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## STATUS AND CHALLENGES IN AUTOMATION AND NETWORKING IN COLLEGE LIBRARIES-A SYSTEMATIC REVIEW OF LITERATURE

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**Abstract:** The college library supports the goals of the teaching and learning environment and is the soul and heart of a college. In light of the fact that the current topic Status and Challenges in Automation and Networking in College Libraries-A Systematic Review of Literature focuses on comprehending the status of automation and networking in college libraries from the past to the present on a national and international level. It is an endeavour to understand the slow but steady expansion and development of networking and automation in college libraries around the world. The study will look at how users get automation and network-based services and how satisfied they are with them, as well as the difficulties college libraries confront in offering these services to their patrons. The study is therefore entirely applicable to college libraries. In addition to the variety of services provided, the value of a college library and the standing of the college librarian also depend on how well users use those services in an automated and networked environment. The success of a college library heavily depends on its users' ability to access automation and network-based services, as well as employment profiles that are based on information communication technology. Additionally, the study looked at the different kinds of resources and services that libraries provide to their patrons, including databases, CD-ROM databases, online public access (OPA) catalogues, open educational resources (OER), etc. Additionally, assessing the IT infrastructure, personnel, and software programmes of the college library can assist one to better assess the library automation challenges.

**Index Terms:** Libraries, Automation, Networks, College Libraries, Status, Challenges,

### 1. Introduction

Higher education institutions are actively contributing to the nation's social, economic, and political advancement. Higher education's main objective is to make students independent and self-sufficient. (Singh, Arona, 1995)

Teachers and students who are considered college users heavily rely on the libraries to fulfil their academic needs. To effectively serve the collegiate fraternity, library professionals employ a range of techniques and technical strategies while keeping and sharing information. Information technology-based skills are employed to automate the college library's many housekeeping duties through the usage of multiple library automation software packages. Despite an increase in the field of library automation in the 1980s, it is still in its infancy in certain underdeveloped countries. This study is particularly interested in learning about the status of automation and networking in college libraries of professional and non-professional colleges and their state of automation, retro conversion of library resources, use of OPAC, use of library automation software, library network-based services, users' satisfaction level, funding agencies, ICT oriented and skilled library staff, and challenges faced by college libraries when providing automation and networking-based services. It is anticipated that the findings of this systematic analysis of the literature will show how automation and networking have been developing gradually over the world. Additionally, the study would examine the kinds of computer-based materials and services that libraries offer their users, including databases, CD-ROM databases, OPAC, and free online course materials (OER). An evaluation of the libraries' IT infrastructure will also be done in order to understand the administrative problems they are having.

### 2. Automation

D.S. Harder was the one who initially coined the phrase "automation" in 1936. "Automation" is a phrase derived from the Greek word "Automose," which meaning "something with the ability to shift spontaneously or autonomously." Harder, a General Motors Company employee in the United States, used the term "automation" to describe automated part handling between successive production stages. (Harinarayana, 1995).

#### 2.1 Library Automation

Modern educational structures are built on a solid foundation of well-equipped and maintained libraries. Knowing where to look for information, how to pick and analyse the papers that will be most useful, and how to get it to those who need it are all essential skills for the library. In industrialised nations with advanced hardware, software, and communication infrastructure, computer applications in the library and information fields have advanced astronomically. They have had remarkable success computerising their entire library and information system thanks to advancements in technology.

The application of strategies to automate library activities using automation software or any other integrated library management software is a component of any library's internal activities.

The application of strategies to automate library activities using automation software or any other integrated library management software is a component of any library's internal operations. This is done in the discipline of library and information science. Using

LISA, Google search, the Emerald database, and other tools accessible in the field of library and information science, a review of the literature has been done in this context.

**2.2 World Scenario-** In the past, the term "automation" was used to refer primarily to managing numerous processes automatically. Automation in libraries initially meant automating some of the more commonplace tasks, such managing magazines and circulation. Herman Hollerith, a notable librarian who worked for the U.S. Census Bureau and invented the punch card system, is credited with coming up with the concept of automation, which has been ingrained in our culture. The director of the Surgeon General's library, Dr. John Shaw Billings, had the idea to create the punch card system. He told Hollerith that "there should be a machine to do entirely mechanical tabulation works and related statistics.

"In 1890, Hollerith creates a system that uses punched cards to tabulate census information, based on Billing's concept. In 1896, Hollerith established the tabulating machine business, which ultimately developed into the well-known International Business Machine (IBM).

This example demonstrates the involvement of a librarian in the automation process, which becomes crucial when a pattern is introduced. In order to update the library's housekeeping procedures, including circulation, learning and development processes, cataloguing and reference control, and methods for accessing information or advice, library automation is defined as a computer application. Currently, "library automation" is defined as the computer-based modernization or mechanisation of library activities. (Uddin, 1998).

Hollerith created the Punched Cards in 1880, and the data from the US Census was tabulated using these cards. The University of Texas Library may have been the first to employ punched cards to control circulation back in 1936. Unit recording machines were employed by the Library of Congress to create catalogues in 1950. The majority of US libraries have implemented an automation system for their daily operations. In the 1960s, with the advent of computers, library automation entered a second phase. The notable computer-related businesses include MEDLARS, MARC, and others. (Faisal & Surendran, 2008).

### 2.3 Library Automation In India

The HEC-2M computer unit, which was imported from the UK, was installed in 1955, marking the start of computerization activities at the Indian Statistical Institute (ISI), Calcutta, India. A Soviet-made computer named URAL-I was also deployed at ISI in 1958. In 1964, ISI, Calcutta and the University of Jadavpur, Calcutta jointly created the first indigenous computer. The National Institute of Scientific Communication and Information Resources (NISCAIR), formerly known as the Indian National Scientific Documentation Centre (INSDOC), was the first organisation in India to use computers for documentation and information work in 1964. With the installation of a HEC-2M computer equipment imported from the UK, computerization work at the Indian Statistical Institute (ISI), Calcutta, India, started in 1955. The Soviet-made URAL-I computer was also deployed at ISI in 1958. Together with the University of Jadavpur in Calcutta, ISI, Calcutta created the first domestic computer in 1964. In 1964, the Indian National Scientific Documentation Center (INSDOC), now known as the National Institute of Scientific Communication and Information Resources (NISCAIR), was the country's first organisation to use computers for documentation and information work. (Harinarayana, 1995).

Later on, several Indian Libraries, especially those with R&D sections, used computers from the year 1970 onwards. The use of computers in libraries increased slowly in the year 1980. Library Automation gained great traction in the 1990s, propelled by rapidly declining hardware costs, growing library software availability, and increasing library professionals' interest in adopting ICT as well as other factors. (Husain, Shabahat, Ansari, Mehtab & Alam, 2007).

**3. Network:** A network is a system that uses computers, computer terminals, printers, etc. to receive and transmit information, according to the English Language Encyclopedic Unabridged Dictionary of Webster. (Singh, 2007). According to the Oxford Advanced Learner's Current English Dictionary, a variety of computers and other devices link so that tools and information can be shared through a network.' (Hornby, 1968). In other terms, a network is made up of two or more connected computers that can share resources like printers and CDs, for example, or exchange data or carry out electronic communications. A network of computers may be connected by cables, phone lines, radio waves, satellites, or infrared light beams. Networks typically come in three flavours: LAN (Local Area Network), MAN (Metropolitan Area Network), and WAN (Wide Area Network). Global awareness of the networked infrastructure phenomenon is expanding. To access and utilise local and remote library resources, many academic institutions deploy networked infrastructure. (Rao & Choudhury, 2010). An totally new platform for offering users improved information services and resources has been made possible by the swift development of IT, particularly the internet and related technologies. An totally new platform for offering users improved information services and resources has been made possible by the swift development of IT, particularly the internet and related technologies. The World Wide Web (WWW), which was developed as a new medium for storing and distributing information, and the Internet were formed at the same time. This was the true blessing of electronic technologies. Individual e-journal subscriptions and institutional membership in any consortium, such as the INDEST-AICTE Consortium, the UGC-INFONET Consortium, the N-LIST Consortium, etc., are two ways to access electronic services (Arora, 2009).

### 4. Statement of Problem

There have been numerous research done in the past about automating college libraries all around the world. In order to learn about the services offered to college library users with the help of automation, user satisfaction levels, and challenges faced by library professionals in providing automation and network-based college library services, the current work has been undertaken to review the literature previously published. Which library software programmes are used in the aforementioned libraries? What features and activities are automated in the college library? Do libraries offer their patrons network-based library services? Are college libraries given enough funding? Does full administrative support exist for college libraries? I was simply thinking these things at the time. Thus, in order to understand the full picture of Status and Challenges in Automation and Networking in College Libraries, a systematic review need to be done.

## 5. Objectives of the Study

1. To determine the state of automation and networking in college libraries.
2. To examine library users' satisfaction by using automated and network-based services.
3. To gain a deeper knowledge of the automation issues college libraries are now facing.
4. To identify the problems users are facing with computer and network-based services.

## 6. Research Methods

The present study is a systematic review of the related studies carried out in the past. The relevant articles from various sources have been analysed keeping in view the objectives of the study and logical inference has been drawn.

**6.1 Benefits of Study:** Since the present study is a review of related studies carried out in past will be useful to have a conceptual understanding of the concept of automation and networking in college libraries. The study will provide a framework to further carry out an empirical study which will add new knowledge to the existing body of literature.

## 7. Limitations of the study

All individuals who require a fundamental grasp of the evolution of automation in college libraries from the past to the present may find the current study to be helpful. In order to help future researchers and provide them a clear picture of the status and obstacles in automation in college libraries, this study will examine the literature on automation in college libraries. They can continue with early concepts based on quantitative research that have a lot to add and contribute to the automation of college libraries.

## 8. Review of Literature

### 8.1 Introduction

A literature review is an overview of theories surrounding a certain subject or field. It provides a general concept of the kinds of procedures that are suitable and beneficial. Thus, it is not the main analysis but rather the comments on other studies. Reviews of literature might be critical or just remark, like an annotation book or a review of regional literature. The following is a description of book reviews:

"Literature evaluations use it as their website, reporting on fundamental or relevant themes but omitting to mention the most recent scholarship. Methodological. Contrarily, literature reviews aim to explain summaries, explain, justify, and/or add context to important studies." (Cooper, 1988).

Typically, literature reviews will be a component of a thesis or subject that establishes the framework for the chapter in advance. It can also be used as a solid backdrop when describing a research endeavour or making a theory presentation. The study of existing literature on a topic chosen by the researcher, as well as a review of pertinent literature that has previously been documented in any sort of literature, are both parts of a literature review. An innovative planning strategy for the inquiry is recommended by the literature review.

### 8.2 Scope and Arrangement of the Review

A review of the literature of the present study is limited to the following aspects;

Literature published till date

Studies conducted about the present topic both in India and abroad are compared to find out the similarities and differences in Status, Problems, and Prospects of Library Automation and Networking.

The major areas covered in this study are ICT applications, integrated library automation software packages for library automation, academic library automation and human aspects of library automation, the status of ICT infrastructure in libraries, problems, and prospects of library automation.

**8.3** The present review of the literature is divided into the international and national levels.

The effort is made to cover almost all the related literature published at national and international level. However, it is to be kept in mind the only literature which is related to automation in college libraries only.

#### 8.3.1 At International Level:

**Charles R. Hildreth, (1987)** this article describes the emergence of the bibliographic utilities and the services with the high costs and risks of computerization. In 1980 the utilities had dreams of one vast national bibliographic network and a automation-based total library system providing not only cataloging and location facilities but also acquisition, circulation, serials control and inter library loan facilities, too and which pay the way for library automation and networking environment today. **Zhonghong (2009)** employed a methodical approach to present an overview of the academic ILS market and to show the important elements influencing the success of an ILS migration project. It highlights the difficulties and opportunities that academic libraries and ILS providers have in a setting where technology is advancing quickly and academic users are becoming more knowledgeable. **Okoroma (2010)** compared the experiences of the University of Ibadan (UI) library card index and the Obafemi Awolowo University (OAU) library in terms of procedures, approaches, financial/material implications, human ramifications, as well as issues and arrangements, and assessed the suitability and productivity of the OPAC framework. The study also revealed that the RECON process took a long time, required skilled labour, and cost a fair amount of money. The research examined a number of factors that restricted the two libraries RECON, including a lack of resources, a subpar maintenance culture, a lack of qualified employees, and infrastructure problems. Finally, the analysis showed that both the UI and OAU libraries had made significant progress in RECON, and that respective OPAC frameworks were operating properly and efficiently. **Back, Godmar & Annette Bailey (2010)** argued that more libraries should include data from web services to improve their online public presentations; methods to make this integration easier are required. The method for such integration that is presented by their study is based on HTML widgets. They talked about three examples of systems that use this technique: Google Book Classes, Tictoc Lookup, and MAJAX. These solutions are easily adaptable without the need for pricey hosting or programming expertise. **Little (2011)** delivered a piece on mobile devices and smartphones in academic libraries. The author talks about how students are increasingly using mobile devices and how this has changed how information is

produced, shared, and consumed. Academic libraries have thus far been sluggish to adapt to this change, but they are currently working to offer mobile access to their services and resources. He contends that such services will become more in demand, benefiting libraries that offer them. **Swanson & Green (2011)** in order to inform the redesign of the Web site, the Moraine Valley Community College Library used the principles created by Jakob Nielsen in the fall of 2009. Nielsen had undertaken a usability study to find out how students were using the library's website. The authors found that compared to a mock-up site that had a central-search box on the site homepage, Moraine Valley's current gateway design provided a more efficient access point to library resources. This result contrasts with current trends in library Web site design, which place a strong emphasis on "Googlized" searches. **Davis, Adams & Hardesty (2011)** sought to introduce the library readership to the U.S. for-profit colleges and universities. They summarized their institutional histories and their characteristics. They explored reasons for their success and current areas in which these schools appeared to excel. With regard to their library services and resources, they focused on issues of concerns based specifically on our experiences with the academic libraries in the proprietary schools operating in the state of Ohio. Finally, they suggested ways whereby these for-profit institutions can address the challenges faced by their libraries. **Lauren Kosrow & Lisa Hinchliffe, (2015)** This study looks at how librarians have projected that technology (automation and networking) will affect academic libraries' roles in the past and in light of contemporary discussions about collections, competition, discovery, and the future of academic libraries. As discussions about collections, discovery, and the future of academic libraries continue, we intend to provide a fresh viewpoint, informed by the past, to the professional discourse by analysing the vocabulary of earlier conversations through the prism of current dialogues. **Sivankalai, (2020)** In nine colleges that are affiliated with the Institutions of, this article paints a sombre image of library automation and other related services. Higher Education (IHE), Eritrea and advised that the appropriate organisations of college libraries and library professionals must take the first measures toward equipping their libraries with information communication technology. **Rosemary M. Shafack, (2021)** This qualitative study sought to understand the difficulties with automation in Cameroonian academic libraries. The findings indicated that Pour Ma Biblioteque, DSpace, and Koha were used for automation; pre-automation challenges included planning, budget, equipment, staff, and technophobia; post-automation challenges included maintenance, inadequate equipment, inadequate staff training, inadequate budgets, a lack of trained staff, staff technophobia, poor Internet connectivity, and irregular electricity supply. To achieve sustainability and the most possible advantage from the automated systems, academic libraries and their parent institutions should heavily engage in staff and user training. They should also take other energy sources, such as solar energy, into consideration.

**8.3.2 At NATIONAL LEVEL:** Many studies related to Library Automation and Networking taken place in India since last decade of 20<sup>th</sup> century; however, the study in Library Automation and Networking in college libraries commenced in India from first decade of 21<sup>st</sup> century. Following are the studies related to automation and networking in college libraries in India are given as under: -

**Kumar, (2007)** In his Ph.D. thesis, "Status of Medical College Libraries in Karnataka and Maharashtra: A Comparative Study," he emphasised the deteriorating automation and networking condition that is currently present in college libraries in Karnataka and Maharashtra. and academic libraries should take various energy sources like solar energy among others into consideration. **Shivaraj, Mohammed & Kanakaraj, (2008)** There is a strong need to develop a library network, and the authors of "Bridging the Information Divide among Engineering College Libraries in Tamil Nadu, India: A Network Design" explored this need by outlining various library networks that can assist in accessing the resources of other libraries and foster a culture of resource sharing. **Bansode & Periera, (2008)** in their study, they emphasised the current condition of library automation in Goa state's college libraries. The college libraries are found to lack qualified librarians, to have a shortage of ICT-skilled library staff, to have issues with retro-conversion, to have started the automation process in the years 2005–2006, to use the software NEWGENLIB, and to be struggling with more conventional challenges like a lack of funding, a shortage of trained staff, and a shortage of space. **Kemdarne, Khot & Birje, (2012)** the survey results of this article primarily address a variety of aspects of library automation and networking, including library automation, networking facilities, information services, the development of human resources, budget, and the need for hardware and software with the most recent configurations. **Tonk, (2013)** by evaluating the various library software programmes utilised, the study presents an analytical picture of library automation in several colleges within the city of Solapur. The results are tallied, and conclusions are drawn because different colleges utilise different software and have different automated services. However, overall library automation aids staff in enhancing patron happiness and library services. **Pegu & Mohanta, (2014)** It is discovered in their study, "A Comparative Study on Library Automation among the College Libraries of Sivasagar and Dibrugarh District in Assam," that automation is not fully implemented in both districts due to a lack of funding, manpower, experienced library employees, and training. The biggest deterrent to automating library activities is these limitations. **Kamdarne, (2014)** this study focuses on the networking and automation of dentistry college libraries in Karnataka. The study results primarily encompass a variety of topics related to library automation and networking services offered by the dental college libraries in Karnataka, including library automation, networking, software, manpower requirements, and budget expenditures. The issues that arose during this process are noted, and potential fixes are offered. **Das, (2016)** the current study intends to emphasise the concerns and obstacles surrounding library automation, as well as the significance of it. It also provides a brief evaluation of the current state of library automation in a few Assamese college libraries, with a focus on Kamrup District (Rural). **Naveen & Nagesh, (2016)** The authors of the study, "Status and challenges of library automation in Govt. first-grade colleges of Hassan district, Karnataka: a study," stated the present status and barriers in library automation in their study. **Sarma, (2016)** in his paper titled "OPAC Module in Open-Source Library Management Software: A comparative study" comparatively studied Koha, Evergreen, NewGenLib, OpenBiblio, PhpMyBibli and found that among this five software the Koha LMS has more provisions, functional, and futures and modules are very user friendly. **Kumar & Kemparaju, (2017)** They provided an update on the condition of the library automation engineering colleges connected to VTU in Karnataka. The essay covers issues like the availability of LAN capabilities, the degree of automation, and the software utilised in the library. **Sarkar, (2017)** through acquisition, circulation, online public access catalogues, cataloguing, and serial control, the article examines library automation to improve users' satisfaction with library services. **Dattatraya, Kalbande & Chavan, (2018)** agricultural college libraries under the control of MPKV, Rahuri, are the subject of the current study, "Status of Automation in Agricultural College Libraries," which details their current state and any issues they are having with automation. Paper discussed ways to implement library automation modules, such as OPAC, Serial Control, stock checking, budgeting, and others. It also reported on the slow pace of library automation, the under utilization of all software modules, inadequate staffing, a lack of infrastructure, inadequate funding, and a lack of training for library staff. **Gupta & Sharma, (2018)** They reviewed the current situation of automation at Government Degree College libraries in Jammu District in their article, "Status of Automation in

Government Degree College Libraries in Jammu District, J&K." The study also intends to investigate the library's services, total employees, human resource qualifications, technical operations, library software applications, etc. **Maheswarappa and Kumar, (2018)** in their article "Status and Problems of Automation in College Libraries, India: A Review of Literature," they discussed the status and problems of library automation as well as the present condition of these libraries in terms of their facilities, staff, and programme packages they use for their libraries, among other related issues. **Maheswarappa and Kumar, (2018)** the current state of library automation is not satisfactory, and there is a lack of infrastructure development, including the physical facilities, resources, hardware, software, and human resources needed for library automation purposes and the current state of library automation, according to the paper "Degree College Libraries and Their Automation Initiatives in Hyderabad Karnataka Region: An Exploratory Survey." **Rajendran and Kumar, (2018)** they examined how 92 college libraries were digitised and employed various sorts of software in their study titled "Status of automation and networking among the college, libraries affiliated to bharathiar university." Out of 92 libraries, only 2 had RFID technology. Only 25 percent of libraries want to share their resources through networking, and only 40.2% of libraries have web-based 19 public access catalogue facilities. **Zaveri and Salve, (2018)** in the current study, "Status of Library Automation Software Utilize in Mumbai College Libraries," it is discussed how often college libraries in Mumbai use library automation software. The majority of libraries are automated, according to the findings. Some of the issues with the use and procurement of the software were the lack of skilled personnel and the financial crisis. **Jayaram, (2019)** in the research paper titled "A study on library automation status among the aided college libraries in Bengaluru," the study primarily focuses on the availability, applicability, and issues encountered during the process of implementation and utilisation of Library automation software, as well as on the lack of sufficient staff, infrastructure, funding, and training for library staff. **Kumar, (2019)** since Kerala state has the infrastructure needed to create a resource sharing network for academic libraries, the author strongly supported resource sharing in Kerala. The Government of Kerala must create a resource sharing network by utilising the state's current IT infrastructure to support decentralised library automation initiatives in Government and Government Aided Colleges throughout the state of Kerala. To reach agreement and launch the networking activities for libraries, there is a need for coordination between government agencies and academic institutions. **Kuri and Om, (2019)** the study in the paper "A study on library automation status among the aided college libraries in Bengaluru" mainly focuses on the availability, applicability, and issues encountered during the process of implementing and utilising Library automation software, as well as on the lack of adequate staff, infrastructure, funding, and training for library staff. **Takkapa and Ready, (2019)** the majority of Polytechnic libraries are prepared to automate their libraries, according to the authors of the report "Present Status of Library Automation in Polytechnic Colleges in Karnataka State: a Survey." The majority of libraries confront challenges like limited funding, a lack of trained staff, and inadequate facilities. **Gaffar and Pati, (2020)** an implementation of the Koha-Automation Software from the Prof. Bhubaneswar Behera Central Library is the goal of this study. The author suggested Koha software for all types of libraries and argued that users should be satisfied with quick information access and retrieval, online searches for e-resources, OPAC searches, client registration, charging and discharging of resources, among other things, that were done with ease in academic college libraries. **Pathumaragam and Maskoora, (2020)** In order to effectively enable the features of cataloguing, OPAC, circulation control, stock verification, and e-gate register, this study illustrates the state of automation services using AutoLib Library Management Software in the library of Sadakathullah Appa College. **Mozumder, Khanom, Barooh and Hussain, (2020)** the purpose of this article is to assess the state of various library services offered by various undergraduate institutions (U. G). College libraries in Barak Valley, Southern Assam, have demonstrated that Assam's college libraries are not fully automated due to a shortage of library space, an inefficient IT infrastructure, and a staff that is both understaffed and unqualified. **Babuprasad, (2022)** assessed the effects and current situation of library automation services in government-run first-year college libraries in the Koolar district.

## 9. Gap identified after literature review

The area that has not yet been adequately studied, or the **gap**, is also referred to as the missing piece(s) in the study literature. Population or sample (size, type, location, etc.), research methodology, data collecting and/or analysis, or other study factors or conditions could all fall under this category. Following an extensive assessment of the literature, the following gaps have been found: Almost all the studies done on Library Automation and Networking are oriented toward university, college, Public and Special libraries. From the literature review it is found that the most of studies are done in southern part of India. The college library of almost all state can be included in the study. The studies can also be covered Govt. Degree colleges affiliated to state universities. There is a smaller number of studies where professional and non-professional Govt. college libraries are covered on the said topic.

## 10 Suggestions

- In order to offer readers better and more effective services in the future, it will be necessary to computerise all of the existing libraries.
- Technical staff positions that are vacant must be replaced, and further positions must be created as needed.
- Computerized systems are not static, but rather dynamic. Therefore, it is crucial to choose hardware and software that is sufficiently versatile to fulfil both the present and future needs while planning for computerization. The hardware must be able to support the system's growth for at least three to five years. Additionally, the programme must be adaptable enough to allow for system expansions and/or modifications as necessary (Johnson, 1989).
- Before choosing software for their library, librarians should survey various automated libraries to compare experiences.
- The capacity to satisfy specific library needs should be carefully addressed while choosing the library software.
- Before choosing library software, the librarian should assess each module by requesting a demo of the programme.
- Vendors should be carefully considered before being chosen, and they should be required to sign a contract outlining the regular service and maintenance of the software they sell.
- The usage of information technology by librarians has to be trained and updated. For all librarians who will live and work in the 21st century, information literacy is equally crucial.
- All library staff members should receive computer training, which should be made mandatory. The workers will practise and integrate more thanks to this training program's format. Additionally, it will provide them time to handle daily tasks.
- B.L.I.SC. and M.L.I.SC. Must offer LIS programmes with an IT focus.

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