Fullerton, 1978).

Functional Variables: All functional variables used in this study are

generally textbook definitions. These definitions were broadly applied to automation and automated library networking activities.

The cataloging module includes the online creation and update of bibliographic records and online transfer of data to and from the network union catalog database. The acquisition module handles the mechanics of processing orders for new items. Items could be selected and ordered directly from vendors through network organizations. The circulation module maintains records regarding the withdrawal of specified materials. A shared circulation system in a network set-up can retain local authority, while it benefits from the convenience and economy of being in a network. The interlibrary loan module enhances library communications online via network telecommunications to create, transmit and fill requests. Reference assistance is a service to assist library users in obtaining online access to requested information. Authority control is part of the cataloging module that provides libraries online access to records for maintaining standardization with regards to author, title, subject headings, etc. from the network database.

Online public access catalog allows users to access library or network databases through self-service terminals. Administrative control function produces a number of reports for management use. The serials control module is an order/inventory control activity that performs serials check-in, subscription renewals, claiming and tracking the status of a publication.

Cooperative collection development agreements among network

members are operated to expedite ILL and provide delivery services for the users of network member libraries. Union catalog, union lists of serials, and union lists of audiovisual databases are generated and maintained by the network organizations for the use of member libraries. Resource sharing is a service to extend the capacity of any one library to deliver information to users from other libraries under a formal agreement among network members. This process leads to cooperative collection development and interlibrary loan. Therefore, these three definitions are closely related (Kent and Galvin, 1979).

Integrated/Turnkey System: A number of LRC functions consolidated into an automated library system is defined as an integrated system. Turnkey is a stand alone automated library system which includes hardware, software, installation, training and ongoing support. With the turnkey system, the LRC has total control over the computer, peripheral equipment and software (Boss, 1984).

Institutional Variables: As used in this study, institutional variables include: enrollment, LRC collection size, circulation of materials, size of budget, and number of LRC staff.

Learning Resources Center (LRC): The LRC has been identified as "an administrative unit of the community college or campus which integrates printed and non-printed forms of instructional resources and the necessary equipment and services to permit their utilization." (Guidelines for Two-Year College Learning Resources Programs, 1981, p. 266).

Network: A network can be defined as a group of organizations

which is linked through computers and a telecommunications system. In the library world, institutions form networks primarily to achieve sharing of resources, consisting both of bibliographic information and collections (Martin, 1978). There are networks at various levels such as local, state, regional (multistate) and national. Local library networks may cover a single city, surrounding counties, or portions of a state. State library networks include the entire geographical boundary of a state. Regional (multistate) library networks may group a number of libraries together on a multistate or regional basis to form a network. SOLINET is an example of a multistate network (Palmour & Roderer, 1978). At present there is no national library network system available. OCLC can be considered a defecto national network which provides services all across the United States and to many foreign countries.

Networking Activities: Cooperative activities by networks are those mutually-beneficial activities which a group of libraries collectively agrees to pursue through a formal agreement. Service linkage among participating libraries is provided to discharge cooperative activities. Networking activities for this study will include joint collection development, common bibliographic database used for acquisition, cataloging, circulation, serials control, reference assistance, resource sharing, and interlibrary loan.

Online: A system in which data are entered directly into the computer as it is generated, as opposed to batch processing. Online may also refer to an ability to access computer records directly from a computer terminal, rather than waiting for printed output.

Telecommunications: (1) The transmission of signals over long distances, such as by telegraph, radio or television, microwave transmission, communications satellites; (2) Data transmission between computing system and remotely located devices via a unit that performs the necessary format conversion and controls the rate of transmission (Rice, 1984).

Delimitations

This study was conducted in light of the following delimitations:

1. The geographic area covered in this study was confined to Alabama, Georgia, Florida, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. These states fall into the geographic subdivision of the Southern Library Network (SOLINET) which acts as a broker for OCLC Online Library Center, Inc.

2. The population surveyed was confined to public community college learning resources centers.

3. The institutional type included American public community colleges listed in the 1985 directory of the American Association of Community and Junior Colleges (AACJC).

4. For this study automated library networks referred to local, regional, state and national networks. With regard to national networks, this study dealt only with OCLC. OCLC has a nationwide application and is used by all types of libraries. Since RLIN is specifically designed for research libraries and UTLAS is primarily used by Canadian libraries, these

networks remained beyond the scope of this study.

5. Upon receipt of the returned questionnaire in the first phase, those LRCs which had no automation were dropped from the study.

Limitations

A survey research approach was chosen to conduct this study. The limitation of this approach is the lack of opportunity to gather further clarification from respondents on specific survey questions without additional resources, time and effort.

The survey questionnaire did not include definitions of the functional variables. Because of differences in interpretation, there might be a possibility of inconsistency in responses to the questionnaire even though most of the functional variables are textbook definitions. Such possibility is somewhat greater in interlibrary loan, cooperative collection development, and resource sharing, since these functions are very closely related in their purpose and objectivity.

Organization of the Study

This study is organized into five chapters. The first chapter includes the introduction and background, statement of the problem, purpose statement, research questions, need for the study, delimitations, limitations and organization of the study. Chapter two presents a review of literature as it relates to automated library networking and community college LRCs. Chapter three details the methodology and design of the

study, the population, the instrumentation, collection and treatment of the data. Chapter four reports the findings and analysis of the data. Chapter five has a summary, conclusion, and recommendations.

Chapter II

REVIEW OF LITERATURE

Introduction to Learning Resources Center

Since World War II, with advancements in the American educational system and technology, the role of community college libraries has gone through many changes. The library and the audiovisual center joined hands and formed an integrated administrative unit called the Learning Resources Center (LRC) (Burlingame, Fields, & Schulzetenberg, 1978). The learning resources center program was developed on the assumption that no one medium of communication is adequate for disseminating information in teaching and learning. Only the use of a wide variety of media, materials, equipment, and approaches can insure that the weaknesses of one approach could be compensated for with the strengths of other approaches. A realistic solution to the problem was to make all resources and services available through a unified program provided by the LRC (Carnegie Commission on Higher Education, 1972). After a decade of development and consolidation, the LRC has gone through dramatic changes in the areas of librarianship, information access and retrieval, and technology. The LRC of today can be characterized as an information network and instructional support system. Dealing with the unprecedented volume of information and meeting the demands of its users, the LRC is faced with further challenges of adapting to new developments such as bibliographical databases, online services and automated library networks (Terwillinger, 1982).

Automation

The industrial society has changed to an information society (Dizard, 1982). This shift has generated new technological devices which offer a wide range of communication resources such as digital information technologies, text and graphics and static and dynamic visual information. Libraries may collect and disseminate these resources, just as they have traditionally collected paper-based resources. These information technologies will create new patterns for the collection, distribution and use of information. They will also create new opportunities and challenges for libraries.

Lancaster (1982), supported this argument and reported that the present society is going through a transition period in order to adopt to a life-style without the use of paper. Lancaster's perspective is that the current society which has been based almost exclusively on paper formats is now shifting to embrace electronic formats. During this transitory period, automation is used to print on paper and the resulting publication is then distributed in a conventional manner. Printed databases exist side by side with machine readable equivalents, but one has not yet replaced the other. Branscomb (1979) explained this trend further and declared the present information oriented society to be on the verge of the "ultimate frontier." To him this frontier is advancing through four areas of technology: telecommunications, computers, video, and cable televisions.

These technological advances have influenced library operations and have increased the efficiency, productivity, and flexibility of many aspects

of library operations (Montague, 1978). Demand for new information services is increasing steadily. Automated operating costs are beginning to decrease or stabilize. These significant developments have greatly influenced the process of accessing resources (Rouse & Rouse, 1977). Effective management, in conjunction with the availability and use of modern technology today, enables librarians to provide services at a level previously unattainable (Cortez, 1983).

Development of Library Automation

The whole automation phenomenon began with a librarian. Herman Hollerith, the Census Bureau employee who invented punched-card machinery, attributed the idea to a suggestion by Dr. John Shaw Billings, Director of the Surgeon General's Library which is now the National Library of Medicine (Salmon, 1975). Billings' encouragement of Hollerith's suggestion provided incentive for the 1890 invention of the equipment to process the familiar punched cards. In 1896 Hollerith opened his own industry, now known as the International Business Machines Corporation. The concept of mechanized handling of information was thus a part of the library tradition (Hayes & Becker, 1974). From the inception of the punched cards to the automation era, librarians expressed moderate interest in mechanized systems for their libraries (Encyclopedia of Library and Information Science, 1975). As early as 1936, Ralph Parker developed an automated circulation system using punched cards at the University of Texas. That system has had many refinements, and various circulation

systems all over the United States have used that processing method as a model. Later, acquisitions, serials, and other library operations were automated. It was quickly realized by systems planners that the punched card was limited as a storage medium since cards allow a maximum of only eighty characters (Rice, 1984). However, it provided the basis for an automated system.

Sporadic and scattered experiments were conducted in various libraries from the 1950 to early 1960. The limited capability of computers and the lack of provision for storing the data kept librarians from accepting computers wholeheartedly for library activities. A primary inhibiting factor in the development of computer based library systems was the lack of a coding scheme to suit library needs for the conversion of nonnumerical data. Also, the high price of hardware was beyond the reach of many libraries. Only a few large libraries could consider such a luxury (Salmon, 1975).

Since 1961, research and development in the computer field have proliferated rapidly. There were major advances in the following areas:

1. The ability to store greater amounts of information in the computer's memory,
2. The speed of processing information,
3. The miniaturization of computer hardware,
4. The ability to use instructions based on natural language,
5. The ability of the computer to interact with a variety of input/output remote terminals (Hayes and Becker, 1974).

Steady declines in the costs of computer equipment, peripherals and other related equipment and steady increases in the power and sophistication of small computers made it possible for many small libraries to automate or to consider automation (Lundeen & Davis, 1982). DeGennaro (1983) wrote that:

> We are well into our third decade of library automation. The first decade, the 1960s, was dominated by primitive local systems. The second decade, the 1970s, was dominated by large multi-type and multi-purpose library networks. The current and third decade, the 1980s, will be dominated by a return to local systems, but this time they will be sophisticated multi-functional turnkeys or integrated systems on mini and micro-computers; and they will have lines to a variety of library and commerical networks on large mainframes (p. 629).

In 1962, Schultheiss, Culberton, and Heiliger published a study on the potential of advanced data processing in university libraries. The study concluded that the speed of computers and the wide range of routines that they can handle offer possibilities for alleviating the pressures of personnel shortages and turnover of staff, of increased volumes of inventory and user activity, and of getting more up-to-date records. In general this rationale explains why libraries become involved in automation.

A survey in 1971 conducted by Markuson and others showed various applications throughout the library:

Applications	Total Number of Libraries
Acquisitions	129
Cataloging	104
Circulation	149
Serials	169
Administration and Management	39
Abstracting and Indexing	23
Bibliography and Special Cataloging	87
Dissemination	40
Information Retrieval	34

Several developments further helped the advancement of library automation efforts: 1) the organization of such groups as the Council on Library Resources, the Office of Science Information Service of the National Science Foundation, and the Committee on Scientific and Technical Information; 2) the appropriations from major federal library legislation; 3) the formation of such associations as the Information Science and Automation Division of the American Society for Information Science; 4) and the development of the Library of Congress MARC Communications Format for bibliographic data.

National library and information related organizations supported and coordinated the development of library automation efforts. The Council on Library Resources Association particularly supported basic research, technological development and cooperative enterprises in library automation. Numerous state and regional organizations began at the same

time for the purpose of promoting various aspects of automated library services. To support these efforts, federal funds under Title III grants were available to individual libraries as well as library organizations to develop automated library systems. The single greatest impact on library automation was from the introduction of the MARC (Machine-Readable Cataloging) format for bibliographical data developed by the Library of Congress. MARC format made it easier for national and international exchange of bibliographical data (Hayes & Becker, 1974). These developments focused attention on library automation.

Need for Library Automation

Like many units within colleges and universities, libraries face numerous challenges. Financial cutbacks and inflation have reduced funds for acquisition, staff, equipment, and buildings at a time when the volume of publications produced annually continues to increase (McDonald & Hurowitz, 1982). Library managers, with the fiscal constraints of the last several years, have actually become aware of the need to maximize diminishing resources while making decisions regarding their use and allocation. Decision making has become a critical part of everyday library management and is an invaluable skill of managers (Cortez, 1983). Through automation, libraries can meet these challenges in three ways. First, computers can assume many of the repetitive clerical tasks that are prevalent in libraries. Second, the speed and precision of information retrieval can be improved through the use of computers. Third,

cooperative ventures previously considered impossible can be feasible.

Veaner (1970) also gave three practical reasons for automating library functions:

1. To do something less expensively, more accurately, or more rapidly;
2. To do something that can no longer be done effectively in the manual system because of increased complexity or overwhelming volume of operations;
3. To perform some functions that cannot now be performed in the manual system, providing always that the administrator actually wants to perform the service, has the resources to pay for it, and is not endangering the performance of existing services for which there is an established demand.

The Extent of Automation in Academic Libraries

This historical overview reflects the major developments of automation in university libraries from its inception in the 1930s to the present. The first attempt to automate library systems was the installation of a punched-card circulation system at the University of Texas in 1936. Since then there has been a great deal of research in other functions of library operations (Salmon, 1975).

The Virginia Tech Library System (VTLS), developed at Virginia Polytechnic Institute and State University, has been in use since 1976. It totally integrated the library processing system which incorporated

circulation, acquisitions, serials control, and an online catalog. All these capabilities were streamlined based on the MARC format (Metz, 1981).

The Northwestern University Library decided to develop an integrated system which incorporated circulation, cataloging, acquisitions, and user access functions in one database. The result was the Northwestern Online Total Integrated System, known as NOTIS. University of Denver Library patrons have been able to consult a serials management system online for about 15,000 serial titles since 1976. The system has capabilities to receive or change the status of current issues, to access and update any data element, to add new titles or cross references, to maintain payment and bindery information, and to predict the receipt of future issues (Culkin, 1981).

In 1981 Cooper Library of Clemson University reviewed twenty-nine library automated systems throughout the country to determine the most appropriate system for Clemson's needs. It decided to replicate the Northwestern University NOTIS System for its versatility and its "stand alone" capabilities for a total integrated library information system. Access to periodical materials was particularly cumbersome and was the source of considerable user frustration. The automated system primarily was considered because modern computer assisted procedures and techniques were needed to provide adequate service to library users (Meyer & Alexander, 1981).

Research and development of automated systems in the 1960s and early 1970s were conducted mostly by research libraries. Stussy (1981) in

her survey of 105 Catholic college libraries, found that there was very little automation in the smaller libraries, but a desire to introduce automation on the part of some library directors existed. Several respondents felt that automation was not feasible in small libraries and two directors were completely satisfied with their all-manual operations. The main finding of the survey was that network membership and grant funding were vital to library automation in small colleges.

As stated previously, there is a lack of literature in the area of community college automation and networking. Reeves (1973), in her study of junior college automation, found that only 27 percent of the institutions reported automation in one or more areas of operation. The study, however, provided no detail on types and mode of automation in various areas. Based on the small amount of literature available, it is obvious that community colleges heavily rely on automated activities and systems designed by "large academic libraries."

For many years, the researcher's own college's LRC, J. Sargeant Reynolds Community College (JSRCC), had an acquisition function automated in-house but was unable to have a full-fledged library automation system due to lack of funds. The LRC directors kept looking for alternative financial approaches within reach of the college. Such opportunity arose in 1985 when the college entered an agreement with Virginia State Library and became a part of the State Library automated network system. This was the first such cooperative and networking agreement between the State Library and a community college in

Virginia. Now, JSRCC is in a position to be completely automated in circulation, cataloging and acquisition functions. Subject to future availability of additional terminals and computer space, JSRCC will be able to provide direct public access to an online database.

Operational and Functional Variables

The types and numbers of library operations and functions automated determine the library services and cooperative activities. In the broadest sense, libraries which are automated or are planning to automate generally concentrate on acquisition, cataloging, circulation, record keeping, and reference service functions. According to Atkinson (1972) there are various types of circulation systems, but an online circulation system is preferred by librarians due to fast service and instant feedback. Many online systems allow users to enter bibliographic information into their records. The Virginia Tech Library System (Metz, 1981) incorporates and integrates circulation control and an online catalog. It has many features including capacity to hold, to recall, and to discriminate between various departmental libraries in a library system.

Serials are the most tedious documents to keep in order and maintain accurate and proper control of receipt and distribution. An increasing number of research and academic libraries are automating serials holdings. The largest attempt to automate serials was started by the Council of Library Resources and later handed over to the Library of Congress. Northwestern University Library developed a serial automation

system along with other automated activities of library operations, and users can have access to serials as well as other materials in one database (Veneziano, 1981).

The cataloging of library materials has gone through several changes. It started with handwritten index cards and moved through typed cards, book catalogs and computer output microform (COM) catalogs and online catalogs. All of these are basically the same devices with different formats, each with certain advantages and limitations in terms of usage, time, cost, and maintenance (Gorman, 1980). The online catalog is the logical outgrowth of automation. The cataloger enters catalog information on the database. Catalog information could be derived either from an existing network database, LC MARC database, or by original cataloging based on the established Anglo-American Cataloging Rules 2 (AACR2) (American Library Association, 1984). Increasingly, college and university libraries are adopting online cataloging processes for easy access, accuracy and economy of time and costs (McAllister & McAllister, 1983).

Another function, probably the most important function of the library, is reference and information service; this can be provided online. This service can be provided from one's own database or from many other existing non-profit databases. According to the 1982 database directory, there are 773 databases with some 70 million reference sources (Williams, 1982). This vast resource is feasible and affordable within a reasonable cost through online processes and cooperative resource sharing. The online process brings resources within easy reach of individuals using smaller

libraries.

The area of acquisitions has increasingly been automated in recent years, especially by research and larger libraries. The major benefit of automated acquisitions is the ability to follow-up on outstanding orders and items in process. Such information can be easily integrated with an online catalog to assist patrons in learning about the status of items on order (Rice, 1984). Libraries can also benefit from an automated acquisition function in terms of collection evaluation through bibliographical networks which maintain records on the holding of libraries for a given item. Frequent order records in a system can indicate the quality or popularity of items in other collections. Research Library Information Network (RLIN) has implemented a system called the Conspectus Online. It enables libraries to compare their collections with those of others, both for purposes of collection evaluation and cooperative acquisitions (Magnuson, 1983).

Online Automated Processing Systems

Online automated processing systems expedite all phases of library operations. Through online processing the computer can deliver the necessary output at the same time the actual transaction is completed. For example, an online circulation system has instant up-to-date circulation information available and is ready to complete the next transaction at once. With the development of online systems, it is no longer necessary to store records on cards. Data could be input as

transactions occurred, organized with a standardized record format, and stored on disk or tapes. Then, when information was needed from the automated system, it was retrieved through interactive online processing using computer terminals (CRTs). Online computing evolved into time-sharing systems in which many (sometimes thousands) terminals could be connected to a single computer system with a computerized database and multi-purpose software (Rice, 1984).

In her nationwide study of 209 academic, public and special libraries with online services, Murphy (1981) found there was a high measure of interest in online searching. However, the majority of the respondents indicated that they did not have online capacity in-house but referred all requests for searches to other institutions. Forty-nine percent of the academic libraries responding ran online searches (Murphy, 1981).

Markuson (1976), in her major study, The Ohio College Library Center: A Study of the Factors Affecting the Adoption of Libraries to Online Networks, developed a three part questionnaire and sent it to 151 participating libraries. Top administrators, middle management, and terminal operators were surveyed separately to find out why libraries join networks, how online operations affect costs, staffing, production and work flow, how the transition to online operations has been handled, and whether staff members like or dislike the use of a CRT (Cathode Ray Tube) terminal for file access. The majority of top administrators either agreed or strongly agreed that the online network was more cost effective than the previous operation. They also agreed or strongly agreed that "overall"

the online system had greatly improved the efficiency of technical processing operations. The survey of middle management particularly provided valuable information on the effects of an online system in areas other than cataloging. Cataloging was seen as the area most affected by being online followed by acquisitions and resource sharing. The majority of the respondents felt that an online system created a moderate to major impact on searching for catalog copy, acquisitions and pre-order searching. Other significant benefits were general resource sharing and interlibrary loan.

In his doctoral dissertation, The Impact of Online Cataloging On the Operation of Academic Libraries: A Study of the Charter Members of the Ohio College Library Center, Hewitt (1976) reported that online operations increased speed in pre-order verification and dramatically reduced the time required to catalog a book. In addition, respondents in this dissertation reported that they experienced staff reductions. Small libraries in particular reported a greater proportion of staff savings than their larger counterparts. They, however, failed to identify precise measurement of staff savings in specific areas of their operations.

Integration and Turnkey System

The successful implementation of online library activities led to further developments of integrated and turnkey library automation systems. The concept of integrated and turnkey library systems was the outgrowth of a number of automated library functions. In an integrated

system, instead of automating one function (e.g. circulation) a database of the inventory record is created and several functions are automated into one system.

The most noteworthy example of integrated library automation is at the National Library of Medicine (NLM) called the Integrated Library System (ILS). This was developed over a three year period and released in 1981. This system successfully automated circulation, acquisitions, serials, catalog access, inventory bibliographic control, administration and other functions. The software for ILS is available from the National Technical Information Service. It is applicable to all types of libraries, especially small and medium-sized ones. With consultation advice from the two designated vendors for purchasing and installation of equipment and system organization, a library could be self-sufficient with an operational integrated library automation system (Matthews, 1983). In the national scene, bibliographic network utilities such as OCLC, RLIN, and WLN have integrated library automation systems and have been providing online integrated library services to member libraries. One big advantage of integrated automation for libraries and networks is more processing, editing, manipulating of records, and inputting can be handled at the local level. Network access and the resulting long distance interactive telecommunications were minimized (Rice, 1984).

Matthews (1983) reported that:

> As the size of the integrated systems increased, so did the frequency with which a system is shared by two or more libraries. In all, some

> 65 (18%) of the total number of installed systems (365) are shared by two or more libraries. These groups of libraries, known as cooperative, clusters, consortia, etc., are sharing in the initial and continuing fixed costs of an automated library system. Automated circulation systems are dying and integrated automated library systems are emerging. Systems that only perform one function are becoming less common and more libraries are asking for an automated system that will not only perform circulation control but can handle acquisitions, serials control, public access, online catalog functions, reference assistance, and database maintenance as well. This does not mean that libraries plan to implement integrated systems immediately, but they will have components and capabilities when they want to utilize them (p. 547).

Matthews (1982) further pointed out that computer system economies of scale play an important role. A computer has high initial and continuing fixed costs. These costs cover the central processing unit (CPU), auxiliary disk storage, software, and peripheral equipment for its application. But after the basic system is operating, additional CPU memory and disk storages are available at marginal costs. Functions such as acquisitions and a public access catalog can be provided at a lower per unit cost than if separate computer systems are dedicated to different functions. In addition, an integrated system saves money in operating costs and personnel. Reassigning library staff whose tasks have been absorbed by the computer is a necessary policy decision in many cases. However,

rather than pursue saving as an end in itself, some libraries have used money saved through automation to improve existing services, restore services cut by previous budget reductions, or provide new services. For example, at the Claremont (California) College Libraries, 32 positions were eliminated but the library materials budget was increased after implementing Claremont's Total Library System.

The turnkey system, generally supplied by a vendor with the "complete" package of hardware, software installation, and training support, continues to gain in popularity both as measured by the number of new computer systems installed in 1983 and by the entry of an additional 99 new firms in 1983 (Matthews, 1983). During the 1980s, a number of libraries that had developed their turnkey library systems marketed them and sold them to other libraries. The Virginia Tech Library System (VTLS), for example, was originally developed with no thought of being marketed to other libraries. Yet, given the availability of mini-computers (HP 3000) in some library environments, many libraries purchased the VTLS software. In early 1984, Hewlett Packard (HP) and Virginia Tech reached an agreement whereby HP would market and Virginia Tech staff would install and maintain the Virginia Tech Library System.

Network Revolution

Several factors contributed to the development of library networks. Among those of major importance were the increased volume of published materials, the emergence of telecommunications technology, the

decreased purchasing power of individual libraries, the increased operating costs, and economic considerations.

Institutions form library networks primarily to achieve better sharing of resources and better service to users. Those institutions using computers online and linking member libraries via telecommunications are in a better position to provide speedy and efficient services to their users (Martin, 1978).

Library networks are simply a further extension of the larger and older process of library cooperation. In the 20th century library cooperation has accelerated and grown at all levels far beyond anything achieved previously in the library field. This is due to changes in society which have placed extremely heavy demands on the individual library manipulation and communication of information. In addition, the equal access of libraries resources to all age groups and races, the amount of information and the need to obtain it, the continuity of inadequate library budgets, the high costs of materials, and personnel have pointed out that it will be increasingly difficult for an individual library or a libray system to meet the varied demands from its own resources. The appropriate response, therefore, is to combine efforts and share resources (Computer Company, 1980).

Resource sharing is probably the most common objective ascribed to library networking. The ability to have access quickly to another library's bibliographic records is a real impetus for the sharing of collections. Networking provides the communications system for immediate location of

the bibliographic data: the faster and more accurate the transmission, the more effective the resource-sharing system. Another justification for library networking is greater utilization of less used materials among member libraries. An individual library can have access to these materials through online networks with minimal costs. In many cases valuable and expensive sources of information available in libraries are being underused due to a lack of bibliographical access. These sources could be better utilized by member libraries through the process of automated library networking systems (Rouse & Rouse, 1980).

The source of funding is a very important issue in networking. Federal funds have not been available on a steady basis. Another source of funding has been state agencies which generally support networks through specific budget items and grant funds. The Illinois Library and Information Network (ILLINET) is funded from the budget of the state library which utilizes both state and federal funds. ILLINET also gets further assistance to support research and development projects which are intended to improve the overall quality and efficiency of network services (Rouse & Rouse, 1980). Another source of funds for networks is local funds, which might be drawn from the local tax base.

Automated library networks enable libraries to share the development and use of sophisticated online computer technology without incurring the full burden of development and operational costs. The use of networks enables libraries - particularly the larger libraries - to significantly reduce their cataloging and technical processing costs.

Network participation permits libraries to gain timely and efficient access to information about bibliographic resources from other libraries through powerful online search capabilities. It also permits more rapid and effective resource sharing via online interlibrary loan systems. The increased speed of access and the increased confidence in the availability of resources held elsewhere in the network enable libraries to gain increased flexibility in the spending of their book and journal funds. It permits them to spend their funds on the books and journals that are most used and most needed by their local clientele and to rely on other libraries for lesser used materials (DeGennaro, 1980).

Palmour, Bellassai and Roderer (1974), in their final report to the National Commission on Library and Information, addressed the problem of library resource sharing and recommended a nationwide program of cooperation among libraries. This report envisioned a linkage of a national library network with the private sector through the cooperation of libraries with publishers, vendors, and computer retrieval services in support of coordinated programs for better access to materials and services.

Over the last fifteen years, while no comprehensive national network system has materialized, several different approaches have been taken to automate library networking systems. These approaches have ranged from the mechanization of various individual processes to fully integrated library systems. Library networks and cooperation have found their most dynamic expression in the formation of various online, interactive networks, such as OCLC, WLN, RLIN, etc. These networks

were created through the shared cataloging data of individual member libraries and those of the Library of Congress through its machine-readable cataloging service (MARC) (Becker, 1977). The development of these networks is seen as an attempt by the library community to solve some of the problems inherent in the current system of limited distribution of research materials among various libraries.

The brief history of existing networks has shown that these networks can be of substantial assistance to individual libraries by increasing the efficiency of bibliographic record production and by providing better bibliographic access to the holdings of other libraries. The rise of networks can be viewed as one of the great innovations in modern library history (Kent, 1979).

Levels of Networks

There have been steady developments of networks at various levels such as local, regional, state, and national. Each level has its specific aims and objectives to meet the particular needs of its member libraries.

Local Level. Within the states, a large variety of local networks are in operation and often serve as the components from which a state-wide network is developed. Local networks may cover a single city, county or extend to a significant portion of a state. Their level of formality usually increases with size. At the local level, reciprocal borrowing is frequently provided and there are a number of delivery systems for rapid interlibrary loans (Palmour & Roderer, 1978).

The University of Pittsburgh developed an integrated automated library network to link six local libraries in the Pittsburgh area. These six libraries are at Chatham College, California State College, the University of Pittsburgh, Carlow College, Westminister College, and Point Park College. The services provided by the network include acquisitions, cataloging, interlibrary loan, mail, reporting, and online public-access catalog. The development of the network was funded by the Buhl Foundation and the University of Pittsburgh. The network system is called the Western Pennsylvania Network (WEBNET) (Peck, 1981).

One academic and five public libraries in the Tidewater region conducted an extensive analysis to cope with new demands to acquire technology which would improve their overall performance and increase staff productivity. Without new technology to aid library operations in the Tidewater region, these libraries had to use manual methods to circulate over 3 million books to their constituents, manage a collection of over 1 million items, and acquire and catalog 140,000 new books each year with a staff of less than 250 people. As a result of the analysis, Fullerton (1978) reported that a cost effective computer-based library network be established in the area. With the concurrence of the six original participants, the scope of this study was expanded to include community colleges and four year institutions. The proposed plan was to implement the network in three phases of unspecified direction. However, the organization remained loose and unestablished due to various factors.

State Level. The publication entitled Toward a National Program

for Library and Information Sciences by the National Commission on Libraries and Information Science (1975), placed heavy emphasis on the role of the states and the state library agencies in the establishment of a national network. Many states now have operational systems or networks in harmony with the commission's program. The publication lists the program of responsibilities of the states as well as those of the federal government in specific areas including funding, planning, network development, program and technical support, research, education, promotion, and evaluation.

Library Services and Construction Act (LSCA) funds provided by the federal government and administered primarily at the state level gave further incentive to develop network projects. In particular LSCA Title III, which provided funds to states to establish and maintain local, regional, state or interstate networks of libraries for systematic and effective coordination of the resources of school, public, academic, and special libraries or special information centers, has played a significant role despite a rather minimal level of funding (Casey, 1974).

Today networking activities of some type can be found in most of the states and new developments are happening frequently. Many state library agencies are now developing plans for statewide network services that rely on and interface with regional networks and the national bibliographical utilities. Indiana created the Indiana Cooperative Library Services Authority (INCOLSA). INCOLSA is an independent organization formed under state legislation enabling libraries to create cooperatives

(Markuson, 1979).

Often cited as models of networking within states are New York, Illinois, California, and Washington, each with considerable history of network development (Butler, 1975). New York has one of the longest traditions of networking, but budget cuts forced them to reorganize and put a new focus on multitype library cooperation, emphasizing activities rather than type of library. Before the reorganization, networking systems were grouped according to the types of libraries such as academic, public, etc. (Humphrey, 1976).

In 1973 Washington placed considerable emphasis on the conversion of the Washington Library Network (WLN) computer system to an online mode. The state legislature created a data processing authority under whose auspices a library automation committee was formed with representatives from academic libraries, public libraries, and the state library. The committee was charged with overseeing the development of an integrated computer system to assist the operations of all libraries. The priorities were set for cataloging, acquisitions, circulation, and serials control subsystems respectively (Reed, 1979). Today, WLN has completed automation on all phases of networking processes, and, in addition to meeting the needs of the State provide services to some western and pacific states.

In 1982 Virginia enacted legislation creating the Commission of a State Library Networking System. The commission was asked to study the feasibility and desirability of a state library networking system which

would act as an interlibrary loan center for all collections in the network district; maintain and distribute an up-to-date union catalog of books, materials, and periodical holdings in the network district; promote staff and collection development among the members including the initiation and supervision of cooperative buying systems as desired by the members; keep membership records; collect and disburse any records related to membership in the network district; develop a delivery system for interlibrary loans; provide centralized acquisitions and processing if desired by membership; develop a plan for reimbursement for materials interlibrary loaned if that is desired by the network district membership; and develop a plan for cross-district cooperation (Commonwealth of Virginia, 1981).

The development of networks has been one of the major accomplishments of Missouri libraries. The Missouri State Network Plan which was adopted by the Missouri Library Association (1977) and endorsed by the Coordinating Board for Higher Education, stated that the goal of networking is "to make information resources available to every Missouri citizen through cooperation of all types of libraries" (p. 1). To this end, the major activities of the networks have been the identification, access, and delivery of resources (Missouri Library Association, 1977). One of the priorities identified in the Missouri State Network Plan was the assessment of the need for a machine-readable database of library materials, print and non-print, located throughout the state. A database containing bibliographic records of library materials would offer the possibility of improving access to existing resources for all users by making widely

available current information on the holdings of the state's libraries.

Glazier (1985), Director of the West Virginia Library Commission, boasted that the "electronic highways, having replaced the often tortuous library lanes, are transporting bibliographic information, holdings, and related library data throughout the state via an uniform library automation system which contains and distributes the collected holdings of all libraries" (p. 64) in West Virginia. This system was based on the plan submitted by Chachra (1981) to the West Virginia Library Commission. The plan included a statewide library network to aid in the development of automated library activities and systems. The Commission accepted the plan and selected VTLS software, the Hewlett Packard 3000 Series and their database management system. Within a two-year period, over one-half million entries representing one million records were entered into the database. Presently, seven public library connections provide geographic coverage of the state. Through the shared system concept, 15 counties are now part of the program. Plans have been developed to bring in remaining county libraries under the system. VTLS expects that Network Intelligent Links System will enable each library to search the Commission's Union database, tag their records, and then download the records to their own CPU and local file.

Other examples of networking activities at the state level are the Louisiana Numerical Register, the Ohio Regional Library and Information System, the State Library Commission of Iowa, the Rhode Island Interrelated Library Network, the Alabama Public Service Pilot projects

for multitype library cooperatives; the proposed Oklahoma Library Network, and the New Hampshire Centralized Catalog Card Service (Evans, 1982).

Regional Level. Libraries often group together on a multistate or regional basis to form a network. The rational for this may relate to an already established regional pattern of cooperation, or it may be a matter of forming a group to gain access to network services such as those of OCLC. Most of the regional networks in existence today are based on a combination of these forces (Palmour & Roderer, 1978).

Many regional networks, also known as brokers, are organizations that contract to provide OCLC services to their member libraries. OCLC works closely with these networks in support of mutual cooperation and resource-sharing goals. These networks provide the basic means by which OCLC furnishes support services to users of the OCLC system. Presently there are twenty regional networks which, in addition to other services, provide OCLC services to their members. Some of these networks are the Association for Library Information, AMIGO Bibliographic Council, Bibliographic Center for Research, Capital Consortia Network, Federal Library Committee, ILLINET Bibliographic Database Service, Indiana Cooperative Library Services Authority (INCOLSA), Michigan Library Consortium, Minnesota Interlibrary Telecommunications Exchange, Missouri Library Network Cooperation, Nebraska Library Commission, OCLC/Europe, OCLC Pacific Network, OHIONET, PALINET, Pittsburgh Regional Library Center, Southern Library Network (SOLINET), State

University of New York (SUNY)/OCLC, and Wisconsin Interlibrary Services (OCLC, 1984).

The most healthy of the groups appear to be SOLINET, AMIGOS, and SUNY/OCLC. SOLINET was one of the earliest of the regional systems to form and take advantage of the new computer technology. From 1972 to 1983 SOLINET grew to include over three hundred member institutions from ten Southeastern states. A recent letter to the researcher indicates that SOLINET currently serves over 400 libraries in the ten Southeastern states. Every SOLINET member has access to the OCLC database. SOLINET members use the database to catalog materials, order catalog cards, verify bibliographic data needed in reference or acquisitions and to participate in interlibrary loan, acquisitions, serials check-in and union listing activities. In addition to borrowing OCLC services, SOLINET has added services of its own including online access to member libraries information, a retrospective conversion program, batch services, and discounted rates for Bibliographic Retrieval Services (BRS), DIALOG Information Services, SDE Orbit, and UMI Article Clearinghouse Services (Chapesuik & Tarlton, 1983).

National Level. Library and information services, including automation, were developing around the United States in a somewhat desperate and uncoordinated way. By legislative action in 1970, the Congress established the National Commission on Libraries and Information Science (NCLIS) to coordinate and plan library service within a national framework. A Network Advisory Committee to the Network Development

Office of the Library of Congress formed in 1976. This included representatives from major existing operational networks (Martin, 1978). Since then there have been a number of plans recommended to form a national library network. These plans were structured from a national level and brought down to the state, regional and local level, respectively. So far nothing has materialized. The present defacto national network structure has been developing in reverse order from local to national levels. For example, BALLOTS (now RLIN) began from a private academic library automation program, Washington Library Network (WLN) from a state plan, and OCLC as a consortium of academic libraries in Ohio. Affiliated networks such as SOLINET, NELINET, and PALINET also stemmed from local, state or multistate initiatives (Markuson, 1979).

The concept of a national network was easy to grasp but difficult to implement. The national network and its structure and governance were the constant topics of discussion (Evans, 1982). During the late sixties, several groups around the United States were experimenting with the MARC database. One such group was the Ohio College Library Center (OCLC) which was incorporated in 1967 to develop a cooperative, computerized regional network for its 54 Ohio College member libraries (Evans, 1979). This system was primarily implemented to offer access to the Library of Congress MARC database and to build its database by collecting the input cataloging of all the member libraries in Ohio. Catalog cards were produced according to a member library's specifications and mailed within one or two days. OCLC then was basically an online shared

cataloging network that offered the computer production of catalog cards and all sorts of other capabilities that assisted catalogers in Ohio libraries.

In 1977, OCLC changed its name to Online Computer Library Center, Inc. (OCLC), to reflect an expansion of services to academic, public, special, and federal libraries throughout the United States and several other countries (OCLC, 1984). It became the first network to achieve national online network status (Evans, 1979). OCLC has designed and operates a bibliographic computer and telecommunications system which supports resource sharing among libraries. Through the OCLC online system, libraries can catalog books, serials, and other library materials; order custom printed order cards; create machine readable data files; maintain location information on library materials; facilitate interlibrary lending; and place control on acquisition orders (OCLC, 1984). From 1971 to 1977, OCLC grew geometrically as more and more libraries became members. As OCLC expanded its services throughout the country, regional non-profit networks were formed to provide more manageable services to its members. By May, 1980, there were 21 OCLC regional network centers which handled nearly 90 percent of the terminals linked to OCLC (Robinson, 1980).

From fifty-four college libraries in Ohio in 1971, OCLC has now grown to over 4,800 active participating members. It has many types of libraries as its members: academic, research, community and junior college, corporate, federal, law, library school, medical, state government, public, school, state, and theological and in all sizes. Slightly more than

half are college and university libraries. Public libraries are the second largest group, representing sixteen percent of the membership. Next are special, corporate, and government libraries, respectively. Only one percent of OCLC users are school libraries (Jenkins, 1983). Directly and indirectly, OCLC serves over 6,000 institutions. About 25-35 new users join OCLC each month (OCLC, 1984).

In August, 1971 there were 100,000 records in the OCLC database (Evans, 1979). As of December, 1984, that database was the largest of its kind in the world. It contained nearly 11.5 million bibliographical records. The database grows by about 23,000 bibliographic records weekly. Of these about 19,000 records are contributed by members; the rest are derived from the Library of Congress and National Library of Medicine (OCLC, 1984). Linked to each record in the catalog are location symbols identifying libraries that have used the records in the cataloging process (Jenkins, 1983).

In addition to shared cataloging, OCLC has implemented several online subsystems. Through the use of 6000 terminals linked to the OCLC online system, users can gain access to these subsystems and services designed to streamline library operations and share costs. The subsystems developed by OCLC could be drawn together into a totally integrated library system network which could include circulation, acquisitions, cataloging, serials, interlibrary loan, administrative functions, budget control, machine-readable conversion, and other functions through the use of LS/2000 Local System.

Washington Library Network (WLN) is the youngest, smallest, and most advanced of the network utilities. It is a state agency under the direction of the Washington State Library which was developed to be the centralized library network for libraries in Washington (Martin, 1982). It went public in 1978. WLN offers the same type of shared cataloging services as OCLC. Its services include keyword subject searching, Computer Output Microfiche catalog, acquisitions control, fund control, interlibrary loan, and a locally based circulation system. It began online processing in 1977 and today serves the Pacific Northwest and the Southwest. At the present time, it provides all the services from its headquarter in Olympia, Washington. The main way WLN offers its services nationwide is by selling its software to a library which can then develop library automation systems and an online catalog (Andersen, 1984).

The two network utilities discussed here are by no means the whole picture of the present network phenomenon. The commercial sector has also entered the network utility field and probably has a significant role in a national network. All segments of network utilities, whether for profit or non-profit, need to cooperate with their respective activities. Utilities and networks will continue to expand and cooperate, but it is doubtful that they will merge into one national network. With the unique features of the systems, their varied approaches, and different markets, they would provide greater options for libraries.

Academic Libraries in a Network Environment

College and university libraries, especially research libraries, are the most active participants in the local, regional, state and national networking process. As previously stated, the entire RLIN network has been developed for and used by research libraries. More than 55 percent of OCLC participating members come from academic libraries. In addition to utilizing the existing network facilities, academic libraries have also formed their own network to serve their specific clientele. The rationale for this may be a matter of forming a group of similar types of libraries of sufficient size to gain access to each others resources and minimize the expenses and staff.

New Hampshire College and University Council has formed by-laws through which academic libraries could establish cooperative networks among the local colleges and universities. Their cooperative project so far has included annual computer-produced union lists of serials holdings. Each institution is assuming responsibility for building its collection on certain special subject areas (in order to avoid needless duplication of expensive materials). Other cooperative activities include an inter-campus truck delivery service, the bulk loaning of books, serials and other materials, and storage at the University of New Hampshire Library (New Hampshire College and University Council, 1980).

In the early 1970s, the Council of Wisconsin Libraries (COWL) was formed by academic librarians. COWL is involved with innovating programs of cooperation and resource sharing that will further assist

libraries in making the resources held by Wisconsin, as a whole, available to any library user. Its first task was to coordinate the sharing of resources among academic libraries in Wisconsin. This program, operational since May, 1972, provides training and technical support for the OCLC online system interlibrary loan services (including document delivery), and reference services (including database searching). The program is operated through a contract between COWL and the University of Wisconsin-Madison and functions as a department of the Madison Memorial Library. There are presently 48 academic and special libraries participating in the Wisconsin Interlibrary Loan Service Network and 350 public libraries have access to this service through a resource contract between COWL and the State Division for Library Services (Council of Wisconsin Libraries, 1984).

The Pennsylvania State University Libraries have been involved with automated networking plans since the late 1960s, and since 1975 there has been a concerted effort to develop a sophisticated, fully integrated computerized library information system. The system, called Libraries Information Access System (LIAS), provides integrated access to a range of information functions in support of services at all libraries of Pennsylvania State University. It supports both academic needs (bibliographic access for research, instructional support) and administrative needs (processing, inventory control, communications, record keeping). LIAS is a fully interactive system, providing immediate information about collections and transactions. Once all of the components of LIAS are developed and in operation, it will be capable of supporting 160 concurrent users (Cline,

1983).

The Texas Information Exchange (TIE) is a state-wide library network organized in 1967 for the purpose of sharing resources among Texas libraries. The membership includes thirty-seven college and university libraries, the Texas State library, and the ten public libraries which serve as major resource centers in the Texas State Library Communications Network. In 1978 the TIE members were surveyed on their use of computer-based reference services. The survey results indicated that an overwhelming number of participating libraries were in favor of computer-based reference services (Menges, 1978).

The libraries of Eastern Washington University, Spokane Community College, Spokane Falls Community College, The Spokane Public Library, and the Spokane County Library District joined together to form the Spokane Cooperative Library Information System (SCOLIS). Since 1980, SCOLIS has been using Universal Library Systems (ULISYS) automated circulation system to give county residents access to resources of the member libraries. The uniform policies and services adopted as a result of the SCOLIS network have benefited both the area library users and the member libraries (Proces, 1983).

The largest automation and cooperative system is maintained by the Research Libraries Group (RLG), a consortium owned by 26 academic libraries in the United States. One of the goals of RLG is to help libraries automate their catalogs. To accomplish this goal, RLG maintains a computerized service system known as the Research Libraries Information

Network (RLIN). RLIN is based largely on a system known as BALLOTS (Bibliographic Automation of Large Library Operations Using a Time Sharing System) which was developed at Stanford University. At the present time, RLIN has more than four million record and five subsystems that interact with the database. Through the RLIN system, RLG member libraries can work together to provide the resources needed for instruction and research. The RLIN system serves two functions: it makes possible the cooperative sharing of bibliographic data--that is, information about publications as well as the publications themselves; and it improves access to bibliographic data and collections. Direct access to the database regardless of geographic location enables libraries to share responsibility for cataloging books and for collection development. RLIN offers libraries the option to eliminate many of the repetitive clerical tasks, to share resources to a greater degree than thought possible just a few years ago, to provide improved information retrieval compared with card catalogs, and to provide all units within a library, as well as member libraries, access to a union database which improves the level of reference service (McDonald & Hurowitz, 1982).

Like automation in community college LRCs, literature specifically in areas of community college networking is extremely scanty. In some states, as stated before, there has been some networking between types of libraries which included community college LRCs. The next logical step was to search literature on small college libraries which resemble community college LRCs.

Dogold (1983) searched ten years of Library Literature Index and found only a handful of full-treatment articles on small libraries and when searching by subjects such as computer operations or online cataloging, he found practically no representation. Holl (1982) believes that the use of computer technology by the small academic libraries of today may make effective use of various bibliographic control devices developed by the database networks and vendors of bibliographic information. Although the costs of computer technology may be unaffordable for a small library, it is possible through networking with other libraries of a smaller size to offer the users a degree of bibliographical access and other services which would have been unimaginable a few years ago. The joint project of the Tri-State College Library Cooperative in Pennsylvania, which was formed in 1978, is a prime example of such a venture. Through cooperation among this group of small college libraries, it has been able to offer its users access to virtually all computerized bibliographic databases (Peck, 1981).

The Research Triangle area of North Carolina provides a further example of what a successful library network could mean for libraries engaged in network and resource sharing activities. Duke University, North Carolina State University and the University of North Carolina at Chapel Hill have library resources totalling more than eight million volumes. Since 1976, these institutions have been cooperatively developing a high quality online catalog as the core of an integrated automated library system. It will eventually support additional functions such as circulation, acquisitions, and serials control (Byrd, Davis, Grosling, & Herman, 1985).

Online Resource Sharing By Academic Libraries

Automated library networking systems enhance the process of resource sharing through interlibrary loan systems. An online communication system enables its member libraries to send requests and to receive responses instantly via the computer terminals.

American libraries have long participated in a variety of cooperative activities that have resulted in the formation of organizations at the local, state, regional, and national levels. Library networks grew out of the tradition of cooperation among American libraries that emphasized the sharing of activities and other bibliographic data in order to reduce costs. What is new is the automated library network and the development of computer telecommunication technology. These systems have the capabilities to store huge records of information which could be searched from remote locations. To this effect academic libraries contributed a vast amount of time, knowledge and effort to develop the networks which presently form the foundation of effective library service and resource sharing.

From the user's point of view, the most important service of the library is access to information and the ability to make it promptly available for use. In this respect Martin (1982) emphasized that:

> The utility of a shared online system for interlibrary borrowing information is unquestionable. With a single database, a librarian needs to search only once to determine the location of the nearest copy of desired material. ILL modules in online systems not only

provide location information, but also transmit the request in online or batch mode to the holding library (p. 13).

Network organizations recognized the function of interlibrary loan and devised a subsystem to conduct this task among the participating members. The OCLC Interlibrary Loan Subsystem, which became operational in March, 1979, is an online communication system which enables its 6,000 members to send interlibrary loan requests and responses over the terminals. It includes a referral feature that sends request, in turn, to any member selected by the borrowing library. It proved to be a superior method of transmitting interlibrary loan requests. The advent of the Interlibrary Loan Subsystem created great anticipation among the academic libraries for meeting the needs of library users for those materials not readily available from their own collections. The system provides users with immediate access to the OCLC Online Union Catalog, the Interlibrary Loan Transaction file and message waiting file (Jacobs, 1979). A study has shown that inclusion of a library's holdings in the OCLC database generates increased interlibrary loan lending activities since the library's holdings are more accessible (Kilgour, 1979). Conversely interlibrary loan borrowing activities were hindered by a library's lack of online access to the holdings of other libraries.

Another major component of resource sharing is the cooperative acquisition of library materials by one library on behalf of others. Such programs are essential to any successful interlibrary loan system and, on a long-term basis, are the most effective means of resource sharing.

Cooperative acquisition policy is based on the same rationale as interlibrary loan policy, e.g., no matter how large, a library cannot be self-sufficient in the sense that it can afford to acquire everything that may be of interest to its users (Fletcher, 1983). But, before the advent of networking, cooperative acquisition and storage of materials were difficult and tedious processes, and many attempts failed. The development of an online union catalog, union serials lists, and interlibrary loan systems through network utilities and other networks have been made possible, in large measure, by cooperative acquisitions and resource sharing. Such programs undoubtedly have done much, despite their many failures, to create a climate of cooperative and a willingness to consider new ventures among American academic libraries.

One of the most prominent developments in resource sharing is the formation of Research Library Groups (RLG). RLG's cooperative acquisition program, as part of the collection management and development component, attempts to coordinate the acquisition and cancellation of serials and the acquisition of expensive items by member libraries (American Library Association, 1984). This includes a system of polling all members before a serial is purchased to be sure that a low-demand title is not already in the collection of another library or on order. Unlike interlibrary loan systems, users of each RLG library have the right to use, on site, the collections of other member libraries (DeGennaro, 1979).

It is, however, predicted that computer technology will soon link

most of the nation's libraries by an online machine-readable database and give book selectors at one library immediate access to information about the selection decisions of another library. This access will be used as a decision making tool in the acquisition process. Also, new online systems, through networks capable of monitoring the actual use of materials in a given library, would assist libraries participating in cooperative acquisition programs in determining the purchase of materials and their locations and storage (Stevens, 1980).

Impact of Automated Library Networking

Automated library networking systems had a significant impact on the operation and the quality of library services. The whole issue of and justification for automated library networking revolves around greater access to resources, economics and productivity. In essence, networks are being created to serve the needs of the nation's libraries better than libraries themselves. Tight monetary policies, expansion of published materials and increased demands for services have brought pressure on libraries to participate in ALN systems (The Chronicle of Higher Education, 1979).

Library work is highly labor intensive. A great deal of human efforts goes into making the library run. A typical library spends an increasing portion of its budget on personnel (reference staff, catalogers, support staff, etc.) and a decreasing portion of the budget on books and other materials for the collection (Rouse & Rouse, 1980).

Krashire (1978), in his study, Impact of Automation on Staff and Organization of Medium Sized Library, found that automation at Indiana State University has both eliminated and created different types of positions. There were more jobs requiring greater skills, experience and training and fewer jobs demanding the repetition of routine tasks. In technical services for example, automation alleviated the need for additional professional staff that would have been necessary using manual procedures. Automation, using para-professionals instead of librarians, permitted an increase in cataloging production and was sufficiently flexible to accommodate future expansion and the changing needs of the library. The overall effect of automation was a savings in labor costs. The study concluded that the impact of automation on the organization was positive. A certain amount of flexibility and local control was relinquished, but the gain in productivity brought greater benefits for the library.

Libraries that move quickly to endorse new technology will be in a position to arrest the escalating costs of operations, achieve greater productivity, improve service and lower costs. For example, automated circulation systems eliminate many laborious tasks and delays in circulation activities. Another advantage of automated circulation systems is that the cost of circulation does not increase in direct proportion to the volume of circulation. After the initial investment for equipment, the marginal costs of circulation are substantially lower than corresponding costs in manual systems. In addition, improved and faster services can be rendered to users through the automated system (Chachra, 1981).

Since most libraries are too small to fund and take advantage of technological developments by themselves, they have started pooling their resources. Economic considerations have become a significant motivating factor for libraries in considering whether or not to join a resource sharing network (Hayes, 1971). Networking enables libraries to share the development and use of sophisticated online computer technology without incurring the full burden of development and operational costs. The use of these systems enables libraries to significantly reduce their cataloging and technical processing costs. Network participation permits academic libraries to gain timely and efficient access to information about bibliographic resources in other libraries (Markuson, 1980).

Another important rationale for automated library networking is greater use of existing and future resources. Resource sharing activities supported by computer technology are appealing to today's libraries as they face increasing demands for services (Rouse & Rouse, 1977). Automated networks permit more rapid and effective resource sharing via online interlibrary loan processes. The increased speed of online access and the confidence in the availability of resources held elsewhere in the network enable libraries to gain increased flexibility in the spending of their material funds. It permits them to spend their funds on the books and periodicals that are most used and needed by their local users and to rely on other libraries for less used materials (Rouse & Rouse, 1980).

Limitations of Networks

While advantages of networking seem to outweigh the limitations, the following points should be considered with regards to the viability of participation for an individual library:

1. Network participation calls for heavy commitment of staff time. For a small library a staff member who performs more than one function may not be able to commit the necessary time for network activities.
2. Network participation can cost a library some of its local autonomy in decision making and management, particularly in collecting policies, service priorities, and budgetary flexibility. Morever, the library can become totally dependent on what may be a distant, and sometimes fragile, irresponsible or unwieldly organization which is subject to the full range of financial, managerial, political, and technical problems.
3. Rapidly accelerating advances in computer and communication technology may make some network systems obsolete. If that happens, it might be difficult for network members to withdraw from one and join another network, or to implement alternative systems.
4. Finally, there is the ever present danger that overselling the benefits of membership in networking may raise the expectations of college administrators to believe network participation saves a lot of money, and thus provide them with a rationale to reduce

budgetary support (Martin, 1982).

In essence, in spite of benefits to be derived from networking, one has to make firm decisions in these cost conscious times and ask: Will the added control, the enhanced efficiency and increased speed of circulation functions, for example, be worthy of the cost? Will additional management information be sufficiently beneficial to justify the expenditure? Will the cost factor be significant enough to consider networking? Is resource sharing effective enough to satisfy the needs of the library? The questions to be asked and the decisions to be made are many and will vary with the individual library.

Summary

Every organization exists in a given society and is subject to its social and cultural influence. Likewise, organizations such as libraries are subject to state-of-the-art technology which has been moving towards a service and information oriented society. Information technology has advanced in four general areas: telecommunications, computers, videos, and cable television. These developments have affected the libraries significantly in areas of efficiency, productivity and resource sharing. Effective management and the use of modern technology today enable libraries to provide services at a level previously unattainable.

Need for Library Automation

For the last several years, libraries have been confronted with reduced funds for acquisitions, staff, equipment, and buildings at a time

when the volume of published materials continues to increase. With the help of technology, libraries are able to meet these challenges in three ways. First, computers can assume many of the repetitive clerical tasks that are prevalent in libraries. Second, the speed and precision of information retrieval can be improved through the use of computers. Third, cooperative ventures previously considered impossible can be feasible. A well established automation system can increase the efficiency, productivity, and flexibility of many aspects of library services. Resource sharing activities supported by automation are appealing to today's libraries facing increased demands for services. The implications of improved technology are therefore apparent.

Automation in Academic Libraries

Comparatively speaking, a much higher volume of research was conducted on automation within libraries of senior colleges and universities than in community college LRCs. Some universities, such as Virginia Tech and Northwestern University, developed their own automated library systems. From the literature it was evident that most development of automated systems took place in the 1960s and the 1970s. The expansion and refinement of the systems occurred in the 1980s. In her survey of automation in small and Catholic colleges, Stussy (1981) found very little literature related to community college automation. Reeves (1974) in her study for junior college institutions reported automation in one or more areas of operation. The study provided no detail on types and mode to

automation in various areas.

Types of Library Functions Automated

Those libraries engaged in automation activities primarily concentrate on automating circulation, cataloging, reference and acquisitions functions to meet the immediate needs of the library users. Other functions and services are considered on availability of funds and computer capacity. An online circulation system is preferred by librarian due to fast service and instant feedback. The online cataloging processes were desired for easy access, accuracy and economy of time and costs (McAllister, 1983). According to the 1982 database directory there were 773 databases with some 70 million reference sources (Williams, 1982) available for reference and information service which could be provided online. This vast resource is only feasible and affordable through online processes and cooperative resource sharing.

Integrated and Turnkey System

The single most noticeable device in the library literature of the past few years has been the integrated system of library operations. Under this device, instead of automating one function (e.g. circulation) a database of inventory records is created and several operations are automated into a library system. Libraries also prefer a turnkey system which includes a complete package such as hardware, software, forms, instruction and other material necessary to operate a system. Turnkey systems are particularly

appropriate to those libraries which have not had prior computerized support. Vendors generally provides staff training, hardware maintenance, and installation. However, a thorough investigation as to the reputation of the vendor is advisable.

Network Revolution

"We are in the midst of a library revolution as a result of computer based networking and none of us can predict all of the impact, as change begets change, in the evolution of network service," said Markuson (1980, p. 5). Automated library networks enable libraries to share the development and use of sophisticated online computer technology without incurring the full burden of development and operational costs. Network participation permits libraries to gain timely and efficient access to information about bibliographic resources in other libraries through powerful online search capabilities. It permits them to spend their funds on the books and journals that are most used and most needed by their local clientele and to rely on other libraries for less used materials (DeGennaro, 1984) via online interlibrary loan systems.

Types of Networks

In general networks can be classified into four broad categories: local, state, regional, and national. For the last several years there have been steady developments of networks at various levels. Each level has its specific aims and objectives to meet the particular needs of its member

libraries. Many state library agencies are now developing plans for statewide network services that rely on and interface with regional networks and the national bibliographical utilities. Indiana created a regionl library network, the Indiana Cooperative Library Services Authority (INSCOLSA). INSCOLSA is an independent organization formed under state legislation enabling libraries to create cooperatives (Markuson, 1979). In addition, there are local, regional and national levels of networks and network utilities being developed by non-profit organizations.

Academic Libraries in Network Environment

Academic libraries, especially research libraries, are the most active participants in all types of networking systems. Extensive research and development of ALN systems from early 1970's to the present were conducted mostly by research libraries. They were frequently funded by both public and private sources. In her study, Markuson (1979) found that most network services ignored the smaller colleges in their planning process. Greater involvement of academic libraries are substantiated by the fact that more than 55 percent of OCLC participating members come from academic libraries and mostly from senior college and university libraries (Smalley, 1980).

This has created some psychological effects on small libraries. "The librarian in the small library may feel that the library is slipping through the cracks of progress because it is not currently participating in automated resource sharing" (Epstein, 1984, p. 873). A search of the

literature for small colleges on automated library networking produced no information appropriate to community college LRCs with regard to the size, funds and hardware. From this it was obvious that most literature describing an ALN came from research libraries, and there was less likelihood that small or community colleges would publish their accounts of ALN activities.

Online Resource Sharing

Some libraries join together to build broader information sharing systems. There is a significant advantage of online computer library operations in terms of speed, accuracy and reliability. An online system particularly is valuable in meeting the challenge of providing information service to users. Through online systems libraries can provide immediate access to large databases from the participating network for sharing resources. The rapid growth of scholarly and research literature in almost all disciplines has created a need for standardized online resource sharing systems. This would permit the quick identification and efficient procurement deemed essential for research. The aim of such online network is to free researchers from their dependency upon a particular library collection and to provide access to materials of other libraries which may now be inaccessible to scholars. Also, online systems, capable of monitoring the actual use of materials in a given library, would assist libraries particpating in cooperative programs in determining the purchasing of materials and their location and storage.

Impact of Library Networking

Networking implies cooperation and sharing of resources for the purpose of enhancing services to the users and usually of increasing efficiency. Growing capabilities of automated library network systems continue to have significant impact on the role of librarians. Ideally, library networks improve operations and open up the collections and services of all member libraries to the users of any single library. Network member libraries are able to do their work faster and more accurately on a smaller unit cost basis.

Emerging Technology

Further research in Library Literature Index, ERIC and LISA databases from 1986 to 1988 on emerging technology once again produced no significant works which were directly related to ALN in community college LRCs. The search, however, generated a number of entries on telefacsimile and CD-ROM technologies which might have great potential to substantially alter the delivery and storage system of network activities.

The telefacsimile or FAX machine opened several new doors for the rapid delivery of documents, much in the same way as RLIN and OCLC interlibrary loan systems reduced the transmission time. The concept behind FAX is nothing new. What is new is the blending of computer and telecommunication technologies enabling FAX users to send copies to any other FAX locations in seconds via conventional telephone lines. The speed combined with greater delivery capacity will undoubtedly enhance the

networking process among libraries (Boss, 1987).

CD-ROM is generating enthusiasm and interest in the field of librarianship. It is a highly efficient and useful storage device both in managing and disseminating the vast amounts of information for which librarians are responsible. Its acceptance in the library field obviously affected individual libraries as well as network organizations (Holtz, 1988). CD-ROM eliminates the expenses of long distance telephone charges that were previously incurred while performing online searches. A union catalog database on CD-ROM could be made available to all participating libraries. This line of data management and retrieval would undoubtedly be easier and more affordable for community college LRCs to join ALN activities (Helgerson, 1986).

In short, the whole issue and justification for automated library networking seem to be revolving around greater access to resources, economics and productivity. Networking enables libraries to share the development and use of sophisticated online computer technology without incurring the full burden of development and operation costs. Network participation permits libraries to gain timely and efficient access to information. Another important rationale for automated library networking is greater use of existing and future resources. The increased speed of online access and the confidence in the availability of resources held elsewhere in the network enable libraries to gain increased flexibility in the spending of their material funds.

While there was ample literature on automated library networking

system, there were very few citations specific enough to be considered benchmark studies for this study. Most of the articles and studies cited in this chapter were primarily directed toward senior college and university libraries. The community college, for the most part, is an unstudied element. Many questions thus far remain unanswered with regards to participation of community college LRCs in automated library networking systems and its impact on overall library services. The need to conduct the research envisioned in this study was thus supported by the review of literature.

Chapter III

RESEARCH DESIGN AND METHOD

Introduction

The review of literature indicated that there was a need to study the extent and perceived value of community college LRC participation in automated library networking. More specifically, the study explored reasons for participation and non-participation, the benefits and problems of participation, and the functions and services used through different networks. The study was designed to provide a basis for identification of trends ,if any, which were common to LRCs participating in automated library networking.

A survey and interview approach were chosen to conduct this study. During the spring of 1987, a survey questionnaire was developed, validated, and mailed to 253 LRC directors. A total of 193 (76.3 percent) usable responses were returned. The methods of data analysis for the survey questionnaire were the crosstabs, the chi-square procedure, the Mann-Whitney U Test, and the Kruskal-Wallis One Way ANOVA by Ranks. The results of these analysis were summarized. Three LRCs from the 193 responses were selected for interviews to gather additional data. Interviews with LRC directors were held during the spring of 1988. Interviews were recorded and transcribed verbatim. A summary of the interviews were reported into three separate case studies.

Population

The population for this study consisted of American public community colleges located in the Southeastern region of the United States, which include Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia as listed in the 1985 Community, Technical, and Junior College Directory, (American Association of Community and Junior Colleges, 1985). The directory provided information on student enrollments, faculty members, tuition and fees, chief executive officers, institutional names, addresses, and telephone numbers. Two hundred and fifty-three community colleges of the Southeastern region of the United States were identified as the population of this study and were surveyed in the first phase.

Sample

Three LRCs were selected for interviews in the second phase of the study. The selection of these LRCs at which interviews were held was based on the size of the book collection, the geographic location, and the extent of automated library networking activities. Experience and involvement of LRC directors in ALN systems and their willingness to allow the researcher to conduct his study were also considered.

The survey (responses) from the first phase of the study were divided into three groups according to the LRC collection size, small (less than 30,000 volumes), medium (30,001-60,000), and large (60,001 and over). One LRC, most involved in network activities, was selected from each group for a

site visit.

Instrument Development

Borg and Gall (1979) found that a mail survey had an advantage over other methods of research on populations which live in a widely scattered area where it is generally impractical or too expensive to send out a personal interviewer. Leedy (1974) called the questionnaire "a commonplace instrument for observing data beyond the physical reach of the observer" (p. 81). Other literature reviewed strongly supported the use of questionnaires. From these findings, a survey questionnaire was chosen as the most appropriate method to investigate this study.

First Phase

The survey questionnaire was prepared based on guidelines suggested by Babbie (1973) and Dilman (1978) with regard to the writing of questions and the presentation of those questions in the instrument. The criterion for constructing the survey was to translate research questions into a questionnaire instrument developed for the study (Kerlinger, 1973). The items on the questionnaire were selected from details in the literature reviewed concerning needs of automated library networking, from discussion with LRC directors, and from the professional experience of the researcher. Further the questionnaire included those LRC functions and services that have direct relationships and applicability to the research questions. For example, institutional variables such as enrollment, collection size, volume of circulation of materials, volumes of annual

acquisition, LRC staff, and annual budget were addressed in the questionnaire.

A fourteen item questionnaire with each item describing a different aspect of automation and automated library networking was constructed. The questionnaire was administered to the population of 253 public community college LRCs identified in the Southeastern United States. LRC directors were asked to respond to their degree of participation in each activity of automation and automated library networking on three and five point Likert type scales.

The items on the questionnaire (see Appendix A) were constructed to solicit data on automated library networking in the following areas:

Items	
1-3	automation needs and integrated turnkey systems,
4-5	automated library networking and factors influencing participation,
6-7	types of networks used for various functions and services,
8-9	benefits gained and problems encountered due to participation,
10	sources of funding,
11	involvement in network related organizations and activities,
12-13	role of the presidents, vice presidents, deans, LRC directors, faculty, and librarians in the decision making process for automated library networking,
14	factors attributed to non-participation,
15-21	and institutional information.

Closed-ended questions, characterized by a number of fixed responses, were posed. The respondents were asked to choose from several answers designed to reflect various facts, views, beliefs or feelings. The attractive feature of close-ended questions with specified mutually exclusive choices was that they are usually less demanding than questions of any other type and provide better and larger returns (Dilman, 1978). Further they do not elicit unpredictable responses. Responses given through the close-ended questionnaire also promoted consistency, facilitated the analysis of data, and enhanced reliability.

Second Phase

With the completion of the first phase of the study, key issues of networking were examined and investigated. In particular, a site visit was planned to obtain additional information which may show certain trends common or unique to LRCs which may not have been adequately answered in the first phase of this study.

The researcher believed that the visits to LRCs and interviews might generate additional data and reinforce the results of the first phase to accomplish the objectives of the study. During on-site visits, interviews were focused on specific questions developed to describe various behaviors and the relationship of these behaviors to selected variables or conditions. They allowed the researcher to probe in depth and to identify variables as they relate to research questions. Oftentimes, such designs provided "an opportunity for the researcher to develop insight into basic aspects of human behavior . . . and may lead to the discovery of previously

unsuspected relationships" (Ary, Jacobs & Razavich, 1985, p. 323).

An interview guide (see Appendix B) was developed based on variables which had high or low frequencies resulting from the statistical procedures applied to the data obtained in the first phase. Responses to the survey questions were used as the major guide to prepare the questions in the interview guide. Experience and professional judgement of the researcher played a major role in selecting key issues and developing an interview procedure for the interview guide It was intended that the results of the second phase would complement and illuminate those items not adequately answered in the first phase.

Instrument Validation

A five member panel of LRC directors was contacted for their consent to validate the questionnaire designed for the first phase. In addition, members of the Virginia Tech dissertation committee were asked to provide comments and suggestions on the questionnaire. In a cover letter (see Appendix C), the panel members were instructed to judge each questionnaire item on the criteria of appropriateness, clarity, stability, extractive power, response capacity, variation, and consistency of the subject matter under study. Respondents were asked if they wanted to suggest additions, deletions or modifications to the question. In addition, members of the Virginia Tech dissertation committee overseeing the study were requested to provide comments and suggestions to improve the questionnaire. Any suggestions made by three or more panel or committee

members were used in the final questionnaire. No additional questions or major modifications were suggested by any of the panel members. Minor changes were made as suggested for clarification.

Collection of Data

First Phase

The survey questionnaire with a cover letter (see Appendix A) and a self-addressed envelope was mailed to 253 directors of LRCs on April 15, 1987. From this request, 143 responses were returned by mail. A follow-up letter (see Appendix D) on June 4, 1987 generated an additional 35 responses. The remaining non-respondents were contacted by telephone and 21 responses were received by this effort. In total 199 (78.7 percent) responses were received. Six (2.4 percent) responses were unusable due to insufficient data. The 193 (76.3 percent) usable responses, therefore, formed the basis of this study in the first phase. Participants were assured that all comments made by them would be confidential and would not be attributed to either a particular institution or individual.

Second Phase

Initial requests for interviews with LRC directors were made by phone. After agreeing to be interviewed, dates for the visits were arranged. A letter (see Appendix B) outlining the purpose of the site visits along with the interview guide was sent to three directors of LRCs. Interviews were held with LRC-A on May 11, 1988 with LRC-B on May 13, 1988 and with LRC-C on May 14, 1988. These provided the researcher an

opportunity to collect data which formed the basis of a case study of those institutions. In addition to interviews and questionnaires, data were collected, if available, from documents and publications relevant to automated library networking.

The following steps were used to collect information for the second phase:

1. Interviewed LRC directors and their immediate supervisors to determine the general objectives of belonging to an automated library networking system and its effectiveness to the overall LRC operation.

2. Gathered any available and appropriate documentations, publications, reports, etc., relating to automated library networking in the areas of objectives and system operations.

3. Gathered information from department heads of LRC, if available, on present functions and services carried out in automated library networking system.

4. Gathered information from LRC directors on future plans, if any, for implementation of additional functions and services in automated library networking systems.

5. Gathered information on strengths and limitations of automated library networking systems.

6. Gathered information on problems created by automated library networking systems.

7. Gathered information on results obtained from the automated library networking systems in use.

8. In addition, specific questions raised in the first phase, were asked at the appropriate level during the interview and information gathering process outlined in the above seven steps.

Data Analysis

First Phase

The returned usable questionnaires (193 LRCs) were divided into three major categories - respondents (77 LRCs) with no participation in automation or automated library networking systems, respondents (55 LRCs) with only automation, and respondents (61 LRCs) with automated library networking systems. Respondents (77 LRCs) with no automaion were excluded from the analysis. The remaining questionnaires (116 LRCs) were part of the data analysis. The data gathered from the first part of the questionnaire specifically assessed the current level and future plans for automation, including any integrated/turnkey system of automation. The data from the second part of the questionnaire pertained to the types and degrees of networking used by LRCs, factors influencing or inhibiting participation, LRC functions and services used through different types of network systems, benefits gained and problems encountered due to participation, sources of funding, involvement in network related organizations and activities, and decision making groups and their degree of participation in automated library networking. The data from the third part of the questionnaire addressed institutional variables such as location, enrollment, collection size, annual acquisition of materials, circulation of

materials, LRC staff, and size of the budget. The data were used to assess the relationship between the institutional variables and the automated library network system.

The questionnaires were coded for computer input. The Statistical Analysis System (SAS Institute, 1979), program was used in the analysis of the data. The methods of data analysis applied to the returned questionnaires were descriptive as well as inferential. The descriptive method provided insight on the extent and value of automated library networking in community college LRCs. Data were used to generate frequencies and percentages for all variables related to automated library networking activities. Relationships between the presence of selected automated library networking activities and the institutional variables were analyzed. The institutional variables selected for this purpose were location, enrollment, LRC collection size, circulation of materials, number of LRC staff, and LRC annual budget. Location of the institutions was divided into two levels and other variables were divided into four levels. This procedure was uniformly used.

The chi-square procedure was used between automation and institutional variables, and between automated library networking activities and institutional variables. The Mann-Whitney U Test was applied to ALN activities and the location with two levels. For the remaining institutional variables - enrollment, LRC collection size, circulation of materials, number of LRC staff, LRC annual budget (each with four levels) and the extent of ALN activities, the Kruskal-Wallis One-

Way Analysis of Variance by Ranks was applied. An alpha level of .05 was selected for determining the statistical significance.

The Mann-Whitney U Test is the nonparametric alternative to the parametric t-test. As with the t-test, the Mann-Whitney U Test is used to determine whether two groups differ with respect to a particular variable. The Mann-Whitney U Test, however, requires only ordinal levels of measurements. It places the scores of both groups into a single group then replaces the scores with ranks; the rank of 1 is given to the lowest score, the rank of 2 to the next lowest, and so on up to the highest score. U, the statistic used in the test, is given by the number of times that a score in the first group precedes a score in the second group in the ranking. For the sample sizes in this study, the U statistic is converted to a z value and this z value is compared to the normal distribution to determine statistical significance. The z value is calculated by subtracting the mean of the distribution from the particular U value and dividing by the standard deviation (Siegel, 1965).

The Mann-Whitney U Test is only applicable for comparing two groups. When there are three or more groups to compare and the level of measurement is ordinal, the appropriate nonparametric test is the Kruskal-Wallis One Way Analysis of Variance by Ranks. As in the Mann-Whitney U Test, all scores are replaced by ranks. The smallest score is given a rank of 1, the next smallest rank of 2, and so on. The sum of the ranks for each groups is then calculated and these sums are compared to determine whether any differences are great enough to say the groups differ in

distribution on the variables being tested. The H statistic used in this test is distributed as chi-square with df=k-1 where k is the number of groups. When two or more cases have the same score, the mean of the ranks of the tied values is calculated, and this mean is given to each of the tied values. The H statistic is adjusted for the number of ties (Siegel, 1965).

These tests were selected because they are very powerful and require no assumptions about the shape of the underlying distributions. The variables can be measured on a nominal or ordinal scale.

Second Phase

Three LRC directors and their immediate supervisors were interviewed to gather additional information on ALN. These interviews each lasted in excess of two hours. The interview guide was used as the basis of discussion. All the questions from the interview guide were asked and the same order was followed with each LRC director and his immediate supervisor. Standardized questions worked into the interviews generated uniformed answers. All deliberations of the interviews were recorded with the permission of the interviewees. At the end of the interview, additional materials related to the college, the LRC and the ALN were collected. Materials collected were used for the introduction of the college and the LRCs. Tape recorded interviews were transcribed verbatim. Information retrieved from the site visits and the transcriptions were descriptively summarized into three separate case studies.

Chapter IV

FINDINGS

Introduction

The purpose of this study was to examine the extent and value of community college LRCs' participation in automated library networking (ALN), to illuminate the influence of college staff in the decision making process for participating in ALN, and to assess relationships which may exist, if any, among selected ALN activities and institutional variables. To accomplish this purpose, a survey questionnaire was sent to the 253 directors of community college learning resources centers in 10 Southeastern states on April 15, 1987 (see Table 1). From this initial request, 143 responses were returned by mail. A follow-up letter on June 4, 1987 generated an additional 35 responses. The remaining non-respondents were contacted by telephone and 21 responses were received from this effort. A total of 199 responses were received for a response rate of 78.7 percent. Six responses (2.4 percent) were unusable due to insufficient data. The remaining 193 (76.3 percent) responses, therefore, formed the basis of this study.

Through the questionnaire data were gathered on present and planned automation, integrated systems of automation, and automated library networking. In the questionnaire respondents were asked to identify factors which influenced or inhibited participation, to identify the functions and services used with different types of networking systems, to identify benefits gained and problems encountered due to participation,

TABLE I

DISTRIBUTION OF RESPONSES RECEIVED
FROM COMMUNITY COLLEGE LRCs BY STATE

State	# of Surveys Mailed	# of Surveys Returned	# of Surveys Not Returned	# of Usable Surveys	# of Unusable Surveys
Alabama	41	30	11	28	2
Florida	34	29	5	29	
Georgia	16	14	2	14	
Kentucky	13	11	2	11	
Louisiana	5	3	2	3	
Mississippi	19	13	6	13	
N. Carolina	58	48	10	44	4
S. Carolina	21	13	8	13	
Tennessee	14	12	2	12	
Virginia	32	26	6	26	
TOTALS	253	199	54	193	6
PERCENTAGE	100%	78.7%	23.3%	76.3%	2.4%

N = 253

sources of funding, and the involvement of LRCs in network related activities. In addition data were sought on the degree of input received or resistance faced from the colleges' decision making groups.

The total 193 usable responses were analyzed to answer research question one, related to the existence of automation. Since automation is a prerequisite to automated library networking and the main purpose of this study was to examine the extent of automated library networking in community college LRCs, all responses with no automation were dropped from the study. The remaining 116 responses were used to answer research questions 2 and 3, related to the degree of automated functions and integration of functions. The 61 LRCs participating in ALN were used to answer research questions 4 through 11 relating to ALN. The 55 non-participating LRCs in ALN were used to answer research question 12, relating to inhibiting factors for non-participation in ALN (see Table 2). Trends or frequently recurring variables, if any, were identified in three case studies which were conducted by site visits.

Material presented in this chapter was organized to correspond with the research questions posed in Chapter I. They are, however, grouped into five major headings: Automation, Automated Library Networking (ALN), Elements Affecting Participation in ALN, Relationship and Trends or Recurring Variables-Case Studies.

Automation

Of the 193 responses received, 116 (60.1 percent) replied as having

TABLE 2

STATE OF AUTOMATION AND
AUTOMATED LIBRARY NETWORKING IN
COMMUNITY COLLEGE LRCs

Usable Responses	No Automation	Automation Only	ALN	Automation and ALN Combined
193	77	55	61	116
100%	39.9%	28.5%	31.6%	60.1%

Total Usable Responses: N = 193

Automation & ALN (Combined: N = 116

some type of automation and 77 (39.9 percent) had no automation. Since automated functions are required to participate in automated library networking, the extent of automated functions and the extent of integrated automated functions in community college LRCs were explored.

Research Question #1: What is the extent of automation available to support library networking?

Nine statements regarding the use of present and planned automation functions were posed to the directors of LRCs. From them, the respondents reported that cataloging was the most frequently automated function and public access catalog was the function presently least automated in community college LRCs (see Table 3). When respondents were asked about their future plans for automation, the first priority was to automate public access catalog function and the lowest priority was administrative support functions (see Table 4). The list of the future plans reflected, to a certain extent, priorities associated with service functions. The ranks established in the future plans clearly suggested that community college LRCs planned to automate those functions which improve access to information and resources.

Research Question #2: What functions and services are integrated into one automated/turnkey system?

The integrated system involves more than one function placed under a system of stand alone automated operation. In this regard, eight functions were reported on by the LRCs. When respondents were asked about the number of integrated functions, it was evident that very few

TABLE 3

THE EXTENT OF PRESENT AUTOMATED FUNCTIONS IN COMMUNITY COLLEGE LEARNING RESOURCES CENTERS

FUNCTIONS	NOT AUTO.*		PARTLY AUTO.		SUB. AUTO.		FULLY AUTO.		COMBINED SCORES**	
	N	%	N	%	N	%	N	%	N	%
1. Cataloging	37	31.9	18	15.5	26	22.4	35	30.2	79	68.1
2. Interlibrary Loan	64	55.2	18	15.5	21	18.1	13	11.2	51	44.8
3. Administrative Support	65	56.0	31	26.7	16	13.8	4	3.4	51	44.0
4. Circulation	72	62.1	9	7.8	11	9.5	24	20.7	44	37.9
5. Reference Assistance	75	64.7	31	26.7	7	6.0	3	2.6	25	35.3
6. Acquisition	82	70.0	19	16.4	10	8.6	5	4.3	34	30.0
7. Authority Control	89	76.7	12	10.3	5	4.3	10	8.6	27	23.3
8. Serials Control	90	77.6	11	9.5	11	9.5	4	3.4	26	22.4
9. Public Access Catalog	97	83.6	8	6.9	4	3.4	7	6.0	19	16.4

*Not automated and planned automation scores were combined.
**Partially, substantially and fully automated scores were combined.
Total number of automated LRCs: N = 116

TABLE 4

THE EXTENT OF FUNCTIONS THAT LRCs PLANNED TO AUTOMATE

FUNCTIONS	AUTOMATED* (Combined Ratings)		NOT AUTOMATED		PLANNED AUTOMATION	
	N	%	N	%	N	%
1. Public Access Cat.	19	16.4	61	52.6	36	31.0
2. Circulation	44	37.9	37	31.9	35	30.2
3. Serials Control	26	22.4	58	50.0	32	27.6
4. Authority Control	27	23.3	67	57.8	22	19.0
5. Acquisition	34	30.0	63	54.3	19	16.4
6. Reference Assistance	25	35.3	63	54.3	12	10.3
7. Cataloging	79	68.1	25	21.5	12	10.3
8. Interlibrary Loan	52	44.8	54	46.6	10	8.6
9. Administrative Support	51	44.0	55	47.5	10	8.6

*Partially, Substantially and Fully automated scores were combined.
Total Number of Automated LRCs: N = 116

functions were integrated into a system. Two to twenty percent of the respondents reported having some type of integrated/turnkey system of operation. Eighty to ninety-eight percent of the LRCs had no integrated/turnkey automated system of operation (see Table 5). In other words automated functions of community college LRCs by and large were not incorporated into a system of automation. Rather, each function was automated and used independently of other automated functions. These findings were reinforced in three case-studies reported at the end of this chapter.

Automated Library Networking (ALN)

The main thrust of this study was to assess the extent of automated library networking in community college LRCs. This section covered the extent of automated library networking, the types of networks and functions used through different networks, and the benefits gained and problems encountered due to participation. The four research questions were addressed with regards to these activities.

Research Question #3: What is the extent of participation in different types of networks?

The local library networks, the state library networks, the regional library networks, and the national library networks were identified as four types of networks possibilly accessible to community college LRCs for participation. The use of these networks by public community college LRCs varied considerably (see Table 6). Regional networks were the most used networks and local library networks were the least used networks.

TABLE 5

FUNCTIONS WHICH WERE INTEGRATED INTO ONE AUTOMATED/TURNKEY SYSTEM

FUNCTIONS	INTEGRATED		NOT INTEGRATED	
	N	%	N	%
1. Cataloging	23	19.8	93	80.2
2. Acquisitions	18	15.2	98	84.5
3. Circulation	13	11.2	103	88.8
4. Serials Control	8	6.9	108	95.1
5. Interlibrary Loan	5	4.3	111	95.7
6. Administrative Support	5	4.3	111	95.7
7. Reference Assistance	2	1.7	114	98.3
8. Public Access Catalog	0	0	116	100

Total number of automated LRCs: N = 116

TABLE 6

NUMBER OF PARTICIPATING LRCs IN AUTOMATED LIBRARY NETWORKING USED VARIOUS TYPES OF NETWORKS

		Don't Use N	%	Seldom Use N	%	Always Use N	%
1.	Regional Library Networks (Multistate) example: SOLINET	8	13.1	5	8.2	48	78.7
2.	National Networks example: OCLC	19	31.1	3	4.9	39	63.9
3.	State Library Networks	30	49.2	13	21.2	18	29.5
4.	Local Library Networks	39	63.9	10	16.4	12	19.7

Total number of participating LRCs in Automated Library Networking: N = 61

Many respondents used more than one network in their operations to meet their needs. The figures in Table 6, however, suggest that the use of automated library networking systems has yet to become normal practice in community college LRCs.

Research Question #4: What functions and services of LRCs are used through different types of automated library networking systems?

Community college LRCs participating in ALN have many options. A LRC could utilize various functions offered through different types of networks. Nine such functions were identified in the questionnaire, and respondents were asked to identify those they used. The respondents reported that they used regional networks, national networks, state networks, and local networks in that order of priority. Regional networks were being used most and local networks were used least for various functions and services.

The function most used through ALN systems was cataloging. Most other network usages were in the areas of union catalog database and interlibrary loan functions. For these functions the majority of LRCs used national and regional networks. National networks could also be used through regional networks wherever such agreements existed. Therefore, there might be some overlap between usages of regional and national networks. In the area of resource sharing services, regional networks were used more than the national networks. State and local networks were also used respectively for resource sharing, but their utilizations were far less than regional and national networks. For union lists of serial database,

state networks were used mostly. Among the "least used functions" through different types of networks were acquisitions, serials control, and union lists of audiovisual materials (see Table 7).

Research Question #5: What benefits have been gained due to participation in automated library networking?

Certain benefits are gained by participation in ALN. Nine benefit statements were identified and posed to the respondents in the questionnaire. The majority of the respondents indicated that national and regional library networks increased the speed in and sharing of catalog records, increased the access to resource sharing, and increased the number of interlibrary loans among members. Participation also improved the performance, productivity, and the management of LRC resources. Benefits gained through the use of state and local library networks were significantly less than those of the national and regional library networks. Activities such as fast and accurate circulation, improved serials control, and lowered unit cost of operation among network members were limited and less beneficial (see Table 8).

Research Question #6: What problems have been experienced due to participation in automated library networking?

While the LRCs gained certain benefits, they might have also encountered some problems due to participation in ALN. Nine problem related statements were identified and presented in the questionnaire. The majority of respondents disagreed with seven out of nine statements. Statements such as negative attitude of LRC staff towards networking, less

TABLE 7

NUMBER AND PERCENTAGE OF PARTICIPATING LRCs IN ALN USED THE FOLLOWING SERVICES THROUGH DIFFERENT TYPES OF NETWORK SYSTEMS

FUNCTIONS & SERVICES	NATIONAL NETWORK		REGIONAL NETWORK		STATE NETWORK		LOCAL NETWORK	
	N	%	N	%	N	%	N	%
1. Cataloging	34	55.7	31	50.8	4	6.6	4	6.6
2. Union Catalog	30	49.2	31	50.8	17	27.9	8	13.1
3. Interlibrary Loan	25	41.0	29	47.5	19	31.1	9	14.8
4. Resource Sharing	14	23.0	18	29.5	15	24.6	13	21.3
5. Union Lists of Serials	10	16.4	13	21.3	16	26.2	8	13.1
6. Acquisitions	9	14.8	7	11.5	1	1.6	4	6.6
7. Union Lists of Audiovisual Materials	6	9.8	7	11.5	6	9.8	6	9.8
8. Serials Control	3	3.3	2	3.3	1	1.6	7	11.5
9. Circulation	2	3.3	3	4.9	1	1.6	12	19.7

Total number of participating LRCs: N=61

TABLE 8

NUMBER AND PERCENTAGES OF LRCs IN AUTOMATED LIBRARY NETWORKING THAT GAINED BENEFITS DUE TO PARTICIPATION

		NATIONAL NETWORK N	%	REGIONAL NETWORK N	%	STATE LOCAL NETWORK N	%	NETWORK N	%
1.	Increased speed in and shared cataloguing record	45	73.8	40	65.6	18	29.5	9	14.7
2.	Improved services to users	41	67.2	40	65.6	26	42.6	15	24.6
3.	Increased access to resource sharing among network members	40	65.6	37	60.6	27	44.3	16	26.2
4.	Improved performance and productivity	36	62.3	34	55.8	22	36.0	11	18.0
5.	Increased number of interlibrary loans	36	59.0	35	57.4	25	41.0	15	24.6
6.	Improved management of resources	36	59.0	31	50.8	21	34.4	24	23.0
7.	Lowered the unit costs of operation	19	31.1	15	24.6	6	9.8	4	6.5
8.	Provided fast and accurate circulation activities	13	21.3	12	19.6	9	14.7	10	16.4
9.	Improved management of serials control	7	11.5	9	14.7	5	8.1	7	11.5

Total number of participating LRCs in Automated Library Networking: N = 61

benefits of networks in relation to expenses, unreliability and lack of computer compatibility, non-cooperation of computer staff, and need for constant staff training were not considered problems in network participation. However, it was stated that network participation did increase the operating expenses and that it is difficult to keep up with the state of technology (see Table 9).

Elements Affecting Participation in ALN

There are certain important elements which affect the participation in ALN systems. The researcher identified six such elements. They were: 1) leading factors for participation in ALN; 2) involvement in network related organizations or activities which motivated the LRCs to participate in ALN; 3) sources of funding used for developing and deploying ALN; 4) input provided by groups into decision making process for participation in ALN; 5) decision making groups that resisted participation of LRCs in ALN; and 6) factors that inhibited the LRCs from participating in ALN. These elements were developed into five research questions.

Research Question #7: What factors influenced the participation of of LRCs in automated library networking?

There are many factors which lead LRCs to participate in ALN and respondents were asked to identify them. Most of the respondents considered five statements out of six as "important" or "very important" factors which led them to participate in ALN. Sharing of bibliographic information and databases were considered a very important factor in network participation. Other important factors were to have immediate

TABLE 9

TYPES OF PROBLEMS ENCOUNTERED BY THE PARTICIPATING LRCs IN AUTOMATED LIBRARY NETWORKING

PROBLEMS ENCOUNTERED	DISAGREE		AGREE		STRONGLY AGREE		COMBINED SCORES*	
	N	%	N	%	N	%	N	%
1. Increased operating expenses	18	29.5	22	36.1	21	34.4	43	70.5
2. Difficult to keep up with the state of technology	19	31.2	31	50.8	11	18.0	42	68.8
3. Increased work load	28	45.9	18	29.5	15	24.6	15	54.1
4. Needs constant staff training	33	54.1	25	41.0	3	4.9	28	45.9
5. Lack of cooperation from the college computer personnel	49	80.3	8	13.1	4	6.6	12	19.7
6. Lack of compatibility with other systems	49	80.3	8	13.1	4	6.6	12	19.7
7. Unreliable computer	51	83.6	10	16.4	0		10	16.4
8. Expenses outweigh the benefits	54	88.5	4	6.6	3	4.9	7	11.5
9. Negative attitude of LRC staff towards networking	56	91.8	4	6.6	1	1.6	5	8.2

*"Agree" and "Strongly Agree" Scores were combined.
Total number of participating LRCs in Automated Library Networking: N = 61

online access to databases, faster services to users and sharing resources. Above all network participation was dictated by the increased and varied demands of the users. Because the respondents assumed that automated operations of the LRC cost more, lowering the unit costs of operations was not a leading factor for participation in ALN (see Table 10).

Research Question #8: What involvement and experiences in network related organizations and activities motivated participation in automated library networking?

It was expected that respondents might involve themselves in network related organizations or activities which might motivate them to participate in ALN. Six such involvement or activities related statements were posed to the respondents. The majority "agreed" or "strongly agreed" that they were "influenced by professional colleagues" and "involved in professional organizations" which motivated them to participate in ALN. The majority of the respondents disagreed with the remainder of the statements as being motivating factors for participation in ALN (see Table 11).

Research Question #9: What sources of funding have been used for developing and deploying automated library networking activities?

Funding was considered an important factor for network participation. The respondents were asked to identify the sources and amount of funding they received for the purpose of automated library networking. It was evident from the replies that very few LRCs received funding for ALN. The meager amount of funding that they received was mainly from their regular budget appropriations. The amount of funding, in

TABLE 10

LEADING FACTORS FOR PARTICIPATION IN AUTOMATED LIBRARY NETWORKING

FACTORS FOR PARTICIPATION	NOT IMPORTANT		IMPORTANT		VERY IMPORTANT		COMBINED SCORES*	
	N	%	N	%	N	%	N	%
1. Sharing bibliographic information and databases	1	1.6	13	21.3	47	77.0	60	98.3
2. Having immediate access to millions of records now on databases and network files	2	3.2	19	31.1	40	65.6	59	96.7
3. Providing faster and more efficient services to users	3	4.9	18	29.5	40	65.6	58	95.1
4. Sharing collections and other resources among network members	10	16.4	22	36.1	29	47.5	51	83.6
5. Meeting the increased and varied demands of users	10	16.4	22	36.1	29	47.5	51	83.6
6. Lowering unit costs of operation	36	59.1	15	24.6	10	16.3	25	40.9

*"Important" and "Very Important" scores were combined.
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 11

INVOLVEMENT IN NETWORK RELATED ACTIVITIES WHICH MOTIVATED LRCs TO PARTICIPATE IN AUTOMATED LIBRARY NETWORKING

ACTIVITIES/MOTIVATION	DISAGREE N	%	AGREE N	%	STRONGLY AGREE N	%	COMBINED SCORES* N	%
1. Influenced by professional colleagues	10	16.4	29.	47.5	22	36.1	51	83.6
2. Involved in professional organizations related to library networking	11	18.0	27	44.3	23	37.7	50	82.0
3. Received training and experience in networking	31	50.8	23	37.7	7	11.5	30	49.2
4. Participated in network organization	37	60.6	14	23.0	10	16.4	24	39.4
5. Participated in governance of networking	47	77.1	8	13.1	6	19.8	14	32.9
6. Participated in the structure of networking	44	72.1	10	16.4	7	11.5	17	27.9

*"Agree" and "Strongly Agree" Scores were combined.
Total number of Participating LRC in Automated Library Networking: N = 61

most cases, was less than $25,000 which was awarded for a period of one to five years. Since the funding sources were very few and the funding amount was so small, it was decided that analysis of this variable against the institutional variables would generate no useful result (see Table 12).

Research Question #10: What groups were involved in the decision to participate or resist participation in automated library networking?

In general, the LRC is considered a collegewide service unit. Participation in ALN may affect major segments of the college community. Input provided by the college decision making groups is therefore considered vital to participation in ALN. Presidents, vice-presidents, deans, division heads, faculty, librarians, and LRC directors were identified as decision making groups. From the responses, it was obvious that the decision to participate in ALN primarily came from the LRC directors and librarians (see Table 13). While there was moderate input by presidents, vice-presidents and deans, and "seldom input" by division heads and faculty to participate in ALN, they provided no resistance to participation. As a matter of fact, librarians exercised more resistance than any other decision making group identified in the study (see Table 14). The reason for this behavior could not be determined from this study.

Research Question #11: What factors inhibited the participation of LRCs in automated library networking?

Those LRCs that had automation but no ALN, were asked to identify the factors which contributed to their non-participation. Nine potential

TABLE 12

AMOUNT OF FUNDING RECEIVED FROM AGENCIES FOR AUTOMATED LIBRARY NETWORKING FOR A PERIOD OF ONE TO TEN YEARS

	STATE		FEDERAL		LOCAL		PRIVATE		OTHER	
	N	%	N	%	N	%	N	%	N	%
Funding Received	20	32.8	6	9.8	5	8.1	0	0	2	3.2
Amount of Funding Received										
Less than $25,000	17	27.7	4	6.6	3	4.8	0	0	1	1.6
25,001 - 50,000	1	1.6	1	1.6	3	4.8	0	0	0	0
50,001 - 75,000	0	0	1	1.6	0	0	0	0	0	0
75,001 - 100,000	1	1.6	0	0	0	0	0	1	1	1.6
100,001 and Over	1	1.6	0	0	1	1.6	0	0	0	0
Sources of Funding										
Institutional Budget	7	11.20	0	0	0	0	0	0	0	0
Special State Appropriation	11	17.6	0	0	0	0	0	0	0	0
LSCA TITLE II	0	0	6	9.8	0	0	0	0	0	0
(LSCA Title II the State)	2	3.2	0	0	0	0	0	0	0	0
Local Funds	0	0	0	0	5	8.1	0	0	0	0
Others	0	0	0	0	0	0	0	0	2	3.2
No. of Years Funded										
1 - 5	15	75.0	6	9.8	5	8.2	0	0	0	0
6 - 10	4	20.0	0	0	0	0	0	0	0	0
OVER 10	1	5.0	0	0	0	0	0	0	0	0

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 13
INPUT PROVIDED BY GROUPS INTO DECISION MAKING PROCESS FOR PARTICIPATION IN AUTOMATED LIBRARY NETWORKING

GROUPS	Never		Seldom		Frequently	
	N	%	N	%	N	%
1. Yourself (respondent)	3	4.9	1.	1.6	57	93.4
2. Librarians	4	6.5	5	8.2	52	85.2
3. President, Vice-Presidents, Deans	10	16.4	31	50.8	20	32.8
4. Division heads	30	49.2	26	42.6	5	8.2
5. Faculty	34	54.8	24	39.3	3	4.9

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 14

DECISION MAKING GROUPS THAT RESISTED PARTICIPATION OF LRCs IN AUTOMATED LIBRARY NETWORKING

	GROUPS	Never N	Never %	Seldom N	Seldom %	Frequently N	Frequently %
1.	Librarians	49	80.3	8	13.1	4	6.6
2.	President, Vice Presidents, Deans	36	59.0	22	36.1	3	4.9
3.	Faculty	41	67.3	18	29.5	2	3.3
4.	Division Heads	42	68.8	18	29.5	1	1.6
5.	Yourself (respondent)	56	91.8	4	6.6	1	1.6

Total number of participating LRCs in Automated Library Networking: N = 61

non-participating factors were addressed. The respondents stated that "budget constraints" was the number one inhibiting factor for their non-participation. The responses regarding limited institutional support were second to budget constraints. Those who had not participated strongly agreed that their institutions placed low priority on LRC participation in ALN. Among the other inhibiting factors were "limited access to computer-equipment and facilities," "limited LRC personnel with computer background," "limited information about automated library networking applicable to community colleges," and "too expensive for benefit gained" from participation in ALN. The majority of the respondents disagreed that the statements "negative attitude of LRC" and "no significant benefits to LRC" were contributing factors for non-participation (see Table 15).

Relationship

A major factor of this study was also to examine the relationship between automation and the institutional variables, and between automated library networking and the institutional variables. In order to determine if there was any relationship between these variables, statistical tests as stated in Chapter III were conducted. The results of the tests are recorded in Tables 16 through 87 in Appendix E.

Research Question #12: What relationship, if any, exists between the presence of automated library networking activities and selected institutional variables?

TABLE 15

FACTORS WHICH CONTRIBUTED TO NON-PARTICIPATION IN AUTOMATED LIBRARY NETWORKING

	NON-PARTICIPATING FACTORS	Disagree		Agree		Strongly		Combined Scores* Agree	
		N	%	N	%	N	%	N	%
1.	Financial resources unavailable	4	7.3	5	9.1	46	83.6	51	92.7
2.	Limited institutional support	8	14.5	16	29.1	31	56.4	47	85.5
3.	Limited access to computer equipment and facilities	17	30.9	13	23.6	25	45.5	38	69.1
4.	Limited LRC personnel with computer background	18	3.2	13	23.6	24	43.6	37	67.3
5.	Due to small size and level of LRC activities	20	36.4	13	23.6	22	40.0	35	63.6
6.	Limited information about automated library networking applicable to community colleges	25	45.5	7	12.7	23	41.8	30	54.5
7.	Too expensive for benefit gained	26	47.3	11	20.0	18	32.7	29	52.7
8.	Negative attitude of LRC	33	60.0	4	7.3	18	32.7	22	40.0
9.	No significant benefits to LRC	34	61.8	2	3.6	19	34.5	21	38.2

*"Agree" and "Strongly Agree" Scores are combined.
Total number of automated LRCs presently not participating in Automated Library Networking: N = 55

1. Relationship between automation and institutional variables.

Size of the institutional variables and location of the institution played a major role in the relationship. The results of the tests (see Tables 16 through 21) indicate that there was a significant relationship between automation and instituional variables. Table 16 shows that there was a relationship between automation and location of the institution. There was a relationship between automation and the level of enrollment (see Table 17). Looking at the additional data generated by the test, institutions with enrollment levels of 1,000 or less and 3,001 and over contributed most to the significant relationship. Institutions with enrollment levels of 1,000 or less were less automated than other schools and those with enrollment levels of 3,001 and over were more automated. There was a relationship between automation and the level of collection sizes (see Table 18). The LRCs with collection sizes 30,000 or less and 70,001 and over contributed most to the relationship. From the additional data produced by the test, LRCs with collection sizes of 30,000 or less were under-automated and LRCs with collection sizes of 70,001 and over were more automated. Other LRCs with collection levels of 30,001 - 50,000 and 50,001 - 70,000 did not differ much from the overall distribution.

There was a relationship between automation and the level of circulation of materials, number of LRC staff, and LRC annual budget (see Tables 19, 20, and 21). The LRCs with circulation levels of 30,000 or less and 70,001 and over contributed most to the relationship. LRCs with 5 or less staff members and 16 and over staff members contributed significantly

more to the relationship. Similarly, there was also a relationship between automation and level of annual budget. Statistically, LRCs with annual budget levels of $300,001 and over had the most extensive automation base.

2. Relationship between the extent of automated functions and the institutional variables. There was a relationship between the location of the institution and the extent of automated functions in cataloging, circulation, and reference assistance (see Table 22). Statistically, cataloging, circulation, and reference assistance functions of LRCs located in urban/suburban areas were automated more than the rural LRCs. There were no statistically significant relationships evident among the rest of the automated functions and the location of the institutions. Table 23 suggests that there was also a statistically significant relationship between the collection size and the automated functions-cataloging, authority control, and public access catalog. Additional data gathered by the test further indicated that the LRCs with collection sizes 70,001 and over scored higher average mean rankings in all three functions, contributing significantly to the relationship. No statistically significant relationships were found between collection size and the remaining automated functions.

As shown in Tables 24 through 27, no significant relationships were found between the automated functions and the institutional variables - enrollments, circulation of materials, number of LRC staff, and LRC annual budget, with one exception in Table 26, function 1. There was a significant relationship between the number of LRC staff and the automated functions in cataloging. The LRCs with 16 and over staff

members had the highest mean rank of 77.40 and had the most automation in cataloging. The figure suggests that the larger LRCs, in this case 16 or more staff members, tend to have automated the cataloging functions.

3. Relationship between the automated library network and the institutional variables. Table 28 shows there was a relationship between the extent of ALN and the location of the institution. The distribution of responses for LRCs located in rural areas differed more from the overall population than did that for urban/suburban LRCs. Rural LRCs participated somewhat less in ALN than their urban/suburban counterparts. Table 29 shows no significant relationships between the level of enrollment and the extent of automation. Tables 30, 31, and 32 show a significant relationship between the extent of ALN and the level of collection size, circulation of materials, and number of LRC staff. Table 30 shows participating LRCs with collection sizes of 70,001 and over participated more in ALN than the remaining levels of collection sizes. The case was the same between the circulation of materials and the extent of ALN. LRCs with circulation levels of 70,001 and over contributed most to the chi-square value being significant. In the case of number of LRC staff and ALN, LRCs with 5 or less and 16 and over LRC staff contributed most to the relationship being statistically significant. In between groups differed little from the overall population. LRCs with 5 or less staff members had least participation and those with 16 and over staff members had the most participation in ALN. Table 33 suggests that there was no statistically significant relationship between the LRC annual budget and

the ALN. The distribution of responses within the groups did not differ enough from the overall distribution to show a statistically significant relationship between the two variables.

4. Relationship between the types of network participation and institutional variables. Tables 34 through 39 show that there were no statistically significant relationships found between the types of networks and the institutional variables except in item 3 in Table 35. Here, there was a relationship between the state library networks and the level of enrollment. There were four types of networks and six institutional variables. In total, there were 24 tests conducted between these independent variables. It is likely that the relationship between the state library networks and the level of enrollment was caused by mere chance.

5. Relationship between functions and services used through networks and institutional variables. Table 41 shows that there was a relationship between the functions used through the state library networks and the level of enrollment. Additional data generated by the test indicated that institutions with enrollment levels of 2,001 to 3,000 used an average of 2.33 functions through the state library networks and had the highest mean rank of 43.11. Similarly, as indicated in Table 42, there was a relationship between the functions used through the state library networks and the LRC collection sizes. LRCs with collection sizes 30,000 or less used an average of 2.46 functions through the state library networks, and had the highest contributing mean rank of 41.08. It seems that LRCs with collection sizes 30,000 or less used functions through state library networks

more than LRCs with other levels of collection sizes. No other function used through the different networks produced statistically significant relationships with the institutional variables.

6. Relationship between benefits gained due to participation in ALN and institutional variables. Tables 46 through 51 show that there were no statistically significant relationships found between the benefits gained due to participation in ALN systems and the institutional variables, except the difference in Table 47, item 2. As indicated in Table.47, there was a relationship between the benefits gained due to participation in state library networks and the level of enrollment. Institutions with an enrollment level of 2,001 to 3,000 gained an average of 5.11 benefits. It seems this group of institutions used the state library networks more than others. As there was a total of 24 tests, it is possible that this significant factor might have been attributed to chance. Statistically it could, however, be predicted that institutional variables had an impact on benefits gained due to participation at the level of state library network activities and enrollment.

7. Relationship between the problems encountered by LRCs due to participation in ALN and the institutional variables. Table 54 shows that there was a relationship between the problem of "increased work load" and the level of collection sizes. The two extreme mean ranks noted in the table might have contributed to the relationship. As shown in Table 57, there was also a relationship between the problem of "negative attitude of LRC staff toward networking" and the level of annual budget. Again the

two extreme mean ranks noted in the table might have significantly contributed to the relationship. No other significant differences were found in the relationship between the other problem statements and the institutional variables. The remaining institutional variables had no statistically significant relationship with problems encountered due to participation in ALN.

8. Relationship between leading factors for participation in automated library networking and the institutional variables. Tables 58 through 63 show that there was no statistically significant relationship between the institutional variables and the leading factors for participation in ALN. Statistically, factors used to consider participation were independent of the institutional variables.

9. Relationship between the involvement in network related organizations or activities and the institutional variables. The results of the tests in Tables 64 through 69 suggest that, with the exception in Table 66, item 3, institutional variables had no impact on involvement in network related organizations or activities which motivated the respondents to participate in ALN. As shown in Table 66, there was a relationship between the statements "received training and experienced in networking," and the level of collection sizes. A total of 24 tests was conducted between the statements and the institutional variables. It is possible that the difference between one pair of variables might have been caused by mere chance.

10. Relationship between the groups providing input for

participation and the institutional variables. Table 71 shows that there was a statistically significant relationship between the enrollment level and the librarians. Librarians from institutions with an enrollment level of 1,001 - 2,000 and 3,001 and over provided more input than the rest of the enrollment levels, thereby contributing more to the relationship. Faculty in institutions with enrollment levels of 1,001 - 2,000 provided more input and faculty with institution enrollment levels of 3,001 and over provided least input . Therefore, enrollment levels had an impact on the amount of input provided by the decision making groups. As shown in Table 74, there was a statistically significant relationship between the amount of input respondents (LRC directors) had into decision making for participation in ALN and the levels of LRC staff. Statistically, it was shown that the input provided by the LRC directors had a significant relationship to the number of LRC staff members in the institutions. Other institutional variables had no impact on the extent of input provided by the groups.

11. Relationship between the groups resisting participation in ALN and the institutional variables. The results of the test analysis indicated that there was no statistically significant relationship found between the groups resisting participation and the institutional variables. In other words, institutional variables had no effect on the groups resisting participation.

12. Relationship between the factors for non-participation and the institutional variables. Tables 82 through 87 show that no statistically significant relationship existed between the institutional variables and the

factors for non-participation. It is interesting to note that, in the descriptive part of this study, in the combined scores (see Table 15), fifty-three to ninety-three percent of respondents identified six statements from "too expensive for benefits gained" to "financial resources unavailable" as the major constraints for non-participation in ALN. But, when data were analyzed against the institutional variables, no statistical relationship existed between the inhibiting factors for non-participation and the institutional variables. In other words, institutional variables had no impact on the factors for non-participation in ALN.

Trends or Recurring Variables-Case Studies

The second phase of the study was to conduct three case studies. The researcher developed a thirteen item interview guide to gather additional information to cover those issues not adequately addressed in the first phase. Items 1 to 5 covered general questions which included objectives for participation in ALN, implementation of the objectives, future plans, strategies for future plans, and strengths and limitations of the present plans. Items 6 to 13 were directly linked to the results of the first phase of the study. Item numbers were uniformly used in all three cases according to the numerical order of the interview guide (see Appendix B).

Interviews were arranged with three LRC directors and their immediate supervisors. A follow-up confirmation letter, along with the interview guide was mailed to the LRC directors. During the interviews,

LRC directors and their immediate supervisors were asked to make comments as they deemed appropriate to specific questions in the interview guide. The immediate supervisor, in most cases, asked the LRC director to respond. The interviews were completed during the week of May 11 to 14, 1988. Based on the material collected from the site visits and transcriptions of the recorded interviews, three descriptive case-studies were prepared and reported.

LRC-A

The State Board of Education established this college in 1958 and granted authority to award associate degrees and certificates in transfer and vocational programs. The college is located in a small urban/suburban area of North Carolina. The present enrollment is 1200 full time equivalent students.

The LRC facilitates the use of traditional sources as well as multimedia instructional materials, audiovisual equipment, and a variety of professional services to meet the needs of students, faculty, and the general community. The collection includes 31,000 book volumes, 235 periodical subscriptions, and 2,880 pieces of audiovisual materials.

The LRC is a part of the local area network consisting of a public library, a four-year college library, and a hospital library. A joint union periodical and audiovisual materials database was developed and is shared by the network members. Each database can be accessed through the ALN system without going to other libraries. Accessibility of other functions

and services have not yet been developed due to the lack of a sophisticated system and software. The LRC can also access and use the state library network for interlibrary loan. Through the state library SOLINET/OCLC can be reached for verification of data only.

1. The major objectives for participation in ALN were to have greater access to resources and more efficiency in producing the union database.

2. The LRC has met its objective substantially at the local level but marginally at state and regional levels. The lack of funding was the major constraint.

3. The future plan of the LRC is to obtain an integrated library automation system (Dynix Library Automation System) and fully participate in local, state, regional and national network systems.

4. Required funds will be sought through the college's operating budget as well as by writing grant proposals. The implementation of the plan would very much depend on the availability of future funding.

5. With regard to strengths and limitations of ALN, it was stated that transactions through an online system are quicker and more efficient. Borrowing books on interlibrary loan from the state network is much faster. With the manual system, it was very time consuming to telephone the state library for a particular title from a lending institution. In turn the state library would make the request to the lending institution on behalf of the LRC (borrowing institution). The ALN system eliminated several intermediary steps and the LRC is now in a position to make or

receive requests from the member institutions directly. However, some institutions consider the process as a limitation because the workload has increased and expenses have fallen on their shoulders.

6. Presently the LRC has automated circulation, cataloging, and acquisition functions. It participates in local and state networking systems for union database and resource sharing. Other functions were not yet automated due to lack of a sophisticated library automation system.

7. As of this date the LRC has no integrated system of library operation. Each function is automated in a separate mode and runs independently of the others. However, since retrospective conversion was based on MARC format, it has the capability to be integrated into a system once a viable library system (Dynix Library Automation System) is acquired.

8. Participation in local and state networks allowed the LRC to search databases of member libraries directly through microcomputers and modem link systems. The important factor for participation in ALN was to expand its resources by receiving materials from other libraries on interlibrary loan faster, sometimes on the same day. Feedback on the status of the results placed on the lending institution was immediate. Besides, ALN allowed the LRC to have direct control of activities with the member institutions.

The LRC was aware of the increased cost of ALN over a manual system. This was made clear to the college administration. The payoff for the increased cost was considered compensated by greater access to

resources, information and services to students and faculty. According to the North Carolina State Librarian, the unification of state databases of all state agencies would be similar to a "highway of information and participation of this institution and the project would be one step closer to a complete and unified state database system to which every institution in the state will have access" (Interview, May 11, 1988).

9. The local network was developed through a local grant contributed by the participating institutions. The LRC is a member of the state library network by virtue of being a state agency. Retrospective conversion was completed through the North Carolina Community College System and all records were transferred to the state network database. Through this database all state agencies can use the interlibrary loan system. This is a legislative mandate to maximize the use of resources by all state agencies whenever it is feasible. In addition to the state library network, the LRC can also use OCLC through the state library for limited functions.

10. The college administration supported the local network by contributing to the grant. Last year a request was made for funding to acquire an integrated library automation system (Dynix). The Vice-President for Academic Affairs, who is in charge of the LRC, supported the request but it was denied over other priorities established by the management group. There is a LRC Advisory Committee in the college. The LRC director was uncertain whether to solicit support from this group.

11. A qualified statement was made regarding the "increased workload", "increased operating expenses", and "keeping up with the state of technology". It was stated that up-do-date record keeping in ALN takes more professional time and attention. The LRC director qualified the statement by saying that "I don't know if that really increases the workload but changes the nature of the workload. Before, it was filing catalog cards, now its updating the edit list, and making sure the accession numbers input for certain things are correct. It is different. I feel like more professional work is involved in ALN, but I am not sure" (Interview, May 11, 1988).

With regards to increased operating expenses, it was clearly stated that maintaining hardware, software, and microfiche for the public catalog cost substantially more than the manual system. Keeping up with the state of technology was considered to be a problem in light of what is happening in North Carolina. Due to constant changes in technology, things have become more uncertain. Some community colleges have gone back to the drawing board to check the IBM Mini and System 2 which just came to the market a few months ago. This college has the Prime computer and the LRC was considering buying the Dynix Library Automation System which runs on Prime. IBM Mini, on the other hand, might be cheaper and that may be the way to go. Now a re-evaluation of the LRC plan might be in order.

12. The LRC was very much involved in local network organization, and governing, structure. There was little or no involvement in the state, regional and national network governance except indirect input to the state

library network. Lack of funding at the college and state levels limited full access to and involvement with these networks. Incentive and motivation to network participation primarily came from reading professional literature and attending meetings and workshops conducted by library organizations such as the Learning Resources Center of North Carolina and American Library Association.

13. It was agreed that little input was received from faculty and division heads with regards to network participation. The LRC director was uncertain whether such input and advocacy from these groups would help or become counter-productive to the case. Five years ago, the need for ALN was presented to the management group and approval for retrospective conversion was granted. Last year when the plan to acquire a library system came up, the group had to be reeducated. While there was support from the Vice-President for Academic Affairs, the President remained unconvinced that an LRC of this size would benefit significantly from automation and ALN.

LRC - B

The state legislature established this college, located in the suburban area of a city on a 125 acre track of land in Florida, in 1965, as a comprehensive public community college. It assumed responsibility for two-year transfer programs, non-credit education, general credit courses and occupational studies. The college has an enrollment of 7,000 full-time equivalent students.

The LRC collection contains approximately 60,000 book volumes, 445 periodical titles, and 5,000 audiovisual software items. Special library services include interlibrary loan, reserves, tours, library instruction, online bibliographic service and preparation of reading lists. This LRC was considered to have the most automated functions of all the community colleges in the state. It participates in a ten member local library network which includes nine state university libraries.

The computer user service provided by the LRC (FOCUS) includes online searching for students and faculty. Bibliographical information includes the database of this LRC as well as nine university libraries. Access to the system is through Library User Information Service called "LUIS."

1. The major objectives for participation in ALN were to provide greater and better access to library materials for students, faculty, and staff. The Dean of the College further stated that "we wanted ALN to better serve the students, to be more cost effective, to be more efficient in terms of workload, speed, and accuracy. We want to be in the 21st Century" (Interview, May 13, 1988).

2. The objective of the LRC has not yet been met due to the unusual situation of being the only community college among nine state universities. The system originally began as a cooperative network venture between one university and this community college. The NOTIS library automation software purchased by this university was later extended to nine others in the state university system, using a central database for

library automation and networking.

At that point it was thought that the network soon would accommodate the rest of the community colleges in the state. Developments made it clear that this was not going to be the case. There is currently legislative action being taken to limit this network to state university libraries, excluding community college LRCs. Since it is the only community college with the network, its status is somewhat uncertain.

3. The plan of the LRC is to have complete automation and ALN participation at the local and state levels. This would depend on the university network system and legislature which is responsible for funding and establishing policies for networking. However, the LRC plans to utilize the maximum services feasible under the present state university network system until a separate networking system is mandated by the legislature and developed by community colleges of the state.

4. Presently, there is no specific plan available for implementation.

5. In the area of strengths and limitations of ALN as they apply to this LRC, the director was uncomfortable about making comments due to the present situation in ALN participation. It was stated that the LRC would be in a better position to comment on this topic when all segments of automation and ALN were firmly established.

6. The objective of the LRC was to automate all functions and participate in available and affordable ALN systems. Cataloging, circulation and interlibrary loan were considered the most immediate

activities needed to be automated for network participation to meet the user's demands. Other functions and services remained in the manual processes due to a lack of personnel, funds, and the ambiguous situation of the LRC in the network membership.

7. Due to the limitation of the number of functions automated so far and the LRC having the lower priority among the participating members, integration of functions has yet to be formalized and put into practice.

8. Participation in the local network enables the LRC to access the resources of nine university libraries without going to their premises. Through the local network, access to OCLC databases for verification of bibliographic information is feasible but no transaction is allowed because the LRC is not a full participating member of OCLC. The significant differences are that the speed of access and acquisition of information and resources are much faster in ALN than the manual procedures. The needs of students and faculty could be met with faster and greater quantity of records.

With regards to expenses, the administration of the college clearly understood that "lowering the cost of operation" would be a least consideration for participating in ALN. The Dean of the College pointed out that the administration, however, expected automation and ALN to modify the increase in personnel cost. Personnel cost would stabilize, in the sense that, with the existing number of people it will be able to provide more efficient service. However, student use of ALN system far outweighs

any difficulties found in ALN, said the Director of LRC. The manual system takes an inordinant amount of time and labor as most library functions are labor intensive.

9. The LRC mostly uses the local network system and can have access to state and regional systems only for reading and verification. Technical processing and public access catalogs could be pulled out but no transaction is permissible due to non-membership status with them. SOLINET/OCLC networks were considered useful but far too expensive. The monetary factor, therefore, was the main reason behind non-participation in regional and national networking systems.

10. The LRC was funded by the college to participate in the local network. No other state or federal grants were written or received for networking purposes. The budget of the LRC is based on the expenditures of the previous year. For special expenses such as LRC networking, a separate request is made to the Dean who brings it before the management group for approval. As such, no budget priority with regard to ALN was established. The Dean further stated that the reason "we don't plan ahead is because we don't know what we are going to need and when. We are at the mercy of the university network system. We don't control our speed, pace and destiny" (Interview, May 13, 1988).

11. Regarding "increased workload" due to participation in ALN, the LRC director stated that the area and type of workloads have been changed. It changed, for example, from card catalog to computer terminal work. In some cases the nature of the workload has been shifted from one

area to another. There has been a moderate increase in operating expenses due to participation in ALN. Major increases were in the area of hardware, operating system and automated library system maintenance. The increase, however, did not exceed the expectations of the planned expenditure of the ALN system.

This LRC is close to the network headquarters and had little difficulty in keeping up with the state of technology. Local network headquarters personnel extended frequent assistance and information. In addition, there was plenty of help available from members of the network system.

12. The Director of the LRC had very little involvement in the governance, organization and structure of the local network. This was because of the ambiguous position of the LRC. In a normal situation of such network set up, the LRC would expect to be involved in all phases of network activities. Presently, the LRC does not participate in state, regional and national networks and has no opportunity to be involved in their activities in meaningful ways.

13. Participation in the local network materialized primarily due to the initiative and involvement of the LRC director. The director made no specific efforts to create interest among the decision making group. He did keep the Dean informed of the opportunity available to the LRC and potential benefits and cost involved in such participation. Since there were no major expenses initially involved, the plan to participate was approved by the management group with no opposition.

As to the advice for those LRC directors interested in ALN, the Dean of the College advises what not to do.

> "Don't try to sell it as a cost or personnel saver because it is not. I think you better be honest up front and say this is going to be very expensive until we get things running. You have to present it for academic and service reasons not as a management cost effective tool. The LRC director ought to explain it to management, who is not acquainted with the technicalities of the system, in as simple a fashion as possible, succinctly and to the point. You should not bog them down with details, always stay with the larger picture" (Interview, May 13, 1988).

LRC - C

The state legislature authorized the establishment of this public community college and classes started in 1966 on a 170 acre site in Florida. The county was recently cited as being one of the most rapidly growing communities in the nation with six major businesses and industries relocating their headquarters to the area in the past year.

The college, in addition to general and transfer education, has made a concentrated effort to keep its occupational training programs in synchronization with its rapid growth. This college is also one of five community colleges in the state designated as a Center of Electronic Emphasis by the Governor's High Technology and Industry Council. This

honor carried with it a significant monetary endorsement and ensured that the program would receive the latest state-of-the-art equipment and instructional materials. The college has 5,200 full-time equivalent students.

The LRC actively supports the growth of the college and enhances the academic programs, both in collection and service. Current collections include 70,000 volumes, excluding microforms, media materials and periodicals. The book collection could be accessed through the library's online catalog. Automated circulation is provided as part of the online system.

1. The initial objective of automation was to devise a system which would be accurate as to bibliographic information, patron's personal data, rapid in transactions and the provision of data such as the answer to a patron's question. In networking, this college was one of the few that took the first opportunity to join SOLINET/OCLC. As a result, the LRC was able to do one hundred percent retrospective conversion of records. Besides cataloging, the LRC uses ALN for acquisition and interlibrary loan.

2. The LRC has met its objectives in part by acquiring a stand-alone system of automation and participating in SOLINET/OCLC networking system. The stand-alone system, as opposed to the college's main frame, was favored because of the low priority the LRC would have received over payroll and registration activities. However, the stand-alone system - Burrough Unicorn hardware and in-house software - has serious limitations for expansion to additional functions. The system was considered as an

interim means since there was a movement that the state university networking system would accommodate of the state's community colleges. It appears the state legislature might take alternative actions by forming a separate network consisting of all community colleges.

3. At the present time the LRC does not have any definite plan for ALN.

4. Since no specific future plan is available, no discussion took place on the subject of implementation strategy.

5. Software developed in-house by the College for library automation has serious shortcomings. The searching scope of bibliographic information is limited. Additionally, in the absence of an integrated system, the LRC developed several stand-alone systems - UNICORN for circulation, IBM-PCs for acquisition, and OCLC for cataloging and interlibrary loan. So far, this segmented system has little problems perhaps due to the low volume of daily transactions. Even though it is somewhat cumbersome and slow in processing, it is certainly much faster than the manual procedures.

6. The LRC tried to treat the most pressing problems first. The circulation system was breaking down so it had to be fixed first. Other reasons for tackling circulation first were economics and complexity. It was not as complex and expensive as cataloging, public access, and reference services. The acquisition and serials were automated because of the availability of PCs and inexpensive software.

7. Since there are several stand-alone systems for different

functions, no integrated functions as yet have been feasible or initiated. This feature would only be possible subject to the availability of a unified system. This seems to be unlikely due to the lack of funds and concrete plans.

8. Participation in SOLINET/OCLC made it possible to perform cataloging and interlibrary loan much faster than the manual system. Because of the extensive OCLC database, cataloging has become easier, virtually with no backlog which was frequently the case with the manual procedures. In addition, the LRC can dial the state university network and its Library User Information System (LUIS) for instant verification of books. This access cuts down the vertification costs while requesting an item on interlibrary loan through OCLC dataase. The obvious difference between the ALN and manual procedures is that ALN provides a larger database with which to work. Interlibrary loan could be done much faster. The LRC can answer questions for students on OCLC terminal to verify bibliographic information instantly.

The LRC director and Vice-President for Academic Affairs were aware of the increased cost of ALN over a manual system. The old theory and justification that ALN would cost less were outdated conclusion and could no longer be applied. The benefit of higher cost in ALN was that it improved the level of services over the manual system.

9. The LRC uses the regional and national networks very heavily. The state library network is marginally used due to clear guidelines as to the extent of services available to libraries other than public libraries. At

the present time, the area is in the process of forming a local library network and the LRC director is actively involved in the organization. This LRC and six counties received a state grant and hired the services of a consultant company to formulate a local library network plan.

10. The President of the College played a key role in the participation of regional and national networks. As far as additional expansion and upgrading of the present system are concerned, there is no priority in the budget planning process. The budget was tight for a number of years and other needs of the college received consideration over the LRC. The LRC director stated that "when money was no problem, library network was in infancy. I did not give enough weight to it at the time" (Interview, May 14, 1988). Presently all network activities have to be considered within the regular operating budget. So far, no attempt has been made to solicit support from other management groups or write grant proposals for automation and network participation.

11. The LRC director perceived that ALN, perhaps, changes the nature of the workload rather than increasing it. He explained that previously certain people needed to do paper shuffling, typing or filing. Now they have to work all day with the terminal.

With regard to expenses, ALN did increase the operating expenses in the area of hardware, software and maintenance service. This phenoneom is, of course, common in all aspects of automated activities not just ALN. Keeping up with the state of technology has been a continuing problem for the LRC. Better and cheaper hardware and software with improved

features are coming to the market constantly. The LRC director stated that, "by the time you buy something, something better will come out in a year or two and it will probably cost two-thirds the price of the one you bought." It is, therefore, difficult to make a decision for a larger commitment for technology which might be outdated in a short time.

12. The LRC was involved in regional and national organizations and governing structure marginally. In most cases, the LRC director found that the organizations discussed problems in larger libraries which were of little value to the LRC. The director suggested perhaps there is a need for a sub-group within the organization to deal with the issues and problems of smaller libraries. Presently, the LRC is playing an active role in establishing a local network which will consist of all libraries within the adjoining six counties.

In this particular state, the state library association and American Library Association were credited with the promotion of network concepts and the training of professionals. This was achieved through workshops and seminars. The LRC director received motivation from discussing networks with colleagues, attending workshops and reading professional magazines. The graduate library schools also offered pre-conference workshops which were excellent for those libraries interested in network participation.

13. The President of the College was interested in ALN and provided strong leadership in the participation of the regional and national networks. The president and the LRC director have been here since the inception of the College. This might have brought some stability of the

LRC as well as the college organizational set up and working relations among the managers. The Vice-President and administration, in general, were equally supportive to LRC activities. The LRC director reiterated, "if there is any deficiency here for ALN, it is because I may not have pushed hard enough" (Interview, May 14, 1988).

Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

New ways of discharging LRC services and finding information through automated library technology are available and are continuing to grow due to rapid technological advancements. If community college LRCs are to enter into this new era, they must explore the present and future of technology. The purpose of this study, therefore, was to examine the extent of community college LRCs' participation in ALN, to identify factors which influenced or inhibited participation in ALN, to identify the functions and services used with different types of networking systems, to identify benefits gained and problems encountered due to participation, to identify the sources of funding, to identify the involvement of LRCs in network related organizations and activities, to illuminate the influence of college staff in the decision making process, and to assess the relationships, if any, which existed among the selected ALN activities and the institutional variables.

In fulfillment of these objectives, a questionnaire entitled Automated Library Networking in American Public Community College Learning Resources Centers was developed to solicit data pertaining to the following research questions:

1. What is the extent of automation available to support library networking?
2. What functions and services of LRCs are integrated into one

automated/turnkey system?

3. What is the extent of participation in different types of networks?
4. What functions and services of LRCs are used through different types of automated library networking systems?
5. What benefits have been gained due to participation in automated library networking?
6. What problems have been gained due participation in automated library networking?
7. What factors influenced the participation of LRCs in automated library networking?
8. What involvement and experiences in network related organizations and activities motivated participation in automated library networking?
9. What sources of funding have been used for developing and deploying automated library networking activities?
10. What groups were involved in the decision to participate or to resist participation in automated library networking?
11. What factors inhibited the participation of LRCs in automated library networking?
12. What relationship, if any, exists between the presence of automated library networking activities and selected institutional variables?

Procedurally, the study employed a survey approach. Based on the

literature and expert input, a questionnaire was developed to solicit data on the research questions. The questionnaire was administered to 253 directors of community college LRCs from ten Southeastern states. From a total population of 253, 199 (78.7 percent) questionnaires were returned and 193 (76.3 percent) were verified to be appropriate for the study. The responses were verified for input in the computer and subjected to analyses through the SAS computer-package for the first phase of the study. Statistical procedures employed for this purpose were chi-square, Mann-Whitney U Test, and Kruskal-Wallis One Way Analysis of Variance by Ranks to test the appropriate samples at the .05 level of significance. The second phase of the study was a description of three case studies conducted by site visits. Findings from the first and second phases were very similar. The findings of the first phase on certain issues, therefore, could be reiterated due to similar findings of the second phase. The summary of findings could be broadly divided into five components: automation, ALN, factors affecting participation in ALN, relationships, and case studies.

Automation

The majority of community college LRCs (60%) had some kind of automation. Most community college LRC automation activities were developed in-house. Because of this, access to external databases and sharing of resources between other libraries were severely limited. The most automated function was cataloging and the least automated function was the public access catalog. The public access catalog, however, was

ranked number one in priority for any future automated activity. Integrated systems of operation were extremely limited. By and large, each function was automated and used independently of other automated functions. The lack of integrated systems was attributed to non-availability of sophisticated commercial software and hardware and institutional low priority. This was further reinforced from the case studies conducted for this study.

Automated Library Networking (ALN)

One-third of the community college LRCs surveyed participated in ALN. Their participation was mostly in regional and national networks. Among the various functions, mostly regional networks were used for cataloging, union catalog databases, interlibrary loan and resource sharing. The most used function, however, was cataloging. Major reasons for participation were sharing bibliographical databases, immediate access to databases, and faster services to users. With regards to costs benefits, the respondents were aware of the high cost of network operations. Therefore, lowering the costs of operations was not considered to be a leading factor for network participation. Among the benefits of participation were increased speed in sharing bibliographic databases, increased access to resource sharing and increased interlibrary loan activities. Along with the benefits there were certain problems of increased workload, increased operating costs, and difficulty in keeping up with the technology related to ALN.

Factors Affecting Network Participation

Externally, the decision to participate in ALN was mainly influenced by professional colleagues and involvement in network related organizations. Internally, efforts to participate in ALN primarily remained with LRC personnel. The LRC directors made little effort to involve other decision making groups in support of ALN. They were uncertain whether such solicitation would help or be counterproductive. Other decision making groups in the college provided little or no input. While there was little or no input from other college decision making groups, they equally provided no resistance to network participation. The participating LRCs mostly used their regular operating budget and received little or no funding specifically for ALN. Those LRCs which had no ALN indicated that lack of financial support and limited institutional commitment were the main inhibiting factors for their non-participation in ALN. Limited computer access, limited LRC trained personnel, limited networking information and small LRC size were cited as other reasons for non-participation.

Relationships

In order to determine if institutional variables had any effect on the extent of automation and the extent of ALN, statistical procedures were applied to the data. In most cases, the institutional variables such as location, enrollment, LRC collection size, circulation of materials, number of LRC staff, and LRC annual budget had a direct impact on the extent of

automation and ALN. The extent of automation and ALN could be predicted from the size of the institutional variables. In most cases there were significant relationships between the institutional variables and the extent of automation and ALN.

Case Studies

Three case studies conducted for this study were to complement the findings of the survey results. Surprisingly, the findings of the case studies were very similar to the survey findings. LRCs participated in ALN because of the quick and efficient service. Major reasons for participation were greater access to databases, most efficiency in productivity, and shared resources among member libraries. Among the functions automated were cataloging and circulation. The lack of an integrated system of operations limited the automation of other functions. Each function was automated in a separate mode and ran independently of the other functions. With regards to future activities, the respondents reported having no specific long-term plan for future automation and ALN.

Conclusions

A survey approach was followed and a questionnaire was sent to 253 community college LRC directors. The questionnaire sent to LRC directors did not include any definitions of functional variables. The reason behind this decision was that definitions of the functions might set restrictive parameters for the extent of automation and ALN to be

reported by the respondents. Responses were therefore received from the LRC directors' self-determined criteria and/or textbook knowledge of the functional variables. This procedure might have sacrificed some degree of consistency for greater responses (78.7%). From the findings of the study, conclusions were divided into six broad areas: benefits of automation and ALN activities, planning and communications, size of institution, integrated system of operations, funding and emerging technology.

Benefits of Automation and ALN Activities

Cortez (1983) outlined benefits of library automation in the areas of clerical tasks, access, speed and cooperative ventures among libraries. Rice (1982) emphasized that ALN systems expedite all phases of library operations. The survey results and case studies substantiated that ALN can be of benefit to community college LRCs by increasing efficiency and productivity and by providing better access to resources of other libraries. It was further evident that libraries that quickly endorse new technology will be in a better position to arrest the escalating cost of operations, achieve greater productivity, and improve services to users.

Planning and Communications

Markuson (1979) found that most network services ignored the smaller colleges in their planning process. Research and development in the 1960s and early 1970s were conducted mostly by research libraries (Stussy, 1981). As stated earlier in this study there was no specific

literature available in the area of community college LRCs' participation in ALN. From the survey results and the case studies it seems that LRC automation and ALN developed in isolation without any official guidance and directions. It was concluded and substantiated by the site visits that the community college systems or centralized offices which could provide greater leadership and influence an individual college were generally indifferent on the issue of ALN. As a result there was little or no systematized planning and participation in ALN.

It further showed that community college LRCs tend to look more to senior college libraries for cooperation and support in networking services than to other community colleges (Reeves, 1973). If the resources of community college LRCs are due to be shared more effectively, then a more deliberate and planned approach is needed for making those resources more easily accessible. In addition to the external communications and relations, there seemed to be a problem of internal communications between the LRC personnel and the other decision making groups on the campus with regard to ALN systems.

Size of the Institution

Stussy (1981) found very little automated activities in the smaller libraries. Automation and ALN were concentrated in larger institutions. The survey results also showed that the size of the institution played and continues to play a major role as to the extent of automation and ALN. In most cases there were significant relationships between the extent of

automation and ALN and the institutional variables. As the size of the institution increased so did the likelihood of participation. Because of this relationship, one can draw a profile. Those community colleges located in urban/suburban areas with larger enrollments, larger book collections, larger number of staff, and larger annual budgets were more likely to be automated and participating in ALN. Therefore, if smaller colleges are inclined to join in ALN activities, they have to find different ways and means to compensate for their limitations of smaller sizes and resources through cooperative activities by forming a community college network.

The rationale for this is a matter of forming a group of similar types of libraries of sufficient number to gain access to each other resources and minimize the expenses and staff. Under such a system, depending on the nature of the networking arrangement, the network members can use a universal library system to give all clientele access to resources of member libraries. The uniform policies and services adopted as a result of the network can be beneficial both to the area library users and to the community college network members. Members can offer the option to eliminate many repetitative clerical tasks, to share resources, and to provide improved access compared to manual systems (DeGennaro, 1980).

Integrated System of Operations

The survey results showed that sixty percent of the LRCs have automation and one-third of LRCs participated in ALN. A closer look at these figures proved them to be somewhat misleading as most automated

activities were limited to one or two functions. The reason behind these limited activities could be attributed to lack of an integrated system in community college LRCs. Matthews (1983) reported that "Systems that only perform one function are becoming less common and more libraries are asking for an automated system that will not only perform circulation control but can handle acquisitions, serials control, public access, online catalog functions, reference assistance, and database maintenance as well" (p. 547).

Isolated automated functions and fragmented databases and data files slowed down the access to network activities. The price for this kind of incremental commitment to automation and ALN has been the sizeable problem of interfacing with other functions and network organizations. A total integrated system is based on the premise that a library is a single complex operating system. All of its varied operations are interrelated and interconnected. There is no data redundency and no duplicative data entry. As soon as a record is created or modified, it is available to all users. In essence, it is a comprehensive operation. On the other hand, multiple modules purchased from different vendors or developed in-house make operation and staff training more difficult. Since community college LRCs still need to move towards the integrated mode of operation, they are further handicapped from total participation in network activities.

Funding

Funding for automation and ALN activities was and continues to be

the major concern of the LRC directors. Library literature points out that four-year college and university libraries, at least initially, received funding from their parent institutions as well as through state, federal and/or private sources (Rouse & Rouse, 1980). This was not the case for community college LRCs. The community college LRCs received very little outside funding to develop and deploy ALN. The reasons why community college LRCs were less automated than their senior college and university libraries counterparts are tied to this lack of start-up funds. Of those community college LRCs that were in ALN, only 16 percent received initial small grants and funding. The rest mainly came from their regular operating budgets.

The lack of financial support was ranked as the number one inhibiting factor for failing to participate in ALN. Although there was no opportunity to observe whether community college LRCs actively sought budget appropriations for ALN, from the small amount of funding granted for ALN and from the three case studies, the researcher could only arrive at a conclusion that no active and deliberate attempts were made by LRC directors as well as the college administrators to seek funding from available sources. Given the present state of funding, the most viable option for community college LRCs is to explore alternative financial approaches within the reach of the colleges. One such possibility is to develop a cooperative plan with other community colleges or area libraries for joint expenditures and sharing resources under a formal agreement.

Emerging Technology

In addition to cooperative ventures, community college LRCs should take advantage of emerging technology - telefacsimile and CD-ROM - for their automation and ALN activities. Telefacsimile or FAX has become an attractive feature and should be explored for community college participation in ALN. Since it is still too expensive for smaller libraries to afford, cooperative installation of FAX should be considered. This should allow community college LRCs to make ILL requests and deliver documents from one LRC to another (Boss, 1987).

Network organizations have accepted CD-ROM as the wave of the future, with numerous online databases starting to convert to CD-ROM. For example, OCLC, in addition to an online database, has already converted its acquisitions and serials control modules to CD-ROMs. This is certainly good news for community college LRCs which are unable to participate in an online database system. Although the potential impact of CD-ROM is yet to be measured, CD-ROM technology is already creating challenges in interlibrary loan and resource sharing among libraries. One might make a prediction that, subject to the full development and application of this technology, it should be easier for community college LRCs to join the network activities (Helgerson, 1986).

General Recommendations

This study has potential applications to community colleges for assessing and developing automated library networking systems applicable to LRCs. The LRC director and the dean of the college should consider the following recommendations:

Community colleges should assess their state of participation in automated library networking systems and develop a plan for full-partnership. Small colleges should be able to take advantages of network developments if they pool their financial resources to form a network system. Networking should enable them to share in the development and use of sophisticated online computer technology without increasing the full burden of planning and operating costs. Through network participation community colleges should be able to offer their users virtually all online databases and access to resources of other libraries which otherwise will be unimaginable.

Community colleges should create an environment and vehicle for frequent and effective communications among community college LRCs. They should aggressively evaluate current practices and develop a solid and coordinated plan for cooperation to share resources and services. To serve their specific clientele, community college systems should consider forming their own networks for gaining access to resources and services and minimizing the operating expenses.

The community college LRCs should consider acquiring integrated

systems of automation for their automated and networking activities. If cost is a barrier for such an acquisition, they should consider a cooperative purchase of hardware and software which could be used by several adjoining libraries. Lease-purchase from vendors on a long-term basis could be another option which should be explored to minimize the financial contraints.

LRC directors should find ways and means to build an advocacy group who will support ALN. Motivation for input in the affairs of networking needs to be developed outside the LRCs and among the rest of the management decision making groups.

LRC directors should actively solicit external funding to support LRC participation in ALN. Presently, there is no evidence of such activities. Those colleges participating in ALN are sacrificing their regular operating budget for ALN. There must be a separate line item for ALN to insure proper maintenance, operation, and further development.

Recommendations for Further Studies

As research generates new knowledge and awareness, there is a constant need to keep up with the state-of-the-art. Below are a few of the many possibilities for further research related to ALN:

1. Further research may be conducted toward identifying and clarifying major issues for those LRCs that had no automation or ALN at all. This activity was beyond the scope of this study.
2. Further research may be conducted regarding the extent of

automated equipment, personnel, facilities, budget and other organizational activities involved in the operation and management of ALN systems.

3. Further research may be conducted regarding present and potential integrated/turnkey system of operation suitable to community college LRCs.
4. Further research may be conducted on user satisfaction with regard to public access and services received through ALN.
5. Further research into the financial and institutional support for ALN is recommended. A genuine concern is limited support in these two categories which hampers orderly development and growth.

BIBLIOGRAPHY

American Library Association. (1984, January-February). The online catalog. Library Technology Reports, 20(1), 7-60.

American Association of Community and Junior Colleges. (1985). 1985 community, technical, and junior college directory. Washington, DC: American Association of Community and Junior Colleges.

Andersen, D. (1984, March). The WLN PC: Local processing in a network context. Information Technology and Libraries, pp. 54-58.

Ary, D., Jacobs, L. C. & Razavich, A. (1985). Introduction to research in education. New York: Holt.

Atkinson, H.C. (1972). The Ohio state online circulation system. Proceedings of the 1972 Clinic on Library Applications on Data Processing: Application of Online Computers to Library Problems. Urbana, IL: University of Illinois.

Babbie, E. R. (1973). Survey research methods. Belmont, CA: Wadsworth.

Becker, J. (1977, March-April). Status report on library network planning in the United States. Unesco Bulletin for Libraries, 31, 77-85.

Borg, W. & Gall, M. D. (1979). Educational research: An introduction (3rd ed.) New York: Longman.

Boss, R. W. (1984). Library manager's guide to automation. (2nd ed.) New York: Knowledge Industry Publications.

Boss, R. W. & Espo, H. (1987, Spring). The use of telefacsimile in libraries. Library Hi Tech, 5(1), 33-42.

Branscomb, L. M. (1979, January 12). Information: The ultimate frontier. Science, pp. 143-147.

Breneman, D. & Nelson, S. C. (1981). Financing community colleges: An economic perspective. Washington, DC: Brookings Institute.

Burlingame, D. F., Fields, D. E., & Schulzetenberg, A. E. (1978). The college learning resource center. Littleton, CO: Libraries Unlimited.

Butler, B. (1975, September). State of the nation in networking. Journal of Library Automation, 8(3), 200-220.

Byrd, G. D., Davis, J. Y., Grosling, W. A. & Herman, L. R., Jr. (1985, February 1). The evaluation of a cooperative online network. Library Journal, 110(2), 71-77.

Carnegie Commission on Higher Education. (1972). The fourth revolution: Instructional technology in higher education. New York: McGraw-Hill.

Casey, G. M. (1974). The public library in the network mode: A preliminary investigation. New York: Columbia University. (Eric Document Reproduction Service No. ED 098 990).

Chachra, V. (1981). Library automation plan. Charleston, WV: West Virginia Library Commission.

Chapesuik, R. & Tarlton, S. (1983, November). SOLINET: What's in it for us? Wilson Library Bulletin, 58(3), 185-189.

Cline, N. (1983, Fall). LIAS-library automation with an integrated design. Library Hi Tech, pp. 33-48.

Cohen, A. M., & Brawer, F. B. (1982). The American community college. San Francisco, CA: Jossey-Bass.

Commonwealth of Virginia. (1981). House joint resolution #239: Creating the commission on a state library networking system; allocating funds. Richmond, VA: Commonwealth of Virginia.

Computer Company. (1978). Integrated library network system for the Commonwealth of Virginia. Richmond, VA: Virginia State Library.

Cortez, E. M. (1983, Fall). Library automation and management information systems. Journal of Library Administration, 4(3), 21-33.

Council of Wisconsin Libraries. (1984). COWL facts. Madison, WI: COWL.

Culkin, P. B. (1981). Descriptions of automated serials control systems. In W. G. Potter, and A. F. Sarkin (eds.), Serials automation for acquisition and inventory control. Chicago, IL: American Library Association.

DeGennaro, R. (1979, November 15). Research libraries enter the information age. Library Journal, 104(19), 2405-2410.

DeGennaro, R. (1980). The role of the academic library in networking. In B. E. Markuson, & B. Woolls (eds.), Networks for networkers: Critical issues in cooperative library development. New York: Neal-Schuman.

DeGennaro, R. (1980, February 1). Resource sharing in a network environment. Library Journal, 105(2), 353-355.

DeGennaro, R. (1983, April 1). Library automation and networking

perspective on three decades. Library Journal, 108(7), 629-635.

DeGennaro, R. (1985, February 1). Integrated online library systems: Perspectives, perceptions, and practicalities. Library Journal, 110(27), 37-40.

Dilman, D. A. (1978). Mail and telephone surveys: The total design method. New York: John Wiley.

Dizard, W. (1982). The coming information age: An overview of its technology, economics, and politics. New York: Longman.

Dogold, M. S. (1983, April-June). The last frontier: Possibilities for networking in the small academic library. Library Resources and Technical Services, pp. 132-141.

Drake, M. A. (1980). The economics of library networks. In B. E. Markuson & B. Woolls (eds.), Networks for networkers: Critical issues in cooperative library development. New York: Neal-Schuman.

Encyclopedia of library and information science. (1975). Vol. 14. New York: Dekker.

Epstein, S. B. (1984, May 1). Through the cracks of progress. Library Journal, 109(8), 872-873.

Evans, G. T. (1979, June). Online library networking: A bibliographic essay. Bulletin of the American Society for Information Science, 5, 10-12.

Evans, G. T. (1982). Library Networking. In M. Williams (ed.), Annual Review of Information and Technology. Vol. 17, White Plains, NY:

Knowledge Industry Publications.

Fletcher, J. (1983, May 1). Collection development and resource sharing. Library Journal, 108(9), 881-882.

Fullerton, R. F. (1978). Tidewater library network study: Final report. Alexandria, VA: Synetics Cooperation.

Gilley, J. W. (1983). Population trends and need for diversity. In George Vaughan & Associates (eds.), Issues for community college leaders in a new era. San Francisco, CA: Jossey-Bass.

Glazier, F. J. (1985, February 1). That bibliographic highway in the sky. Library Journal, 110(2), 64-67.

Gorman, M. (1980). The prospective catalog. In D. K. Gapen & B. Juergens (eds.), Closing the Catalog. Phoenix, AZ: Oryx Press.

Guidelines for two-year college Learning Resources programs. (1981). Chicago, IL: Association of College and Research Libraries/American Library Association.

Hayes, P. F. (1971). Financial formulas for library networks. In Proceedings of the conference on interlibrary communications and information networks. Chicago, IL: American Library Association.

Hayes, R. M. & Becker, J. (1974). Handbook of data processing for libraries, (2nd ed.). Los Angeles, CA: Melville.

Helgerson, L .W. (1986, Spring). CD-ROM: A revolution in the making. Library Hi Tech, 4(1), 23-27.

Hewitt, J. A. (1976). The impact of on-line cataloging on the operation of academic libraries: A study of the charter members of the Ohio

College Library Center. Dissertation Abstracts International. 37, 1855A. (University of Microfilms No. 76-23, 624).

Holl, D. G. (1982, December). Cooperative online services for small academic libraries. Catholic Library World, pp. 392-394.

Holtz, F. (1988). CD-ROMs: Breakthrough in information storage. Blue Ridge Summit, PA: Tab Books.

Humphrey, J. A. (1976, Spring/Summer). New directions in library development. The Bookmark, 35(2), 23-27.

Jacobs, M. E. (1979). Online resource sharing II: A comparison of OCLC, Inc. In S. K. Martin (ed.), Research libraries information network and Washington library network. (2nd ed.). San Jose, CA: Class.

Jenkins, J. (1983, September). Supersystems: OCLC continues to innovate. Wilson Library Bulletin, 58(1), 23-26.

Kent, A. (1979, June). The online revolution in libraries. American Libraries, 10, 339-342.

Kent, A. & Galvin, T. (1979). The structure and governance of library networks. New York: Marcel Dekker.

Kerlinger, F. N. (1973). Foundations of behavioral science. (2nd ed.) New York: Holt.

Kilgour, F. G. (1979, February 15). Interlibrary loans online. Library Journal, 104(4), 460-463.

Krashire, G. (1978). The impact of automation on staff and organization of a medium sized library. Terre Haute, IN: Indiana State University. (ERIC Document Reproduction Service No. ED 190 153).

Lancaster, F.W. (1982). Libraries and librarians in an age of electronics. Arlington, VA: Information Resources Press.

Leedy, P. D. (1974). Practical research: Planning and design. New York: MacMillan Publishing Company.

Lundeen, G. W. & Davis, C. H. (1982). Library automation. In M. Williams (ed.), Annual Review of Information Science and Technology: Vol. 17. White Plains, NY: Knowledge Industry Publications.

Magnuson, B. (1983, May). Collection management: New technology, new directions. Wilson Library Bulletin, 57(9), 736-741.

Malinconico, S. M. & Fasana, P. J. (1979). The future of the catalog: The library's choices. White Plains, NY: Knowledge Industry Publications.

Markuson, B. E.. (1972). Guidelines for library automation: Handbook for federal and other libraries. Santa Monica, CA: System Development Corporation.

Markuson, B. E. (1976). The Ohio college library system: A study of factors affecting the adoption of libraries to online networks. Library Technology Reports, 12(1), 11-132.

Markuson, B. E. (1979, March). Cooperation and library network development. College and Research Libraries, 40(3), 125-135.

Markuson, B. E. & Woolls, B. (eds.). (1980). Networks for networkers: Critical issues in cooperative library development. New York: Neal-Schuman.

Martin, S. K. (1978). Library Networks, 1978-79. White Plains, NY: Knowledge Industry Publications.

Martin, S. K. (1982) Library Networks, 1981-82. White Plains, NY: Knowledge Industry Publications.

Matthews, J. R. (1979, November-December). The four online bibliographic utilities: A comparison. Library Technology Reports, 15(6), 665-838.

Matthews, J. R. (1982, June). 20 Qs and As on automated integrated library systems. American Libraries, 13(6), 367-71.

Matthews, J. R. (1983, March 15). The automated library system marketplace, 1982: Change and more change. Library Journal, 108(6), 547-553.

Matthews, J. R. (1984, May 1). Competition and change: The 1983 automated library system marketplace. Library Journal, 109(8), 853-860.

McAllister, C., & McAllister, A. S. (1983, January). A case for conversational cataloging. The Electronic Library, pp. 59-67.

McDonald, D. R. & Hurowitz, R. (1982, December). Research libraries: Automation and cooperation. Perspectives in Computing, 2(4), 4-11.

Menges, G. L. (1978). Use of computerbased reference services in Texas information exchange libraries. Austin, TX: Texas Library Association. (ERIC Document Reproduction Service No. ED 171 306).

Metz, P. (1981, December). Integrating automation at Virginia Tech. Wilson Library Bulletin, 56(4), 261-265.

Meyer, R.W. & Alexander, G. (1981). Total integrated library system; a report on the specific design: Identification and evaluation. Clemson, SC: Clemson University.

Missouri Library Association. (1977). Missouri state network plan. St. Louis: MO: Missouri Library Association.

Montague, E. (1978, December). Automation and the library administrator. Journal of Library Automation, 11(4), 313-321.

Murphy, M. (1981). Online services in some academic, public and special libraries: A state-of-the-art report. Urbana, IL: The University of Illinois.

National Commission On Libraries and Information Science. (1975). Toward a national program for library and information services: Goals for action. Washington, DC.: Government Printing Office.

New Hampshire College and University Council. (1980). Handbook for members: Library policy committee. Manchester, NH: The Council.

Newcomb, J. (1983, April). Electronic information distribution: The role of the traditional publisher and librarian. Special Libraries, pp. 150-155.

OCLC. Online Computer Library Center, Inc. (1984). OCLC questions and answers. Dublin, Ohio: Online Computer Library Center.

Palmour, V. E., Bellassai, M. C., & Roderer, N. K. (1974) Resources and

bibliographic support for a nationwide library program: Final report to the national commission for libraries and information science. Washington, DC: Government Printing Office.

Palmour, V. E. & Roderer, N. K. (1978). Library resource sharing through networks. In M. Williams (ed.), Annual Review of Information Science and Technology: Vol. 13. New York: Knowledge Industry Publications.

Peck, G. B. (1981). WEBNET project evaluation, phase one: Current system operation. Pittsburgh, PA: Pittsburgh Regional Library Center.

Peters, P. E. (1979). United States political science documents: Its design philosophy. Pittsburgh, PA: Pittsburgh University Center for International Studies.

Proces, S. (1983, June 15). Cooperative for automated circulation in Spokane County. Library Journal, 108(12), 1226-1227.

Reed, M.J.P. (1979). Library automation. In M. E. Williams (ed.), Annual Review of Information Science and Technology: (Vol. 14). New York: Knowledge Industry Publications.

Reeves, P. (1973, January). Junior college libraries enter the seventies. College and Research Libraries, 34(1), 7-15.

Research libraries collection hit hard by inflation. (1979, January 22). The Chronicle of Higher Education. p. 11.

Rice, J. (1984). Introduction to library automation. Littleton, CO: Libraries Unlimited.

Robinson, B. M. (1980, November). Cooperation and competition among library networks. Journal of the American Society for Information Science, 31(11), 413-415.

Rouse, W. B. & Rouse, S. H. (1977, March). Assessing the impact of computer technology on performance of interlibrary loan networks. Journal of the American Society for Information Science, 28(2), 87.

Rouse, W. B. & Rouse, S. H. (1980). Management of library networks, policy analysis, implementation, and control. New York: John Wiley.

Salmon, S. R. (1975). Library automation systems. New York: Marcel Dekker.

SAS Institute. (1979). The statistical analysis system. Cary, NC: SAS Institute.

Schultheiss, L. A., Culbertson, D. S., & Heiliger, E. M. (1962) Advanced data processing in the university library. New York: Scarecrow Press.

Shaw, W. (1982, September). Resource sharing and the network approach. In Galvin, T. & Lynch, B. (eds.), Priorities for academic libraries. San Francisco, CA: Jossey-Bass.

Siegel, S. (1965). Nonparametric statistics for behavorial sciences. New York: McGraw-Hill.

Smalley, D. A. (1980). Technical report on linking the bibliographic utilities: Benefits and costs. Columbus, Ohio: Battelle Columbus Lab.

Stevens, N. (1980, November 31). Library networks and resource sharing in the U.S.: A historical and philosophical overview, Journal of American Society for Information Science. 31, 405-412.

Strauss, L. J., Strieby, I. M., & Brown, A. L. (1964). Science and technical libraries: The organization and administration. New York: John Wiley.

Stussy, S. A. (1981, October). Automation in Catholic College libraries. Catholic Library World, 53, 109-111.

Terwillinger, G. (1982, Fall). Future of learning resources centers: A partnership with emerging technology. Community College Review 10(2), 41-43.

Toffler, A. (1980). The third wave. New York: Morrow.

United States National Center for Educational Statistics. (1984). Library statistics of colleges and universities. Washington, D.C.: National Center for Education Statistics.

Veaner, A. B. (1970, September). Major decision points in library automation. College and Research Libraries, 31(9), 210.

Veneziano, V. (1981). Serials and the online catalog. In W. G. Porter & A. F. Sirkin (eds.), Serials automation for acquisition and inventory control. Chicago, IL: American Library Association.

Williams, M. E. (1982). Computer readable databases: A directory and sourcebook. Washington, DC: American Society for Information Science.

APPENDIX A

COVER LETTER AND QUESTIONNAIRE SENT TO COMMUNITY COLLEGE LRC DIRECTORS

April 15, 1987

As Director of a Learning Resources Center, I have undertaken to conduct a study on Automated Library Networking in American Public Community College Learning Resources Centers.

The purpose of this study is to examine the extent and value of community college LRC participation in automated library networking systems. The study also identifies various factors which may be considered as constraints to and problems in automated library networking systems.

In order to make this study statistically unbiased and acceptable, I am soliciting your assistance. Please complete and return the enclosed questionnaire to me by May 11, 1987. A self-addressed stamped envelop is enclosed for your convenience.

Although I am aware that you are quite busy and that I am making a demand on your time, I am compelled to do so as the success of this study is solely dependent on your response and cooperation. It should take approximately 15 to 20 minutes of your time to complete the questionnaire.

Your individual responses will be kept in strict confidence, and neither you nor your LRC will be identified in the study. The results from the questionnaire will be reported only in aggregate form.

Thank you for your cooperation and assistance.

Yours sincerely,

Abdul J. Miah
Director of Learning Resources

AUTOMATED LIBRARY NETWORKING IN AMERICAN PUBLIC COMMUNITY COLLEGE LEARNING RESOURCES CENTERS

Definitions and Instructions

The purpose of this study is to examine the extent and value of community college LRC participation in automated library networking systems. The following definitions are to be considered in completing this study:

1. Integrated/Turnkey System: More than one LRC function integrated into your automated library system.

2. Automated Library Networking Systems: A group of libraries, which have automation, collectively enter into an agreement and are interconnected (linked) via telecommunications and computer controlled devices to share resources and participate in various functions and services. There are various levels of networking systems:

   A. Local Automated Library Networks: may cover libraries of a city, surrounding counties or portion of a state (example: Western Pennsylvania Network)

   B. State Automated Library Networks: may include libraries of the entire geographic boundary of a state (example: Indiana Cooperative Library Services Authority - INSCOLA)

   C. Regional (Multistate) Library Networks: may group a number of libraries together on a multistate or regional basis to form a network (example: Southern Library Network - SOLINET)

   D. National Automated Library Networks: may provide services to all libraries in the county. Online Computer Library Company (OCLC) may be considered a defacto national network which provides automated library services to all libraries across the United States and to many foreign countries.

If you have arrangements/agreements with libraries at any level as stated, you may consider your LRC as having an automated library system. If you use OCLC through SOLINET, please circle regional as well as national networks as and when appropriate.

Under each question, please circle the ratings as they apply to your LRC. If items under the question are not applicable, please leave them blank.

AUTOMATED LIBRARY NETWORKING IN
AMERICAN PUBLIC COMMUNITY COLLEGE
LEARNING RESOURCES CENTERS

Part I: Automation

Definition: Automated Library/Library Automation - The mechanization of library activities using computer equipment with all or part of the work activities being done through the use of a computer.

1. Do you have any automation in your LRC?
   1. _____ Yes
   2. _____ No

   If your response is "yes", please continue.
   If your response is "no", please complete Part III, questions 15 to 21, and return this questionnaire in the self-addressed, stamped envelope.

2. Which functions of your LRC are automated, not automated or planned to be automated? (Please circle the appropriate response.)

	1-Not Automated	2-Partially Automated	3-Substantially Automated	4-Fully Automated	5-Planned Automation
1.	Cataloging			1 2 3 4	5
2.	Public Access Catalog			1 2 3 4	5
3.	Authority Control			1 2 3 4	5
4.	Acquisitions			1 2 3 4	5
5.	Circulation			1 2 3 4	5
6.	Serials Control			1 2 3 4	5
7.	Interlibrary Loan			1 2 3 4	5
8.	Reference Assistance			1 2 3 4	5
9.	Administrative control			1 2 3 4	5

3. Which of the following functions are integrated into one automated/turnkey system? (Please check all that apply.)

   1. _____ Acquisitions 2. _____ Cataloging

3. _____ Circulation
4. _____ Serials Control
5. _____ Interlibrary Loan
6. _____ Administrative Support
7. _____ Reference Assistance
8. _____ Public Access Catalog

Part II: Automated Library Networking

Definition: Automated Library Network - A group of libraries, which have automation collectively enter into an agreement and are interconnected (linked) via telecommunications and computer controlled devices to share resources and participate in various functions and services.

4. Do you participate in an automated library networking system?
   1. _____ Yes
   2. _____ No

   If your response is "yes", please complete the questionnaire starting with question #6. If your response is "no", please complete questions #5 and Part III, questions 15 to 21, and return this questionnaire in the self-addressed stamped envelope.

5. To what extent did the following factors lead you to participate in automated library networking? (Please circle the appropriate response.)

	1-Not Important	2-Important	3-Very Important
1. Sharing bibliographic information and databases	1	2	3
2. Sharing collections and other resources among network members	1	2	3
3. Providing faster and more efficient services to users	1	2	3
4. Meeting the increased and varied demands of users	1	2	3
5. Lower unit costs of operation	1	2	3
6. Having immediate access to millions of records now on databases and network files	1	2	3

6. What is the extent of your participation in the following types of automated library networking systems? (Please circle the appropriate response.)

	1-Don't Use	2-Seldom Use	3-Always Use

1.	Local Library Networks	1 2 3
2.	State Library Networks	1 2 3
3.	Regional Library Networks (Multistate)	1 2 3
4.	OCLC	1 2 3
5.	WLN	1 2 3

7. Which of the following functions and services do you use through different types of automated library networking systems? (Please circle all that apply.)

		1-Local Network	2-State Network	3-Regional Network	4-OCLC	5-WLN
1.	Union Catalog database	1	2	3	4	5
2.	Union lists of serials database	1	2	3	4	5
3.	Union lists of audiovisual database	1	2	3	4	5
4.	Acquisitions	1	2	3	4	5
5.	Cataloging	1	2	3	4	5
6.	Circulation	1	2	3	4	5
7.	Serials Control	1	2	3	4	5
8.	Interlibrary Loan	1	2	3	4	5
9.	Cooperative collection development	1	2	3	4	5
10.	Resource sharing among network members	1	2	3	4	5

8. What benefits are gained due to participation in different automated library networking systems? (Please circle the appropriate response.)

		1-Disagree	2-Agree	3-Strongly Agree
1.	Improved performance and productivity			

a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
2.	Improved services to users			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
3.	Increased access to resource sharing among network members			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
4.	Increased speed in and shared cataloging records			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
5.	Facilitated cooperative collection development			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
6.	Lowered the unit costs of operations			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3
d.	OCLC	1	2	3
e.	WLN	1	2	3
7.	Improved management of resources			
a.	Local library network	1	2	3
b.	State library network	1	2	3
c.	Regional library network	1	2	3

d. OCLC 1 2 3
e. WLN 1 2 3

8. Provided fast and accurate circulation activities
   a. Local library network 1 2 3
   b. State library network 1 2 3
   c. Regional library network 1 2 3
   d. OCLC 1 2 3
   e. WLN 1 2 3

9. Improved management of serials control
   a. Local library network 1 2 3
   b. State library network 1 2 3
   c. Regional library network 1 2 3
   d. OCLC 1 2 3
   e. WLN 1 2 3

10. Increased number of interlibrary loans
    a. Local library network 1 2 3
    b. State library network 1 2 3
    c. Regional library network 1 2 3
    d. OCLC 1 2 3
    e. WLN 1 2 3

9. What problems are encountered with automated library network participation? (Please circle the appropriate response.)

	1-Disagree	2-Agree	3-Strongly Agree
1.	Increased work load		1 2 3
2.	Reduction in staff		1 2 3
3.	Too expensive to operate		1 2 3
4.	Expenses outweigh the benefits		1 2 3
5.	Difficult to keep up with the state of technology		1 2 3
6.	Unreliable computer systems disrupt services		1 2 3
7.	Needs constant staff training		1 2 3
8.	Lack of compatibility with other systems		1 2 3
9.	Negative attitude of LRC staff towards networking		1 2 3

10. Lack of cooperation from the college computer personnel 1 2 3

10. What are the sources and amount of funding received for automated library networking? (Please specify the sources.) Example: $20,000 Title III 6 years

	Total Amount	Source	Number of Years
1. Federal			
2. State			
3. Local			
4. Private			
5. Other			

11. What involvement did you have in network related organizations or activities which motivated you to participate in automated library networking? (Please circle the appropriate response.)

	1-Disagree	2-Agree	3-Strongly Agree
1. Participated in network organization		1	2 3
2. Participated in governance of networking		1	2 3
3. Participated in the structure of networking		1	2 3
4. Involved in professional organizations related to library networking		1	2 3
5. Influenced by professional colleagues		1	2 3
6. Received training and experience in networking		1	2 3

12. To what extent did the following groups give input into the decision making for participation in automated library networking? (Please circle the appropriate response.)

	1-Seldom	2-Frequently	3-Always
1. President, Vice Presidents, Deans		1	2 3

2.	Division heads	1	2	3
3.	Faculty	1	2	3
4.	Librarians	1	2	3
5.	Yourself (respondent)	1	2	3

13. To what extent did the following groups resist participation in automated library networking? (Please circle the appropriate response.)

		1-Seldom	2-Frequently	3-Always
1.	President, Vice-Presidents, Deans	1	2	3
2.	Division heads	1	2	3
3.	Faculty	1	2	3
4.	Librarians	1	2	3
5.	Yourself (respondent)	1	2	3

5. What factors contributed to your non-participation in an automated library networking system.? (Please circle the appropriate response.)

		1-Disagree	2-Agree	3-Strongly Agree
1.	Financial resources unavailable	1	2	3
2.	Fewer trained personnel in the LRC	1	2	3
3.	Limited institutional support	1	2	3
4.	Limited information about automated library networking applicable to community colleges	1	2	3
5.	Limited access to computer equipment and facilities	1	2	3
6.	No significant benefits to LRC	1	2	3
7.	Not appropriate for LRC	1	2	3

8. Negative attitude of LRC 1 2 3

9. Too expensive for benefit gained 1 2 3

10. Due to small size and level of LRC activities 1 2 3

Part III: Institutional Information

Please supply the following information about your college and LRC for 1985-86 year. Give estimates if no records are kept for any items.

15. Location of the Institution
1. _____ Urban
2. _____ Rural

16. Enrollment (full-time equivalent) _____

17. LRC Collection size (include all catalogued materials) _____

18. Annual acquisition of volumes _____

19. Circulation of materials (include all materials except audiovisual equipment) _____

20. Number of LRC Staff (full-time equivalent) _____

21. Total LRC annual budget for 1985-86 _____

APPENDIX B

LETTER OUTLINING THE PURPOSE OF THE SITE VISITS WITH THE INTERVIEW GUIDE

April 1, 1988

Dear

I would like to express my appreciation for allowing me an interview with you and your immediate supervisor to discuss automated library networking system as it applies to your Learning Resources Center.

As per our appointment, I will see you on at .

Enclosed are questions which I plan to discuss with you during our interview. It would be helpful if you could gather information which may specifically be applicable to your operation and system.

Once again, thank you for your assistance.

I am looking forward to seeing you.

Yours sincerely,

Abdul J. Miah, Director
Learning Resources Center

Interview Guide

Interviews with LRC Directors and Their Immediate Supervisors

Introduction

Based on the survey results of 253 community college LRCs in 10 southeastern states, your LRC has been selected to gather additional information on "Automated Library Networking in Community College Learning Resources Centers." The researcher plans to solicit information and answers to the following questions:

General Information

Title of the Interviewee: _____

Division/Department: _____

Nature of Responsibilities: _____

Management Groups: _____

Title of the Immediate Supervisor: _____

General Questions

1. What were your objectives for participation in an Automated Library Networking (ALN) System?

2. Have you met your objectives? If your answer is no, please elaborate as to the kinds of problems you are encountering.

3. Do you have any future plans for ALN?

4. How do you plan to achieve and implement it?

5. Can you comment on the strengths and limitations of ALN as it presently applies to your LRC?

Questions Developed Based on Survey Results

6. Cataloging, interlibrary loan, administrative support, and circulation were the primary automation activities presently available in community college LRCs.

What were your primary reasons, if applicable, for having automation of the above activities and having no or less automation in areas of public catalog, authority control, acquisition, serials control, interlibrary loan, reference assistance, and administrative support?

7. Out of 74 LRCs with integrated systems of automation, 18 (15.2%) had acquisition; 23 (19.8%) had cataloging; 13 (11.2%) had circulation; 8(6.9%) had serials control, 5 (4.3%) had interlibrary loan, 5 (4.3%) had administrative control, and 2 (1.7%) had reference assistance.

What was your state of integration, if applicable, and your reasons for integration, including advantages and limitations, automation and operating systems, administrative and financial supports, and present and future plans of integration?

8. The "very important" factors for participation in ALN were "sharing bibliographic information and databases (98.3%)," "providing faster and more efficient services to users (95.1%)," and "having immediate access to millions of records now on databases and network files (96.7%)". "Lowering unit costs of operation" (59.1%) was considered not an important factor in making the decision to join ALN.

A. What were the effects of the above factors upon your participation? How many databases, if applicable, could be searched or accessed without going to other libraries to provide information to users and share resources?

B. What were the significant differences, if applicable, between ALN and manual procedures to efficiency to user services, resource sharing and access to databases?

C. What kinds of weights, if applicable, were given in decision making to participate in ALN with regards to "lowering unit costs of operation?"

9. The networks - local (19.7%), state (29.5%) regional (78.7%), and national (63.9%) - were used by community college LRCs for various functions and services.

If applicable, what were your reasons for utilization variances among the four types of networks, in terms of availability, advantages and limitations, financial implications, and legislative mandates.

10. Out of 61 automated library networking LRCs, grants received were 6 (9.8%) from federal, 20 (32.8%) from state, 5 (8.2%) from local, and 2 (3.2%) from other sources.

    What role, if applicable, did the presidents, vice-presidents, deans and other decision making groups play in getting funding for ALN? What was the state of the LRC in budget priority for ALN in the last three years? Who was the key role player and initiator in getting funding for ALN? Was there any support groups created in the college? How many grants, if applicable, were written for ALN project?

11. Fifty-four to seventy-one percent of respondents "agreed" or "strongly agreed" that ALN "increased workload", "increased operating expenses", and "was difficult to keep up with the state of technology."

    A. Please elaborate on areas and types of workloads, if applicable, which increased due to ALN participation.

    B. Please elaborate on areas and types of increased operating expenses, if applicable, due to ALN.

    C. Please explain the nature of difficulty, if applicable, faced in order to keep up with the state of technology.

12. Sixty-one to seventy-seven percent indicated their non-involvement in organization, structure or governance in ALN. Fifty-one percent received training and experience in networking.

    A. Please clarify your non-involvement, if applicable, in network related organization, governance or structure in terms of opportunity, location, needs, costs, training or other factors necessary for involvement.

    B. Please explain the nature and types of training and experiences, if applicable, which motivated your participation to ALN.

13. Sixty-seven to ninety-four percent of presidents, vice-presidents, deans, division heads, and faculty "never" or "seldom" provided input in decision making process to participation in ALN, while eighty-five to ninety-three percent of input came primarily from librarians and LRC directors respectively.

Please clarify, if applicable, the limited input by the majority of decision making groups in ALN process. What role did the your LRC directors or librarians, play to create interest among the decision making groups?

Please feel free to make any comments concerning how to get dean/other groups involved and interested in support of ALN participation.

APPENDIX C

LETTER TO PANEL MEMBERS

FOR INSTRUMENT VALIDATION

March 4, 1987

Thank you for agreeing to review the enclosed questionnaire which has been designed for a study on Automated Library Networking in American Public Community College Learning Resources Centers. Your participation and input are solicited because of your experience and involvement in LRC activities.

Please apply the following procedures in judging and completing the questionnaire item by item:

1. Record your starting time and complete all items in the questionnaire. Mark any question which is unclear, ambiguous or which you are unable to answer due to insufficient directions. Note the finishing time and indicate the total time needed to complete the questionnaire.

2. Identify those questions which caused problems and state the nature of problems in the areas of appropriateness, clarity, and consistency of the subject under study. Feel free to suggest any additions, deletions or modifications to the questions.

3. Kindly state any problems and/or suggestions to improve the questionnaire on a separate page.

4. Please return your comments and the completed questionnaire in the self-addressed stamped envelop.

Once again, I thank you for assisting me in this matter.

Yours sincerely,

Abdul J. Miah, Director
Learning Resources Center

APPENDIX D

FOLLOW-UP LETTER TO LRC DIRECTORS

June 4, 1987

On April 15, 1987, I sent you a letter and a questionnaire about my study on Automated Library Networking in American Public Community College Learning Resources Center/Libraries. As of today, I have not received your response.

The purpose of this study is to examine the extent and value of community college LRC participation in automated library networking systems. The study also identifies various factors which may be considered as constraints to and problems in automated library networking systems.

I am writing to you again because of the significance each questionnaire has for the usefulness of the study. Your name was drawn through a scientific process by virtue of the position you hold at your institution. In order for the results of this study to be truly representative of community college LRC/Libraries, it is essential that I receive your completed questionnaire. In the event, the questionnaire was misplaced or directed to the wrong department in your campus, a replacement is enclosed.

Kindly take a few minutes to complete and return the questionnaire. It should take approximately 15 to 20 minutes of your time. A self-addressed stamped envelop is enclosed for your convenience.

Thank you for your cooperation and assistance.

Yours sincerely,

Abdul J. Miah
Director of Learning Resources

APPENDIX E

TABLES 16 - 87

ANALYSES OF RELATIONSHIP BETWEEN AUTOMATION AND THE INSTRUCTIONAL VARIABLES AND AUTOMATED LIBRARY NETWORKING AND INSTITUTIONAL VARIABLES.

TABLE 16

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND THE LOCATION OF THE INSTITUTION

	LOCATION OF INSTITUTION					
AUTOMATION	RURAL	URBAN/SUBURBAN	TOTAL	CHISQ	DF	PROB
YES	56	60	116 60.10%	7.955	3	0.005*
NO	53	24	77 39.90%			
TOTAL	84	109	193			
	56.48%	43.52%	100.00%			

*Significant at .05 level

TABLE 17

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND LEVEL OF ENROLLMENT OF THE INSTITUTIONS

	LEVEL OF ENROLLMENT							
AUTOMATION	1,000 OR LESS	1,001 - 2,000	2,001 - 3,000	3,001 & OVER	TOTAL	CHISQ. 25.064	DF 3	PROB. 0.000*
YES	21	43	17	35	116 60.10%			
NO	35	24	13	5	77 39.90%			
TOTAL	56	67	30	40	193			
	29.02%	34.72%	15.54%	20.71%	100.00%			

*Significant at .05 level

TABLE 18

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND LEVEL OF LRC COLLECTION SIZES

	LEVEL OF COLLECTION SIZES							
AUTOMATION	30,000 OR LESS	30,001 - 50,000	50,001 - 70,000	70,001 & OVER	TOTAL	CHISQ	DF	PROB
						9.610	3	0.022*
YES	29	40	24	23	116 60.42%			
NO	33	26	10	7	76 39.58%			
TOTAL	62	66	34	30	192			
	32.29%	34.38%	17.71%	15.63%	100.00%			

Responses Missing = 1
*Significant at .05 level

TABLE 19

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

	LEVEL OF ANNUAL CIRCULATIONS OF MATERIALS							
AUTOMATION	30,000 OR LESS	30,001 - 50,000	50,001 - 70,000	70,001 & OVER	TOTAL	CHISQ	DF	PROB
						14.986	3	0.002*
YES	82	11	9	14	116 60.42%			
NO	70	4	2	0	76 39.58%			
TOTAL	152	15	11	14	192			
	79.17%	7.81%	5.73%	7.29%	100.00%			

Responses missing = 1
*Significant at .05 level

TABLE 20

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND LEVEL OF LRC STAFF

	LEVEL OF LRC STAFF							
AUTOMATION	5 OR LESS	6 TO 10	11 TO 15	16 & OVER	TOTAL	CHISQ	DF	PROB
						26.156	3	0.000*
YES	36	42	12	26	116 60.42%			
NO	45	23	8	0	76 39.58%			
TOTAL	81	65	20	26	192			
	42.19%	33.85%	10.31%	13.54%	100.00%			

Responses Missing = 1
*Significant at .05 level

TABLE 21

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATION AND LEVEL OF LRC ANNUAL BUDGET

LEVEL OF LRC ANNUAL BUDGET

AUTOMATION	100,000 OR LESS	100,001 - 200,000	200,001 - 300,000	300,001 & OVER	TOTAL	CHISQ	DF	PROB
						9.473	3	0.024*
YES	24	33	27	32	116 60.42%			
NO	22	32	12	10	76 39.58%			
TOTAL	46	65	39	42	192			
	23.96	33.85%	20.31%	21.88%	100.00%			

Responses missing = 1
*Significant at .05 level

TABLE 22

THE ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST
LOCATION OF INSTITUTIONS

FUNCTIONS	RURAL N=56 Mean	URBAN/SUBURBAN N=60 Mean	Z-VALUE	PROBABILITY
1. Cataloging	50.63	65.85	2.5303	0.0114*
2. Interlibrary Loan	55.30	61.48	1.0884	0.2764
3. Administrative Support	56.19	60.66	0.7957	0.4262
4. Circulation	55.68	64.87	2.4326	0.0150*
5. Reference Assistance	52.18	64.40	2.3171	0.0205*
6. Acquisition	55.04	61.73	1.3346	0.1820
7. Authority Control	55.18	61.60	1.3863	0.1657
8. Serials Control	57.06	59.84	0.6064	0.5442
9. Public Access Catalog	55.14	61.63	1.6086	0.1077

*Significant at 0.05 level
Total number of automated LRCs: N = 116

TABLE 23

ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

FUNCTIONS	30,000 or LESS N=29 MEAN	30,001 - 50,000 N=40 MEAN	50,001 - 70,000 N=24 MEAN	70,001 & OVER N=23 MEAN	CHISQ.	PROB.
1. Cataloging	57.29	50.81	51.13	81.09	14.76	0.0020*
2. Interlibrary Loan	54.09	57.84	53.27	70.57	5.00	0.1714
3. Administrative Support	55.14	63.99	51.94	60.04	2.89	0.4092
4. Circulation	57.45	54.54	60.77	64.35	1.85	0.6042
5. Reference Assistance	58.93	55.20	59.46	62.70	1.08	0.7819
6. Acquisition	52.45	56.66	64.69	62.87	3.52	0.3181
7. Authority Control	60.88	52.54	54.08	70.48	8.66	0.0341*
8. Serials Control	51.48	62.40	58.48	60.59	3.56	0.3136
9. Public Access Catalog	59.45	52.06	56.04	71.07	11.64	0.0087*

*Significant at .05 level
Total number of automated LRCs: N = 116

TABLE 24

ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

FUNCTIONS	1000 OR LESS N=21 MEAN	1,001 - 2,000 N=43 MEAN	2,001 - 3,000 N=17 MEAN	3001 & OVER N=35 MEAN	CHISQ.	PROB.
1. Cataloging	57.83	52.57	54.50	68.13	4.82	0.1858
2. Interlibrary Loan	56.33	55.51	55.12	65.11	2.38	0.4977
3. Administrative Support	60.17	57.13	58.94	58.97	0.17	0.9829
4. Circulation	46.00	59.20	65.86	61.57	5.36	0.1472
5. Reference Assistance	51.52	56.47	58.12	65.37	3.55	0.3139
6. Acquisition	50.98	56.60	67.88	60.90	4.27	0.2333
7. Authority Control	50.98	59.60	58.76	61.53	2.53	0.4700
8. Serials Control	59.45	57.27	59.76	58.83	0.19	0.9789
9. Public Access Catalog	52.05	55.78	66.15	62.00	5.58	0.1342

Total number of automated LRCs: N = 116

TABLE 25

ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ANNUAL CIRCULATION OF MATERIALS

FUNCTIONS	10,000 OR LESS N=20 MEAN	10,001 - 20,000 N=31 MEAN	20,001 - 30,000 N=19 MEAN	30,001 & OVER N=34 MEAN	CHISQ.	PROB.
1. Cataloging	50.44	55.95	61.79	66.57	4.49	0.2127
2. Interlibrary Loan	48.14	65.42	56.45	63.09	6.15	0.1044
3. Administrative Support	63.53	59.55	51.87	56.51	2.00	0.5727
4. Circulation	55.63	55.56	61.32	62.31	1.38	0.7092
5. Reference Assistance	54.41	57.58	60.53	62.06	1.33	0.7213
6. Acquisition	52.56	59.19	57.87	63.81	2.91	0.4064
7. Authority Control	56.73	55.29	57.37	63.72	2.22	0.5287
9. Public Access Catalog	58.83	52.39	54.84	65.81	6.89	0.0755

Total number of automated LRCs: N = 116

TABLE 26

ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

FUNCTIONS	5 OR LESS N=36 MEAN	6 - 10 N=42 MEAN	11 - 15 N=12 MEAN	16 & OVER N=26 MEAN	CHISQ.	PROB.
1. Cataloging	53.36	51.40	57.79	77.40	11.81	0.0080*
2. Interlibrary Loan	51.38	55.71	62.33	71.10	6.95	0.0735
3. Administrative Support	58.83	56.00	75.63	54.17	4.71	0.1945
4. Circulation	51.76	60.05	67.58	61.13	3.42	0.3312
5. Reference Assistance	51.50	55.43	69.67	68.00	7.57	0.0583
6. Acquisition	51.74	57.49	75.21	61.79	7.33	0.0620
7. Authority Control	55.22	59.37	50.54	65.31	3.86	0.2775
8. Serials Control	59.56	56.79	60.58	58.85	0.36	0.9476
9. Public Access Catalog	52.40	58.71	59.67	66.06	6.06	0.1088

*Significant at .05 level
Total number of automated LRCs: N = 116

TABLE 27

ANALYSIS OF RELATIONSHIP BETWEEN THE EXTENT OF AUTOMATED FUNCTIONS AND THE LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ANNUAL BUDGET

FUNCTIONS	100,000 or LESS N=24 MEAN	100,001 - 200,000 N=33 MEAN	200,001 - 300,000 N=27 MEAN	300,001 & OVER N=32 MEAN	CHISQ.	PROB.
1. Cataloging	50.79	59.41	54.61	66.63	3.80	0.2841
2. Interlirary Loan	47.71	64.83	56.15	62.05	5.03	0.1696
3. Administrative Support	57.38	56.79	58.65	60.98	0.36	0.9487
4. Circulation	58.44	50.95	61.07	64.16	3.63	0.3044
5. Reference Assistance	46.83	59.30	55.81	68.69	8.47	0.0373
6. Acquisition	48.42	54.62	63.98	65.44	7.29	0.0633
7. Authority Control	54.44	57.42	59.28	62.00	1.36	0.7142
8. Serials Control	53.92	59.64	56.76	62.23	1.79	0.6174
9. Public Access Catalog	54.33	56.42	56.78	65.22	4.44	0.2175

Total number of automated LRCs: N = 116

TABLE 28

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LOCATION OF THE INSTITUTIONS

LOCATION OF THE INSTITUTIONS

ALN	RURAL	URBAN/SUBURBAN	TOTAL	PERCENTAGE	CHISQ	DF	PROB.
					4.10	3	0.043*
YES	24	37	61	52.59%			
NO	32	23	55	47.41%			
TOTAL	56	60	116	100%			

*Significant at .05 level

TABLE 29

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

ALN	1,000 OR LESS	1,001 - 2,000	2,001 - 3,000	3,001 & OVER	TOTAL	CHISQ.	DF	PROB.
						5.993	3	0.112
YES	8	20	9	24	61 52.59%			
NO	13	23	8	11	55 47.41%			
TOTAL	21	43	17	35	116			
	18.10%	37.07%	14.66%	30.17	100.00%			

TABLE 30

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC COLLECTION SIZES

	LEVEL OF LRC COLLECTION SIZES							
ALN	30,000 OR LESS	30,001 - 50,000	50,001 - 70,000	70,001 & OVER	TOTAL	CHISQ.	DF	PROB
						8.036	3	0.045*
YES	13	20	10	18	61 52.59%			
NO	16	20	14	5	55 47.41%			
TOTAL	29	40	24	23	116			
	25.00%	34.48%	20.69%	19.83%	100.00%			

*Significant at .05 level

TABLE 31

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

LEVEL OF ANNUAL CIRCULATION OF MATERIALS

ALN	30,000 OR LESS	30,001 50,000	50,001 70,000	70,001 & OVER	TOTAL	CHISQ	DF	PRO
						8.870	3	0.031*
YES	30	4	6	12	61 52.5%			
NO	43	7	3	2	55 47.41%			
TOTAL	82	11	9	14	116			
	70.69%	9.48%	7.76%	12.07%	100.00%			

*Significant at .05 level

TABLE 32

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC STAFF

	LEVEL OF LRC STAFF							
ALN	5 OR LESS	6 TO 10	11 TO 15	16 & OVER	TOTAL	CHISQ.	DF	PROB
						13.668	3	0.003*
YES	12	22	6	21	61 52.59%			
NO	24	20	6	5	55 47.41%			
TOTAL	36	42	12	26	116			
	31.03%	36.21%	10.34%	22.41%	100.00%			

*Significant at .05 level

TABLE 33

ANALYSIS OF RELATIONSHIP BETWEEN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC ANNUAL BUDGET

LEVEL OF LRC ANNUAL BUDGET

ALN	100,000 OR LESS	100,001 - 200,000	200,001 - 300,000	300,001 & OVER	TOTAL	CHISQ.	DF	PROB.
						5.772	3	0.123
YES	9	17	13	22	61 52.59%			
NO	15	16	14	10	55 47.41%			
TOTAL	24	33	27	32	116			
	20.69%	28.45%	23.28%	27.59%	100.00%			

TABLE 34

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

	TYPES OF NETWORKS	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1.	Regional Library Networks (Multistate) example:SOLINET	31.17	30.89	0.0723	0.9423
2.	National Networks example: OCLC	33.13	29.62	0.8857	0.3758
3.	State Library Networks	30.13	31.57	0.3191	0.7421
4.	Local Library Networks	28.52	32.61	1.0217	0.3069

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 35

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

ENROLLMENT OF THE INSTITUTIONS

	TYPES OF NETWORKS	1,000 OR LESS		1,001 - 2,000		2,001 - 3,000		3,001 - OVER		CHISQ.	PROB.
		N=8	MEAN	N=20	MEAN	N=9	MEAN	N=24	MEAN		
1.	Regional Library Networks (Multistate) example:SOLINET		34.19		25.27		30.89		34.75	6.68	0.0827
2.	National Networks example: OCLC		38.00		24.95		29.00		34.46	6.48	0.0904
3.	State Library Networks		20.88		35.67		40.83		26.79	9.57	0.0226*
4.	Local Library Networks		23.06		35.55		30.61		30.00	4.12	0.2490

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 36

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LRC COLLECTION SIZES

	TYPES OF NETWORKS	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1.	Regional Library Networks (Multistate) example:SOLINET	25.81	30.22	30.90	35.67	4.69	0.1956
2.	National Networks example: OCLC	24.77	33.50	32.40	31.94	2.98	0.3948
3.	State Library Networks	35.19	30.60	25.05	28.83	4.93	0.1770
4.	Local Library Networks	33.85	29.00	29.55	31.97	0.97	0.8073

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 37

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LRC ANNUAL CIRCULATION OF MATERIALS

	TYPES OF NETWORKS	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1.	Regional Library Networks (Multistate) example:SOLINET	29.09	28.11	33.83	33.30	2.41	0.4917
2.	National Networks example: OCLC	28.45	27.41	38.44	32.32	3.81	0.2823
3.	State Library Networks	38.18	31.19	28.50	28.09	3.05	0.3842
4.	Local Library Networks	34.14	31.34	22.72	32.52	3.40	0.3344

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 38

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

	TYPES OF NETWORKS	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1.	Regional Library Networks (Multistate example:SOLINET	25.38	29.09	32.00	35.93	6.07	0.1082
2.	National Networks Example: OCLC	28.67	31.36	26.00	33.38	1.51	0.6799
3.	State Library Networks	31.42	35.00	35.00	26.64	2.53	0.4700
4.	Local Library Networks	30.00	34.14	25.92	29.74	1.82	0.6106

*Significant at .05 level

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 39

ANALYSIS OF RELATIONSHIP BETWEEN THE TYPES OF NETWORK PARTICIPATION AND THE LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LRC ANNUAL BUDGET

	TYPES OF NETWORKS	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1.	Regional Library Networks (Multistate) example:SOLINET	33.83	28.56	26.31	34.50	4.54	0.2091
2.	National Networks example: OCLC	31.33	30.12	28.08	33.27	1.07	0.7843
3.	State Library Networks	24.39	34.53	33.04	29.77	2.60	0.4581
4.	Local Library Networks	26.67	35.56	28.19	30.91	2.73	0.4354

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 40

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

	TYPES OF NETWORKS	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1.	Local Library Network	28.27	32.77	1.2148	0.2245
2.	State Library Network	30.21	31.51	0.3041	0.7611
3.	Regional Library Network	30.15	31.53	0.3039	0.7612
4.	National Library Network	30.83	31.11	0.0531	0.9577

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 41

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

	TYPES OF NETWORKS	1,000 OR LESS N=8 MEAN	1,001 - 2,000 N=20 MEAN	2,001 - 3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ.	PROB.
1.	Local Library Network	25.94	29.75	35.00	32.23	2.12	0.5483
2.	State Library Network	26.75	35.50	43.11	24.13	11.81	0.0080*
3.	Regional Library Network	37.06	26.27	32.72	32.27	2.71	0.4387
4.	National Library Network	29.31	27.32	32.78	33.96	1.78	0.6197

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 42

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

TYPES OF NETWORKS	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Local Library Network	29.31	30.80	28.15	34.03	1.45	0.6949
2. State Library Network	41.08	31.40	27.40	25.28	8.03	0.0454*
3. Regional Library Network	27.27	35.45	29.10	29.81	2.15	0.5425
4. National Library Network	21.92	31.10	33.65	35.97	5.31	0.1506

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 43

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

TYPES OF NETWORKS	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Local Library Network	33.00	31.08	22.50	33.41	4.18	0.2427
2. State Library Network	39.91	33.26	27.67	25.95	6.41	0.0932
3. Regional Library Network	29.32	31.76	32.94	30.39	0.28	0.9630
4. National Library Network	20.31	30.63	39.67	33.07	67.71	0.0816

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 44

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

TYPES OF NETWORKS	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Local Library Network	29.50	31.34	28.67	32.17	0.46	0.9272
2. State Library Network	36.75	32.82	35.33	24.57	5.70	0.1270
3. Regional Library Network	32.38	31.39	26.17	31.19	0.56	0.9053
4. National Library Network	24.54	34.36	22.50	33.60	4.43	0.2185

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 45

ANALYSIS OF RELATIONSHIP BETWEEN THE FUNCTIONS AND SERVICES USED THROUGH NETWORKS AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL BUDGET

TYPES OF NETWORKS	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Local Library Network	25.89	32.65	28.31	33.41	2.56	0.4649
2. State Library Network	26.89	33.29	36.54	27.64	3.50	0.3211
3. Regional Library Network	33.67	34.91	32.12	26.23	2.83	0.4189
4. National Library Network	27.50	26.91	35.85	32.75	2.56	0.4644

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 46

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

TYPES OF NETWORKS	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Local Library Network	29.25	32.14	0.7607	0.4470
2. State Library Network	32.13	30.27	0.4241	0.6715
3. Regional Library Network	30.50	31.32	0.1730	0.8626
4. National Library Network	29.02	32.28	0.7046	0.4811

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 47

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

TYPES OF NETWORKS	1,000 OR LESS N=8 MEAN	1,001 - 2,000 N=20 MEAN	2,001 - 3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ.	PROB.
1. Local Library Network	31.06	29.97	35.17	30.27	.093	0.8124
2. State Library Network	26.00	35.27	44.61	24.00	12.71	0.0053*
3. Regional Library Network	37.00	26.75	36.33	30.54	3.00	0.3917
4. National Library Network	33.69	25.07	39.67	31.79	4.75	0.1913

*Significant at .05 level

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 48

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

TYPES OF NETWORKS	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Local Library Network	30.42	32.35	28.75	31.17	0.45	0.9299
2. State Library Network	41.23	29.92	28.15	26.36	6.90	0.0750
3. Regional Library Network	25.85	31.80	33.65	32.36	1.52	0.6774
4. National Library Network	23.12	32.40	32.95	34.06	3.45	0.3278

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 49

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ANNUAL CIRCULATION OF MATERIALS

TYPES OF NETWORKS	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Local Library Network	32.50	32.16	22.00	32.92	4.21	0.2396
2. State Library Network	40.68	31.68	25.00	28.02	5.81	0.1211
3. Regional Library Network	28.41	31.21	32.56	31.48	0.33	0.9534
4. National Library Network	28.18	28.79	31.56	34.09	1.29	0.7324

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 50

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

TYPES OF NETWORKS	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Local Library Network	32.21	32.20	27.67	30.00	0.67	0.8807
2. State Library Network	36.92	32.80	30.25	25.95	3.84	0.2794
3. Regional Library Network	29.83	32.75	28.17	30.64	0.44	0.9312
4. National Library Network	25.88	33.73	23.17	33.31	3.14	0.3709

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 51

ANALYSIS OF RELATIONSHIP BETWEEN THE BENEFITS GAINED DUE TO PARTICIPATION IN ALN AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL BUDGET

TYPES OF NETWORKS	100,000 OR LESS N=19 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Local Library Network	25.39	33.88	30.81	31.18	2.08	0.5557
2. State Library Network	24.56	36.82	34.31	27.18	5.27	0.1531
3. Regional Library Network	32.00	32.05	33.58	28.27	0.91	0.8224
4. National Library Network	26.22	32.06	34.62	30.00	1.36	0.7144

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 52

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF INSTITUTIONS

PROBLEMS ENCOUNTERED	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Increased operating expenses	30.00	31.65	0.3684	0.7126
2. Difficult to keep up with the state of technology	30.17	31.54	0.3154	0.7524
3. Increased work load	30.13	31.57	0.3258	0.7446
4. Needs constant staff training	27.88	33.03	1.2511	0.2109
5. Lack of cooperation from the college computer personnel	29.75	31.81	0.6291	0.5293
6. Lack of compatibility with other systems	27.19	33.47	1.2511	0.2109
7. Unreliable computer	31.08	30.95	0.0345	0.9725
8. Expenses outweigh the benefits	32.48	30.04	0.9342	0.3502
9. Negative attitude of LRC staff towards networking	29.85	31.74	0.8384	0.4018

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 53

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA (DF = 3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

PROBLEMS ENCOUNTERED	1,000 OR LESS N=8 MEAN	1,001 - 2,000 N=20 MEAN	2,001 - 3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ.	PROB.
1. Increased operating expenses	27.56	27.80	32.22	34.35	2.09	0.5549
2. Difficult to keep up with the state of technology	28.25	32.75	34.56	29.13	1.22	0.7485
3. Increased work load	29.31	27.65	29.11	35.06	2.48	0.4783
4. Needs constant staff training	27.88	33.65	34.67	28.46	2.03	0.5661
5. Lack of cooperation from the college computer personnel	35.69	29.57	28.83	31.44	1.74	0.6275
6. Lack of compatibility with other systems	30.88	32.73	33.33	27.92	1.75	0.6275
7. Unreliable computer	26.00	32.10	32.78	31.08	1.95	0.5828
8. Expenses outweigh the benefits	31.56	33.47	34.33	27.50	5.38	0.1458
9. Negative attitude of LRC staff towards networking	28.50	33.13	31.83	29.75	2.58	0.4604

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 54

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA (DF = 3)

LEVEL OF LRC COLLECTION SIZES

PROBLEMS ENCOUNTERED	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Increased operating expenses	23.58	32.10	36.10	32.31	3.69	0.2970
2. Difficult to keep up with the state of technology	28.25	32.75	34.56	29.13	1.22	0.7485
3. Increased work load	28.15	34.90	19.10	35.33	7.96	0.0469*
4. Needs constant staff training	30.38	30.75	32.90	30.67	0.28	0.9805
5. Lack of cooperation from the college computer personnel	30.31	34.15	30.70	28.17	2.32	0.5091
6. Lack of compatibility with other systems	28.04	29.77	33.10	33.33	1.62	0.6556
7. Unreliable computer	30.69	27.52	35.15	32.78	3.64	0.3030
8. Expenses outweigh the benefits	30.00	31.85	36.90	27.50	6.18	0.1031
9. Negative attitude of LRC staff towards networking	30.81	33.13	28.50	30.17	2.33	0.5074

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 55

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA (DF = 3)

LEVEL OF ANNUAL CIRCULATION OF MATERIALS

PROBLEMS ENCOUNTERED	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Increased operating expenses	31.86	29.89	20.78	35.70	5.22	0.1564
2. Difficult to keep up with the state of technology	25.18	32.84	31.78	32.00	1.77	0.6218
3. Increased work load	31.55	27.66	22.17	37.23	6.51	0.0892
4. Needs constant staff training	30.18	33.74	26.67	30.82	1.31	0.7265
5. Lack of cooperation from the college computer personnel	31.27	33.13	28.17	30.18	1.15	0.7644
6. Lack of compatibility with other systems	34.91	28.16	23.50	34.57	6.26	0.0996
7. Unreliable computer	26.00	34.03	26.00	32.93	5.83	0.1200
8. Expenses outweigh the benefits	33.09	29.21	37.56	28.82	6.23	0.1011
9. Negative attitude of LRC staff towards networking	31.23	31.66	32.11	29.86	0.68	0.8784

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 56

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA (DF = 3)

	LEVEL OF LRC STAFF					
PROBLEMS ENCOUNTERED	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Increased operating expenses	28.33	29.91	30.00	33.95	1.08	0.7830
2. Difficult to keep up with the state of technology	29.83	31.05	30.17	31.86	0.14	0.9870
3. Increased work load	28.21	27.95	26.00	37.21	4.63	0.2012
4. Needs constant staff training	29.09	32.77	36.33	28.71	1.62	0.6558
5. Lack of cooperation from the college computer personnel	35.00	28.14	34.50	30.71	2.96	0.3973
6. Lack of compatibility with other systems	33.33	27.52	33.33	32.64	2.38	0.4980
7. Unreliable computer	28.54	28.77	41.25	31.81	6.37	0.0949
8. Expenses outweigh the benefits	29.92	33.25	37.17	27.50	6.34	0.0964
9. Negative attitude of LRC staff towards networking	31.00	31.23	33.92	29.93	1.07	0.7842

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 57

ANALYSIS OF RELATIONSHIP BETWEEN THE PROBLEMS ENCOUNTERED BY LRCs DUE TO PARTICIPATION IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA (DF = 3)

LEVEL OF LRC ANNUAL BUDGET

PROBLEMS ENCOUNTERED	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Increased operating expenses	27.78	27.41	33.15	33.82	1.94	0.5811
2. Difficult to keep up with the state of technology	23.44	30.12	35.69	32.00	3.18	0.3644
3. Increased work load	30.22	24.56	30.69	36.48	5.04	0.1686
4. Needs constant staff training	26.67	33.18	31.46	30.82	1.04	0.7919
5. Lack of cooperation from the college computer personnel	32.00	34.09	29.85	28.89	1.90	0.5938
6. Lack of compatibility with other systems	30.06	32.62	28.04	31.89	1.04	0.7919
7. Unreliable computer	29.39	27.79	33.04	32.92	2.58	0.4613
8. Expenses outweigh the benefits	27.50	33.03	34.46	28.82	4.57	0.2060
9. Negative attitude of LRC staff towards networking	28.50	28.50	37.92	29.86	11.42	0.0096*

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 58

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

LEADING FACTORS	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Sharing bibliographic information and databases	30.50	31.32	0.2315	0.8161
2. Having immediate access to millions of records now on databases and network files	31.19	30.88	0.0644	0.9487
3. Providing faster and more efficient services to users	29.42	32.03	0.6653	0.5058
4. Sharing collections and other resources among network members	32.25	30.19	0.4748	0.6349
5. Meeting the increased and varied demands of users	30.46	31.25	0.1980	0.8430
6. Lowering unit costs of operation	31.23	30.85	0.0890	0.9291

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 59

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

LEADING FACTORS	1000 OR LESS N=8 MEAN	1001 - 2000 N=20 MEAN	2001 - 3000 N=9 MEAN	3001 & OVER N=24 MEAN	CHISQ.	PROB.
1. Sharing bibliographic information and databases	38.00	27.50	27.22	33.00	5.13	0.1627
2. Having immediate access to millions of records now on databases and network files	32.25	35.52	29.28	27.46	2.83	0.4191
3. Providing faster and more efficient services to users	30.63	29.38	37.11	30.19	1.86	0.6020
4. Sharing collections and other resources among network members	35.44	30.57	31.06	29.85	0.73	0.8669
5. Meeting the increased and varied demands of users	34.75	27.75	37.56	30.00	2.68	0.4430
6. Lowering unit costs of operation	34.13	28.22	30.50	32.46	1.32	0.7252

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 60

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

LEADING FACTORS	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Sharing bibliographic information and databases	31.08	32.00	31.301	29.67	0.32	0.9571
2. Having immediate access to millions of records now on databases and network files	34.00	36.47	25.95	25.56	5.68	0.1285
3. Providing faster and more efficient services to users	28.12	30.82	38.60	29.06	3.46	0.9052
4. Sharing collections and other resources among network members	34.00	30.25	30.10	30.17	0.56	0.9052
5. Meeting the increased and varied demands of users	29.85	28.05	32.90	34.06	1.45	0.6950
6. Lowering unit costs of operation	34.69	24.75	34.55	33.31	5.44	0.1421

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 61

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WILLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ANNUAL CIRCULATION OF MATERIALS

LEADING FACTORS	10,000 OR LESS	10,001 - 20,000	20,001 - 30,000	30,001 & OVER	CHISQ.	PROB.
	N=11 MEAN	N=19 MEAN	N=9 MEAN	N=22 MEAN		
1. Sharing bibliographic information and databases	35.27	29.74	28.00	31.18	1.86	0.6015
2. Having immediate access to millions of records now on databases and network files	36.27	31.89	35.67	25.68	4.30	0.2312
3. Providing faster and more efficient services to users	30.95	29.71	35.06	30.48	0.85	0.8373
4. Sharing collections and other resources among network members	36.27	30.21	31.06	29.02	1.52	0.6771
5. Meeting the increased and varied demands of users	33.27	30.89	34.33	28.59	1.04	0.7915
6. Lowering unit costs of operation	35.18	26.97	31.67	32.11	2.45	0.4840

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 62

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

	LEVEL OF LRC STAFF					
LEADING FACTORS	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=16 MEAN	16 AND OVER N=21 MEAN	CHISQ.	PROB.
1. Sharing bibliographic information and databases	35.50	26.77	33.00	32.29	4.14	0.2471
2. Having immediate access to millions of records now on databases and network files	38.50	31.64	35.83	24.67	6.28	0.0986
3. Providing faster and more efficient services to users	34.25	31.80	30.08	28.57	1.24	0.7446
4. Sharing collections and other resources among network members	39.29	30.18	30.00	27.40	4.21	0.2394
5. Meeting the increased and varied demands of users	36.42	30.14	25.50	30.38	2.04	0.5644
6. Lowering unit costs of operation	31.67	31.16	21.83	33.07	2.77	0.4288

Total number participating LRCs in Automated Library Networking: N = 61

TABLE 63

ANALYSIS OF RELATIONSHIP BETWEEN THE LEADING FACTORS FOR PARTICIPATING IN AUTOMATED LIBRARY NETWORKING AND THE LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL BUDGET

LEADING FACTORS	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N-13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Sharing bibliographic information and databases	38.00	27.41	30.54	31.18	3.95	0.2671
2. Having immediate access to millions of records now on databases and network files	33.89	34.06	30.81	27.57	1.85	0.6016
3. Providing faster and more efficient services to users	24.22	32.97	31.77	31.80	2.30	0.5133
4. Sharing collections and other resources among network members	31.06	33.68	30.81	29.02	0.79	0.8266
5. Meeting the increased and varied demands of users	34.33	28.18	31.62	31.45	0.90	0.8266
6. Lowering unit costs of operation	30.50	32.82	24.81	33.45	3.18	0.3645

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 64

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF INSTITUTIONS

INVOLVEMENT AND PARTICIPATION	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Influenced by professional colleagues	33.19	29.58	0.8369	0.4026
2. Involved in professional organizations related to library networking	33.29	29.51	0.8707	0.3839
3. Received training and experienced in networking	33.13	29.62	0.8264	0.4086
4. Participated in network organization	32.69	29.91	0.6771	0.4983
5. Participated in the structure of networking	31.08	30.95	0.0281	0.9775
6. Participated in governance of networking	32.60	29.96	0.7638	0.4450

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 65

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND THE LEVEL OF ENROLLMENT OF INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

	LEVEL OF ENROLLMENT					
INVOLVEMENT AND PARTICIPATION	1,000 OR LESS N=8 MEAN	1,001 - 2,000 N=20 MEAN	2,001 - 3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ.	PROB.
1. Influenced by professional colleagues	30.06	29.42	26.33	32.38	1.87	.15997
2. Involved in professional organizations related to library networking	30.38	31.85	23.56	33.29	2.39	0.4961
3. Received training and experienced in networking	22.75	35.35	28.00	31.25	3.92	0.2702
4. Participated in network						
5. Participated in the structure of networking	25.88	35.00	31.50	29.19	3.13	0.3715
6. Participated in governance of networking	27.44	37.42	27.06	28.31	7.30	0.0631

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 66

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

	LEVEL OF COLLECTION SIZES					
INVOLVEMENT AND PARTICIPATION	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Influenced by professional colleagues	23.38	36.10	28.15	32.41	5.25	0.1546
2. Involved in professional organizations related to library networking	31.69	35.90	19.90	31.22	6.39	0.0942
3. Received training and experienced in networking	40.46	28.90	21.40	31.83	8.52	0.0364*
4. Participated in network organization	30.65	29.05	34.15	31.67	0.77	0.8564
5. Participated in the structure of networking	29.38	29.17	31.45	33.94	1.33	0.7230
6. Participated in governance of networking	28.77	31.92	30.20	32.02	0.63	0.8894

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 67

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

INVOLVEMENT AND PARTICIPATION	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N-19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Influenced by professional colleagues	22.55	32.97	25.67	35.70	6.05	0.1094
2. Involved in professional organizations related to library networking	30.64	31.53	29.11	31.50	0.16	0.9831
3. Received training and experienced in networking	33.45	31.95	25.00	31.41	1.60	0.6589
4. Participated in network organization	32.77	26.89	35.83	31.68	2.40	0.4937
5. Participated in the structure of networking	30.64	29.53	32.44	31.86	0.40	0.9404
6. Participated in governance of networking	32.14	29.45	33.94	30.57	0.84	0.8409

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 68

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

LEVEL OF LRC STAFF

INVOLVEMENT AND PARTICIPATION	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Influenced by professional colleagues	30.75	29.57	26.00	34.07	1.49	0.6856
2. Involved in professional organizations related to library networking	32.75	30.64	29.17	30.90	0.22	0.9738
3. Received training and experienced in networking	33.25	30.32	25.00	32.14	1.23	0.7468
4. Participated in network organization	29.50	34.48	35.75	26.86	3.29	0.3489
5. Participated in the structure of networking	30.67	34.70	28.42	28.05	2.70	0.4405
6. Participated in governance of networking	34.33	33.70	28.58	26.95	3.96	0.2658

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 69

ANALYSIS OF RELATIONSHIP BETWEEN THE INVOLVEMENT IN NETWORK RELATED ORGANIZATIONS OR ACTIVITIES AND LEVEL OF THE LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

LEVEL OF LRC ANNUAL BUDGET

INVOLVEMENT AND PARTICIPATION	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Influenced by professional colleagues	29.83	29.06	31.81	32.50	0.51	0.9175
2. Involved in professional organizations related to library networking	34.67	30.47	30.23	30.36	0.53	0.9125
3. Received training and experienced in networking	22.00	37.00	26.62	32.64	6.43	0.0924
4. Participated in network organization	26.00	31.62	34.46	30.52	1.64	0.6511
5. Participated in the structure of networking	26.44	33.03	32.12	30.64	1.41	0.7022
6. Participated in governance of networking	27.83	32.91	33.54	29.54	1.75	0.6248

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 70

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

GROUPS PROVIDING INPUT	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Yourself (respondent)	30.42	31.38	0.4646	0.6422
2. Librarians	30.19	31.53	0.4552	0.6490
3. President, Vice-Presidents, Deans	29.38	32.05	0.6241	0.5325
4. Division Heads	28.33	32.73	1.0460	0.2956
5. Faculty	33.77	29.20	1.1133	0.2656

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 71

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE WAY ANOVA BY RANKS (DF = 3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

	GROUPS PROVIDING INPUT	1000 OR LESS N=8 MEAN	1,001-2,000 N=20 MEAN	2,001-3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ	PROB
1.	Yourself	25.25	33.00	33.00	30.50	6.65	0.0834
2.	Librarians	27.25	33.85	22.33	33.13	8.85	0.0314*
3.	President, Vice-President, Dean	27.25	36.70	22.56	30.67	5.38	0.1459
4.	Division Heads	29.50	37.42	28.28	27.17	4.99	0.1726
5.	Faculty	30.06	40.70	25.44	25.31	12.19	0.0068*

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 72

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

GROUPS PROVIDING INPUT	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Librarians	27.88	31.22	26.50	35.50	5.80	0.1218
2. President, Vice Presidents, Deans	31.08	30.82	27.00	33.36	1.00	0.8016
3. Faculty	33.12	31.22	30.45	29.53	0.42	0.9362
4. Division Heads	32.96	30.27	28.25	31.92	0.60	0.8970
5. Yourself (respondent)	28.23	33.00	29.90	31.39	3.35	0.3402

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 73

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

GROUPS PROVIDING INPUT	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001 - 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Yourself (respondent)	30.18	31.37	29.56	31.68	0.67	0.8799
2. Librarians	29.91	29.26	28.17	34.20	3.08	0.3796
3. President, Vice-Presidents, Deans	27.36	32.16	29.94	32.25	.082	0.8438
4. Division Heads	23.14	36.45	27.94	31.48	5.27	0.1534
5. Faculty	28.05	31.24	38.33	29.27	2.68	0.4438

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 74

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

LEVEL OF LRC STAFF

GROUPS PROVIDING INPUT	5 OR LESS N=12 MEAN	6 TO 11 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Yourself (respondent)	25.25	33.00	33.00	31.62	8.91	0.0305*
2. Librarians	30.00	28.61	35.50	32.79	2.72	0.4366
3. President, Vice-Presidents, Deans	33.21	31.55	23.42	31.33	1.58	0.6644
4. Division Heads	36.50	29.77	29.50	29.57	1.79	0.6177
5. Faculty	39.08	29.36	36.83	26.43	6.16	0.1043

*Significant at .05 level
Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 75

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS PROVIDING INPUT FOR PARTICIPATION AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF = 3)

LEVEL OF LRC ANNUAL BUDGET

GROUPS PROVIDING INPUT	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Yourself (respondent)	26.11	33.00	30.62	31.68	5.09	0.1653
2. Librarians	24.50	32.15	28.28	34.20	5.89	0.1172
3. President, Vice-Presidents, Deans	24.28	37.38	27.15	31.09	4.94	0.1761
4. Division Heads	24.83	33.79	32.94	30.20	2.13	0.5461
5. Faculty	27.17	33.65	36.38	27.34	3.82	0.2813

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 76

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTION

GROUPS RESISTING PARTICIPATION	RURAL N=24 MEAN	URBAN/SUBURBAN N=37 MEAN	Z-VALUE	PROB.
1. Librarians	31.19	30.88	0.0853	0.9320
2. President, Vice Deans	33.52	29.36	1.0245	0.3056
3. Faculty	32.06	30.31	0.4506	0.6522
4. Division Heads	32.75	29.86	0.7611	0.4466
5. Yourself (respondent)	31.93	30.93	0.0621	0.9505

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 77

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF ENROLLMENT OF THE INSTITUTIONS

GROUPS RESISTING PARTICIPATION	1,000 OR LESS N=8 MEAN	1,001 - 2,000 N=20 MEAN	2,001 - 3,000 N=9 MEAN	3,001 & OVER N=24 MEAN	CHISQ.	PROB.
1. Librarians	25.00	34.15	32.00	30.00	3.44	0.3288
2. President, Vice Presidents, Deans	30.94	33.00	24.94	31.63	1.78	0.6193
3. Faculty	32.06	32.80	21.00	32.90	5.01	0.1708
4. Division Heads	32.75	33.50	21.50	31.90	4.80	0.1868
5. Yourself (respondent)	28.50	33.13	28.50	31.00	2.76	0.4303

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 78

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

GROUPS RESISTING PARTICIPATION	30,000 OR LESS N=13 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=10 MEAN	70,001 & OVER N=18 MEAN	CHISQ.	PROB.
1. Librarians	32.04	32.72	31.30	28.17	1.45	0.6940
2. President, Vice Presidents, Deans	27.42	37.15	31.35	26.56	5.43	0.1429
3. Faculty	30.08	34.27	24.95	31.39	2.81	0.4217
4. Division Heads	30.73	35.00	25.45	29.83	3.20	0.3619
5. Yourself (respondent)	30.81	31.63	31.50	30.17	0.33	0.9549

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 79

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

GROUPS RESISTING PARTICIPATION	10,000 OR LESS N=11 MEAN	10,001 - 20,000 N=19 MEAN	20,001- 30,000 N=9 MEAN	30,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Librarians	30.18	34.95	28.83	28.89	2.94	0.4011
2. President, Vice Presidents, Deans	27.36	32.16	29.94	32.25	0.82	0.8438
3. Faculty	29.05	30.32	28.67	33.52	1.13	0.7687
4. Division Heads	29.68	30.97	29.22	32.41	0.45	0.9304
5. Yourself (respondent)	31.23	30.21	31.83	31.23	0.28	0.9641

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 80

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

GROUPS RESISTING PARTICIPATION	5 OR LESS N=12 MEAN	6 TO 10 N=22 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=21 MEAN	CHISQ.	PROB.
1. Librarians	35.50	30.73	29.75	29.07	2.20	0.5322
2. President, Vice Presidents, Deans	36.46	29.05	23.33	32.12	3.48	0.3231
3. Faculty	36.58	29.05	25.92	31.31	2.91	0.4057
4. Division Heads	36.58	29.05	25.92	30.07	3.20	0.3625
5. Yourself (respondent)	33.71	29.86	28.50	31.36	2.20	0.5323

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 81

ANALYSIS OF RELATIONSHIP BETWEEN THE GROUPS RESISTING PARTICIPATION AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL BUDGET

GROUPS RESISTING PARTICIPATION	100,000 OR LESS N=9 MEAN	100,001 - 200,000 N=17 MEAN	200,001 - 300,000 N=13 MEAN	300,001 & OVER N=22 MEAN	CHISQ.	PROB.
1. Librarians	25.00	32.06	37.35	28.89	6.39	0.0942
2. President, Vice Presidents, Deans	28.17	35.32	34.12	26.98	3.70	0.2955
3. Faculty	27.56	33.15	30.85	30.84	0.88	0.8303
4. Division Heads	28.17	33.85	31.46	29.68	1.23	0.7454
5. Yourself (respondent)	31.83	30.41	30.81	31.23	0.19	0.9787

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 82

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND THE LEVEL OF ENROLLMENT OF THE INSTITUTIONS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)
LEVEL OF ENROLLMENT OF THE INSTITUTIONS

FACTORS FOR NON-PARTICIPATION	1,000 OR LESS N=13 MEAN	1,001 - 2,000 N=23 MEAN	2,001 - 3,000 N=8 MEAN	3,001 & OVER N=11 MEAN	CHISQ.	PROB.
1. Financial resource unavailable	30.54	28.78	22.38	27.45	3.33	0.3429
2. Limited institutional support	32.77	27.70	22.3	27.14	2.77	0.4279
3. Limited access to computer equipment and facilities	28.15	29.83	23.63	27.18	1.07	0.7840
4. Limited LRC personnel with computer background	28.54	29.93	25.75	24.95	1.04	0.7911
5. Due to small size and level of LRC activities	27.31	28.15	31.63	25.86	0.72	0.8681
6. Limited information about automated library networking applicable to community colleges	28.54	27.91	24.75	29.91	0.60	0.8959
7. Too expensive for benefit gained	22.54	28.01	31.50	31.86	2.97	0.3957
8. Negative attitude of LRC	25.23	29.35	26.69	29.41	0.92	0.8202
9. No significant benefits to LRC	26.85	29.89	24.63	27.86	1.03	0.7942

Total number of participating LRCs in Automated Library Networking: N = 61

TABLE 83

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND THE LOCATION OF THE INSTITUTIONS

MANN-WHITNEY U TEST

LOCATION OF THE INSTITUTIONS

FACTORS FOR NON-PARTICIPATION	RURAL N=32 MEAN	URBAN/SUBURBAN N=23 MEAN	Z-VALUE	PROB.
1. Financial resource unavailable	29.03	26.57	0.8618	0.3887
2. Limited institutional support	27.84	28.22	0.0862	0.9313
3. Limited access to computer equipment and facilities	28.09	27.87	0.0459	0.9634
4. Limited LRC personnel with computer background	26.61	29.93	0.8054	0.4206
5. Due to small size and level	27.89	28.15	0.0547	0.9564
6. Limited information about automated library networking applicable to community colleges	26.13	30.61	1.1136	0.2654
7. Too expensive for benefit gained	26.13	30.61	1.1002	0.2713
8. Negative attitude of LRC	27.38	28.87	0.3845	0.7006
9. No significant benefits to LRC	27.86	28.20	0.0803	0.9360

Total number of non-participating LRCs in Automated Library Networking: N = 55

TABLE 84

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND THE LEVEL OF LRC COLLECTION SIZES

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC COLLECTION SIZES

FACTORS FOR NON-PARTICIPATION	30,000 OR LESS N=16 MEAN	30,001 - 50,000 N=20 MEAN	50,001 - 70,000 N=14 MEAN	70,001 & OVER N=5 MEAN	CHISQ.	PROB.
1. Financial resource unavailable	30.63	28.00	27.04	22.30	2.69	0.4421
2. Limited institutional support	26.75	31.75	24.00	28.20	2.60	0.4567
3. Limited access to computer equipment and facilities	28.81	29.55	26.79	22.60	1.02	0.7976
4. Limited LRC personnel with computer background	27.09	28.67	29.82	23.10	0.85	0.8384
5. Due to small size and level of LRC activities	28.41	29.05	25.00	30.90	0.85	0.8355
6. Limited information about automated library networking applicable to community colleges	25.63	27.80	29.71	31.60	0.92	0.8198
7. Too expensive for benefit gained	28.44	27.10	27.93	30.40	0.22	0.9743
8. Negative attitude of LRC	28.06	27.70	26.75	32.50	0.65	0.8848
9. No significant benefits to LRC	28.19	28.38	26.93	28.90	0.13	0.9885

Total number of non-participating LRCs in Automated Library Networking: N = 55

TABLE 85

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL CIRCULATION OF MATERIALS

FACTORS FOR NON-PARTICIPATION	10,000 OR LESS N=21 MEAN	10,001 - 20,000 N=12 MEAN	20,001 - 30,000 N=10 MEAN	30,001 & OVER N=12 MEAN	CHISQ.	PROB.
1. Financial resource unavailable	29.64	28.15	23.95	28.25	2.09	0.5537
2. Limited institutional support	31.60	26.25	19.95	30.17	4.97	0.1739
3. Limited access to computer equipment and facilities	26.43	28.17	30.50	28.50	0.53	0.9120
4. Limited LRC personnel with computer background	31.74	20.33	26.20	30.63	4.99	0.1722
5. Due to small size and level of LRC activities	31.40	23.13	23.90	30.33	3.39	0.3349
6. Limited information about automated library networking applicable to community colleges	27.81	24.75	30.10	29.83	0.99	0.8028
7. Too expensive for benefit gained	28.02	20.88	30.40	33.08	4.47	0.2150
8. Negative attitude of LRC	30.00	21.00	27.70	31.75	4.38	0.2233
9. No significant benefits to LRC	29.71	21.38	27.85	31.75	4.08	0.2527

Total number of non-participating LRCs in Automated Library Networking: N = 55

TABLE 86

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND THE LEVEL OF LRC STAFF

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC STAFF

FACTORS FOR NON-PARTICIPATION	5 OR LESS N=24 MEAN	6 TO 10 N=20 MEAN	11 TO 15 N=6 MEAN	16 & OVER N=5 MEAN	CHISQ.	PROB.
1. Financial resource unavailable	31.25	25.67	27.50	22.30	4.95	0.1758
2. Limited institutional support	31.67	24.67	24.25	28.20	3.09	0.3787
3. Limited access to computer equipment and facilities	27.71	27.85	34.17	22.60	1.70	0.6373
4. Limited LRC personnel with computer background	29.48	27.90	26.50	23.10	0.84	0.8410
5. Due to small size and level of LRC activities	28.06	28.22	24.58	30.90	0.50	0.9180
6. Limited information about automated library networking applicable to community colleges	26.00	27.80	33.67	31.60	1.66	0.6457
7. Too expensive for benefit gained	25.77	26.90	38.58	30.40	3.86	0.2767
8. Negative attitude of LRC	25.92	28.25	31.75	32.50	1.51	0.6790
9. No significant benefits to LRC	26.56	28.38	31.75	28.90	0.76	0.8592

Total number of participating LRCs in Automated Library Networking: N = 55

TABLE 87

ANALYSIS OF RELATIONSHIP BETWEEN THE FACTORS FOR NON-PARTICIPATION AND THE LEVEL OF LRC ANNUAL BUDGET

KRUSKAL-WALLIS ONE-WAY ANOVA BY RANKS (DF=3)

LEVEL OF LRC ANNUAL BUDGET

FACTORS FOR NON-PARTICIPATION	100,000 OR LESS N=15 MEAN	100,001 - 200,000 N=16 MEAN	200,001 - 300,000 N=14 MEAN	300,001 & OVER N=10 MEAN	CHISQ.	PROB.
1. Financial resource unavailable	30.50	30.91	24.89	23.95	4.97	0.1740
2. Limited institutional support	30.60	31.91	21.46	27.00	4.68	0.1966
3. Limited access to computer equipment and facilities	31.13	27.63	26.79	25.60	1.03	0.7946
4. Limited LRC personnel with computer background	36.30	24.78	26.29	23.20	6.64	0.0844
5. Due to small size and level	33.03	27.31	21.57	33.03	3.62	0.3053
6. Limited information about automated library networking applicable to community colleges	32.67	23.75	29.71	25.40	3.40	0.3345
7. Too expensive for benefit gained	31.63	20.84	29.15	32.25	5.58	0.1339
8. Negative attitude of LRC	32.00	23.69	28.07	28.80	2.83	0.4185
9. No significant benefits to LRC	33.90	23.97	25.64	28.90	4.68	0.1968

Total number of participating LRCs in Automated Library Networking: N = 61

The two page vita has been removed from the scanned document. Page 1 of 2

The two page vita has been removed from the scanned document. Page 2 of 2

AUTOMATED LIBRARY NETWORKING IN AMERICAN PUBLIC COMMUNITY COLLEGE LEARNING RESOURCES CENTERS

by

Abdul J. Miah

(Abstract)

The purpose of this study was to investigate the extent of community college Learning Resources Centers' participation in automated library networking (ALN), to identify the factors which influenced or inhibited participation, to identify the benefits gained and the problems encountered due to participation, to identify the sources of funding for participation, to identify the involvement of LRCs in network related organizations and activities, to illuminate the influence of college staff in the decision making process for participation, and to assess the relationships, if any, which existed among the selected ALN activities and the institutional variables.

A survey and interview approach was chosen to conduct the study which consisted of two phases. During the first phase, a survey questionnaire was developed, validated and mailed to 253 LRC directors of American public community colleges located in the southeastern United States. A total of 193 (76.3 percent) usables responses were received. Statistical procedures employed for this study were chi-square, Mann-Whitney U Test, and Kruskall-Wallis One Way ANOVA to test the appropriate samples at .05 level of significance. The second phase involved a site visit to three LRCs selected out of the 193 responses to further examine any significant trends or practices common or unique to networking which were not adequately addressed in the first phase. The

results of the interviews from the site visits were recorded descriptively.

The principal findings of the study indicated that community college LRCs which had automation capability, mostly automated the cataloging function. The majority of the LRCs had not yet automated the other functions. There were a few integrated or turnkey automated systems available in the LRCs. In general, LRCs used regional and national networks for all functional activities. But, all four networks - local, state, regional and national - were used for interlibrary loan, resource sharing and union catalog database. Among the most important benefits gained by participation in ALN were sharing bibliographic databases, immediate access to network files, faster and improved services to users, and sharing of resources among network members. Participating LRCs mostly used their regular operating budget and received little or no external fundings. Incentive to participate primarily came from professional colleagues and involvement in network related organizations. Those LRCs which had no ALN reported that lack of financial support and limited institutional commitment were the main reasons for non-participation.

The extent of automation and ALN could be predicted from the size of the institutions. Size of the institution played a major role in he participation in ALN. In most cases, there were significant relationships between institutional variables - location, enrollment, collection size, volume of circulation, number of LRC staff, size of annual budget and the extent of automation and ALN.