EVALUATING RESOURCES, AWARENESS AND SERVICE QUALITY IN AGRICULTURAL UNIVERSITY LIBRARIES OF PUNJAB, HARYANA AND HIMACHAL PRADESH IN DIGITAL ENVIRONMENT

Thesis Submitted For the Award of the Degree of

DOCTOR OF PHILOSOPHY

in

LIBRARY AND INFORMATION SCIENCES

By

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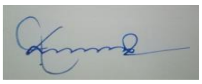
2024

CERTIFICATE

It is certified that the thesis entitled **" Evaluating Resources, Awareness and Service Quality in Agricultural University Libraries of Punjab, Haryana and Himachal Pradesh in Digital Environment"** submitted by Mr. Sanjeev Kumar for the fulfilment of requirement for the award of degree of Doctor of philosophy in Library Science and submitted to Lovely Professional University, Phagwara is an authentic work done under my supervision.

The matter embodied in this thesis has not been submitted for the award of any other degree of this or any other University/ Institute.



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CANDIDATE'S DECLARATION

I hereby certify that the work presented in the thesis entitled **" Evaluating Resources, Awareness and Service Quality in Agricultural University Libraries of Punjab, Haryana and Himachal Pradesh in Digital Environment"** in fulfillment of the requirements for the award of the Doctor of Philosophy in Library Science and submitted in Lovely Professional University, Phagwara is an authentic record of my own work carried under the supervision of Dr. Jatinder Kumar.

The matter embodied in this thesis has not been submitted by me for the award of any other degree of this or any other University/ Institute.

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This is to verify that the above statement made by the candidate is correct to the best of our knowledge.

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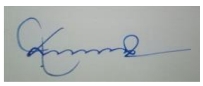

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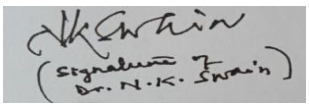

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ABSTRACT

Prosperity of any nation depends upon the generation of new knowledge and information. The strength of any research system largely depends upon its ability to create, organize as well as use of information. Special libraries such as agricultural libraries are playing major role by supporting research and development activity of an instiution. It has been observed that there is much diversity in the forms and format of agricultural information content, technology, audiences and services.Scientists, researchers and teachers of agriculture sector play significant role in nation's development soit becomes important to assess the quality of agricultural library by measuring the satisfaction level of their users in this changing environment. Therefore the present study **"Evaluating resources, awareness and service quality in agricultural university libraries of Punjab, Haryana and Himachal Pradesh in digital environment"** has been undertaken to assess agricultural university libraries for ensuring their flourishing success and advancement as a knowledge-based institution.The present study has evaluated resources, awareness level of the users with regard to various services of the library and its quality from the users point of view. The study has been attempted to know user's perception towards various library services of the selected agricultural university libraries. Further it has tried to assess the satisfaction and awareness level of the users of agricultural university libraries of Punjab, Haryana & Himachal Pradesh.The study has helped in discovering the strengths and weakness of each library.

Scope of the study: The present study is restricted to State Agricultural Universities (SAU's) of Punjab, Haryana and Himachal Pradesh. The universities selected for the study are:

1. Punjab Agricultural University (PAU), Ludhiana.
2. Chaudhary Charan Singh Haryana Agricultural University (HAU), Hissar.
3. Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishva Vidyalaya **(**HPKV**),** Palampur.

Objectives of the study: The study aims to achieve following objectives

1. To evaluate the resources and services available in different agricultural university libraries.
2. To study the role and impact of knowledge of staff on quality services.
3. To evaluate the relationship of information communication technology with service quality of agricultural university libraries.
4. To define and identify service quality of agricultural university libraries from user's perspective.
5. To study the user's awareness and satisfaction regarding services provided by the agricultural university libraries.

Major findings of the study:

- It has been observed that all the libraries have adequate infrastructural facilities with good collection of print as well as digital resources**.**
- The analysis of the library resources reveals that major part of library print collection comprised of books, theses, bound journals and other reference collection in all the libraries under study.
- It has been found in the analysis that in addition to print resources libraries also subscribed to variety of e-resources such as electronic books (e-books), electronic journals (e-journal), CDs/DVDs and online electronic databases etc.
- The analysis represents that due to finanacial consraints there is overall decrease in the subscription of online resources like databases and electronic journals over the years.
- It is found that in terms of richeness of library resources, HAU library has added highest number of print as well as electronic resources during the previous years among all agricultural libraries.
- It has been observed that users of all the selected agricultural libraries involve their users in building the library collection.
- As per the analysis of available human resources it is found that there is shortage of professional staff in all the agricultural libraries.
- It is observed that available staff is professionally qualified and skilled. They keep themselves updated by attending workshops and trainings programs.

- All the university libraries are working in a hybrid mode as per analysis and are providing library services such as automated Lending, Reference, Indexing & Abstracting services, Reprographic services, Current awareness services, User education etc.
- It has been observed that all the agricultural libraries provide web-based services through 'Library webpage'.
- The data analysis revealed that none of libraries is using web 2.0 tools like library blogs, wikis etc. for marketing of their resources and services.
- It is found that all the libraries have automated its cataloguing and circulation operations whereas serial control and acquisition activities are partially automated.
- It has been observed that none of the library is using instant messaging service, FAQ or Ask a Librarian link service in answering the reference queries of the users.
- All the librarians have positive perception towards ICT applications in library service improvement.
- Analysis shows that users also have positive pereption towards ICT based library services.
- It has been found that majority of the users of are well aware of resources and services of their libraries.
- Computer devices such as laptop, desktops and mobiles are found to be used by the users of agricultural libraries for accessing the information.
- Most of the users of all the libraries found literacy programs to be informative and useful.
- It is found that all the users are satisfied with the infrastructural facilities of the libraries.
- Regarding print resource adequacy it was found to be 'Good' for all the libraries.
- Staff of HAU library found to be more competent as compared to PAU and HPKV library.

- Users of HAU were found to be more satisified with services rendered by the staff of HAU library as compared to other two libraries.
- All the libraries are involved in the user education activities. Students of PAU library were found to be more satisfied with user education programs as compared to HAU and HPKV library.
- In the analysis it is found that WEBOPAC services to be 'Good' for all libraries.The overall mean value for satisfaction towards all the items under WEBOPAC services was found to be more for PAU followed by HAU and HPKV library.
- Users' satisfaction data revealed that overall service with regard to use of library website found to be 'Very Good' for all the agricultural libraries under study.

No significant difference was observed in the satisfaction level among the users of all agricultural libraries towards print collection of the library in terms of adequacy, currency and updatedness. Overall study found significant difference for level of awareness about various library services among the users of agricultural libraries. Users of HAU library were found to be more aware as compared to PAU and HPKV library. Further in terms of staff competence users of HAU library were found to be more satisfied as compared to PAU and HPKV library. Satisfaction with regard to user awareness and education activities PAU library users were found to more as compared to HAU and HPKV library. Staffs as well as the users of all agricultural libraries were found to have positive perception towards information communication technology based services of the library. Therefore all the library staff should embrace the change positively for better service provisions. Library web based services were found to be very good for the agricultural libraries. As the user education and awareness plays an important role in effective utilization of resources so library staff of all the libraries should organize more education and training programs for better utilization of resources.Overall library website service quality was found to be 'very good' for all the agricultural libraries.

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way, she could help me in managing my personal and professional life. I would fail in my duty if I not mention the name of my daughters Srishti and Divyanshi whose love and motivation kept me high all the time of my project. The moral support given by family was the greatest pillar of strength for me during entire journey of this work.

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LIST OF ABBREVIATIONS USED

UNESCO	United Nation Educational Scientific and Cultural Organization
UGC	University Grants Commission
AIU	Association of Indian Universities
AICTE	All India Council of Technical Education
CSIR	Council of Scientific and Industrial Research
ICAR	Indian Council of Agricultural Research
MHRD	Ministry of Human Resource Development
GOI	Government of India
NAAC	National Assessment and Accreditation Council
NKC	National Knowledge Commission
SCONUL	Society of College, National and University Libraries
IFLA	International Federation of Library Associations and Institutions
ICT	Information Communication Technology
CD/DVD	Compact Disk/Digital Versatile Disk
WEBOPAC	Web Online Public Access Catalogue
FAQ	Frequently Asked Questions
SMART	Specific, Measureable, Achievable, Relevant, Time phased
ACRL	Association of College and Research Libraries
PAU	Punjab Agricultural University
HAU	Haryana Agricultural University
HPKV	Himachal Pradesh Krishi Vishavidyalaya
CeRA	Consortium for e-Resources in Agriculture
SERVPERF	Service Performance scale
NOPR	NISCAIR Online periodical Repository
IASLIC	Indian Association of Special Libraries and Information centres
ILA	Indian Library Association
DARE	Department of Agricultural Research and Education
URL	Uniform Resource Locator
SERVQUAL	Service Quality scale
SPSS	Software Package for Social Sciences
ANOVA	Analysis of Variance
APA	American Psychological Association
UAE	United Arab Emirates
EARS	Electronic Access to Reference Service
SSTs	Self Service Technologies
CAS	Current Awareness Service

SDI	Selective Dissemination of Information
RSS	Really Simple Syndication/Rich site summary
BBAU	Babasahib Bhimrao Ambedkar University
CSR	Customer service relationship
NCR	National Capital Region
e-SQ	Electronic Service Quality
ARL	Association of Research Libraries
NASSDOC	National Social Science Documentation Centre
FAO	Food and Agriculture Organization
CABI	Centre for Agriculture and Bioscience International
SAUs	State Agricultural Universities
AICRP	All India Coordinated Research Project
NARP	National Agriculture Research Project
NATP	National Agriculture Technology Project
CAUs	Central Agricultural Universities
DUs	Deemed Universities
NAIP	National Agriculture Innovation Project
UFLS	User Focused Library System
LSQA	Library Service Quality Assessment
ETAM	Electronic Technology Acceptance Model
BYOD	Bring Your Own Device

LIST OF PUBLICATIONS

S.NO.	TITLE OF THE PAPER WITH AUTHOR NAMES	NAME OF THE JOURNAL/ CONFERENCE	PUBLISHED DATE	ISSN NO/VOL. NO. ISSUE NO.
1	Awareness and Information Seeking Behavior of Undergraduate Students of University in Digital Environment-A Systematic Review by Sanjeev Kumar, Dr. Jatinder Kumar	Library Philosophy and Practice	02-05-2021	ISSN 1522-0222 https://digitalcommons.unl.edu/libphilprac/5601/
2	User satisfaction towards library website usability : a study by Sanjeev Kumar, Dr. Jatinder Kumar	IPE Journal of Management	January-June,2024	14(1) 2249-9040, 7.138
3	Institutional repositories and their role in knowledge management: a study of PAU repository	Journal of Agricultural Extension Management	(July-Dec) 2022	
4	Role of library consortia in strengthening agricultural education; a study of CeRA By Sanjeev Kumar, Dr. Shiv Singh and Navdeep Kaur	SUSTAINABLE AGRICULTURE, FOOD & NUTRITIONAL SECURITY (SAFNS) Organized by LPU, Phagwara	17/02/2018	
5	Resource Sharing in Digital Environment: a study of document delivery request at Punjab Agricultural University. By Sanjeev Kumar and Aarti Sharma	International Conference on Digital Transformation: A Cognitive learning towards Artificial Intelligence" (ICDT 2019) organized by Rajiv Gandhi National University of Law, Punjab	08/09/2019	

LIST OF CONFERENCES/WEBINARS

Sr. No.	Date	Title	Organizer
1	Feb16-17, 2018	Conference on Sustainable Agriculture, Food and Nutritional Security(SAFNS)	Lovely Professional University, Phagwara
2	April 19-20, 2019	Workshop on Data analysis using SPSS	HRDC, Lovely Professional University, Phagwara
3	Oct 18, 2019	Knowledge Feast 2019-Future trends in knowledge services	EBSCO International services
4.	Sept 06-08, 2019	International conference on digital transformation: a cognitive learning towards artificial intelligence	Rajiv Gandhi National University of Law, Punjab
5	Oct, 4-5, 2021	International conference on marketing of information products and services	Shri Binzani college , Nagpur and Aggarwal college Ballabgarh
6	Nov 24-25, 2021	Online conference on Recent Advances in Information Technology (READIT-2021)	IGCAR, Kalpakkam
7	Nov 8-13, 2021	Information sources and learning in digital age: Challenges and Prospects	Guru Jambeshwar Univ of Science & Technology, Hisar
8	Feb 16-17, 2022	Online conference on knowledge management for agricultural librarians and information professionals	National Institute of Agricultural Extension Management (MANAGE)

Chapter 1

INTRODUCTION

1.0 Introduction

Education is crucial for the betterment of humanity as well as in the development of modern civilization. It is considered to be the most essential pillar that holds whole nation together and lead towards ultimate success. It is at the heart of both personal and community development. Its main aim is to enable each one of us to develop our talents to the fullest and to realize our creative potentiality including responsibility for our own lives and achievement of our aims. So education is the fundamental for overall growth as well as development of any nation. **Jim Trelease** (n.d.) emphasized on the importance of education by saying that "A nation that does not read does not know much; more likely to make poor choices in the home, the marketplace, the jury box, and the voting booth which ultimately affect the entire nation, the literate and illiterate." Only those nations lead, which read. The powerful human mind can make all the possible developments from health care advances and agricultural innovations to efficient public administration and private sector growth. For any country to reap these benefits fully there is a need to unleash the potential of the human mind for which education is the best tool. In this contemporary world of a knowledge-based economy, the level of education has become important factor in improving the comprehensive national strength. Higher educational institutions are charged with the function of knowledge creation, processing and dissemination is a link between workforce training and economic development. To some extent, the innovation ability of a country is determined by the development level of higher education, which further affects the economic growth and development of a country. So quality in higher education is essential for capacity building which is necessary for social and economic growth as well as for environmental sustainability. **UNESCO (2017)** laying emphasis on the importance of institute of higher education said that their main role is to produce knowledge and capacity building for socio-economic development and eradication of poverty.

1.1 Higher Education System and Knowledge management

Knowledge combines information with individuals; group or organization which helps in understanding patterns that can guide future actions. Knowledge management is systematic and organized way to manipulate and take advantage of knowledge whether tacit or explicit which in turn leads to creation of new knowledge **(Serban & Luan, 2002)**. American Productivity and Quality Center signifies Knowledge management is the systematic process to identify, capture and transfer information and knowledge which the people can use for creativity, competence and improvement. Creation of new knowledge is at the core of knowledge management framework. All organizations particularly the higher educational institutions play a key role in knowledge creation through scientific discoveries and discussions however it can be lost or not used properly if not captured and preserved in right way. India has made remarkable growth in higher education sector during the last two decades. Due to fast growing technological interventions it has been possible to provide low cost access to high quality education at all levels. **Hasan and Pandey (2019)** pointed out that higher education system of India to be one of the largest education systems in the world after US and China**.** There were about 20 universities and 500 colleges at the time of independence and presently the number of universities has swelled to 1057 **(ugc.ac.in).** Every academic institution contributes towards knowledge growth so it is essential to organize growing knowledge properly and preserve it for future use. As new knowledge builds on existing knowledge and past events, so it is essential to preserve the growing knowledge for posterity and access. Knowledge management is considered to be new emerging field in the academic environment in the recent past which has great significance for education sector. Institutions of higher learning are considered to be the knowledge houses where knowledge flows through different channels result in creation of new knowledge available in different forms and sources like book, journals, theses, dissertations, case studies, technical reports, patents etc. It is observed that knowledge generated is not stored and captured properly and many a times not known to everyone. Information being the invaluable resource for mankind played a key role in human civilization and societal development. It is regarded as national resource just like energy, coal, water etc. which has become vital for nation's

development.So the ultimate aim of any nation is swift social and economic development (**Gelfand, 1971).** To achieve success in any field information is now treated both as economic commodity and prime mover of the society in 21st Century (**Dabas, 2008)**. Growth and development of any country depends progressively on information and its exploitation (**Chemarthi, Reddy & Babu, 2016)** which in turn rely upon how efficiently its information resources are managed .Thus knowledge is a vital source for value creation in organization and needs to be managed properly.

Libraries are considered to be the carriers of human civilization, protect culture and history for the coming generations. Information is considered to be the strongest weapon which library is expected to hold for its users and the library staff to assemble it in a way for easy and fast access. Since libraries procure useful and relevant information resources for their users thus playing an important role in education system. In this context library being the center of information dissemination plays a key role in managing information in the right format. **Saufi et al (2012)** emphasized on the importance of libraries as "Knowledge preservation centres where nothing is lost; organize knowledge so that nothing is wasted, and make availble knowledge so that no one should be deprived of it". Libraries can become a potential force in social and cultural life of the community if serviced by trained and efficient staff**.** The main aim of any library is to satisfy the information requirements of users by providing pleasing ambience and relevant services to their users. The main activities of modern libraries are to support and progress of higher education system through activities like collection development print as well as digital resources, research assistance, reference services, information retrieval, user education programs, library networking and resource sharing etc.**Parmar and Pateria (2019)** identified the role of libraries in higher education as lead centre in bringing institutional effectiveness; place for users in achieving self-sufficiency; learning laboratory for users and as an educator for the users by providing self-learning material as well as other searching tools.

1.2 Quality education and libraries: Quality education is not possible without effective library support to teaching, learning and research programs of an institution. Dr. S R Ranganathan while participating in UGC agenda in 1957 regarding role of libraries in academic development observed libraries as heart of education and is

essential for free access to the ideas. He further stressed that quality education is impossible without quality libraries. Various organizations like UGC, AIU, AICTE, CSIR ICSSR, ICAR, MHRD, GOI, NAAC, NKC etc. were formed for the improvement of higher education.They provided important guidelines for the improvement of academic libraries and considered learning resources as one of the important parameter while assessing the quality of higher education. Libraries are considered to be the life-long learning centres where knowledge is preserved and disseminated. A library with rich variety of collections is considered to be foundation stone of modern educational set up and no education is perfect and complete in its absence. The learning which takes place in classrooms or laboratories is enriched by variety of reading material available in the library. **Popescu (2017)** observed that in order to enhance the quality of scientific research, innovation and teaching process library must pursue the analysis of users' requests, enrich its collection with wide variety of information resources and provide on-demand support to researcher in scientific data management. Further librarians must continuously upgrade their skills needed for managing, presenting, archiving and promoting informational resources. So, institutions with well-planned and functional library can become intellectual hub both for students and teaching community. The quality of teaching learning process depends on learning resources of academic library and library staff being alert in knowledge dissemination. In context of higher education, quality is a multidimensional concept. The status and functioning of academic library has an impact on accreditation process of higher educational institute. It is considered to be one of the important areas during the assessment process of an institution. To meet the demands and to fulfil the objectives of higher education library must be dynamic or up-to-date with collection or content. So, library is not just repository or a place for study or service like others but can also be partner in research & teaching. The quality and depth of resources is also more important as it is also a determinant of quality of research a university academic can produce. Institutions which fail to capitalize on this asset will find it harder to compete in future **(SCONUL, 2017). Bavakutty and Majeed (2005)** enunciated that library is charged with function of providing relevant

information to the users so it is imperative to evaluate its resources and services in view of changing environment.

1.3 Libraries as Information resource centre

Library plays an important role in educational, social, cultural as well as industrial development of any nation. The library with sufficient resources providing easy access is an asset to the institution. It is considered to be knowledge repository and social dynamic institution which is meant for providing reliable information and is central in the educational process **(Jackson et al, 2005). Kuh and Goneya (2003)** pointing towards the importance of libraires emphasized that "Libraries can be thought of as the physical manifestation of the activities of an academic life and its central role for academic community can't be questioned." Since knowledge is created and communicated through teaching and research so the role of library can't be neglected as the teaching as well as research activities of any academic institution is largely supported by the library. Without library achievements in teaching and research are not possible for any institution **(Ranganathan, 2012).** In the libraries of higher educationl institutions especially universities strategic knowledge management activities are not limited to manage books or periodicals only but also to create knowledge by repackaging the information in this era of digital connectivity. Internet especially the 'World Wide Web' with the powerful hardware, software and networking technologies has made possible to deliver the information easily overcoming hinderance of place and time. Libraries have now evolved into network structures for optimum utilization of their resources, services and facilities. Apart from access to library subscribed resources large numbers of other resources are now freely available in open domain. Interactive features are forming part of online platform to attract the readers. All these developments have posed a challenge before the library managers to provide access to wider variety of information in easy way which necessitated leveraging the library staff and users with knowledge along with rapidly evolving technology **(Islam, Agarwal & Ikeda 2015).** Use of various ICT tools and products has brought lot of positive change in the libraries. **Ramana (2004)** in view of technological developments also clearly stated that the proper exploitation of new technologies in library is a matter of survival rather than no longer a matter of

choice in this era of rapidly changing technologyand global knowledge society. Today, there is transition in library services from localized traditional collections to globalized resources which can be avaible in anticipation or on demand through most advanced networking technologies. It has now become possible to get up-to-date information independent of time zone and geographical location without actually visiting the library. With access to mobile search library users today have more choices to avail services than ever before. Modern academic libraries are now in a position that they can serve the users at their doorstep and quick delivery of information has become feasible through technology. In short knowledge management activity of library involves series of process which helps in knowledge transformation and dissemination irrespective of format as per demands of the users. It has become very essential to clarify the knowledge elements relevant for future, comparing it with current and restructuring on the basis of results. **Jantz (2012)** stressed upon need to redesign the role of libraries of an academic institutions in this changing environment by leveraging strengths and reform their services. **Li (2006)** also opined that today's libraries should innovate in creating responsive and convenient services. It can be depicted in figure 1.3 as under

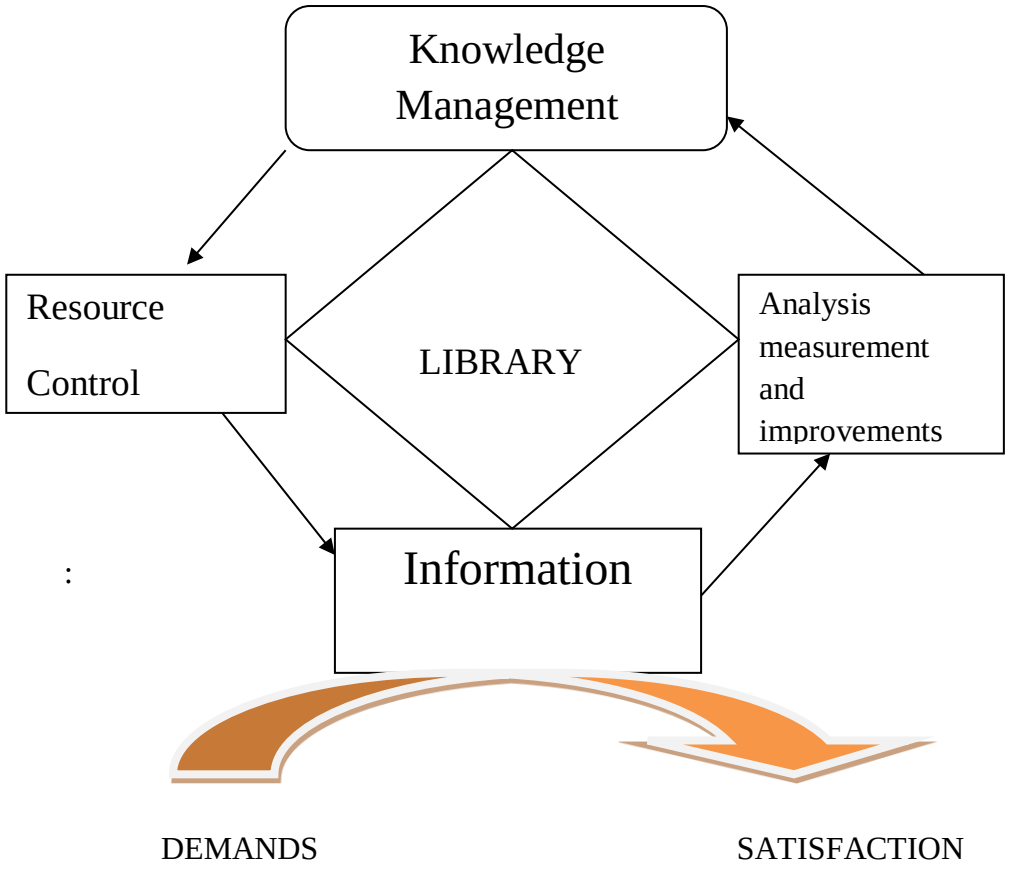

Figure 1.3: Knowledge management in libraries

1.4 University Libraries: The Knowledge Hub

Universities are expected to produce specialists who guide the country towards its attainment and library considered to be knowledge as well as dissemination centre plays a major role in it. Library being at the core of university occupies primary place as it serves all the functions of a university which is the creation of new knowledge and transmission to posterity of the learning **(Norman, 1980)**. University library which is considered to be the heart of any academic institution primarily support teaching, research and other extension activities of its parent institution through the availability of requisite information to its patrons. It is a collection of resources, services and the building which provides access to support the intellectual activities of an institution. It has been acknowledged as the gateway of knowledge. Recognizing the value of university libraries Dr.Shankar Dayal Sharma, the late president of India once remarked in the year 1988 that "A library is more important than university

because university can't function without library whereas library can exist without university".

University libraries which are considered to be the nerve centers of academic institutions particularly universities must reinforce teaching, research, and other academic activities **(Mahajan, 2005)**. They should have contact with the research community at regular intervals in order to know what their real demands from the library. The contact may be personal visits, enquiry support or virtual presence in online environment which help in understanding all variations in learning & research practice thus play an important role in the teaching, research, and other academic activities that universities undertake **(Gurikar & Gurikar, 2015).** University libraries can retain their importance in providing content-based value-added services and can become electronic learning centers **(IshwaraBhat & Sangam, 2003)**.Due to ongoing developments in information and communication technologies (ICTs) competition is mounting in higher education sector as well. It has greatly influenced the functioning and performance of the universities for varied jobs **(Owusu-Ansah, 2001).** As a result, the knowledge-based institutions predominantly the universities are undergoing transformation in order to stay current and competitive in every area of operations **(Malhan, 2006)**. Even though the key mission of the university which is generation, preservation, integration, dissemination, and application of knowledge is not transforming, yet the meticulous comprehension of each of these roles is transforming radically. In view of the fact, every facet of the university in general and particularly library and information services are also undergoing transformation **(Malhan, 2006)**. Therefore, university libraries nowadays have become multifaceted institutions with many roles and a host of varied services developed over the years**. Campbell (2006)** pointed out that libraries not only have the responsibility of assisting in information search and making available the documents but also provide quick access to trustworthy and authoritative knowledge. This has led to the development of era of electronic and digital libraries. To maintain digital collection and to provide access, digital libraries have become important part of information society.

The concept of library has also been changed over the years. Hybrid library concept has been evolved which is portraying the society by promotoing technological as well

as easy accessible spaces for the development of communities. Due to proliferation of wide variety of information the new emerging role of library professionals has been also been recoganized in information handling and its management which calls for diversified skills and training. Overall the library systems are evolving on globalization and cooperation among institutions for economic and social development. In other words it is the amalgamation of converntional and information communication technologies. **Silva and Caldas (2023)** have identified various hybrid elements of library, their relationships and impact on society which are (i) Technology convergence: impact on economic development; (ii) Understanding information needs of community and its impact on society; (iii) Trainng and its impact on human development; (iv) Librarians as institutional leaders; (v) User interactivity and impact on cultural development; (vi) Easy information access and its impact on society; (vii) Promotion of information literacy and its impact on cultural development; (viii) Public/Private partnership and its impact on economic and social development. In today's world electronic/digital libraries become the most important of knowledge management while at the same time it also can't move away from it's traditional functions connected with knowledge accumulation and storage **(Baryshev, 2021).** In other words it is a social system oriented towards performing traditional as well as non-conventional functions using the new emerging technologies. So today's library status is no longer defined by its collection but it is extended to include seamless access to electronic reosurces.

1.4.1 Digital library: It is the managed collection of information objects which is stored in digital format and is accessible over the network **(Arms, 2005). IFLA/UNESCO (2011)** digital library manifesto adopted in 2011 characterizes digital library as "the existence of online collection of digitized objects, through the application of new technologies, creation of a digital information network and collaborative participation allowing interoperability, while digitallibraries are complementary to digital archives initiatives".

ICTs have enabled the user to access information globally, instantly thus overcome the barrier of place and time. In today's environment various online discovery tools have made possible for the researchers to even search for hidden documents which

might had never been indexed in printed tools before. Researchers nowadays want to locate and extract required information with less attention to the source from where that information is coming. E-resources support enhances research and education by providing timely access to information resources in affordable manner **(Vakkari, 2008).** Digital information resources can be born digital or digitized resources. It means can be created digitally, stored and accessible in digital environment. Most of the periodical/journals are nowadays publishing in digital form. The available printed information can also be converted into digital format which can be in the form of institutional repositories, institute publications, e-newsletter etc. with the help of technological interventions like use of suitable software and hardware.

1.4.1.1 Digital information resources: are the organized sets of digital material along with metadata that describe them and provide interface for access. These resources may be created for local, nationals or international use through use of networks. Digital resources can be databases which can be local and remote, CD/DVD databases, E-books, E-journals, E-books, E-newspaper, E-Theses and Dissertations, E-standards, E-newsletters etc.

Database is a file of updated digital information consisting of bibliographic records, abstracts or full text documents etc. It can be accessible in CD/DVD form or online over the internet.

E-book- The book published in electronic format which can be read by computer or e-book reader accessed by multiple users.

E-journals are the journals accessible in electronic form over the internet. Single or multiple user access can be there.

E-Theses and Dissertations: Theses and dissertations are important source of knowledge and information which are now accessible in digital form in the form of digital repositories.

E-Standards: The digital form of print standards available over the internet.

E-Newsletter: It is the online publication of an organization accessible over the internet. It is useful to get information about various activities and achievements of an organization.

Web Resources: Various web resources provide access to scholarly information. Abstract as well as full text articles and link to publisher's site can be accessed over the internet using search engines. Further reference material like encyclopedias, dictionaries, handbooks etc. are available in digital form.

Subject specific portals: These are the information rich sites developed by experts having deep knowledge and interest in particular subject.

Institutional Repositories: Institutional print resources can be digitized which can be accessible over internet. It is platform available to share institutional output.

1.4.1.2 Digital information services: Libraries nowdays are in a position to serve the users with services at their doorsteps. They are providing digital information services through computers and networked information resources. These are the services which are provided to the users over intranet or internet. The modern digital information services include OPAC/WEBOPAC, E-Database service, Electronic table of content services, Current awareness service, E-reference service, Document delivery in electronic form, Virtual instruction tool, Newspaper clipping services; Ask a librarian/FAQ, Library portal, Blogs etc.

OPAC/WEBOPAC: It is a bibliographic record of library documents accessible online over intranet or internet which helps to know the availability/nonavailabiltiy and location of document.

E-Database service: It is an organized collection pertaining to specific subject/multidisciplinary subject accessible electronically. It can be indexing, abstracting or full text database. It helps the user to get details of published literature.

Electronic table of content service: Contents of the latest journals can be provided to the user electronically which can help the researchers to keep themselves updated in their area of research.

Current Awareness Service: This service alert the user about latest literature published in the relevant subject area. List of latest acquired books, contents of the journal are some form of current awareness services provided in anticipation or on demand.

Digital Reference Service: Referring the user to required resources for finding specific information using digital media.

Document Delivery Service: Information and communication technology has helped to send the required information electronically. Under this service if sometime article/information if not available in one library can be arranged from the other library. It is the online transfer of required article to the user through email.

Library portals: It is the webpage of the library which provides detailed information about collection, available resources, services and facilities available in the library. It also provides insight to the user as how to make use of resources and services.

Institutional repositories: All the institutional output of an institution can be accessed for use through creation of institutional repositories which can host any kind of content.Digital information services provide user friendly interface and links to internal as well as external objects. Library managers need to be proactive to anticipate as well as respond to the ever-increasing demands of the researchers. They have to ensure that they are providing range of resources to meet different needs and also to understand the user's behavior in using different resources**.** Digital library improves services as the information stored in computer can be accessed easily through the network **(Sonekar & Mahawar, 2007). Manda (2005)** on the other hand found that though digital information resources provide easy access to information with in no time but there are some problems that hinder the usage of digital information resources among the users due to lack of skill to find the information; awareness about library resource; lack of interest; time and commitment to use the digital resources**.**

1.5 User education/ Literacy programs: Users require skills and knowledge to exploit the resources of the library to the fullest which ultimately depend on effective user education. These skills and knowledge are provided by well-planned user education programs of the institution **(Onuoha, 2017)**. Use of library and information services has direct linkage with awareness of users about those services which in turn rely on promotional strategies of the library (**Namugera, 2014).** Helping the user in finding suitable resource in digitally chaotic world is the first priority **(Lombardi, 2000). Ming (2000)** rightly pointed out that library with richest online resources will not be beneficial unless the user know what resources are available and how to extract the required information from it.User education programs enable user to get any

information he/she desires as well as help in developing skills to use the resources, services and facilities of the library independently **(Aina, 2004**). In this regard it is pertinent to mention that university libraries can act as a potential functional unit of knowledge management only through the well-knit association of the trio i.e., collection, services and staff. So, library as such is not a single entity rather it is the combination of various facets or in more comprehensive terms *"*library is a natural combination of people (users and staff), collections, services and buildings, whose rationale is to assist users in the process of transforming information into knowledge and applying it in their specific situations*"* **(Kavulya, 2004)**. Today library managers view technology as change agent and try to elevate customer expectations with limited resources, create sustainability and add value to the lives of stakeholders. **Franklin (2012)** sensing the technological developments is of the view that most libraries are undergoing transition and it is hoped moving from "Surviving to Thriving". We can grow and thrive in the dynamic environment with right approach **(Dewy**,**2012)**. In the above perspective, it becomes evident that a university library exists to provide their users with access to required knowledge and information in an organized manner. In order to accomplish the same, quality in collection development and library services have to be maintained and enhanced progressively **(Parameswaran, 1999). Bavakutty and Majid (2005)** emphasized that the focus of libraries has now been shifted more towards users' satisfaction and quality. However, for preserving and advancing libraries there is a need to assess and evaluate them systematically.

1.6 Service quality: Service is the experience or treatment offered by one party to the other. It is intangible and doesn't result in any kind of ownership. Quality of service is critical for survival and profitability of an organization where consumer is the sole judge. It is a system consisting of set of interactions between customers, staff, physical resources and environment which results in providing solution to the customers. Service quality encompasses process quality, product quality, Physical quality, Interaction quality and Organization quality. Quality means degree of goodness as per specifications and standards. **Robert and Rowley (2004)** observed that quality management process involves activities and measures that contribute to

the quality of the products, service or other outputs from the organization. It operates at different levels of the institution with aim to enhance quality and providing accountability.

In 21st Century there is paradigm shift in quality concept from" measuring what you can count to measuring what counts" **(De Jager, 2005).** Initially the concept of quality was related only with goods or products. With the increased awareness of consumer about quality and the journey from quality assurance or quality control to total quality management has entirely changed the orientation of management from product to the consumer. Service quality is an elusive and abstract construct that is difficult to manage and measure. The customer judges the quality on the basis of performance during the process of service delivery. So, the materials, facilities and personnel were identified as three most important components while evaluating performance of service. Materials here refer to tangible part of the service, facilities mean the environment and personnel are the employee involved in the process of service delivery. Customer service is the organization's ability to consistently meet the needs and expectations of its customers. Considerable interest in the issues of measuring service quality and conceptualization of relationship between service quality and service delivery leading to customer satisfaction have been exhibited by the practitioners. **Zeithaml, Berry and Parasuraman** (1996) pioneers of service quality found that it has considerable impact on customer behavior which relates to customer retention.

1.7 Service quality and Libraries:

A quality process is of utmost importance in order to achieve efficiency with performance metrics process in any of the organization. Quality is not new concept for libraries as it is deeply rooted in the library principals and activities particularly the fourth law which calls for saving the time of the reader implies the importance of quality in service. The success of searches in database Index Medicus was considered to be important for quality **(Lancaster, 1969)** where as **Orr (1973)** defined quality as "how good is the service?" Globalization of information has resulted in cost effectiveness and quality consciousness of product or service. The fundamental role of library is to serve its users. They are the focus point of library service. **Ranganathan**

(1988) fourth law of library science "SAVE THE TIME OF THE READER" clearly indicates the importance of reader's time which calls timely delivery of services thus imply the value of library service quality.**Cholin (2005)** pointed out that library is considered to be functional unit in real sense due to its key activities such as collection development, access to resources, document delivery and user education. Total quality management in service sector like LIS started in late 1980s and has become relevant in current technological era due to changing information needs of the library user **(Raina, 1995).** So all energies are now directed towards satisfying the needs of the customers. There is paradigm change in the management of present-day libraries and are shifting from isolation to partnership/sharing, standalone to networked environment. They are trying to achieve service excellence through continuous innovation in their products/ services. **Ball (2000)** proposed six interrelated criteria for quality management of library services in digital era which are topicality of information content, precision and relevance of information, reliability (no broken or missing links), completeness of information, speed and flexibility of distribution (Customization). In this changed environment 'quality' has become new success mantra not only to prosper but for survival also. Nowadays quality is connected with the outcome of a service. This must be so because it is the user who senses quality. He gives value to the service he receives from the organization. Libraries play key role in the lifelong learning by providing learning environment to fulfill informational, educational, social and cultural needs of diverse population. Library service quality comprise of quality of information i.e. comprehensiveness, appropriateness & format and the services being offered which include physical facilities, attitude, helpfulness and behaviour of the staff **(Shi & Levy, 2005).** Libraries acquire different resources and educate their users for optimum its use. **Kalan (2002)** has rightly pointed that our services are the products we sell. In academic library quality may be recognized by the customer in terms of prompt and error free services. So quality of the library relies upon the service quality given to those who use the library physically or through remote location. Quality services bring satisfaction to the users as well as to the staff which is the main objective of library. Satisfied and happy users value the library services which can further improve

the professional image of library **(Pinder & Melling, 1996). Line (1996)** commented that Librarianship "is not just the collection of documents but it is managing the resources for people". Librarians are no more restricted to provision of document or information but can add value to the service and provide quality services as desired by the users of the library. They must understand the user's requirements and delivery of what, how and when they demand. Implementation of quality improvements in the library means a change from an inner process-oriented view to a customer oriented interactive approach. To ensure high quality service three critical aspects (3T's) i.e Task, Treatment and Tangibles must be managed while any service design process. It is through the manipulation of these three T's in any service encounter perception along various dimensions of service quality are influenced **(Stewart, 2003).** The key issues like coverage, relevance, kind of information supplied, accuracy, speed of response, accessibility and ease of use of service whether used physically or remotely appear to be important predictors of client satisfaction which ultimately determines the quality **(Whitehall, 1992).**The importance of quality service depends upon user's fulfillment and satisfaction of maintaining the existing users and attracting the new ones. The entire process of evaluating the quality of an academic library is in terms of its collection, whereas its usage indicates process quality. Thus on the whole quality of any type of library is in this era is measured by services being provided to the users. Thus, Service quality process calls for customer focus, motivated staff; clear understanding of service quality concepts as well as factors affecting them and effective feedback system **(Seth, Deshmukh & Vrat, 2005).**Over the last few decades quality of service is a determining factor in the broad consensus of user satisfaction and loyalty across university system **(Einasto, 2009)**. **Balasubramanian and John (2016)** has nicely expanded the word **QUALITY** covering all the components necessary for managing servcie quality in libraries

Q- Quest for the knowledge excellence

U- Understanding the needs of the users

A-Actions required for meeting demands

L- Leadership quality for Librarian

I- Involvment of all the staff members

T- Team spirit for the attainment goal

Y- Yard stick to measure progress

So Quality on the whole in the library with respect to information services encompasses the followings:

1. Adequacy of documents in all respects and their processing for use by suitable procedures and methods
2. Attitude and skills of the workforce
3. Working equipments and processing
4. Time span of service to be provided
5. Features of service to provided to the user

The quality service gets many benefits not only for the user but also for staff and university/Institute ranking. The main objective of managing quality service in library is to improve the library conditions. On the whole quality services involve teamwork, problem solving and error reduction in the process. If library provides quality services then users will be inspired to become regular users spreading the words to others regarding usefulness of resources and services of the library. By this way quality parameter programs will improve the library coherence and image in the academic world.

1.8 Performance measurement and evaluation:

An organization is grouping of people and other resources to produce goods or services. It aims to coordinate the actions of people to create something desirable or valuable. Organizations which continue to satisfy people's needs will be able to create more and more value as it adds to their stock of skills and capabilities **(Blau, 1970).** As organizational structures are evolving so is organizational culture.It refers to the shared values and norms that control organizational members' interaction with each other and with customers as well as with other people outside the organization. Every organization strives hard to find improved ways of using resources and capabilities to create value and hence its performance **(Jones & Mathew, 2018).** In any organization performance measurement is the metric which can be used for quantifying the effectiveness and efficiency of an activity. It is a method to measure effectiveness;

efficiency and cost-effectiveness of any organization or in other words it is a tool that allows administrators to get concrete data for meaningful evaluation. The pressure of competition is compelling the organizations not only to look on process but also how it is being delivered. As information is said to be developed from data which can lead to better knowledge likewise performance indicators can lead to better knowledge of the services and their improvements **(Hewlett, 1998).** The real value of performance can measured only when an organization goes through the process of planning that identifies the measures or methods linked to organizational visions, mission, goals and objectives. **Matthew (2011)** observed good performance measures to be called as **S M A R T** i.e. Having **S**pecific purpose, **M**easureable, **A**chievable, **R**elevant and **T**ime phased. Thus, performance measurement methods pave the way for managers to better understand the organizational needs for innovation.The performance framework for any profit and nonprofit service organization includes criteria like service innovation, resource utilization, quality of service and flexibility. Performance criteria covers key elements of performance outcomes like how relatively well an organization is doing, innovating, managing investments, resource and satisfying the customers. For evaluating the effectiveness managers should (1) Secure scare and value skills and resources from outside (2) Coordinate resources with employee skills creatively to innovate product or process (3) Convert skills and resources efficiently into goods/services. Thus for success of every organization three kinds of performance metrics are must first is the ability to mobilize its resources; second is how effective is the staff and ultimately the progress in achieving its mission **(Sawhill & William, 2001).**Any productive activity of the organization needs updated information services which a library is capable of providing it. The output of any organization is collective work of all or group of members of an organization whose needs and demands are well supported. The concept of performance measurement and evaluation in library has been borrowed from management science where the organizational effectiveness is of prime importance.

1.8.1 Performance measurement and evaluation in libraries:

Library is provided with a set of resources which are managed well to provide intended services. It aims to create service culture that is focused on effective

outcomes for the users. Being the service providing organization library performance can be gauged through effective services provided to its users or evaluation of libraries as a whole can be described as whether a particular library has capacity to meet the demands of the users. **Cronin (1982)** has defined Library performance measurement as "the process of assessing the effectiveness systematically against predefined norms, standards or goals set for the said purpose. **Mackenzie (1990)** viewed performance measurement activity as "Systematic measurement of a system (Library) as extent to which it has been able to achieve its objectives with in certain period of time". In other words, we can say how much good the library service achieves rather than how good the library is **(Orr, 1993).** The primary purpose of measuring the value of library is to see how much it is doing well but not to do comparsion with other libraries for doing better or worse **(Cram, 1999). Osburn (1992)** regarded "proper evaluation method which helps one to assess the strengths, limitations and possibilities for improvements." Libraries can create value only through its intangible assets i.e. services in such a way that can benefit the society. We can say that library value is related to perception of actual or potential users who use the information or publication. There is a deepening divide between stakeholder's perception about the role of libraries and librarians as part of research process as well as of content providers. So the perception of library can be evaluated by branding provisioned resources **(Housewright & Schonfeld, 2008).** There are reasons which necessitates the significance of gathering assessment data from libraries to justify positions of resources, illustrate patterns of use and demand for services, verify suitable service hours or staffing, for peer comparison, to enhance existing services, evaluate latest services, etc. Library effectiveness can be described as systems providing customized information to meet individual needs, timely delivery, easy to understand/use and are delivered by courteous, knowledgeable staff**.** Library assessment techniques help to understand what is going well or poor and also about its current strengths and weaknesses. **Lancaster (2003)** pointed out the effectiveness and evaluation of library must be measured as how good a library service can satisfies the demands of the users placed upon it. Therefore libraries should be assessed and evaluated from time to time by their users**.** It has become essential to measure the

effectiveness of library in the changing environment in order to achieve the desired goal of organization.**Fidzani (1998)** said that users'survey based assessment provide valuable insights which can help the libraries in re-orienting their collections, as well as services for meeting their information needs effectively. **Majid, Anwar and Eisenschitz (2001)** opined that adequacy of collection along with services and facilities in line with user requirements are the most important factors that contribute positively towards library effectiveness**. Jantti (2006)** also commented for the most important assessment categories to evaluate in libraries are collection, services, facilities, equipment and library staff. In other words it analyzes the working status of library in rendering effective services to the users which can be done through various angles such as resource mobilization and utilization, quality of services and extent to which users are satisfied with the library services. The idea of assessing the performance of library has been central focus of library management. It is clear that the main dimensions which can affect perceived service quality are library collection, surroundings, equipment, library staff and library services **(Snoj & Petermenac, 2001). Poll and TeBoekhorst (2007)** also mentioned the most important international set of performance indicators which are IFLA indicators viz Resources, Infrastructure, Use, Efficiency, Potential and development.Performance measurement evaluates whether a library is effective and efficient in delivering its services. It can be described as follows

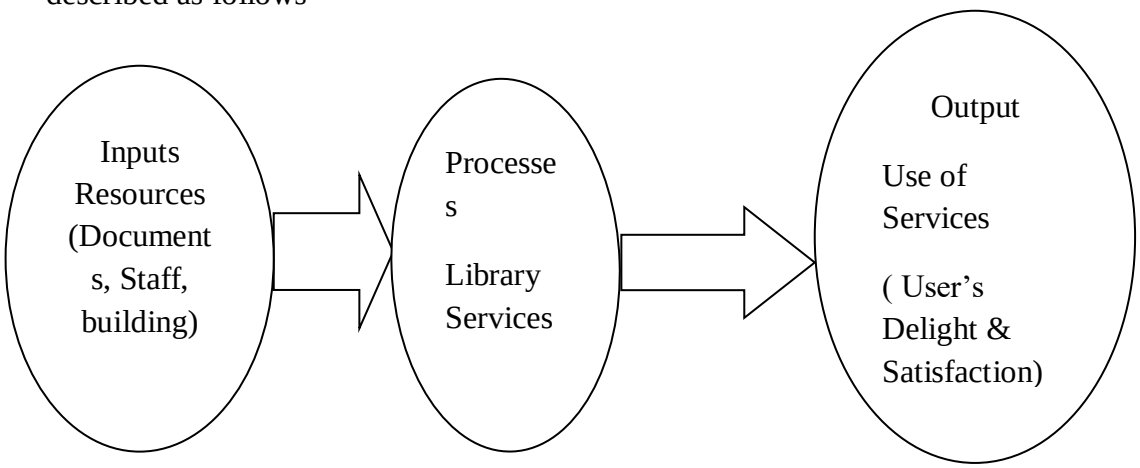

Figure :1.8.1 Library performance measurement & evaluation

The information in the library is avaibale in the form of different types of documents like books, periodicals, newspapers, reports, theses, research monographs, audio

visuals, grey literature such as working papers, handouts, speech etc. A lot of information generated through these resources can only be handled by an agency specially created for it. Library is considered to be effective if it renders services that make perceptible contribution to the output of its users. Efficiency is the component of effectiveness and is concerned with the optimization of performance. It reflects emphasis on resource input as opposed to the effect of the library on its users. Efficiency may be related to tasks which are operational and enable the library to produce its service. Adaptability with changing environment also determines the effectiveness of an organization. Library's capacity to change with the surrounding environment proves its ability to survive with effectiveness. Library use therefore becomes part of the effectiveness. So libraries have become indispensable for any organization.

Performance measurement being the multifaceted process focuses on inputs, outputs and outcomes. Therefore, libraries funding, staff, collections, building or space, equipment etc. are the input to their services and the no. of loan transactions, visits, downloads, reference transactions are the outputs to those services. So performance measurements evaluates whether a library is effective and efficient in delivering its services. Impact or outcome is to assess the effect of service on user and on society. Output is the usage of library services and outcome or impact is the changes in user in terms of gaining knowledge **(Brophy, 2001).** Users through the use of library can attain knowledge and information literacy skills which further help them in lifelong learning as well as achieving success in life. The changes could be seen as going from cognitive impacts (Knowledge gaining) to change in attitude and opinions which further have an impact on the behavior of an individual. **Poll (2001)** affirms that "outcomes" are the "visible effect of an event or activity" which can be social impact, information literacy and professional success. So we can say that library performance assessment consists of several activities which are a) Using several methods and indicators b) Assessment of input, output and outcomes c) Evaluation of service quality **(Nutt, 2005).** In the electronic era library performance measurement should take into consideration Network technology, Infrastructure, Digital information resources, Electronic services, Websites, Remote access etc.

In the wake of ongoing technological developments academic libraries have been compelled to support users with timely access to high quality information for advancement of teaching, learning and research. Libraries need to ensure that they are still relevant in this constantly changing environment. With services ranging from literacy education to research support emphasis is centered on providing effective services. Today's libraries consider improved discovery tools, institutional repositories; consortia-based access and digital preservation to be important during collection development activity. Librarians are no longer custodian of physical resources but are becoming more involved in process of teaching. Open access has given library professionals new responsibility to advise the researcher on copyright, licensing and privacy issues. It has become essential for the library professionals to acquire new skills such as digital skills, usage data analysis etc. to serve the user in better way. Further promoting usage of library resources has become necessary to justify return on investments which calls for positive leadership, marketing and soft skills. Customers want easy access to services and information which can be provided through library portals **(Lakos, 2001).** Libraries will have to be ready to take present and future challenges in ensuring that equitable access to information provided to the users. In short we can say knowledge management process of library is a series of processes of information transformation and circulation. Organizations that focus on customer needs increase their ability to provide quality services to their customers. **Brophy and Couling (1996)** also pointed out that libraries have to transform themselves into organizations that support the value of quality and quality management. The internet is growing fast and the wireless environment is exploding. All the organizations are rediscovering themselves and are trying to adapt themselves to potentials and the pitfalls of the internet. Libraries are also being faced with radically changing user demands and environmental changes as well. They have to adjust, re-evaluate their services and change their perspective in order to stay relevant. With the application of ICT academic libraries services are transforming and have changed in the last twenty years. Nowadays in addition to print resources the electronic resources, networks and web-based services are representing a large parcel of library services. New strategies and techniques are required to manage them

efficiently in this changing environment. It has therefore become necessary to evaluate the services of library on continuous basis. Thus, library contribution can be judged through up-datedness of information, wide variety of information and authenticity of the data. Since libraries are operating under the pressure of constant change with ever growing networking technologies so wide variety in the form, content and services related to information in electronic form is available and the term digital library is in vogue. Portals nowadays are becoming environment of choice for delivery and access to information **(Lakos, 2001).** Libraries that focus on customer needs increase their ability to provide quality services through continuous learning and capacity building. Due to wide emergence and use of internet as well as other related information communication technologies in the libraries it has become necessary for the librarians to break this myth that all information that ever required is available on internet and librarians are no longer needed in this age information. For evaluating information technology-based media and services of the libraries various measures like transaction based, time based, cost-based and user-based measures were proposed **(Young, 1998).** Transaction-based measures refers to no. of hits, downloads etc. whereas time- based measures include session lengths, no. of hours etc. Cost-based measures based on expenditure for equipment, staff, training etc and user-based measures include simultaneous users, user satisfaction etc. The best measures of library output are in terms of satisfaction and dissatisfaction generated during the library use. It may include frustration and anger or happiness resulting from interaction with library personnel's, processes or from difficulty in locating needed information **(Marchant, 1976).** So leaders of the libraries must take lead in assessment of their library's operations there by justifying the investment on the same. Effective functioning of the library and enhanced customer delight ultimately lead to overall improvement of the functioning of the library. Library assessment work calls for continuous communication with the user for needs assessment, quality outcome and satisfaction measurement. Empirical data collection pertaining to libraries and its interpretation not only helps in significant service quality and improved management but can also enhance professional involvement and satisfaction. This necessitates for analyzing the cureent working of the libraries with

respect to rendering of services to their users. Hence it can be said that performance evaluation in its spirit is assessing the present conditions of library services and recommending improvements on the basis of defects and problems identified in the system **(Griffiths & King Donald, 1991).**

Library performance can be gauged from various angles like the resources of library, the extent to which library management can mobilize resources to meet the demands of its users and the quality of service which calls for the extent to which the library users feel satisfied with the services of library. So, libraries must have some mechanism to assess their day to day activities which can be used to create environments that are effective and user centric. The value of assessment should be absorbed at all level of management from leadership to staff. It should be made part of each person's individual work assignment. Services of the libraries must be based on expressed needs and requirements of their users in order to ensure service quality. Regular communication with the library user can be maintained through need assessment and satisfaction measurements. Analysis of periodic feedback from the users help to set the priorities, allocate resources and in making decisions **(Lakos, 2001).** In any of the assessment process library resources, structures and processes are in place to continuously communicate with users about their needs, expectations and success in using library services. All library services, products and programs should be evaluated for quality and impact with respect to changing environment. Performance measures assess the library service quality either by quantitative means or by users' perception of the quality. Special standards have been identified and are evolving. All services and processes are measured against these standards. Earlier studies focused on assessing reference services whereas reader's instruction programs and bibliographic instruction which help in locating resources as well as in reducing uncertainties were also considered as an influencing factor in measuring the performance. Other studies have included collection size and budget allocation as predictors of effective performance **(Broadly-Preston & Preston, 1999).** Recently studies in the direction of quality services have resulted in the development of instruments which evaluate customer's perception of library services or user's satisfaction **(Cook &Thompson, 2000; Cook, Heath & Thompson, 2001).**

The study of budget status, sources of finance, staff strength, manpower planning, user awareness and satisfaction are the important areas to be considered while evaluating the performance of library.Thus assessment regarding library service effectiveness can be judged from the views of the library users in terms of physical facilities, arrangement of reading material, various library services such as user education, current awareness service, circulation, reprography, bibliographic services, online services etc. So, library performance assessment activity essentially incorporates assessment of inputs, outputs, outcomes and service quality. Inputs we take into consideration resources viz. financial, informational and human resources that are applied in providing library services. Output is the amount of services being generated and offered. It covers quantity and quality of service(s). Outcome refers to accountability, management of resources and promotion of library which can be measured through social impact, information literacy and professional success **(Nutt, 2005).** It means how the library has brought change in the library users as a result of their contact and use of library resources and programs **(ACRL, 1998).** Changes could be from cognitive impacts to changes in attitude/opinion and ultimately in behavior.

Since the library provides knowledge intensive services with the use of on-going technologies thus involve both physical and/or digital interaction in the service delivery encounter. Attributes which the library users most likely to use involve both human as well as digital factors. These include Resources, Staff/Employee competence, services, environment and web service quality or E-service quality

Special libraries especially agricultural libraries are directly related to scientific and technological research and intend to serve specialized group of users like teachers, scientists, economists, extension specialists etc. Quality of teaching and research work in any institution is dependent upon the potential of its library responding to the needs of its users. Technological developments change the way in which information is being delivered to the users. Agricultural libraries all over the world have their own place of importance. Agricultural university library has a collection of books, journals, pamphlets, films, reports etc. organized to serve the needs of specific

clientele as producers of agricultural products, scientists, teachers and students. Modern agricultural libraries have the responsibility of rendering the service to promote agricultural research, teaching, learning and extension. They are being redefined from a place to access books to one which houses the most advanced media including CDROMs, internet resources and provide remote access to wide range of electronic resources. The extent to which the expectations and demands of the users are met determines the quality of information services provided by these libraries on its ability to meet the needs and demands of their users. So to keep pace in developing and delivering quality services it is highly important to assess about their fundamental components which include collection, services, implementation of technological advancements, perception of users about their libraries and most importantly the knowledge and skills of human resources that are responsible for overall management of libraries.

1.9 Statement of Problem:

Today's agriculture should feed the growing population in this world of limited natural resources and increasing environmental constraints. The ability to tap resources on a world-wide scale is vital for the successful completion of research project and effective inter-lending service is one of the mainstays of an effective library service for research-based institution. Further an inadequately staffed library progressively lowers its service level. Technological advancements have created new challenges which call for the attainment of new skills. There is high level of diversity in agricultural content, format, technology, audiences and services as well. Effectiveness of library can be gauged through availability of library resources and services as well as optimum utilization of the same which rely upon awareness level of the user. So, agricultural information professionals can play role in agricultural development by managing and providing improved access to wide array of information resources. As the agricultural information flows from laboratories to land so information needs of scientists have an impact on other users especially those who work in extension channel. If scientists are well informed and provided with latest information more exhaustively only then they can use the information more purposefully. With the application of ICT agricultural libraries services are

transforming and have changed in the last twenty years. In addition to print resources, the electronic resources and web-based services are forming a large parcel of library services and digital libraries are emerging, so it has become necessary to evaluate services of library in this changing environment**. Bhanupartap (2018)** in his LIBQUAL+ based study on quality assessment of library services in medical and agricultural libraries of Haryana and Punjab found users of agricultural libraries to be more satisfied as compared to that of medical university libraries. **Vinod Kumar (2011)** reported similar findings in his study of selected university of Northern India where services of agricultural university was found to to be superior as compared to science & technology and general university libraries. **Raza and Samim (2017)** in their study at Aligarh Muslim University found a wide gap between users' expectations and perceptions of quality of services. **Mohindra and Shokeen (2016)** in their study at National Law University, Bangalore revealed that overall users were found to be satisfied with the library services. Difference in perception of library staff and users regarding service quality was found during the quality assessment study in two university libraries of Punjab **(Sharma, Anand & Sharma, 2010).** Since the scientists, researchers and teachers of agriculture sector play significant role in nation's development therefore it is essential to measure the quality of services as well as satisfaction of the users of agricultural libraries in the changing environment. In view of above scenario, the present study **"Evaluating resources, awareness and service quality in agricultural university libraries of Punjab, Haryana and Himachal Pradesh in digital environment"** has been undertaken to assess agricultural university libraries for ensuring their flourishing success and advancement as a knowledge-based institution. It will evaluate resources, awareness level of the users with regard various services and quality of information services rendered to the users. Further study attempts to know about user's perception towards various library services of the selected agricultural university libraries. Further it will find out satisfaction and awareness level of the users of agricultural university libraries of Punjab, Haryana & Himachal Pradesh regarding its resources and services. It will help in revealing the strength and weakness of each library and on the basis of

findings of the study suggestions will be made for improvements in providing better services.

1.10 Objectives of Study: The objective framed for the present study is as under

1. To evaluate the resources and services available in different agricultural university libraries.
2. To study the role and impact of knowledge of staff on quality services.
3. To evaluate the relationship of information communication technology with service quality of agricultural university libraries.
4. To define and identify service quality of agricultural university libraries from user's perspective.
5. To study the user's awareness and satisfaction regarding services provided by the agricultural university libraries.

1.11 Hypotheses of Study: The following hypotheses have been proposed as perobjectives of the study

1. The resources and services differ on the basis of financial resources available with the university libraries.
2. The competencies of human resources play significant role in providing quality services.
3. The application of information communication technologies in libraries has enhanced the quality of services.
4. There is no difference in the awareness among the users' of different agricultural university libraries.
5. There is no difference in the satisfaction level among the users' of different agricultural university libraries.

1.12 Scope of study: The proposed study is confined to State Agricultural Universities (SAU's) of Punjab, Haryana and Himachal Pradesh. These are Punjab Agricultural University **(PAU)**, Ludhiana, ChaudharyCharan Singh Haryana Agricultural University **(HAU)**, Hisar and CSK Himachal Pradesh KrishiVishvaVidyalaya **(HPKV),** Palampur. The rationale for taking these universities was that each university is representative of respective state under study and has been established before 1980. All the universities under study have

contributed significantly towards agricultural development and have been ranked best institutions by Indian Council of Agricultural Research (ICAR). Further the study is delimited to Post-graduate students, research scholars and faculty members of the agricultural universities. All the universities have well established libraries. Moreover, there is homogeneity financial assistance, clientele and services provided by these universities which can be evaluated for assessing their performance.

1.13 Research Methodology

Research methodology is an important part of any research study. The main objective of this chapter is to describe about the population under study, sampling design procedure, data gathering tools, pilot study, data collection and data analysis techniques to accomplish the study. The present study empirical in nature deals with the assessment of library resources, its awareness and evaluation of service quality in agricultural libraries of Punjab, Haryana and Himachal Pradesh. The universities under study include Punjab Agricultural University **(PAU)**, Ludhiana, ChaudharyCharan Singh Haryana Agricultural University **(HAU),** Hisar and Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishavidayala **(HPKV)**,Palampur. The assessment of agricultural libraries can be carried out by properly surveying the libraries and describing the results through data analysis and presentation. So the present study has been discussed as under

Phase I: Review of Literature

Firstly, a thorough review of relevant literature has been carried out to get a clear idea about the status of research work conducted in the past related to the topic of research area. Online databases like Library &Information Science Source , EBSCO and CeRA databases were searched using keywords like library resource adequacy, user awareness, information literacy, users' satisfaction and library services, service quality, users' perception, SERVPERF, Digital library services, E-service quality etc. Important relevant articles from various quality indexed national and international journals of library science domain were searched and consulted of which Library Management, Electronic library, Malaysian Journalof Library &Information studies, Library & Philosophy, DESIDOC J Library & Information Technology, IASLIC Bulletin, Library Herald, ILA bulletin, Annals of Library and Information studies etc.

are few to name. Literature available in open domain was also searched in to get clear idea about the research problem. Academic portals like NOPR (NISCAIR Open Periodical Repository), Academia.edu, Research Gate and Google Scholars were also searched to get the relevant literature. This has helped to ascertain what has been done and what further is to be achieved thereby eliminate the chance of duplication of research work thus saving time, effort and money of the researcher. Moreover, it also provided an insight about the methodologies adopted in previous studies that proved helpful in strengthening the research techniques and tools adopted for accomplishing the desired research objectives.

Phase II: Research Method Adopted

Different research methods, tools and techniques were identified through literature review that has been employed to conduct research study similar to the problem under study**.** It was evidently observed that assessment of university libraries can be either quantitative that deals with figures and numerical data; qualitative that deals human attitude & behavior or a combination of both methods. Thus, methods for assessing collection and services in university libraries can be categorized under following headings:

a) Quantitative method: Surveys or Questionnaires that ask close-ended questions

b) Qualitative method: Surveys or Questionnaires that ask Open-ended questions, Observations, Interviewing, Group discussions /Focus group

c) Mixed method: Combination of qualitative and quantitative methods of assessment.

Accordingly, keeping in view the objectives of the study, mixed method technique was used to conduct present study. After, appropriate analysis of the problem, survey method is selected as key research method, which is incorporated by other methods wherever necessary to achieve the set objectives of the study.

Phase III: Study Population

The present study covers three state agricultural university libraries one from the state of Punjab, Haryana and Himachal Pradesh. The respondents for the study included university librarians/ heads of university libraries, and users of respective universities. User population comprised of faculty, research scholars and postgraduate students of

the universities under study. Faculty included professors or equivalent, associate professors or equivalent and assistant professors or equivalent.

Phase IV: Sampling

It is impractical to examine the whole population to arrive at generalizations if the populace is sizeable. In like manner, if sample drawn is perfectly illustrative, it becomes indistinguishable with its parent populace practically in each regard and is thus possible to draw substantial inferences or generalizations. Keeping in view the nature and scope of the problem under study, stratified sampling technique is followed to draw necessary sample size for the study. The actual sample was thus achieved in following steps

(A) Sampling Procedure:

Indian council of Agricultural Research **(ICAR)** an autonomous organization under the Department of Agricultural Research and Education **(DARE),** Ministry of Agriculture and Farmer welfare, Govt. of India with its 101 institutes and 71 Agricultural Universities is one of the largest agricultural systems in the world. It has played major role in promoting higher education in Agriculture through partnership and efforts of ICAR Agricultural Universities system comprising of State Agricultural Universities (64), deemed to be universities (4), and Central Universities (3) (ICAR). It is witnessed that at present there are 64 state agricultural universities. Out of 71 state agricultural universities there are three agricultural universities in Haryana, two in Punjab and two in Himachal Pradesh. As present study is limited to the state of Punjab, Haryana and Himachal Pradesh so only three agricultural universities one from each state as its representative has been taken up for study. Besides this only those universities that are in operation for long time and established on or before 1980 have been included for study. Further all the selected universities have been adjudged as best institutes by ICAR as per their contribution towards development of agriculture. Furthermore the assessment is possible only when there is well established building, collection, staff for resources and services. Consequently, three state agricultural universities one each in Punjab, Haryana and Himachal Pradesh has been selected for study to make sample more comparable to avert bias. The detailed

description of agricultural university libraries is presented and arranged in chronological order of their year of establishment.

Table 1: University Libraries under study

State	Name of the University	Name of the University Library	Year of Establishment
Punjab	Punjab Agricultural University, Ludhiana	Mohinder Singh Randhawa Library	1962
Haryana	ChaudharyCharan Singh Haryana Agricultural University, Hisar	Nehru Library	1970
Himachal Pradesh	ChaudharySarwan Kumar Himachal Pradesh Agricultural University, Palampur	Library HPKV	1978

Subjects selected under the scope of the study includes university librarians/Incharges of the university libraries for providing data pertaining to existing resources as well as services of the respective library and the different categories of user groups for their responses with regard to various library facilities.

(B) **University Librarians/Library In charges**: It encompasses all heads of University libraries.

(C) **Users**: The user groups for the study comprise of post graduate students, research scholars and teaching faculty covering different departments of the respective universities keeping in view of the fact that these categories constitute major user group of university libraries who mostly uses research services of the library. Apart from teachers of the universities, scientists and extension specialist also constitute teaching faculty so professors or equivalent/ associate professors or equivalent and assistant professors or

equivalent have been included in the sample to make sample true representative of the population.

(D) Sample Size:

It is impractical to assess each and every user so for that reason keeping in view the time and financial constraints only selected sample of users from each university was considered for the study. Scholar like **Chochran (1977)** has suggested formula for determining the sample size. Chochran statistical formula has been used in the present study for determining the sample size which is as under

$$n_o = Z^2pq/e^2$$

Where n_o = Necessary Sample size

Z = Confidence level

e= Desired level of precision/Proportion of sampling error

p= Estimated proportion of an attribute that is present in the population (Standard Deviation)

q= (1-p)

Therefore

$$n_o = (\text{Z score})^2 \text{ x StdDev x } (1\text{-Std Dev})/ (\text{Level of precision})^2$$

At 95% confidence level (Z score for the 95% confidence is 1.96), assuming maximum variability equal to 50% i.e. Std. Dev. 0.5 and at small level of precision/sampling error (6%) sample size is

$$n_o = (1.96)^2 \text{ x } 0.5 \text{ x } (1\text{-}0.5)/(0.06)^2$$

$$n_o = 266.77 = 267 \text{ users}$$

(E) Distribution of user sample size:

After deriving the necessary sample size of the users for each university was derived, they are further distributed as

(i) The state-wise distribution is presented in Table 1.2 which indicates user population representing universities from Punjab, Haryana and Himachal Pradesh. Since three universities one from each state has been selected so each university user population has representation of 33.33%

Table 1.2 : State/University-wise distribution of users

Region	University	Abbreviation used	Sample Size
Punjab	Punjab Agricultural niversity	PAU	267
Haryana	CCS Haryana Agricultural University	HAU	267
Himachal	CSK Himachal Pradesh KrishiVishavidyala	HPKV	267

(ii) Category-wise distribution of users: Users' group have been categorized as under

Table 1.2.1 Sample Structure

Region	University	Post graduate students	Teachers or equivalents	Research scholars	Total
Punjab	Punjab Agricultural University(PAU)	133	81	53	267
Haryana	CCS Haryana Agricultural University(HAU)	133	81	53	267
Himachal Pradesh	CSK Himachal Pradesh KrishiVishavidyala (HPKV)	133	81	53	267

Since the target users group comprised of PG students, teachers & research scholars of the universities and the number of postgraduate students out number research scholar and teachers so in order to collect the data from the concerned respondents the sample of users' categories has been divided proportionately into the ratio of 5:3:2

Phase V: Data Collection: Collection of data is essential part of any research activity. For making data useful it is necessary to organize in such a manner that same pattern and logical conclusion can be drawn. There are number of methods and tool/Instruments available for the data collection. Each and every method has its advantages and disadvantages.

(a) Selection of data gathering tools: After obtaining sample size questionnaire method supported by observation in view of survey research methods appears to be appropriate tools for collecting data from the concerned respondents for the present study. Primary data has been collected from the library users which including (Faculty, Research Scholars and Postgraduate Students) and Library authority. The choice of these tools was based on nature of data to be acquired, available time and objectives of the study. The detailed description of data gathering tools is given as follows.

(i) Questionnaire: Two different types of questionnaires based on the literature survey and theoretical framework were compiled for the varied categories of the respondents. These include university librarians/Library Incharges and end users of the library which include post graduate students, research scholars and teaching faculty. Questionnaires were got validated by consulting the experts library and information science domain for getting their suggestions and modifications regarding readability, sequencing of the questions and understating of the same. For questionnaire reliability cronbach alpha test was run where value was found to 0.7

Questionnaire-I for Librarians/Library Incharges: The main aim of this questionnaire was to gather quantitative data related to various facets of university library and its services. It has two types of question opinion seeking on service quality and informative questions requiring factual to achieve 1st, 2nd and 3rd objectives of the study. Questionnaire was framed in order to seek details about library facilities, resources and awareness programmes of the library. Further questions were designed to know attitude of the Librarians/Library Incharges towards application of information communication technologies in the libraries.

- Part A of the questionnaire was designed to obtain general information about the library like name of the library, year of establishment, working hours, URL, etc.

- Part B seeks information about existing library physical facilities
- Part C attempts to gather information about library learning resources, library policies, financial resources, human resource management etc.
- Part D of the questionnaire was designed to seek information about various library services and user education programs available for publicity and awareness of the users.
- Part E intended to know the opinion of librarians/library incharges towards information technology and library service quality improvement
- Part F of the questionnaire had open ended questions to ascertain the views of librarians/library incharges about service quality of the library.

Questionnaire-II for the users: The aim of this questionnaire was to gather data from the users of respective library to have their opinion about library resources, awareness programs and services available to them. Further an attempt had been made to know the attitude of the user towards ICT in library services on five-point Likert scale. In order to have clear perception of user about performance of various library services modified version of SERVQUAL which is SERVPERF developed by **Cronin and Taylor (1992)** had been used. Since the focus of the study is users' survey, therefore item related to users' satisfaction on almost all the service elements had been added according to local conditions and situations. The researcher had borrowed heavily from earlier studies exploring library effectiveness, library performance and service quality of libraries in general and academic university libraries in particular. The questionnaire is based on the modified version of SERVPERF used by **Nitecki and Hernon (2000)**. The original version of SERVPERF comprised of 22 statements whereas the instrument used by Nitecki and Hernon has 40 statements. In order to examine how technology based services impact the customer satisfaction the study has borrowed some of the statements under online service quality dimensions like communication, content, access and website design of eUTLibQual performance only based instrument **(Einasto, 2019).** The present study has extended to 55 statements to cover various categories of services being measured. These items have been derived from indicators, dimensions and parameters of satisfaction and service quality within

the university mission. Instead of seven-point likert scale used by Nitecki and Hernon, this study uses a five-point scale.

- Part A of the questionnaire was designed to collect categorical information about user, library visit frequency and duration of use etc.
- Part B seeks information about awareness of the users about resources & services of the library and tried to assess awareness programs of the library from user's perspective.
- Part C was designed to know the users opinion about various resources of the library
- Part D had been designed to study the attitude of users towards application of ICTs in library activities.
- Part E was designed to measure users' perception and satisfaction with the items based on service elements of university library services. Open ended questions were also added to have responses of users with regard to library goodness, quality etc.

(i) ***Observation:*** Apart from questionnaires, the functioning of university libraries under study was observed from close corners with a view to develop an insight about each library to support the data.

To achieve the research objectives in effective manner secondary data was also gathered from the respective university library by consulting annual reports and websites of university libraries under study.

Phase VI: Pilot Study: To ascertain the suitability of selected research methods and to test the reliability of questionnaire as well as to check the lucidity of framed questions, a pilot survey was conducted prior to final survey so as to eliminate the chances of ambiguity if any in the data gathering tool. However, for selecting the pre-test sample size Simmonds and Andaleeb (2001) suggested that the no. of pre-test sample must be 10. Since two sets of questionnaires were used to collect data from the concerned respondents, So Questionnaire-I was used to gather data from University

Librarians, and Questionnaires-II was pre-tested to a sample of 30 users constituting Postgraduate students, research Scholar and teachers. 10 users from each category were selected randomly from Punjab Agricultural University library, Ludhiana.

The pilot study helped in not only assessing the lucidity of the questions framed for the study but also helpedin ensuring that all important issues have been included. Further less important and equivocal inquiries were recognized. At this stage few modifications were made to remove the complexities and ambiguities of the questionnaire. The final questionnaire used for the study is provided for the reference as Appendix I & II

Phase VII: Final Survey:

After pretesting, the questionnaire was standardized by omitting misleading questions. In this way a comprehensive and final version of questions were structured for University Librarians as well as the users of the library. In order to measure the different construct all the areas of library services were combined in the form of questionnaire containing items/Statements. It used five-point Likert scale to measure users' perception and satisfaction. The final survey was launched and data was collected.

The researcher personally visited all the universities under study to gather data from the concerned respondents. A total of two questionnaires-I were administered to all the three heads of University Libraries of respective university who responded positively and returned the dully filled questionnaire. The second category of respondents comprising of library users included postgraduatestudents, researchers andthe teachers of respective universities which were selected randomly. The questionnaires were personally distributed among the library users to ensure return and timely reply of the questionnaires. It was assured to maintain full anonymity and confidentiality of the respondent so that they can freely give responses without any bias. Though most of the users were cooperative in giving the responses, however in order to ensure the return of desired no. of duly filled questionnaire from each category of users extra questionnaires were distributed in order to achieve the target of selected sample size 801.

It was not easy to collect empirical data on both qualitative and quantitative aspects. The collection of the filled in questionnaire was not smooth. Almost 20% respondents desired to leave the questionnaire with them to be filled later on at free time. Some asked to take the questionnaire with them to fill it back to the library after some days. Researcher requested the professional colleagues to help him in collecting the questionnaires left with those users. . Further In-person data collection proved beneficial as it helped to respond to clarification asked by the respondents regarding some questions. Further face-to-face interaction provided valuable feedback regarding various aspects of university libraries. Personal observations by the researcher during visit to universities also helped in enriching data gathered through questionnaires.

Phase VIII: Data Analysis and Interpretations

Data analysis and interpretations leads to the actual outcome of solution to the research questions in hand. Accordingly, after gathering the required data from the concerned respondents, it was thoroughly checked and organized for analysis and generation of required results. The data analysis was done thematically involving grouping of data into various headings based on the framed objectives of the study. The duly filled questionnaires were thoroughly examined and has been coded in excel. It involved coding and decoding process using various statistical techniques. Data was analyzed using SPSS statistical software besides manual calculations. The responses were analyzed and computed using various statistical techniques viz. mean, standard deviation, average mean, average standard deviation besides applying statistical tests viz; Chi-Square test, ANOVA wherever necessary to arrive at the appropriate findings. Depending upon the different aspects of the present study the data was analyzed on the basis of nominal scale measures in terms of YES/NO and Ordinal scale measured on the basis of Five Point Likert scale ranging from (1-5). Accordingly, the resultant findings were presented in tabulated form under various headings. The interpretation of data has been done which lead to the generation of summary report in the form of finding and conclusions.

Brief description of tests and analysis: The brief description of scales used and tests for the analysis of data is presented as under :

Scale 1: To measure repondent's attitude towards application of ICT in service improvement. A score of 5 has been assigned "Strongly agree", 4 to " Agree", 3 to Neither Agree Disagree, 2 to Disagree and 1 to Strongly Disagree.

Scale 2: For assessing user satisfaction with regard to various services of the library a score of 5 has been assigned to "Highly Satisfied", 4 to "Satisfied", 3 to "Neither Satisfied Dissatisfied" , 2 to "Dissatisfied and 1 to "Highly Dissatisfied"

Following statistical techniques were used to analyze the data

Percentage: It is denoted by % which is the ratio expressed as a fraction of 100.

Mean ($\bar{x}$) : Mean is the measure of central tendency or type of average . It is the mean value obtained by dividing the sum of values of a variable by total number of values and is represented $\bar{x}$and calculated as

$$\bar{x}=\sum X/N$$

Where $\sum X$ = sum of total values in the distribution; N=Total number of cases

It provides simple and systematic description of raw data thus helpful in comparison.

Standard Deviation (σ): It is the measure of dispersion of a set of data from its mean. It is used to compare two or more series w.r.t. their variability i.e. the degree of difference between values and center value. It is defined as the square root of the arithmetic mean of the squared deviation of the mean value.

Chi-Square (χ^2): It is also known as test of association; Goodness of fit. It is used to compare observed data with expected data. The test is used to see the significance population variance. It is non-parametric test where data was measured on nominal scale to measure two or more groups.

ANOVA: It is a group of statistical tests to know whether any significant difference exists between mean values in a given data set. It uses F-values, degree of freedom and level of significance. If the level of significance is ≤ 0.05 (95%) then there is a significant statistical difference between variables under comparison. It has been used in the present study to measure difference in satisfaction level of users of selected agricultural libraries with regard to various services .The data were presented in the form of tables and charts etc. and hypotheses have been tested at 5 percent level of significance.

1.14 Limitations of the study: The present study is restricted to three state

agricultural university libraries of Punjab, Haryana and Himachal Pradesh. Moreover, the user group includes postgraduatestudents, Research Scholars and Teachers of the three selected universities. Though undergraduate students make use of the library but their study is limited olny to text books thereforehave been excluded from the present study. The decision regarding selection of these three state agricultural university libraries for this study was based on some logic and justification. All these three universities have well established libraries and are recognized by Indian council of Agricultural research (ICAR) and University Grant Commission (UGC) thus their comparison is justified.

1.15 Citation Style Used: Every research study should acknowledge the earlier works referred or used in the conduct any study. In the present research work, the APA writing style (6th Ed.) has been used for writing the references and bibliography. Some of the examples of references are given below:

1.16 Chapterization:

OUTLINE OF CHAPTERS

The present study is divided into five chapters:

Chapter 1: Introduction

It is an introduction of the research study. This chapter covers concept of performance measurement and evaluation in general and libraries in particular, library assessment methods, statement of problem, and objectives of the study, hypotheses, research methodology, scope and limitations of the study.

Chapter 2: Review of Literature

Related work carried out in the past is covered in this chapter in order to avoid any duplication in the research. It provides literature review on related topics pertaining to collection, services, Use & impact of ICT, Skills and competencies of library staff and perception of users with regard to service quality.

Chapter 3: Agricultural Libraries: Resources and Services

It gives brief description about history of agricultural education along with development of agricultural universities in India. It describes various facets of agricultural libraries like Agricultural knowledge management system, components of agricultural libraries in changing environment. It also covers the profiles of the state agricultural university libraries of Punjab, Haryana and Himachal Pradesh, i.e. Panjab Agricultural University (PAU), Ludhiana; ChaudharyCharan Singh Haryana Agricultural University, Hisar andChaudharySarwan Kumar Himachal Pradesh KrishiVishvavidyalaya, Palampur. Various library assessment methods with emphasis on services quality in academic libraries have been discussed. Further e-service quality dimensions affecting the service quality have been discussed.

.**Chapter 4: Data Analysis and Interpretation**

This chapter is based on the analyses of the data collected from universities through questionnaires and by personally consulting the library records. It comprises of analysis of perception of user regarding library resources and services of the library

Chapter 5: Findings, Conclusions and Suggestions

The study is concluded in this chapter. Suggestions are given for the improving the service quality, management and the utilization of the services. Finally, it offers suggestions for further research.

Bibliography

Appendices: Appendix 1: Under appendix 1 the questionnaire used to collect data from the university libraries is given.**Appendix 2:** Under appendix 2 the questionnaire used to collect data from postgraduatestudents, researchers and teachers.

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Chapter-2

Review of Literature

2.0 Introduction

Literature review pertinent to specific research problem plays a key role in any research program. It forms the basis for clear understanding of the concept under study. It provides an insight about the research that has already been published on the related topic. It not only gives the idea about work already done in the relevant area but also enables us to understand methods and procedure followed to arrive at solution to the research problem. Research on the subject like assessment of resources, awareness programs and service quality of special libraries in digital environment has not been sufficiently carried out particularly in agricultural libraries. Further studies related to service quality assessment using SERVPERF scale has not been carried out in India. Few studies on service quality assessment and customer satisfaction using SERVQUAL and LIBQUAL+ tool have been carried out but no study on service quality assessment in agricultural libraries using SERVPERF instrument was reported in India. An attempt has been made to review the existing literature pertaining to assessment of library collection, awareness programs and service qualityof academic libraries in general and agricultural libraries in particular. Studies related to changing trends in library collection and services, ICT and its impact on libraries, user's awareness programs and service quality assessment in general followed by service quality assessment of libraries using SERVQUAL and LibQUAL+ toolhave been discussed. Some studies related to e-service quality have also been reported. Assessment of service quality using SERVPERF instrument are presented at the end. Consequently, the related research studies based on relevancy and currency conducted in India as well as abroad is grouped, analyzed and presented under the following headings.

2.1 Library Performance and Evaluation

2.2 Collection assessment and evaluation

2.3 Services in University Libraries

2.4 Skills and Competencies among staff

2.5 Service Quality and User Satisfaction

2.6 Conclusion

2.1 Library Performance and Evaluation: Performance indicators can lead to better knowledge of the services and their improvements. Collection size or amount of expenditure were some of the earlier measures which were used to assess the performance of libraries. Another effective approach is to formulate the construct that can be used to measure users' perceived service quality.**Rowley (1998)** defined perceived service quality as the consumer judgment about service overall excellence or superiority. Effectiveness and quality management provides greater opportunity to make advances in service provision.**Sawhill and Williamson (2001)** asserted that for measuring success of any organization three kinds of performace metrics such as mobilization of resources, staff effectiveness in provision of service and its progress are needed. In other words performance measurement helps to answer questions like how we are doing, what we have done, how we can do better and make the difference in order to improve further for achieving the desired goal. Sources of finance, budget status, staff strength and manpower planning of library constitute one aspect of assessment whereas user satisfaction with services of library constitutes another aspect. In the electronic era library performance measurement should also take into consideration aspects like network technology, infrastructure, digital Information resources, electronic services, websites, remote access etc. **Poll (2001)** outlined performance indicators for digital library which are provision and use of electronic resources, market dominance, user support, human resources and cost of electronic services**.**Factors like adequacy of collections; services and facilities were found to be closely related with library effectiveness which can contribute positively in shaping the user's perceptions about library effectiveness (**Majid, Anwar & Eisenschitz, 2001)**. In order to evaluate the customer perception of library services instruments have been developed which are referred as user satisfaction measures **(Cook, Heath & Thompson, 2001)**. Therefore, academic librarians must efficiently manage their resources and staff to fulfill the objectives of organization. So for measuring the

success of any library five elements like collection, services and programs, users and communities, technology and staff which should be kept in mind.**Singh and Satija (2006)** conducted review of research on information seeking behavior of agricultural scientists across the globe. The study covered around 65 research studies undertaken by international scientists. The findings of the study explicitly explained about theories of information seeking, information needs and information seeking behavior of agricultural users. The study concluded agriculture as a discipline to be critical sector for national economy and livelihood for many people of developing countries especially in India. So it is important to know the information seeking behavior of agricultural scientists which will help to clearly to understand the information needs so that it can be fulfilled in a better way. **Johari and Zainab (2007)** asserted performance measurement as an essential component for determining the quality of services in academic libraries as it minimizes error and enhances efficiency. If an information service is able to attract more users more will be the value of that service. Performance indicators for libraries can be increase in the use of content, products and services, reducing costs; economic and human cost in terms saving the time, faster accessibility and increase the user satisfaction. **Hernon and Altman (2010)** also viewed measurement in terms of evaluation questions of how's from library perspective such as how much, how economical, how prompt whereas how courteous, accurate and satisfied from user's perspective. Performance measurement methods pave the way for clear understanding of the organizational requirements of the libraries for innovation. In the same vein **Illangarathne (2017)** proposed new framework to evaluate the library performance and the major factors considered were library efficiency, library core people process, library environment, library adaptability and satisfaction of library patrons.Library performance was proposed to be significantly related to users' satisfaction with available resources and services. **Nichols and Philbin (2022)** conducted library space usage study to understand how and what spaces are used. The study helped to demonstrate value of library as space for quite study. Seating quality and quantity balance should be taken into account while designing the library in providing quiet space for study. **Ajit, Ramanayaka and Weerasooriya (2023)** also pointed out that there is a need to evaluate

effectiveness of library on continuum basis for providing effective services to the community. The study identified user satisfaction, collection development, management and staff contribution, service efficiency and accessibility as the top key evaluation criteria. In totality effectiveness of library can be assessed in terms of facilities and provision of effective library services to the user. So the studies related to adequacy of library resources, awareness about resources as well as services of the library, staff competence and service quality in general and of agricultural libraries in particular have been discussed keeping in view the objectives of present study in the following sections.

2.2 Collection assessment and evaluation: Librarians have realized that the existence of library depends upon its users which persuade them to develop effective collection so that their information needs can be fulfilled. **Matarazzo and Prusak (1990)** rightly said that library value should be calculated in user terms. A library service is fit for its purpose only if it satisfies the needs and demands of the users not because it meets some standards thus can add value to the organization. **Purdy (1942)** emphasized that library resources of the university should be evaluated in relation to specific patron needs and must be included in day to day evaluation to know how much their needs have been fufilled. Library activities like circulation statistics and interlibraryloan requests of the library also help to determine the size as well as strength and weakness of library collection. Further university library users' like students, scholars and scientists depend on both print as well as online resources. Adequacy of library materials, services and facilities are closely linked to user perception about effectiveness of library as reported in the study about library effectiveness in agricultural libraries of Malaysia **(Majid et al, 2001).** Further study also found other factors like library promotion, involvement of users in selection of library material and user education programs of the library positively contribute in improving the perception of user about library effectiveness. **Siddiqui (2002)** in his study of Jawaharlal Nehru University library observed that majority of the users visit library to consult course and research material and found that use of print resources is still prevalent.He further added that meeting users' demands will thus have relevance not only in determining what material is required but also how it is arranged and how

user gain access to it. He pointed out that collection development in line with users' demands is the one of main activity of the university libraries. **Ching and Chennupati (2002)** assessed the library collection of Ministry of Education library, Singapore through citation analysis of documents published between 1980-994 and found that books were most cited followed by journal articles. Further library had only 20% of cited citations and rests were fulfilled through interlibrary loan service. The study recommended for change in acquisition policy and reduction in non-used journals. **Fombad and Mutula (2003)** in their study about collection development practices at the University of Botswana Library discussed about the importance of written collection development policy and considered collection is valuable only if it satisfies the intellectual needs of its patrons. They discussed various methods such as evaluation by subject specialist, bibliographic list checking, numeric counts, interlibrary loan request analysis, standard lists, and implementation of user surveys for development of effective library collection. Further selection of relevant literature is coordinated activity of librarians, faculty and students. **Tenopir (2009)** on the other hand also stressed upon usage of library collection and considered it to be the implied measure for measuring the value of library. Therefore, it is necessary for the library to have an evaluation criterion which can determine as how well patron needs are met cost effectively and how library system is integrating print and electronic needs in response to users' requirements. Library collection considered to be effective if it is developed on firm perspective of needs of its users. **Shivalingaiah and Gowda (2009)** reported in their study that user surveys were not conducted in most of the Indian universities to know the opinion about collection and services in the libraries which form the basis of library evaluation. **Kachaluba, Brady and Critten (2012)** also advocated for patron driven collection which is helpful in fulfilling user needs in a better way. They conducted study involving faculty to know their perception about electronic and print resources.**Sohail and Raza (2012)** recommended that customized library services provided to the users can better accommodate their needs and demands. **Seppanen and Laitinen (2012)** on the other hand reported that with the emergence of electronic resources physical library visits have been decreased and user preferred remote use. Lancaster university library in the west regularly conduct user's

satisfaction survey for providing better services to their users. **Ahmad and Panda (2013)** observed that majority of users tend to use electronic journals as the most preferred sources of information over the other e-resources to fulfill their academic requirements. They advocated for inbuilt method for assessing the user's need which can be regular user's satisfaction surveys that can be implemented for identifying areas for service improvement. Most of the university libraries have initiated this practice to have strong customer base and to improve the image of an institution. **Prakash and Patil (2013)** in their study on university libraries of India also revealed that users' needs should be considered for collection development but regular assessment of user satisfaction is lacking. Selection of reading material is the basic step in the procurement process. Libraries should acquire those documents which are in line with the requirements of the readers. The study advocated for user-oriented collection which necessitates involvement of teachers, researchers and scientists of the university in the document selection process for procurement by the library.**Sivathaasan (2013)** studied the impact of library collection on user satisfaction at University of Jaffna, Sri Lanka and used regression analysis to find the effect of different types of library collections on satisfaction of the user. He found positive relationship between the variables.**Johnson (2014)** also conducted study to evaluate the quality of services in academic libraries at United Arab Amirates (UAE). He assessed learning resources both print as well as online by measuring the satisfaction level of users towards its accessibility, information content, adequacy, richness and uniqueness.**Singh and Mahajan (2015)** assessed the collection of two universities of the Punjab region to know the perceptionof user about print and electronic collection of the libraries. Further an attempt was made to know the awareness of user about library collection development policies and procedures. It was found that the respondents were not aware of collection development procedures and study recommended for involvement of user in collection development process in order to have feedback and suggestions for effective library collection. **Nwosu and Udo-Anyanwu (2015)** in their study on collection development in academic libraries in Imo state Nigeria and recommended for increased involvement of faculty in acquiring material. In the same vein **Khan and Bhatti (2016)** also revealed that

selection of study material in the universities was done by the librarians recommended by the teachers and students thus advocated for user involvement in collection development process of the library. **Nikam and Shivakumaraswamy (2018)** in his study on user satisfaction with resource adequacy of libraries of engineering college of Mysore region found direct relationship between adequacy of library collection and user satisfaction. Adequacy of library collection is based on its quantity, quality and accuracy. The study used chi square test to find any significant difference in library collection and satisfaction level of the user. The study recommended that library must involve faculty and other users in selection of reading materials.**Wanyonyi, Odin and Sikolia (2018)** also reported similar findings in their study on effect of adequacy of information resources on user satisfaction at Pwani University, Kenya. They found that adequacy of resources has positive effect on user satisfaction and marketing techniques helped in creating awareness about resources and services of the library.**Ho (2019)** tried to measure the electronic resource adequacy of Federal university at United Arab Emirates.He tried to find the correlation for utilization of resources and research output of faculty during 2009-2016.Counter usage data about searches, sessions and downloads were collected for electronic resources used by the end users. The study found positive correlation and concluded that research productivity is highly correlated with library utilization if library resources are in line with user's demands. Enhancing quality of library collection helps to ensure greater user satisfaction and value. Diversity, completeness, timeliness and condition of physical as well as digital collection play a key role in user satisfaction and utlimatley in the quality of service **(Riyanto et al, 2023).**

From the above studies it is clear that user perception and satisfaction is closely linked with adequacy and usefulness of library collection. Most of the studies advocate for the involvement of library users in collection development activites.

2.3 Services in University Libraries: Libraries provide information services to their users. Library services help in better utilizationof library resources available in the library. User based library services which are helpful in optimum utilization of the information resources include Lending services; Library orientation and bibliographic instructions; Provision of general and specific information; Assistance in locating

documents or use of library catalogue; or understanding of reference books etc.; 'Literature search; Current Awareness Services **(CAS)**; Preparation of bibliographies; Indexing and abstracting, services; Reservation of library documents; Inter library loan; Maintenance of clippings; Reprographic services and Translation service.With the use of emerging technologies forms and format of library services have transformed. Electronic access to reference services **(EARS)** started in 1984 was earlier based on email technologies followed by internet-based reference service in 1992. Technology has made possible to introduce many new services which include electronic access to digital content such as databases, e-journals, e-books, digitized collection and other services such as webportal, personalized services, library instruction, online help, online document delivery etc. With the introduction of self-service technologies **(SSTs)** there is paradigm shift from professional mediated to self-service mode .While formulating any service three T's that is task, treatment and tangibles are most important in quality service design framework which can provide valuable insights in building robustness to service failure **(Stewart, 2003).**Thorough knowledge and preparedness affect customer satisfaction whereas courtesy, professionalism and attentiveness are believed to be important in face to face interaction rather than in the technology mediated context **(Froehle, 2006)**. The services follow a continuum from frontline to peripheral where staff and facilities have interaction with users. These can be grouped as Frontline services, Core and Peripheral services which are interrelated in such a way that subtle changes in any one type are expected to enhance or detract the users' satisfaction **(Johari & Zainab, 2007)**. **Idowu (2011)** enumerated various library services as per international standards " Reference services, Document delivery request services, Borrowing of document, renewing and reservation of library document, computer interactive search service, Technical services, IT services, Reprographic services, serial services, Exhibitions and displays, User education, Selective Dissemination of Information (SDI), Current Awareness Services (CAS), Referral service and other web based services.

2.3.1 Technology and Library services: Information communication tools are the main game changer in information management and played a key role in sustainable

development of nation. Technology has helped to widen the range of information resources as well as to add worth to their content. This has been done by making them digitally accessible so that the patrons have direct access to the information anytime, anywhere.The major noticeable impact of technological changes in libraries is the transformation from card catalogue to Online Public Access Catalogue **(Sridhar, 1995).**Internet and networking technology has also made possible to search catalogue of any library on the web. Technology has improved the quality of services by providing fast searching thus save time and effort which further result in satisfaction to great extent. Web based services have enabled the user to interact solely with appropriate user interface in order to get the desired results.With the advancement of internet and its allied technologies there is drastic change the way libraries provide services to the user as well as the way user choose to access them (**Chowdhury & Margariti, 2004**). Higher educational instituions particularly the universities have taken lead in implementing technology based services in the libraries.**Cholin (2005)** discussed the role of INFLIBNET in implementation of information technology in Indian university libraries. He pointed out that ICT has helped in achieving efficiency, productivity as well as excellence in service provision of libraries with special emphasis on UGC-INFONET E-journal consortium. There is a trend towards electronic delivery of article in ILL. **Bhatnagar (2005)** discussed about web based services and pointed out that web-based document delivery adds value to the service of the users. She emphasized on different internet based services. She added that virtual tour sare replacing image maps. Users can update themselves through services like Table of contents (TOC), email alert service as preferred by the users. **Jeevan (2007)** also shed light on web-based content, CD-ROM Network and consortia based services. **Bhatia and Vohra (2007)** stressed upon the need to revolutionize the service provision in libraries by highlighting the trends in technology mediated reference and information services in the contemporary digital era. **Nielsen and Hummelshoj (2007)** highlighted about chat reference service better as compared to email which make possible better interaction with the user as synchronous way of communication. Web 2.0 tools like Blog, Wikis, Rich Site Summary (RSS), IM (Instant messaging), and podcast are

considered to be the best in service provision for academic libraries **(Hanson & Cervone, 2007).** Various new forms of services like podcasting, wikis etc. added new dimensions in provision of reference service **(Lukasiewicz, 2007).** New emerging tools such as RSS feed has transformed the way current awareness service of the library provided to the library which can be integrated with library catalogues and journals database to inform the user about new purchases and publications **(Kajewski, 2007)**. With the intervention of technology overall quality of library services was found to be improved **(Sharma, 2009).** Today almost all the academic libraries are providing access to digital resources and electronic services like digital reference, online documents delivery, information skill tutorials etc. to complement information search process. Most of the Indian university libraries are providing hybrid kind of services i.e. both conventional as well as ICT enabled services to their users which was confirmed through studies by **Shivalingaiah and Gowda (2009)** at Karnataka university libraries, **Ranganadham and Babu(2012)** in Osmania university library at Hyderabad and **Saikia and Gohain (2013)** at Tezpur university library.**Khan and Khan (2010)** also reported the availability of automated services in Indian university libraries surveyed by them. The services provided were access to internet, e-resources and consortium-based services. Further **Krubu and Osawaru (2010)** pointed out that ICT has helped not only in automating library core activities but also in library resource sharing activities; development of institutional repositories of local digital content and initiation of ICT based programs for the users.**Tyagi (2011)** conducted a study to know the awareness and perception of faculty, research scholars and students of Indian Institute of Technology, Roorkee with regard to use of electronic information resources. The study showed that majority of the respondents was highly aware and satisfied with online resources of the library. Further they perceive electronic information resources better for current and comprehensive information. Perception of respondents regarding use of electronic resources in meeting information needs was found to a very high extent.**Madhusudhan and Nagabhushanam (2012)** pointed out that though most of university libraries of India are offering internet based services yet there is need to exploit full potential of web forms thus lag

behind in effective utilization of websites. Various library activities like acquisition, technical processing, storage, retrieval and dissemination etc. have been be improved with the application of ICT **(Kasalu & Ojiambo, 2012).** Information about new arrivals as well as databases can be created with the use of ICT techniques **(Khademizadeh, 2012). Singh (2012)** pointed out that most of agricultural libraries have transformed and improved their services but library websites are more in static form which needs to be developed further by using web 2.0 technologies. **Rajagopal (2013)** studied the overall effect of information technology in service quality improvement of health care services like service delivery, administration, accessibility, reduction in workload etc and found that e-literacy help to improve accessibility and opined that better services can be provided with adoption of technologies. **Elavazhagan and Udayakumar (2013)** conducted study to know the perception of users towards the use of e-resources in BITS-Pilani at Hyderabad campus. Faculty members and research scholars of the institute were selected for survey. The study found high level of awareness about e-resources by the respondents and they perceive e-resources to be time saving, flexible and effective. **Kahre and Patil (2017)** observed that how library services had transformed with the the developing web technologies and discussed about emerging web tools 2.0 and 3.0 which can be used to provide new directions for quick and better services to the users. Similarly **Chaddha (2017)** explained about mobile based services and significant changes in the ways our libraries provide services from stack-only library to mobile accessible library and access to quality resources with much ease through mobile app. **Ankamah, Akussah and Adams (2018)** conducted study about perception of the postgraduate students regarding the use of ICT in research at Ghanian public universities and found that users consider use of ICT in research is very important and ICT has helped in quick access to uptodate information conveniently without any wastage of time . **Rao, Rao and Bhat (2018)** conducted a study of semi-professionals to know their perception towards use ICT in day to day working at Manipal academy of higher education libraries. The study consisted of 58 library professionals working in institutional libraries and found that respondents are now in a position to provide quick, accurate

and current information services to their users**. Mahanta (2020)** conducted a survey to know the opinion of users towards use of ICT in college libraries at Assam. Users showed positive attitude towards ICT in library services. The study found that with the application of ICTs various library services have improved and it has become easy to search the information. **Munshi and Faizen (2020)** conducted study to know the users' perception towards ICT services and facilities in central library at AMU. They found positive attitude of the user towards application of ICT in quick information retrieval and access. Users find services like e-mail and social networking sites are helpful in quick sharing of information. **Ndou and Chilimo (2021)** conducted user's survey at the University of Venda, South Africa to know the perceptions of academics about electronic resources. The study tried to find the awareness, attitude as well as usersatisfaction towards e-resources of the library. It was found that majority of users were aware of e-resources and opined that e-resources provided easy searching facility; linkage to additional information etc. and influenced the perception of users towards access to e-resources. **Dwivedi and Verma (2022)** in their study about awareness and perception of the users of Gautum Buddha Central Library, BBAU, Lucknow towards the use of E-resources revealed that e-resources to be very helpful in study and research as perceived by most of the users. **Singh and Singh (2022)** tried to understand users' attitude towards information technology application in selected two university libraries of North India through survey of Postgraduate students, researchers and faculty in the field of social sciences and sciences. The study found positive attitude towards the use of information technology in library among the users of both libraries.

It is clear from the above studies that with the use of information technology libraries services have transfomned. Though libraries are providing web based services to the users yet there is need to fully exploit the potential of web forms. Users were found to have positive perception towards use of information technology.

2.4 Skills and competencies among staff: Library staff is the live link between collection and users without which libraries can't be imagined as functional unit. They are the main conduit between users and service thus has to continuously improve their capability to serve users in better way. They are important in designing,

promoting, educating and training people to use information resources and knowledge access tools. Libraries are incorporating new technologies and tools for providing quality services to the users and at the same time library professionals are also facing challenges of learning new tools. Skills of information provider play an important role in developing quality system **(Delone & Mclean, 1992).** In any organization there is always a need for upgrading the skills regularly at every level as the information environment keep on changing due to ongoing technological developments. Knowledgeable and trained staff is needed for effective system interaction **(Rosenquist-Bhuler, 1996)**. To deliver quality services library staff should be given support, motivation and resources to upgrade their skills. Staff development is needed in all areas like training on information analysis tools, technical skills, troubleshooting and other software related aspects. Lack of skills leads to lack of confidence which may be the cause of resist to change. Lack of technical support for non-technical staff can also be one of the reasons for lack of skills. Supportive environment enables the staff to learn and perform well. The new competence, experience and learning agility lead to more effectiveness for users and other stakeholders. **Mu (2001)** pointed out that academic librarians need to continue to adapt new technologies and should recognize that concepts critical to educating the users. Skills and abilities of the library staff considerably affect the use of resources by the user thus may result in satisfaction or dissatisfaction of the user. Customer friendly staff is above all for exceptional customer service. Sincerity and commitment of the library staff affect the customer satisfaction which ultimately determines the service quality of library. Appearance, competence and professionalism of the customer service personnel affect the service quality perception of the user **(Nguyen & LeBlance, 2002).** Adequate staff strength with necessary information handling skills, communication, and e-literacy etc.considerably affects the services of library **(Ramesha, Kanamadi & Kumber, 2004)**. Continuing professional development programs have resulted in improvement of library service design and delivery activities **(Raina, 2005)**.**Chang and Holland (2005)** in their survey of users' satisfaction about reference service stressed upon education and training of librarians in conducting reference interview and providing information. **Froehle (2006)** also considered courtesy, professionalism,

attentiveness, knowledgeableness; preparedness and thoroughness to be most important customer service relationship characteristics which are associated with task and relationship building. Knowledgeableness, preparedness and thoroughness are related to task oriented activity whereas courtesy, professionalism and attentiveness related to relationship building. The study found that task related characteristics were found to be more significant in technology mediated services.Users at the remote locations not only require round the clock access but also one-on-one help and comprehensive information describing full range of services **(Poll & TeBoekhorst, 2007).** Training, interpersonal skills and customer friendly policies play an important role in satisfaction of the user **(Miao & Bassham, 2007). Haneefa (2007)** revealed that ICT skills and expertise were not satisfactory in Indian university libraries. **Babu, Vinayagamoorthy and Gopal Krishnan (2007)** found in their study at Tamil Nadu university libraries that library professionals lack knowledge about network and digital library services. **Helms and Mayo (2008)** found in their study that employee behavior, competencies and responsibilities at poor level cause customer dissatisfaction. Awareness about emerging web tools was found to be low. ICT competencies of library professionals were also found to be low in Nigerian university libraries **(Archibong, Ogbiji & Anijao-Idem, 2010).** Higher level of ICT competency is necessary for enhanced library services. Service quality has positive influence on customer satisfaction which in turn leads to customer happiness and loyalty. Organizational success also depends on manpower and its performance **(Kannappanavar & Kumbargoudar, 2010)**. Service performance, delivery and environment are the predictors of service quality. Moreover university's vision and human resource development policies, readiness towards information technology, courses offered etc. significantly affect the competencies of library professionals **(Tanloet &Tuamsuk, 2011)**. Periodic training of the staff is necessary in order to update the skills necessary for providing quality information services **(Singh, 2013).**

Charkravarty and Sharma (2013) tried to analyze core, behavioral and technical competencies of the university library professionals at Chandigarh. They found that there is strong need to develop in all the domains of competencies with much emphasis on technical part due to fast changing techologies and organization should

give ample opportunities to the employees to attain higher level of competencies. **Hussain (2013)** in his study about ICT based library and information services at B-schools of NCR region concluded that attitude and skills of library professionals affect the service delivery process. Skills can be upgraded through training, seminars conferences etc. He further added that trained professionals will have positive attitude which help in development of effective library services. **Chawner and Oliver (2013)** in their survey of New Zealand academic librarians found that technology skills, customer skills, and computer troubleshooting skills were considered important in addition to traditional reference skills. They further stressed on instruction and outreach considered to be more important for reference librarians which can be managed through the use of social media. Skills of the librarians and competencies are necessary to be more successful in mediating user information needs **(Namugera, 2014). Seena and Pilliai (2014)** analyzed the skills of library professionals for web-based services and concluded libraries should frame specific goals and strive to achieve it. Staff readiness and staff satisfaction is positively correlated with service quality. Staff readiness is identified with willingness and ability to attain new knowledge **(Ranaweera, 2015). Nkamnebe et al. (2015)** in their study about information communication skills of university librarian in Nigeria found to be moderately skilled in information search and retrieval. Libraries should devise mechanism to interact with the users. **Ahmed and Rehman (2016)** tried to assess ICT competencies of librarians of public sector universities at Khyber Pakhtunkhwa, Pakistan. It was found to be unsatisfactory. Further training in establishing and maintaining digital libraries and in using institutional repository software was foremost needed. The study concluded by acquiring ICT skills qualitative and standardized services can be provided. **Deodhar and Powdwal (2017)** discussed the importance of special training programs for library professionals and advocated for regular training for organizational success. **Singh and Kushawaha (2020)** conducted study to assess information communication skills and competencies of library professionals in eastern state university libraries of U.P. The study found that they possess only the basic skills of ICT and are facing problems in developing the required skills. **Ahmed and Sheikh (2021)** conducted a study to measure information

communication skills of library professionals and highlighted that higher level of ICT competency particularly the information retrieval skill plays key role in providing enhanced library services. Staff attitude goes long way in effective library service delivery which influneces the patronage of library resources. **Oden and Owolabi (2022)** conducted study in university libraries at Nigeria to know the impact of staff attitude on service delivery.The study found that staff attitude had significant influence on service delivery and recommended that library staff should qualified and skillful with right disposition for regular assessment and evaluation of users' needs. **Bolasco (2023)** opined that librarians must gain digital skills in view of technological advancement for providing efficient and effective library services services. He commented in his study that acquired knowledge and skills related to digital technologies siginificantly influence the utilization of technologies in managing the digital services. In the same vein **Hamad, Al-Fadel and Shehata (2024)** in their study of about digital competencies at academic libraries in Jordan found positive relationship between level of digital competencies and level of smart information services which ultimately affect the service quality. **Badenhorst and Raju (2023)** in their study tried to identify competencies required for the professionals in providing research data management services. They found key competencies like information and data management, repository management, data curation, data collection, ICT and digitization etc. and highlighted the importance of training to manage the services effectively.

From the above studies it is clear that skill and competencies of the library considerably affect the use of resources and services which ultimately has impact on user satisfaction. Most of the studies recommend for upgradation of skills particularly the technical competencies in view of technological developments

2.4.1 Library service awareness and use: Creating awareness about products and servicesof an organization distinguishit from its competitors. Awareness about variety of products and services offered by an organization has a great impact on maintaining a long term relationship. Awareness about service or product in mind of user for a considerable amount of time helps in motivating for its use. User orientation/ education program aims to help the user in making user aware about resources and

services of the library. Service value and marketing affect the consumer's decision making related to services and service delivery system. Policies of the institution and administrative support play vital for the success of user education programs. The importance of information literacy programs has been realized in the recent past to make the user self-sufficient in getting the required information. User education and awareness programs conducted by the library considerably affect the use of library resources and services which may lead to satisfaction or dissatisfaction of the user. **Yang (2000)** while measuring the perception of faculty reported that there had been increased in the use of library resources and services due to liaison programs of the library. **Simmonds and Andaleeb (2001)** also discussed about usage of academic library which is greatly influenced by user's awareness and resources of library which inturn affect the service quality. According to **Xia (2003)** unfamiliarity results in low frequency of use and dissatisfaction as access to resources is important aspect in evaluating user's satisfaction. In similar vein **Haneefa (2007)** asserted that lack of training and orientation is the key problem towards optimum use of resources and services of the library. **Shrivastava and Nandwana (2007)** opined that user education programs play significant role in optimum utilization of library resources in networked environment and should be the regular conducted in the library. Relationship marketing is considered to be essential tool in ensuring that services provided meet the needs of the users **(Ladhari & Morales, 2008). Popoola (2008)** in his study also found significant relationship between awareness of library services and products and its use.Information literacy course help the students to have easy access to resources and services of the library. Literacy program inspires the users to make use of the library **(Ajegbomogun, 2009). Shivalingaiah and Gowda (2009)** highlighted in their study at Karnataka university libraries that majority of the scholars were unaware about availability of services leading to non-use of services and dissatisfaction. **Loprinzo (2009)** in her study about perception and awareness of library services of public library asserted that it is essential to know level of users' awareness about various services for further improvement as such studies help in identifying those areas which need improvement.User awareness and confidence play an important role with regard to use of service which ultimately has significant impact

on customer satisfaction **(Keswani & Chaturvedi, 2009). Mokotjo and Kalusopa (2010)** while evaluating agricultural information services in Lesotho asserted that lack of promotion and training hinders the utilization agricultural information services. The study recommended for regular training programs and active promotion of services for its better utilization. Users' education programs should be carefully planned as per the level and requirements of the different users**.Natarajan et al. (2010)** in their study at Annamalai University about usage of library resources revealedthat despite the availability of range of e-resources lack of awareness and subject coverage were the key reasons for low usage. Further lack of information literacy skills resulted in restricted access as well as use of e-resources by the researcher **(Angello, 2010). Bhat (2017)** conducted study to know the usage of e-theses in agricultural libraries of northern India. Further study tried to know the satisfaction level of users with adequacy and availbility of e-theses.

Chen and Lin (2011) found direct impact of information literacy and user education programs on usage of library resources and services which ultimately play a role in service quality. Information literacy course has positive impact on users' perception in terms of ability to use, perceived usefulness, quality of information, system quality and user satisfaction. **Sharma (2017)** carried out impact assessment study of library course in an Indian Agricultural University of northern India and found positive effect on student ability to use the resources. **Fatima, Ahmad and Ahmad (2011)** also revealed that use of library portal by the user is greatly affected due to lack of awareness, training and guidance. Poor level of adaptation to the use of information communication technology resources of the library calls for proper awareness of the same through effective communication channels. Lack of awareness about existing resources and services of the library may result in dissatisfaction of users **(Ramos and Abrigo, 2012).**User training programs also need careful planning which ultimately affect the awareness and utilization of library resources. Extensive user surveys help to develop need-based collection and proper training programs help in optimum utilization of the same. Further user education should not be limited to library orientation only but should also include bibliographic instruction and information literacy programs for effective utilization of the resources **(Aderibigbe &**

Ajiboye, 2013). Ahmed and Panda (2013) found that lack of awareness has resulted in ineffective use of e-resources particularly CD-ROM databases and OPAC services. **Oloteo and Mabesa (2013)** in their study at state universities and colleges in Bicol region recommended for library marketing strategies for satisfaction of library customers. **Taha (2013)** recommended for e-literacy into classroom courses to overcome the problems faced during research studies. Proper understanding of the library and its use through user education programs affect the satisfaction level of the user and it should be done on continuous basis. **Ahmad (2014)** conducted users' awareness survey of IIT libraries regarding library software and extent of use of OPAC. The study found positive relationship between awareness and utilization of services. **Seena and Pillai (2014)** in their study about awareness, skills and attitude of library professionals towards ICT at Kerala university found that they were having average level technological skills and agreed that with the application of ICT library services have improved. They advocated for awareness of library professionals as well as user through workshops, seminar, training programs and lectures.**Patil and Pradhan (2014)** also suggested similar ways like information literacy programs, workshops/training for promotion and marketing of the services. Any form of awareness program increases the interest of user to participate which further helps in utilization of resources **(Dutta & Paul, 2014).** They studied the awareness level of faculty members regarding institutional repository and concluded that library professionals should take lead in creating awareness about resources of the library. It is the need of the hour to promote digital services to improve the awareness of services and how to use them. **Zha, Xiao and Zhang (2014)** found that user training to be essential for new as well as for experienced users with regard to use of digital libraries. **Khan (2015)** advocated for proper training programs, user education programs, seminar etc. to educate library users for proper utilization of resources and services.Usage of library services has a direct link with awareness of library users. Further user education program positively affect the usage of library and their academic performance which ultimately influence service quality perception **(Uwakwe, Onyeneke & Njoku, 2016**). **Edem (2016)** reported similar findings in his study about awareness of faculty for resources and its utilization in teaching and

research in agricultural library at University of Calabar, Nigeria. He found that lack of awareness and orientation resulted in low utilization. **Tamarkar and Garg (2016)** highlighted in their study about relationship of user education programs, usage and service quality. **Deepa and Abdul Azeez (2016)** in their survey about the use of web based resources and services at university of Calicut recommended for awareness about web services. Users' awareness and attitude of the library staff significantly affect the overall quality of services. Lack of awareness was found to be one of the reasons for service quality gap. Therefore effective user education/awareness plays an important role in service quality management **(Sajna & Haneefa, 2018). Dukper, Sakibu and Arthur (2018)** in their study of technical university at Ghana assessed the extent of awareness and utilization of electronic library resources by the students. The study found close relationship between awareness and utilization of library resources and concluded that low awareness of resources resulted in its low utilization. **Donebedian, Carey and Balayan (2018)** conducted a survey to determine the awareness and use of library resources and services by the instructional faculty of two Armenian universities. The study found that very less respondents were frequently using the services and usage varied with factors like academic status, length and type of employment etc. **Iqbal, Inam and Qayyum (2021)** tried to find the role of technology in service quality perception and awareness in promoting customer loyalty and satisfaction in financial institutions. The study found direct and positive relationship of service quality and awareness with customer loyalty.

2.4.2 Technology and Awareness: Technology has paved an easy way to reach out to the user. Marketing skills are necessary for optimum use of digital resources. To arouse the interest of user in patronizing the library and use of resources, ICT play significant role in publicizing library resources and services. Today Library website has become effective medium in reaching out to their users and in promoting use of electronic resources. **Kaur (2009)** observed that though free information is available on the internet there is urgent need to make the user aware about value added services and information resources so that value of the library is recognized. **Mandal (2011)** discussed the importance of blogs as promotional as well as feedback tool through which library patron can provide information about their experience and can be

guided to improve further. Most of the libraries are using Web 2.0 technologies and social media tools to market their resources and services. **Mu and Kem (2011)** emphasized the role of new technologies like RSS and social bookmarking as current awareness tool in academic libraries. **Balaji B and Kumar (2011)** conducted study of southindian technological universities to find the use of social media and web 2.0 technologies in providing library services to the user. They found less use of web 2.0 tools by the librarians in service provisions and advocated that librarians should develop necessary skills. **Singh (2012)** emphasized to make information literacy course more interactive with the use of social media technologies. **Kathuria and Kaur (2013)** also advocated for the use of social media in promoting library resources and services. **Namugera (2014)** insisted that promotion and marketing along with end user training programs are essential to create user awareness about information products and services. **Shukla and Babbar (2016)** found that effective marketing strategies bring resources and users closer. Effective marketing plan calls for the involvement and coordination of entire library staff towards single objective which is user satisfaction. Marketing activities create awareness among the library users which prompts them to make use of resources and services. **Sriram (2016)** asserted that social media is all about participation sharing and creation of content and all these features are of great importance. Social media tools like facebook, Twitter, LinkedIn etc are very useful medium in quick sharing of information with the users. He emphasized that with the use of facebook communication between user and library can be effective. Social media tools are helpful in improving the image and visibility of the library so that more users are attracted to the library which is the main goal library**.**

From the above studies it is clear that awareness and utilization of library resources is directly related with user's satisfaction. Technology has paved the way for easy reach to the user. User can be provided innovative services through the use of networking technologies. In view of techological developments libraries can use various social media tools to market their services and products which can affect the users' perception towards libraries.

2.4.3 E-service quality: Today libraries are expanding into virtual spaces so user's friendly interface, currency, interactivity, attractive design along with assistive tools are considered to be the important features for educational website nowadays as it is the first contact point for any information. Library portals make libraries more customers centric, provide more visibility and result in better customer relations **(Lakos & Gray, 2000).** In the networked environment there is a need to find new and relevant performance indicators for libraries **(Brophy, 2001).** Website of library is now an integral part of a library's identity and library users prefer to visit library virtually than physical visit. Library websites are evolving into information gateways unlocking access to library resources and services **(Battleson, Booth & Weintrop, 2001)**. User visits the website because of its content which determines the user's satisfaction **(Aladwani & Palvia 2002).**So, it is important to measure overall customer assessment and judgment in relation to excellence in service quality of e-services **(Santos, 2003).** Evaluation of academic libraries therefore should not only include physical facilities and print collection but also electronic resources as well as their usage **(Shi & Levy, 2005). Hernon and Calvert (2005)** pioneered the library e-services research and define electronic service quality as to how much extent the website facilitates the intended transaction. Quality information should be relevant, interpretable, accessible, accurate and complete in all respect **(Nicolaou & Mcknight, 2006).** Quality of service in case of remote access is associated with electronic resources and services. Remote access users require point-of-need or just-in-time help. Library e-service quality is multidimensional construct. **Collier and Bienstock (2006)** described E-service as dimensions (i) Usability which refers to customer ability to get information or ratify transaction without much of the effort (ii) Content of the website should be updated and currently reviewed. It should be reliable and error free. (iii) Support in terms of technical help, guidelines and advice all have an impact on quality. **Hu et al (2008)** found Security, Convenience and Perceived usefulness were the key determinants of service quality in their study on eTax services. Service quality of information system consists of readiness for service, safe transaction; availability, individual attention and users' specific needs. ICT application has resulted in globalization of information resources which has helped

the users in accessing wide range of resources from anywhere **(Krubu & Osawaru 2011)**. **Joo, Lin and Lu (2011)** proposed usability evaluation model for academic library website which include dimensions Efficiency, Effectiveness and learnability. The availability of abundant information on the web has helped in expanding the research services to the users beyond the library premises **(Taha, 2012). Kiran and Diljit (2012)** proposed three factor model to measure the web based service quality which included service environment quality, service delivery quality and service outcome quality. **Kincland Strach (2012)** in their study identified content and navigation as key ingredients of website quality from user perspective. **Iqbal and Warriach (2012)** while evaluating academic library website of University of Punjab, Lahore found two criteria Affect and Efficiency to be more important. Libraries are now providing access to various electronic resources through its dedicated web page so website design, navigation and personalization play key role in overall evaluation of e-service satisfaction **(Allahawiah, 2013). Zha, Xiao and Zhang (2014)** pointed out that service quality construct of digital libraries involves four aspects viz. dependable services, prompt services, personalized services and professional services. **Einasto (2014)** also pointed out user friendliness along with reliability, security, speed, credibility, competence, responsiveness and aesthetics to be the important criteria for successful digital service environment. Functionality, information usability and security are the important dimension of e-service quality. Users' satisfaction is greatly influenced by different library service attributes which ultimately determines the service quality of library. **Becker, Hartle and Mhlauli (2017)** in their study about assessment of use and quality of services at Peninsula University of Technology found that though students prefer to use online resources still they want face-to-face interaction with library staff. **Kaushik (2015)** in his study of website evaluation of National Institutes of Technology stated that clear mission statement, currency, reliability, effective searching interface along with use of web 2.0 technologies considered to be essential indicators for evaluating the quality of library website. He found that most of websites were lacking in mission statement, currency, Web 2.0 features and cloud-based services. Navigation, download speed, personalization, ease of use and accessibility are the key criteria for assessing web. Continuous evaluation

of library website should be done in this dynamic environment. **Einasto (2019)** discussed about eUTLibQual instrument which does not use gap score approach. It implements performance only measurement score just like SERVEPRF. He identified four dimensions affecting e-SQ (i) Communication (Librarian to users) (ii) Content related to information provided or mediated by library (iii) Access related to user-information interaction (iv) Web Design. **Wan Mansor (2022)** tried to evaluate information system at the University library of Sultan Azian Shah based on dimensions of Delon McLean model which were system quality, information quality, service quality, use, user satisfaction and net benefits.

It is clear from above studies that evaluation of e-services has become important in the virtual environment. Various dimensions such as design, navigation, ease of use, personalization, accessibility etc. can be taken for assessing the e-services. E-service quality can be gauged through user satisfaction with the various e-service quality parameters.

2.5 Service quality and User satisfaction: The process of service quality assessment in the libraries help to identify the weaker area where improvement is needed and demands of the users can be taken care properly. Quality management programs help in achieving the efficiency and improvement of image. Success of any information system depends on information quality, system quality and service quality **(Pitt, Watson &Kavan, 1997).**Service quality and satisfaction are distinct but related construct. Service quality is the long term examination of the expectations of the customer whereas customer satisfaction is the short term measure related to personal and emotional reaction to service **(Altman &Hernon, 1998).**Quality is continuous process where customer is the key determinant **(Thapisa & Gamini, 1999).** Customer satisfaction is defined as an affective reaction to an incident during the dispensing of a service **(Diaz & Ruiz, 2002).** The ultimate goal of university library is the core satisfaction of user for which the library collection is built, maintained and preserved for providing range of services to their patrons.**Simmond**

and Andaleeb (2001); Cullen (2001) stressed upon measuring the users' satisfaction in improving the efficiency of library and commented that "User satisfaction is one method of evaluating the effectiveness of library services". Therefore it is imperative for the libraries to include users' analysis in their collection development activities of how well the information resources and services currently meet their patron needs as well as will continue to satisfy the prospective patrons. User satisfaction measures include awareness, accessibility, expectations, reasons for service use and nonuse, improvement needed etc. Perceived usefulness lead to satisfaction which relates to service quality. **Miao &Bassham (2007)** opined that customer vision/mission statement defines specifications to follow in order to achieve quality. Libraries should identify the potential areas to work with for improved services. Customer satisfaction and dissatisfaction result from experience encountered and its comparison with given standard **(Helms & Mayo,2008).** Customer friendly staff is above all for exceptional customer service. Sincerity and commitment of the library staff affect the customer satisfaction which ultimately determines the service quality of library. Service quality is the forerunner of customer satisfaction and the satisfied customers are more likely to have more positive word-of-mouth and repurchase.**Jayasundra, Ngulube and Minishi-Majanja (2009)** proposed theoretical model to predict customer satisfaction in relation to service quality. They found responsiveness, supportiveness, building environment, collection, access, and web services were the quality domains to predict customer satisfaction. **Hakala and Ngren (2010)** observed that library operations can be assessed by measuring the customer satisfaction. They found positive correlation between customer satisfaction, library services and overall image of the university. **Kiran (2010)** emphasized that if the users continually experience satisfaction with service provided they perceive the service to be of high quality as customer satisfaction is function of performance. **Ayob and Sendut (2011)** opined that activities like

involvement of the user in selection of library material and user education/literacy programs lead to enhanced perception of library effectiveness. Information technology has impact on users' expectations which affect the service quality **(Rasul & Sahu,2011).** Majority of the users like to use social networking sites for knowledge sharing. **Jayasundara (2013)** identified different determinants of customer satisfaction which can be helpful in setting up quality assurance while conducting study at Fijian university libraries. He stressed for increasing the level of customer satisfaction for uplifting the quality of library services. Good service results in customers delight which are profits of the library whereas bad service can be computed as loss **(Hossain & Islam 2012)**. According to **Shah (2013)** the real meaning of service quality is user satisfaction i.e. good or bad, suitable or not suitable so service quality is abided in user satisfaction. He concluded in his study on user satisfaction that level of user satisfaction is enhaced with improvement in service quality. **Sophia (2014)** pointed out that user satisfaction is the measure to assess the service quality**.**Users' satisfaction therefore plays a decisive role in determining the service quality of an academic institution. It is important to measure the satisfaction level of user in order to improve the service quality of library (**Oman, Sriram & Rajev, 2014**).**Mohindra and Kumar (2015)** found in their study that environment of library and library services greatly influence the user satisfaction level.**Mathurajothi and Venkateswaran (2018)** found significant relationship between service quality, user's satisfaction and user's loyalty. **Mallya and Patwardhan (2018)** used importance performance matrix technique to identify the strengths and weakness if various areas of academic libraries based on users' perception about library services. Personalized services can affect the satisfaction of user which in turn affects the service quality. Performance delivery and environment is predictor of service quality. Better service quality positively affects the customer satisfaction which results in customer happiness and loyalty **(Gong & Yi, 2018).** Promotion

also has significant impact on user satisfaction. **Johoran (2019**) in his study involving the users of main library at University of Colombo to see the effect of marketing mix elements on customer satisfaction found positive linear correlation between product and promotion elements with library user satisfaction. Information quality, System quality and Service quality positively affect the user satisfaction **(Alotaibi & Osman, 2020).Alam (2020)** measured the effect of SERVQUAL dimensions on user satisfaction and found that tangibles, staff responsiveness and resources of the library considerably influence the user satisfaction. **Amarasekara and Marasinghe (2020)** also conducted study about user satisfaction with library resources and services of library of Open University at Sri Lanka. User satisfaction was evaluated under parameters like library facilities, staff, services, library resources, and library website and information access. The study found that users were not much satisfied with user awareness & training programs and recommended to conduct more information literacy programs. **Suharto and Kadir (2021)** conducted user satisfaction study on digital library and found system quality; service quality and information quality possess significant positive relationship with student's satisfaction. **Mursidah et al. (2022)** tried to evaluate the service performance of its library institutional repository by measuring the level of user satisfaction. The study also helped to identify the service indicators that could be prioritized for quality improvement.

2.6 Service quality assessment studies: User surveys play an important role in gathering data about perception, performance and satisfaction with resources and services of library. They help to recognize the utility of deep expert knowledge of librarians to students and faculty in accessing information to fulfill their academic needs. Many instruments are in being used by the libraries to gauge the service quality. Surveys can be designed locally or customized survey tools like SERVQUAL, SERVPERF, LibQUAL+, DigiQUAL etc. can be used to know the user perception about library. "There has been continuous pressure on the libraries to have

outcome-based assessment methods which can showthat how well an organization is serving its users thus efficiency and effectiveness of an organization can be measured. The are three level of service given as under:

- **Minimum:** It is the minimum level of the service which users can be acceptable to them. .
- **Desired:** It is the actual want of servive by the users.
- **Perceived:** It is the state of quality that they are actually receving currently from the library. (Rao, 2012).

Parasuraman et al (1985) developed SERVQUAL instrument for measuring the service quality. They defined service quality as the differencein the expectations and performance along with different quality dimensions. The instrument consisted of set of twenty-two pairs of statements based on five interrelated factors/dimensions such as tangibles, reliability, responsiveness, assurance and empathy. Though it was developed for business sectors but it has also largely been used in library & information centers. Later on, other instruments based on SERVQUAL were developed to assess the service quality in library settings. Some studies argued that perception score alone could better explain the service quality performance **(Cronin & Taylor, 1992; Andaleeb & Simmonds, 1998).** A modified version of SERVQUAL which is SERVPERF based on perception only measurement score was also used by the researchers. It is modified version of SERVQUAL developed by Cronin & Taylor in 1992. The instrument measures the quality based solely on current performance and uses the same twenty-two statements but does not repeat the set of statements as expected items thus have better predictive validity **(Landrum, Prybutok & Zhang, 2007).** The Association of Research Libraries (ARL) has developed LibQual+ to measure the users' perception of service quality in libraries. The quality of service can be determined by measuring the satisfaction level of the user. **Johari and Zainab (2007)** tried to measure service performance of university library at Malaysia by assessing user's satisfaction with the services using modified SERVPERF instrument and found that users were having problems in accessing electronic resources. Further they were not satisfied with layout, navigation and

support interactivity facilities of the website. **Haridasan and Khan (2009)** measured user satisfaction with e-resources and observed that users were satisfied with e-resources availability and its use at NASSDOC. **Sharma (2009)**also found that e-resources were sufficient for all existing discipline. On the other hand **Kassim (2009)** found that respondents were relatively most satisfied with the infrastructure as compared to collection and services. **Arshad and Ameen (2010)** observed that overall service quality was somewhat good at university libraries in Punjab state of Pakistan. **Kaur (2010)** in her study at university of Malaysia observed that university library users who are able to inculcate confidence in them rated helpfulness of staff as the best service. **Somaratna and Peiris (2011)** conducted a study to investigate dimensions of library service quality at University of Colombo from user's perspective and identified seven dimensions which were service delivery by staff, collection and access, e-resources and awareness, physical facilities, information control, library catalogue and security. **Khan and Zaidi (2011)** reported in their findings that users were satisfied with infrastructure and organization of their collection in the library**. Tyagi (2012)** also highlighted in his survey that most of the users found to be satisfied with e-journals and databases collection while surveying Dr. ZakirHussain library of Jamia Milia Islamia. **Sohail and Raza (2012)** reported that most of the respondents overall perceive service quality to be average and positively responded with reliability aspect of service quality. **Kumar (2012)** reported in his findings that users of Kerala university libraries were moderately satisfied with collection, physical facilities, staff behavior and services. **Jena and Dalbera (2013)** during their study at technical colleges of Odisha found library services to be unsatisfactory and confirmed positive relationship between various service quality attributes and customer satisfaction. Further with respect to e-resources and digital library software was lagging behind the expected level of users significantly. **Nawarathne and Singh (2013)** reported dissatisfaction of respondents with check out system of library materials, internet facilities, library hours and availability of information through online catalogue during their study of academic libraries at Sri Lanka. **Hossain**, **Islam and Saadi (2013)** tried to evaluate users' experiences of service performance of university libraries at Bangladesh by developing service

performance matrix using SERVPERF scale. They mapped service performance index and service strategy index of different service items onto service performance matrix. The various service items comprising dimensions of service quality included resources, competence, responsiveness, demeanor and tangibles. **SheelaDevi (2015)** in her study on service quality in university libraries of Haryana revealed average level of user satisfaction with library collections, staff and services**. Mohindra and kumar (2015)** used SERVQUAL instrument to find any significant difference in the level of servcie quality attributes like environment, collection staff and services across different disciplines. Further the study found significant positive correlation among variour service quality attributes and user satisfaction. **Krishnamurthy and Awari (2016)** while evaluating information resources and services of Karnataka university library reported that user education programs should be conducted for more visibility and library authorities should create library websites. **Dash and Padhi (2016)** developed library service quality assessment scale using qualitative and quantitative measures for measuring the users' perception of service quality which includes Library infrastructure and Environment, collection of libray , services and staff as dimensions of service quality. **Sohail and Ahmed (2017)** evaluated user satisfaction with regard to awareness and use of e-resources at Fiji National University and found that innovative library services and information literacy is need of the hour for effective library services. **Bhanu Partap (2017)** conducted study to measure library service quality study using LIBQUAL+ at Chaudhary Charan Singh Haryana Agricultural Univerisyt, Hisar. The study found that the respodents were overall satisfied and suggested to give more emphasis on the improvement in all areas. **Sajana and Haneefa (2018)** in their study about service quality of Indian council of Agricultural Research Institute of Kerala revealed that service quality fall short of user expectations which was attributed to low awareness and lack of updated technologies. **Bhat and Ganaie (2018)** measured the satisfaction level of users of seven universities with e-resources and found that most of them were satisfied with availability of e-journals and databases.**Karim (2018)** used modified SERVQUAL instrument to measure performance of university residential hall libraries at Dhaka and found most of the service items fall short of meeting users' needs. . The study

pointed out that in order to provide better services to the users it is essential to assess the performance of library in terms of resource adequacy, staff competence & behavior and the environment for providing services from time to time in order to overcome the shortcomings. **Pal and Barman (2021)** studied the user satisfaction with library resources and services of law college libraries. It was found that libraries were unable to meet the minimum satisfaction level with regard to law reports collection and e-resources. Furthermore, all the 16 colleges were lacking basic OPAC service thus libraries of the selected colleges were far behind in giving access to the documents available in their libraries.**Ekpenyong and Esin (2021)** in their study about attitude of users towards library facilities and staff in National Library of cross River state at Nigeria found user satisfaction was significantly high. **Kaur and Kathuria (2022)** tried to assess student-faculty satisfaction with university library facilities at Punjab Agricultural University, Ludhiana. The study found differences in satisfaction level and awareness level among undergraduate, postgraduate students, research scholars and faculty. **Kazimi and Gurbanov (2022)** tried to examine the factors associated with user satisfaction of library services and their quality using SERVQUAL model. The study pointed out ergonomic environment, provision of new information; staff expertise and openness were identified as key factors of users' satisfaction and service quality. **Hinsey and Felicia (2023)** conducted LibQUAL+ survey to assess library services at University of Bahamas in terms of library collection, space and information control. Users had positive perception towards library literacy sessions. Users were found to be less satisfied with infrastructure facilties like computers, printers and updated equipments.

2.7 Conclusion: The literature makes it apparent that library performance indicators help in better understanding of functioning and services of the library. In the networked environment in addition to print resources network technology, infrastructure, digital Information resources, electronic services, websites, remote access etc. should also be taken into account while evaluating the performance of library. The literature vividly reveals that most of the libraries are providing hybrid kind of services i.e. conventional and technology mediated services so it is important to consider both human as well as technology component while assessing the library.

It is clear from the studies that university librarians are striving to adapt the ongoing technological transformations by attaining necessary skills. With the emergence of wide variety of electronic resources there is drastic change in information seeking behavior of the user. Most of the studies laid emphasis on upgrading technological skills in the wake of emerging technological developments. Besides automating the library activities emerging technologies are providing new opportunities for the librarians to think out of the box. Number of value-added services like development of institutional repositories, document delivery, Podcasting, Vodcasting, RSS feeds etc. can be provided to enhance the user experience. Studies reveal an increasing trend towards web-based services in addition to provision of conventional services in India and abroad. Though an array of studies on user perception level reveal that users are aware and satisfied with library resources and services yet good portion of the studies also emphasized for awareness and training programs to be a part of curriculum for better utilization of resources. As far as the impact of ICT, literature highlight that although its use has potentially benefitted the libraries in all areas yet its implementation is not markedly apparent due to lack of skills. Most of the studies stressed more on technical skills and information literacy skills in technology mediated environment. Some of the studies stressed on marketing of library resources and services for their proper utilization. Outreach is important to reach the user in this technological environment who are accustomed to find information on web but may not be aware about those resources available in the library. New emerging web tools like facebook, twitter, blogs, youtube etc. can be used to create awareness about the library. So, information retrieval along with digital information literacy and marketing skills will play key role in this digital environment which can be attained through regular workshops, seminar, conferences, training programs, lectures etc. It is significant to mention that most of the studies lay emphasis on professional development for improvement in service delivery activities. E-literacy and regular user education programs also considerably affect the user satisfaction. Most of the studied highlighted the importance of user satisfaction in measuring the service quality of the library. Services quality instruments like SERVQUAL, LIBQUAL+, SERVPERF have been used by the researcher in various studies conducted in India

and abroad. A wide array of studies necessitated to define dimensions of e-services like usability, content and support which can be helpful in online service quality improvement. Instruments like E-S-QUAL, WebQUAL, DigiQUAL, SSTQUAL etc. have been used by the various researchers to measure service quality in online environment. The concept of E-service quality has not been explored fully in indianagricultural libraries settings. Further there is need to understand underlying dimensions of E-service quality and to measure the user satisfaction towards it. To fill this research gap present study has been undertaken to assess the status and services of agricultural libraries of Punjab, Haryana and Himachal Pradesh. It is clear from some of the studies that E-service quality is multidimensional construct and dimensions vary as per service characteristics. In case of academic libraries most of the studies revealed Website design, Navigation, Access to information, Reliability, ease of use, speed, support etc. to be important quality indicators. It is clear from above studies that periodic user‘s surveys play key role in assessing the library collection. So in present study an attempt has been made to assess the library collection of agricultural libraries under study quantitatively and qualitatively from user’s view point through survey.

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Chapter-3

Agricultural Libraries: resources & services

3.0 Introduction

Food is considered to be indispensable need if populations are to survive. The biggest and world best libraries in agriculture field are generally affiliated with the best agricultural research programs. The National Agricultural Library of United States houses the richest collection in agricultural and forestry related materials in the world. In UK the CAB International libraries are the representative of strong European materials and literature from other developing countries. In Rome the FAO library has the collection which is impressive in material from countires like Africa, South America and Asia **(Jones, 1990).**

India is mainly the agrarian society and depends basically on agricultural outputs. The scientific research and information contribute largely towards the development of nation and makes the country prosperous. The development of any country is based upon quality research. If we think how agrarian society has developed we come across many factors but the most discernable impact is of agricultural universities which support agricultural education and research. Therefore library of the agricultural university is there to fulfill all the academic needs of the end user. Strength of any research system depends mainly on its capacity in creating, organizing and use of information. It is therefore essential to lay much emphasis on transfer of scientific and technical knowledge from research institute to the actual user **(Sreenivasulu & Nandwana, 2001).** The efforts of government, private and international organizations much have been concentrated on increasing agricultural production by use of modern methods and by utilizing the results of research into nutritional improvement; increased yield of crops; the protection and conservation of natural environment. Libraries and information centers manage print as well as electronic collection thus is the main centres in providing information to the user. In this milieu agricultural university libraries have been emerged as important area to investigate and explore with in the research community. In view of that this chapter offers a brief account of

history of agricultural education, development of agricultural universities in India in general while in Punjab, Haryana and Himachal Pradesh in particular. A brief account of agricultural resources, services in the changing environment along with different methods of assessment have been discussed, therefore this chapter can be summarized under following headings

3.1 Agricultural Education and Research
3.2 Agricultural Universities: Growth & Development
3.3 State Agricultural Universities (SAUs)
3.4 Agricultural Libraries
3.4.1 Components of Agricultural Libraries
3.4.1.1 Users
3.4.1.2 Resources
3.5 Information Communication Technology in Libraries
3.6 Library Assessment Techniques
3.7 Conceptual framework of the study
3.8 Service quality and customer satisfaction
3.9 Conclusion

3.1 Agricultural Education and Research: history & development

Agriculture is the mainstay of the state economy. Prosperity of any nation depends upon generation of new knowledge and information. Agriculture being the backbone of Indian economy plays very important role in the social and economic growth of any country. The main role of government of any country is to motivate and instruct the farmers about new developments in agriculture. As a result, various institutions, agricultural universities, centers and agencies has been set by the government **(Reddy, 1987).** The emergence of scientific research in modern India began with the establishment of Asiatic Society of Bengal in Calcutta by Sir William Jones on Jan. 15, 1784. The society provided an effective framework supported by a library and collection of medals, ancient coins and archaeological, technological & geological collections during the first century of its existence. With the publication of journal of the Royal Asiatic Society of Bengal in 1832 stimulus was provided to advancement of science in India. Large number of organizations in various pure & applied sciences

disciplines like anthropology, botany, mathematics, physics, chemistry etc. set up during the nineteenth century.

The main event in history of agricultural research was the establishment of agricultural departments, Imperial Council of Agricultural Research, reorganization of Indian Council of Agricultural Research and development of Agricultural Universities. Until 1877 there was no formal system for agricultural education when the first agricultural college was established at saidapet which was later shifted to Coimbatore **(Borthakur and Singh, 2013).** Research activities in Agriculture and Veterinary sciences were done in provincial department of Agriculture. The need for formal agricultural research and education on a larger scale was realized in the beginning of the 20th century with the establishment of Imperial Agricultural Research Institutes at Pusa in 1905. The journey of agricultural education was started with the establishment of 17 agriculture colleges,03 veterinary colleges and one agricultural engineering college in 1950. The need for a central agency to co-ordinate agricultural research was considered by the Royal commission on Agriculture. Consequently, Imperial Council of Agricultural Research as a society was set up in 1929 to promote and encourage scientific studies in the field of agriculture and veterinary sciences. The council was renamed as ICAR on June 10, 1947 and immediately after independence the Govt of India formed University Education Commission (1949) under the chairmanship of Dr. S. Radhakrishnan. The commission examined the entire pattern of higher education in India and recognized the need for linking education with production programs, identified agricultural education as a major issue and made recommendations for the establishment of 'Rural Universities'. This was considered to be one of the most significant landmarks in the history of Indian agricultural education and research . They recommended that all aspects of agricultural research should be the function of Agricultural Universities. The concept of rural university was very similar to the Land Grant colleges. Agricultural education scaled a new height in early 1960s. It was carried out in three phases depicted as under in the Table 3.1

Table3.1: Phase wise early development of Agricultural Universities

Phase	Year	No. of Agricultural Universities
Phase-I	1960-65	07
Phase-II	1969-71	08
Phase-III	1972-1978	05

ICAR was recognized into fully autonomous organization in 1965. It was given fresh mandate for undertaking, promoting and coordinating research in the field of agriculture. The council was also entrusted with the responsibility of imparting higher education in agriculture. National Agricultural Education System (NAES) under the control of Indian Council of Agricultural Research (ICAR) is the largest network of agricultural education and research in the whole world. It comprised of State Agricultural Universities (SAUs), their constituent colleges and research institutes partially funded and controlled by ICAR, which impart education, research and extension in all fields of agricultural science and technology. The ICAR made efforts to reinforce the research capabilities of agricultural universities through their programs like AICRP, NARP and NATP. Presently ICAR with its 101 ICAR institutes and 71 agricultural universities across the country is one of the largest national agricultural systems in the world. (https://www.icar.org.in/content/about-us)

3.2 Agricultural Universities: growth & development

Today Indian agricultural system under the control of ICAR is one of the largest in the world comprising of state agricultural universities, research institutes, project directorates, Bureaus etc. The state agricultural universities are the major partners in growth and development of agricultural research and education under National Agricultural Research System (NARS). It was at Pantnagar in 1960 that the first State Agricultural University was established followed by SAU's at Bhubaneshwar and Ludhiana in 1962, Hyderabad and Jabalpur in 1964 and Bangalore in 1965. Thereafter it was recommended by the Education commission that there should be at least one agricultural university in each state. Today there are 70 agricultural universities out of which three are Central Agricultural Universities, four are Deemed

Universities and 63 are State Agricultural Universities. Salient features of state agricultural universities include (i) Teaching, research and extension activities have been integrated at all levels (ii) Education pattern is course-credit based (iii) There is no provision of affiliated colleges and teaching is through constituent colleges (iv) Having autonomy at organizational and operational level.

Table 3.2 : State-wise distribution of Agricultural Universities in India

S.No.	State	SAUs	CAUs	/DUs
1.	Andhra Pradesh	3	-----	----
2.	Assam	1	-----	----
3.	Bihar	2	1	----
4.	Chattishgarh	2	----	----
5.	Delhi	---	----	1
5.	Gujarat	5	----	----
6.	Haryana	3	----	1
7.	Himachal Pradesh	2	----	----
8.	Jharkhand	1	----	----
9.	Jammu & Kashmir	2	----	----
10.	Karnataka	6	----	----
11.	Kerala	3	----	----
12.	Madhya Pradesh	3	----	----
13.	Maharashtra	5	-----	1

14.	Manipur	----	1	----
14.	Orissa	1	----	----
15.	Punjab	2	-----	----
16.	Rajasthan	6	------	----
17.	Tamil Nadu	3	------	----
18.	Telangana	3	------	----
19.	Uttrakhand	2	------	----
20.	Uttar Pradesh	5	1	1
21.	West Bengal	3	-----	----
	TOTAL	**63**	**3**	**4**

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https://icar.org.in/content/state-agricultural-universities-0

3.2.1 Agricultural Universities in India: Agricultural universities' research and development was encouraged by efforts of various Committees and Commissions. In 1948, University Education Commission chaired by Dr.S.Radhakrishnan was the first commission of Joint Indo-American team on agricultural R&D under the supervision of Dr.Ralph R Shaw and Dr.D.K.Krishna (Librarian of Indian Council of Agricultural Research library) followed by the second Joint Indo-American team on Agricultural Education, Research in 1954 and its further extension under the chairmanship of Dr.M.S.Randhawa in1959. In 1964 university education commission under the Chairmanship of Dr.D.S.Kothari was formed. The National Education Commission made some recommendations in its report according to which at least one agricultural university must be established in each Indian state. National Education Commission on Agriculture recommended implementation of various developmental plans for establishing new agricultural complexes, I.C.A.R. institutes and projects directorates in collaboration with the agricultural universities in India in 1976. This was gateway for the establishment of modern, well developed and well organized university

libraries to support agricultural education, research andextension services. Government of India has recognized the need for a well-organized system of scientific education in agriculture. At the National level Indian Council of Agricultural Research is an apex scientific organization established with an objective to plan, promote, execute and coordinate agricultural education, research and extension activities in the country through a network.

3.3 State Agricultural Universities (SAU's): The mandate of state agricultural universities is to provide agricultural education, conduct research and disseminate the latest happenings in the field of agriculture & allied areas to the farming communities. Education in state agricultural universities is closely linked with research and extension activities. The SAUs were provided autonomous status and funded directly by the state governments.They were autonomous bodies with the state-wide responsibility for agricultural research, education and training or extension education. The establishment of SAUs was on same pattern as that of land-grant universities of the United States. It was a landmark in reorganizing as well as strengthening of the agricultural education system in India. These universities were considered to be the branches of research under the ICAR and thus became the partners of the National Agricultural Research System (NARS). The significant contribution from the SAUs was the green revolution which had great social and economic impact in terms of trained scientific work force and the generation of new technologies.The first SAU in India was established in 1960 at Pantnagar in Uttar Pradesh. The Vice-Chancellor is the head of SAU governed by a board and advised by an advisory committee. The governing board of the SAU has representatives mix from the government, farmers and persons in agri-business. Being autonomous organizations, they are able to effectively integrate research and education. The SAUs are funded for research and education by the state governments and also from the national agricultural research council or national institutes. Dr. D. S. Kothari who was head during second National Education Commission (1964-66) recommended for the establishment of at least one agricultural university in each state of India. These universities not only imparted education on all aspects of agriculture but also integrated teaching with research and extension.

State Agricultural Universities works on service philosophy to agriculture and rural community with emphasis on programs that are directly related to solving social and economic problems of the countryside. Its main aim is quick communication of new knowledge to students in classrooms, to extension, personnel and to farmers **(Singh, Meena & Swanson, 2013).** SAUs are the major partners in growth and development of agricultural research and education under the NARS. All important states have at least one SAU, and most of the SAUs are multi-campus universities. The ICAR as an apex body coordinate research and promotes research linkages between different institutions. ICAR supports all SAUs through regular grants so it has direct participation in the management of the SAUs. In addition to monitor the status of research, extension and education in all ICAR institutes and SAUs covering different regions of the country regional level committees were formed in 1975. These committees also make suggestions and recommendations to undertake research on immediate emerging problems of a region. Officials from the ICAR and its institutes, SAUs, State department, Non-Governmental Organizations (NGOs), members from parliament and farmers' representatives are members of these committees. In Punjab there are two State Agricultural Universities (SAUs) , three in Haryana and two are in Himachal Pradesh as shown in the table below

Table 3.3: State Agricultural Universities of Punjab, Haryana and Himachal Pradesh

Sr. No.	State	State Agricultural university	Establishment Year
1.	Punjab	Punjab Agricultural University, Ludhiana	1962
		Guru AngadDev Veterinary and Animal Science university, Ludhiana	2006
2.	Haryana	Chaudhary Charan Singh Haryana Agricultural University, Hisar	1970
		LalaLajpatRai University of Veterinary and Animal Sciences, Hisar	2010

		Haryana State University of Horticultural Sciences (MHU), Karnal	2016
3.	Himachal Pradesh	Ch. Sarwan Kumar Himachal Pradesh KrishiVishwavidyalaya, Palampur	1970
		Dr. Yashwant Singh Parmar University of Horticulture & forestry, Nauni, Solan	1985

3.3.1 Brief description of State Agricultural universities libraries under study:

i) Punjab Agricultural University:

Figure 3.3.1a : Punjab Agricultural University

In the year 1962 Punjab Agricultural University was established on the pattern similar to that of land grant colleges in US. It is located in Ludhiana city Punjab in the north-west India. It has played key role for ushering an era of green revolution in India thus helped in increasing the food production in Punjab state. It has spread over an area of 494 hectares at Ludhiana with an off campus area of 1793 hectares. Two other agricultural universities one Haryana Agricultural University, Hisar in February 1970 and other Himachal PradeshKrishiVishavidalya, Palampur in July 1970 was carved out by an act of parliament. In the year 2006 college of veterinary sciences at Punab Agricultural University was also upgraded as Guru AngadDev Veterinary and Animal Sciences University. Presently Punjab Agricultural University has five constituent colleges viz. College of Agriculture, College of Agricultural Engineering

&Technology, College of Community Sciences, College of Basic Science and Humanities and College of Horticulture and Forestry. University through its 32 departments and three schools in the constituent colleges offers 43 Master's, 29 PhDs and 11 undergraduate programs. Further it has eight research stations, 18 krishivigyankendras and 14 farm advisory service centers. It has strength of 2581 employees out of which teaching faculty strength is 846. It has strength of 4166 students. PAU has been accredited with overall A+ grade by ICAR for five years (2019-2024). It was the first university to receive best institute award by ICAR in 1995. During the year 2020 PAU has been ranked 5th among Agricultural Universities and Institutes of India by ICAR and got 2nd position among SAUs. It was also ranked 1st by Confederation of Indian Industries-Indian Citation Index among all state universities of the country with respect to total number of publications and total number of citations. It offers various undergraduate, postgraduate, diploma and research degree programs like M.Sc. & Ph.D. covering agriculture and allied area. The university library was first established in the year 1959 having collection of only 200 books in the college of Agriculture. The library was shifted to its new building in 1972 and was named after the former Vice-Chancellor Dr. Mohinder Singh Randhawa. The library buildingis five storeyed with the covered area of 93,320 sq. ft. and is centrally air conditioned surrounded by the lush green lawns with beautiful ornamental trees. Seven hundred sixty readers can be accommodated at one time in its five reading halls. It renders automated services to its users. It has automated its library operations like circulation, catalogue etc. and also implemented RFID technology. Library collection is searchable through Online Public Access Catalogue (OPAC). It has also digitized its theses collection and journal which are accessible through institutional repository. Further library also provides campus wide access to number of online resources like CeRA, krishikosh, e-books, e-standards, Indiastat.com and other open access resources through its web page. http://www.pau.edu/msrlibrary/

ii) Haryana Agricultural University: ChaudharyCharan Singh Haryana Agricultural University popularly known as HAU is located at Hisar in the state of Haryana, India. It is leading in agricultural research and has contributed significantly to green

revolution and white revolution in India in 1960s and 70s. Initially it was satellite campus of Punjab Agricultural University whichafter the formation of Haryana in1966 through the ordinace of president established as a university later ratified as by Haryana and Punjab Agricultural Universities act, 1970 passed by the LokSabha on March 29, 1970 and was named as Haryana Agricultural University. It was established as an autonomous body on Feburary 2, 1970 by an act of Parliament. It got its present nomenclature on 31st October 1991. It has an area of 7219 acres at Hisar and 1426 acres at outstations. The university has nine constituent colleges/Institutes viz. College of Agriculture (Hisar, Kaul , Bawal), College of Agriculture Engineering & Technology, College of Fisher sciences, College of Basic Sciences & Humanities,

Figure 3.3.1b: Chaudhary Charan Singh Haryana Agricultural University

College of Home Science, College of Biotechnology and Institute of Business Management & Agripreneurship.It won the Indian Council of Agricultural Research's Award for the Best Institute in 1997. CCSHAU was rated as the Best Agricultural University in the Atal Ranking of Institutions on innovation and achievements indecember 2021. In the year 1948 both library as well as college of Veterinary Sciences got establishment. The year 1975 was landmark in the history as the present library building which was named after the first Prime Minister Pt. Jawaharlal Nehru was officially dedicated to the university community. It is centrally located having

seating capacity of 650 readers. It possesses a very rich collection of 373232 documents including books, bound journals and other reading material to cater to the informational requirements of its patrons. It subscribes to 201 print journals of which 29 are International and 181 are Indian journals. It has automated its library operations and providing access to various online resources such as e-journals, e-books, e-theses etc. Library collection is searchable through online public access catalogue. It has also implemented RFID technology. Further digital library has been developed which provides access to online resources like CeRA, krishikosh, e-books, Agricat and open access resources. Library servers are linked to the campus networks for providing online library services all over the campus.

iii) Himachal Pradesh KrishiVishvidyalaya: The establishment of ChaudharySarwan Kumar Himachal Pradesh KrishiVishvidyalaya (HPKV)came into being after August 1, 1966 when a junior college of Agriculture was established at Palampur under the aegis of Punjab Agricultural University, Ludhiana which formed the nucleus of new farm university. After the reorganization of Punjab, Haryana and Himachal Pradesh in 1966 college of Agriculture at Palampur and Solan were transferred to Himachal Pradesh University on July 22, 1970 as a part of its Agricultural complex. The University came into existence on 1st Nov. 1978. It has an

Figure:3.3.1c : Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishavidyalaya

area of 397 hectares at main campus and 190 hectares at outstations. It has four constituent colleges such as college of Agriculture,Veterinary& Animal

Sciencescollege, college of Community Sciences and Basic Sciences and Humanities college. In 1985 a separate university of Horticulture named as Yashwant Singh Parmar University of Horticulture and Forestry was carved out of HPKV. The university is duly accredited with Indian Council of Agricultural Research and has got ISO 9001:2015 certifications. It has been ranked 14th in the ranking list of all farm universities of the country. It has immense contribution towards hill agricultural diversification and growth which enable the state to receive "Krishikarman award" of GOI four times in a row among small states of India. It has 225 faculty and 808 non teaching staff members on its roll. It runs undergraduate, Masters and Doctoral degree programs covering area of agriculture and allied subjects. The University library, Palampur had its origin to with the establishment of third campus of the Punjab Agricultural University at Palampur as a part of the Hill college of Agriculture. The library has seating capacity of 200 readers and has a carpet area of 4093 sqmtrs. It provides online/off-line services Web based On-line Public Access Catalogue (WEBOPAC), CD-ROM searching on LAN, Access to Full-Text online journals through CeRA and J-gate online journal portal. www.hillagric.ac.in/library.

3.3.1.1 Agricultural Knowledge and Information System:

Francis Crick (1979) the Noble laureate has observed that " The essence of science is the communication ". In any agricultural communication process it is the creation of agricultural information which is one part and another critical part is its storage, organisation and easy accessibility what has been created so that link can be completed **(Malhan & Rao, 2007).** Agricultural information flows from laboratories to the land. The end users are those engaged in farming, research, teaching, extension, production, development, planning etc. Thus, users in agricultural libraries are at two extremes. Highly scientific and technical users working with diversified subject specialties are at one extreme and farmers at the other extreme. Extension workers act as link between scientists and farmers who transliterate the technical information to the farmers. The three major elements involved in the creation, spread and use of agricultural knowledge are research; dissemination and use **(Ramachadra & Stanley, 1981).** Utilization of information system as demonstrated by scientists generates new information in the laboratories which is used by the farmers to increase the

agricultural production. They also strive for overall improvement in social and economic conditions of rural areas. **R Subbahiah (1985)** designed following conceptual model as in Fig 3.3.1.1 for agricultural knowledge generation and transfer

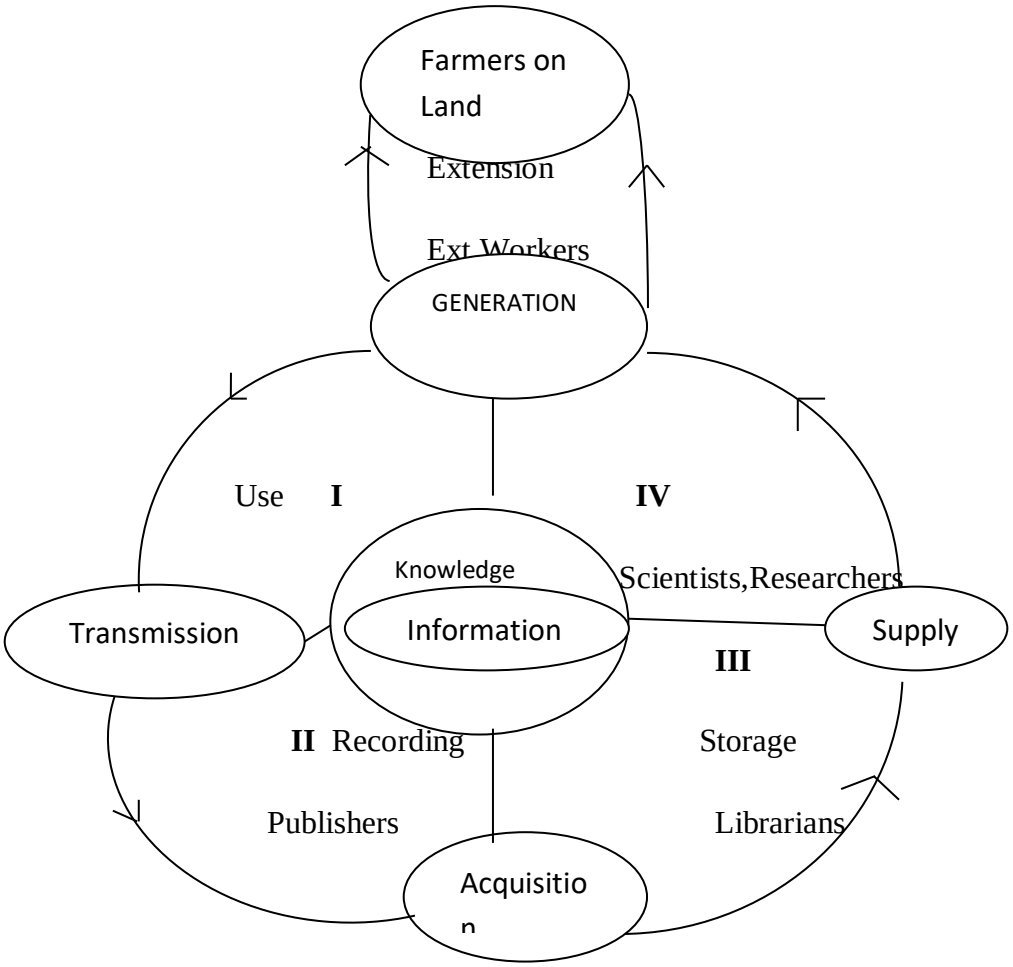

Figure 3.3.1.1 Conceptual Model forAgricultural Knowledge and Information System

Annon (1993) has graphically demonstrated about the utilization of information system as under

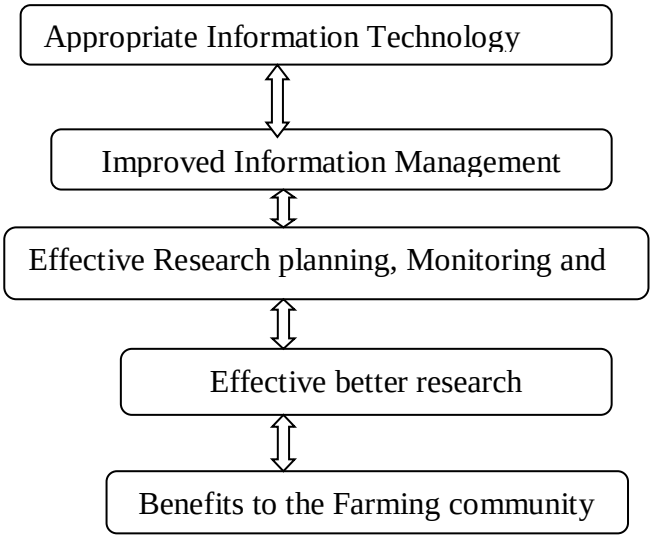

Figure 3.3.1.2.: Graphic representation of Agricultural Information Utilization

3.3.1.2 Agricultural Knowledge Management System: Indian context: Success or failure in agriculture depends on timely access and use of right kind of information. The research productivity of any country depends on effective management as well as transfer of agricultural knowledge as the information provided in time result in improvement of agricultural production **(Aina, 1995).** Agricultural knowledge management comprises of activities to identify, create, represent and integrate knowledge which can be implicit or explicit. Sharing, exchange and dissemination of agricultural knowledge are the key elements of agricultural knowledge management. Agriculture being an interdisciplinary area has some distinct feature of information such as timely nature and requirement by very diverse groups of users. Agricultural knowledge in India is being generated through grid of ICAR research institutes and agricultural universities. All information generated can be communicated through research articles, books, conference or seminar proceedings, monographs and theses etc. Unpublished or Grey literature in the form of research reports, technical reports, research guidelines etc. also constitute important segment of agricultural information. Success or failure in agriculture mainly depends on access and use of right kind of information **(Sharma, 2012).** Agricultural knowledge has two important aspects-

scientific and technological signifying its generation and use simultaneously. The scientific part includes generation of agricultural knowledge by the scientists, researchers, farmers and extension specialists whereas technology part covers utilization of the generated knowledge for various purposes. There are four major components viz. creation, organization, dissemination and use in agricultural knowledge management system. In order to support research and extension activities agricultural libraries have been playing major role by meticulously organizing and disseminating the agricultural information to the users. Internet and web technologies have enabled producers, organizers and users of the information to reach up-till now were un-reached.

Sensing the importance of agricultural knowledge management for improving Indian agriculture ICAR has been instrumental in promoting the production and use of agricultural knowledge. It established exclusive directorate DKMA (Directorate of Knowledge Management in Agriculture) for management of agricultural knowledge through dissemination and sharing agricultural knowledge in print, electronic and web mode. It aims to develop e-resources and work for strengthening virtual connectivity among the ICAR institutes, SAUs and KVKs. With the support of ICAR most of the institutes and agricultural university libraries have developed their separate web portals integrating printed and e-resources for online access and use. Institutional repositories are being created to archive the full text publication of institute thus helped in better management of scholarly material with greater visibility and accessibility. The most promising step taken in the direction of access and use of agricultural information by ICAR is the establishment of online resource **C**onsortium for **e-R**esources in **A**griculture **(CeRA),** Krishikosh, E-Granth, Agricatetc. (https://icar.org.in/content/directorate_of_knowledge_management_in_agriculture)

CeRA: CeRA was launched at IARI, New Delhi in the year 2007. It is an e-consortium covering agricultural libraries under the Council of Agricultural Research (ICAR) for NARES with aim to upscale R & D information resources base of ICAR institutes and SAUs. Initially this consortium was started for three years under centralized funding and subscription of the National Agricultural Innovation Project (NAIP) by maintaining print subscription of individual libraries of ICAR institutes

and State Agricultural Universities which were members of this consortium. It is now entrusted to ICAR-DKMA from July 2014 onwards. It facilitates 24x7 online access to journals in agriculture and allied areas. There are 152 consortium members at present consisting of all the ICAR institutes, State Agricultural Universities, Project Directorates and National Bureaus etc. It provides access to journals and e-resources, facilitates document delivery request and remote access to electronic resources. (https://icar.org.in/content/consortium-e-resources-agriculture-cera accessed on 23/03/21).

Krishikosh: It is a repository of accumulated knowledge in digital format covering the field of Agriculture and allied areas which provides open access to institutional knowledge. It is having collection of theses, old books, research articles, old journals, case studies, annual reports, bulletin and other grey literature. Presently 103 SAU's /ICAR institutes are registered members of krishikosh. It is full text searchable repository and includes more than 1, 00,000 PhD/ M.Sc. level theses submitted by various participating SAU's and ICAR institutes. (https://krishikosh.egranth.ac.in/aboutUs.html accessed on 23/03/21).

E-Granth: It is a consortium for strengthening of digital library and information management for digitizing, standardizing and merging their catalogue into union catalogue to upload in OCLC Worldcat.

Agricat: It is a union catalogue of holdings of 12 major agricultural libraries of ICAR institutes and state agricultural universities. Its aim was to create OPAC under agricultural research group catalogue and for digitization of all the important intellectual resources like rare books, old journals etc. of NARS libraries **(Hasan, 2011).**

3.4 Agricultural Libraries: The agricultural library may serve the needs of teaching, learning and practice in any or all the branches of knowledge necessary for professional agriculture. Modern agricultural libraries have the major responsibility of provoding maximum service for promoting agricultural research, teaching, learning and extension **(Subbaiah, 1988).** Therefore teaching, research and extension activities are the tripartite function of any agricultural institution vis-à-vis it's library. Every agricultural library must be an integral part of every research institute/university is

special library oriented towards the service of agriculture. A modern well equipped agricultural library plays an important role in the process of information transfer to users' of agricultural society. Organization and institutions which are involved in agricultural education, research and extension generate lots of information which is applied by teachers, researchers and students for development of society. Agricultural libraries therefore as a resource occupy the central and primary place. Today's users need information that should be accurate, timely and interpreted in a meaningful way. So, for the success of any organization libraries play key role in effective dissemination and sharing of knowledge to stay ahead in competition.

An agricultural library is a necessary accompaniment to the teacher's aide and researcher's tool which can help them in making effective use of their time. An agricultural library has a special collection of books, journals, pamphlets, films and other material organized to serve the needs of those engaged in agriculture, whether as producers of agricultural products, scientists who conduct agricultural research or teachers and students. Modern agricultural libraries have the main responsibility of providing service for promotion of agricultural research, teaching, learning and extension. Further, technological advancement and information explosion has facilitated the emergence of new electronic devices, media and formats.Although electronic resources can't take over the print collections but can definitely elevate the print collection. An agricultural library collects processes and devises methods for making all the resources available to its diverse categories of readers. The agricultural libraries and information centers are playing important role in the service of nation. All the agricultural libraries of state and ICAR institutes have been connected through Agricultural Research Information System thus have connectivity with libraries for accessing bibliographic information and resource sharing **(Sreenivasulu & Nandwana, 2001)**. Today's libraries need to be assessed and evaluated taking into account contemporary issues as well as their traditional roles and functions. The three fundamental facets of the library include Content (Resources), Services and Users which can be expanded into activities encompassing collection management, Document delivery and digitization, Physical reading space, organization through catalogues, provision of electronic resources, provision of IT

and computing facilities, storage space, preservation methods etc. **(Appleton, 2017).** So, it has become important to ascertain how effective are the library services of agricultural libraries. Performance evaluation helps in analyzing the working status of library in respect of rendering effective services to the users so that further improvements can be on the basis of lacuna found in the existing system of functioning.

3.4.1 Components of Agricultural libraries: Library is the service organization provided with transmission of information through material organized for the purpose of study and research. It is a collection of books and other material which is made available to the reader for maximum use. Thus user group, literature and the library professionals are the essential components of library system. It is necessary for the library staff of agricultural library or an information system to have clear picture about user groups and their information requirements for devising any plan for improvement in the system. So, attention with regard to user must be centered on (i) who are seekers of agricultural information (ii) what are their information needs and requirements (iii) how to educate them so that they become self-sufficient in getting required information from library.

3.4.1.1 User Group in Agriculture Information System: Agricultural information users may be broadly classified as end users and intermediaries. The end users are engaged in research, teaching, extension, production, development, planning, industry, trade, credit and financing, farmers etc. The intermediaries are the librarians, documentlists, information scientists, and publishers etc. who act as link in supplying information to the end users. As the information needs of scientists leave an impact on the other users especially those works in extension therefore the primary function of user need study to make an assessment of information needs of scientists, then information needs of extension workers and finally the needs of the farmers. Scientists mostly draw their required information from journals followed by books. Complete research articles are preferred followed by abstract and reviews. Extension workers act as linking agency between the laboratory and land. The information requirement includes basic agricultural knowledge, innovative information from research and development and timely information required at a particular time.

Reports, meetings, circulars, periodicals etc. were used as communication channels. User should know how to make better use of resources and services of the library

3.4.1.2 Resources: The second important component of agricultural library is its resources which comprise of (a) Documentary resources (b) Building/Equipment (c) Manpower resources (d) Financial resources.

3.4.1.2.1 Documentary Resources: Literature or collection is through which the information is transmitted to different user categories. It points toward the accumulation of information resources over the time intended for the user community or a set of communities managed by information professionals **(Lee, 2000).** It is vast, multidisciplinary and available in wide variety of formats. It can be macro and micro in dimensions. Information can be from any source. It can be from books, journals, reports, proceedings and electronic databases. Proliferation and penetration of information communication technologies have resulted in information resources which are neither tangible nor owned rather they are licensed to provide access virtually. Most recent is the online electronic form of literature accessible through computer and internet including online Books, Journals or Periodical publication, Serial publication like advances and annual reviews, Abstracting and Indexing databases, Bibliographies, Reports, Conference Proceedings, Theses, Bulletin and non-conventional forms like patents and standards. Libraries should acquire useful, appropriate, and affordable information resources, regardless of format to achieve the goal of satisfying the information needs of their users. Since the library collections play a pivotal role in meeting information needs of users so its inadequacy may drive away the potential users from the library **(Majid, Anwar & Eisenschitz, 1998).**Collection development is one of the fundamental function of university library as the survival of any library depends on how well it is satisfying the user‘s information needs which is not possible without effective, qualitative as well as the up-to-date collection of information resources. The present term library collection is the combination of information resources which include print as well as non-print and electronic resources.

American Library Association(1983) has put forth library collection “as the collection of materials which is organized for providing physical, bibliographic and

intellectual access by the staff trained for the purpose of providing services and programs related to the information needs of the target group".Library professionals aim to fulfill the information needs of the users not only from the resources available within the four walls of the library but also from the resources available anywhere else. In today's time of information technology the focus of collection development has been shifted from local collection building to more cooperative activites and resource sharing **(Jakubs, 1999).Gorman (2003)** pointed towards four-levels of collection that library can put forward to their users. It may include ―a) Locally possessed and owned information resources; b) Information resources made physically available through interlibrary loan (ILL); c) Electronic resources which are subscribed by the library; and d) Open Access information resources.**Negi, Nailwal and Kumar (2009)** are of the view that collection development is a dynamic activity should have the involvement of users, library staff, and subject experts on selection side. It is a mean to develop a need-based, up-to-date, and balanced collection keeping in view the users' current as well as future requirements.**Maidabino and Zainab (2011)** stated that library collection encompasses entire information resources or library holdings which are fundamental in meeting the objectives of academic libraries and satisfying the teaching, learning as well asresearch needs of users associated with their parent institutions. Owing to technological developemtns library collection is undergoing rapid change from a print mode to hybrid mode which is more and more electronic based now **(Borin & Yi, 2008).** Accordingly, the collection of modern university libraries may be summarized as under

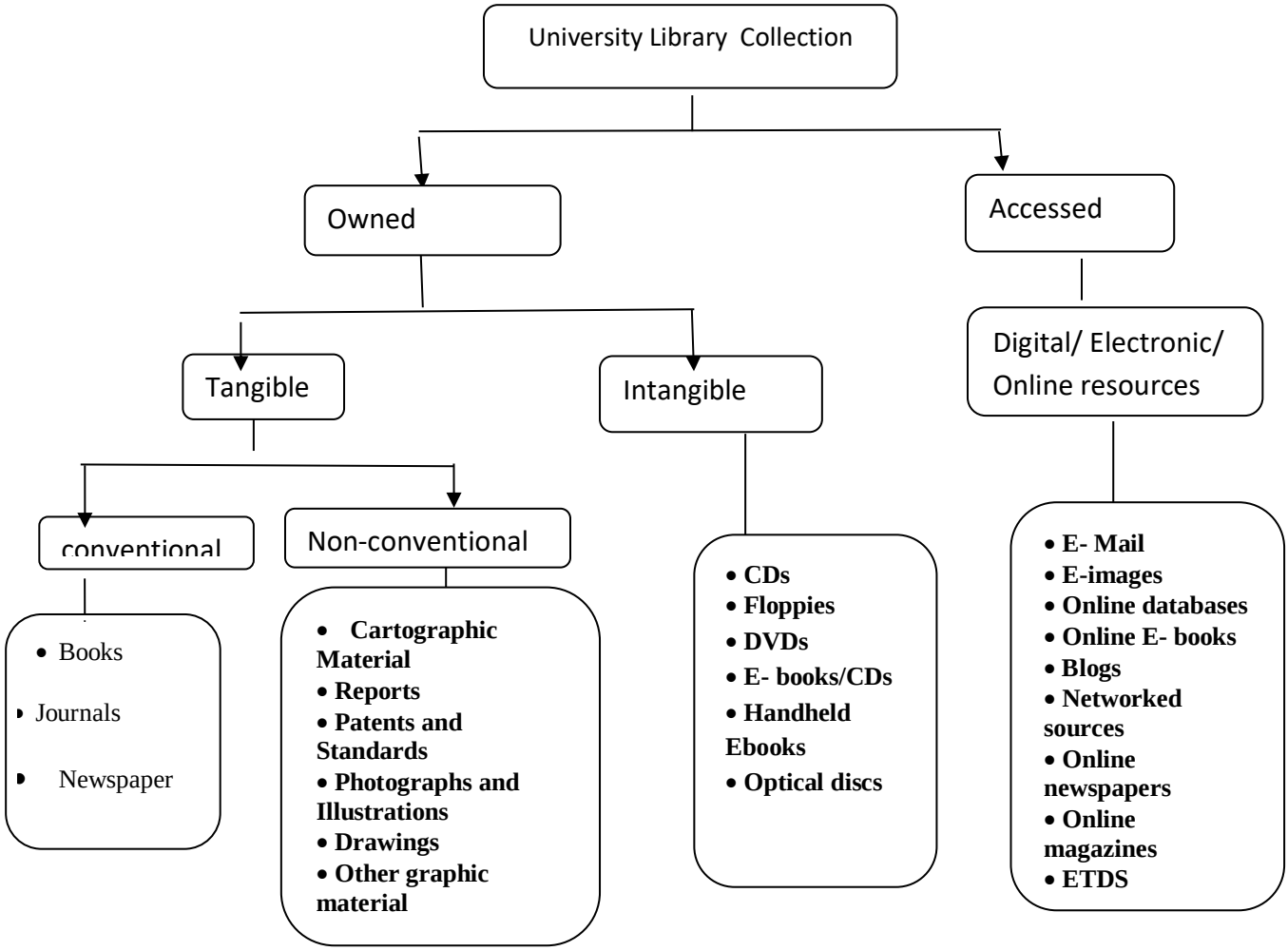

Figure 3.4.1.2 : Graphic representation of Information Resources in University Libraries (Kavitha, 2009)

So collection development and collection management include print as well as digital resources. **Satija (2005)** has rightly pointed out that "the new technology is no way in conflict with print documents rather the hybrid libraries are having harmonious blend of tradition and modernity". The various features of digital documents and media like high compact storage, ease of multiplication & searching, ease of migration and transmission, multiple searching, multiple access, hypertext, multimedia etc have brought revolution in information storage and its retrieval **(Satija, 2003).**

3.4.1.2.2 E-Resources in Agriculture: The value of information is determined by its relevance and importance to the scientists, scholars and researchers for the end result

of their research and decision being made. Today user needs information that should not only be accurate, timely and relevant but also presented, interpreted and filtered in a meaningful way. The emerging technology has greatly influenced all aspects of library operations. There has been paradigm shift from print to electronic resources and these technologies have made libraries as "One-stop shopping" **(Thakur, 2006).** Furthermore, digital technologies have led to the concept of library without walls. It has opened several avenues of communication and sharing irrespective of geographical barriers. Advancements in ICT have influenced the concept of collection development to great extent and brought in sweeping changes in information collection, storage and its dissemination **(Khademizadeh, 2012).** Demand oriented approach to collection development ensures usage which is a step towards meeting service quality **(Quinn, 1997).** Being the special libraries agricultural libraries are making full use of the potential of internet and related technologies for providing innovative services such as access to digital resources of the library. The various electronic resources include e-journals, e-book, Electronic Theses and Dissertations, Patents, Standards, course materials etc.

E-Journals : Libraries have been exploring ways to cope with problems of ever increasing pricing, space requirement etc. Electronic journals come to the rescue of librarians in addressing these problems. They can be accessed through internet and are full text searchable thus help in easy and fast searching. Many publishers of electronic journals are offering their journals through consortia of libraires at much lower rates thus helping the researcher in wider access to the resources. INFLIBNET, CeRA are some of the consortia operating in India.

E-Books: These are text analogues to a book that is in digital form to be displayed on computer screen. It has features like fast and easy searching, multiuser access, annotations, linking and multimedia possibilities. Various publishers are providing perpetual access to number of electronic books in the field of agriculture.

Electronic Theses and Dissertations: Institutional repository captures the research output of an institution and makes it avaible the users. It is the database of digital resources accessible within or outside the organization through internet or intranet **(Kavitha, 2009).**It may include all kinds of documents such as project reports,

research papers, theses, dissertations,working papers, reports, question papers, syllabus etc. Presently large numbers of universities have converted their theses and dissertation into digital formats and are globally accessible. Almost all the universities have now implemented ETD (Electronic Theses and Dissertation) programs under which teacher, student and researcher can submit their work in electronic form. Shodganga of INFLIBNET and Krishikosh of ICAR have been developed to provide full text access to theses. KRISHIKOSH was developed to cover theses of all the Agricultural Universities and Agricultural institutes under NAIP project and is currently operational covering agricultural resources of SAUs and ICAR institutes.

Agropedia: It is an open access online resource project of GOI started in 2009 with the financial support of World Bank under the project NAIP of ICAR. It is the online repositoryof knowledge and informationin the field of agriculture in India. Presently it is hosting vast range of agricultural information like variety of crops, its management with an aim to empower farmers with crop information.

Course material: Web based course ware and teaching aids are being developed to facilitate flexible learning. Libraries can provide access to such course material to students, teachers and researchers.

Digitized Library resources: Libraries maintain all or a substantial part of their collection in computer accessible form as supplement or complement to conventional printed and microform material. It facilitates access to electronic information, print material and library services to ensure that the information needs of the user community are met irrespective of geographical barriers.

3.4.1.2.3 Building/Equipment: Library building demands careful attention in order to ensure suitable environment for user and the collection. Adequate ventilation, illumination, cleanliness, comfortable furniture, sanitary services etc. are essential to provide congenial atmosphere to the users and staff of the library.

3.4.1.2.4 Manpower/Human resources: Human resources are the interpreters of the library. Staff members are probably the library's greatest assets as they can make suggestions and educate the users about programs and services from which they might benefit themselves **(Loprinzo, 2009).** The staff should be friendly and courteous with all the clients of library. They play a key role in promoting realistic knowledge about

library. They select, acquire and technically process the reading material and disseminate information to the user. So services can be categorized broadly as (i) Technical Services (ii) Reader services. Library services are the essential link between the information resources and the users. They constitute series of activities involving different kind of resources like documents, service personnel, information, systems and infrastructure often interacting with user **(Hakala & Nygren, 2010).** User based services enable the users to make optimum utilization of information resources available in the library. **(Dahibhate et al, 2013)**. Libraries are intended to provide broad range of services **(Dhiman & Sinha, 2002)** which may include—Lending services or charging discharging of library documents*;* library orientation and bibliographic instructions; provision of any general or specific kind of information; helping in location (searching) of document or use of library catalogue; or understanding of reference books etc.; literature search; Current Awareness Services(CAS); preparation and compilation of bibliographies; Indexing services and abstracting services; reservation of documents; Inter Library Loan; Maintenance of news clippings; reprographic services and translation service **.** Library services can be broadly grouped as frontline, core and peripheral services which solely depend on learning and human resources of the library **(Johari & Zainab, 2007).** Library services have undergone tremendous change and are still continue to evolve with the new emerging technologies.

Training of the user in identifying, locating and acquiring required information in the library occupies great significance. Due to growth in wide variety of information resources necessity was felt to train the users as how to find the relevant information in meeting their information needs. Library services are designed to meet the challenges of information explosion. Methods of instruction may be formal courses, manuals and guides, orientation programs/ guided tours etc. Such programs provide unique opportunity for better understanding and help the readers in making optimum use of library. Library promotes its services in order to engage the user community. It helps in developing relationships with all the stakeholders just to say what you are and what you do for them. Improved library services can help in increasing usage which is the main goal of library marketing. It ensures growth and survival of libraries. It has

been observed that users don't fully know about resources and services of the library because of one or the other reason. To overcome this challenge, it is essential to reach out to all users by adopting proper plan based on the inputs received from the stakeholders.Effective communication channels need to be developed to get the attention of users as well as to enhance the awareness about what valuable is available for them. Library staff play vital role in creating awareness among the users. There are number of approaches like word of mouth, brochures, posters, workshops, seminars, newsletters, websites, targeted e-mails etc. to attract the readers. So, these techniques have been grouped into four categories **(Kennedy, 2011)** as

- Human interaction
- Physical items
- E-communication
- Training

Human interaction includes faculty and professional's interaction with users (word of mouth), Physical items as brochures, newsletters, pamphlets, banners, posters, flyers etc. E-communication refers to email, website, alerts, social networks and training includes seminar, workshop, demonstration, and orientation/user education programs. User satisfaction is the cornerstone of marketing library services **(Jotwani, 2014).**Academic library usage is mostly influenced by user's awareness about resources and services of the library which ultimately affect the service quality **(Simmonds &Andaleeb, 2001).** Awareness has direct relationship with utilization of resources and services and any form of awareness program increases the interest of user to participate which further helps in utilization of resources.

3.4.1.2.5 Financial Resources: The financial needs of a library depend on the services to be offered. All other resources like Documentary, Building and human resources largely depend upon the financial position of the library.

3.5 Information Communication Technology in Agricultural Libraries:

Competitiveness refers to the level of competence which includes parameters like technology, knowledge, staff skills and quality of management systems. Technology

is a combination of skills, knowledge, abilities, techniques, computer tools and other equipment that people use to convert or change raw materials, problems and ideas into valuable goods/services. It exists at individual, functional and organizational level. At the individual level it is the personal skills, knowledge/ competence whereas at functional level it is procedure or technique that groups work out to perform their work. The way an organization converts inputs to outputs is used to characterize technology at organizational level. According to **Kranich (2006)** "New methods of creating and disseminating scholarly information provide opportunities to transform research libraries into the institution of 21stcentury for collective action". The four stages of transition began in 1950s with the automation of day to day operations followed by reference use of computerized databases in late 1970s, then the direct access to internet by patrons in late 1990s and finally the commercial databases and digitization of collection. Automation and networking operations by the librarians helped them to directly connect the user with resources and services. As a result, libraries are now available anytime, anywhere and to anyone. Further research libraries began transcending from automated service providers to digital information collaborators. Today's library professionals are working together with information/learning communities to enhance the production, availability, preservation of knowledge; fostering the creation of information communities both within and outside the library". Though wide variety of information sources are converging on the desktop but technology cannot completely replace the "people element" from the equation (**Khan, 2003). Sherikar and Jange (2006)** emphasized that technological developments and ICT tools have helpful in making the library more accessible. Human interaction is still needed by the users despite the convenience of digital access to resources **(Miao &Wang Bassham, 2007).** Librarians are working in collaboration with fellow professionals in information technology, research & development, or communication & marketing to create awareness and to facilitate improved access to information.

The agricultural libraries have strengthened their efforts in a direction to reorganize their collection and services in accordance with digital environment so that libraries and users can be brought in close proximity for delivery of library services in better

way. The World Bank sponsored projects NATP (National Agricultural Technology Project) started in 1998and NAIP (National Agricultural Innovation Project) in 2006 marked new chapters in agricultural research. ICAR who was manily responsible in implementing these projects reached out to all the agricultural universities, science and technology institutes, private bodies for innovation and research. Besides strengthening of digital infrastructure in terms of computers, application software, Local Area Network, VSAT etc. online resource base was also expanded through Consortium for e-Resources in Agriculture (CeRA), E-granth, online courses etc.

3.5.1 Impact on Library Collection: Changing trends

Information technology is considered to be one of the most strategic factors in creating competitiveness and essential for determining the success of organization. It has brought revolution in the traditional concept about libraries from store house of books to centre of intellectual information and dissemination centre and has facilitated global access to information by overcoming the geographical limitations**.**Modern electronic resources such as databases CDROM or Online, e-Journals, e-books, electronic theses, reports, conference proceedings, magazines, newspaper etc. are now considered to be important during collection development process. These are "Materials consist of data in machine readable form and manipulated by a computer through the use of a device connected directly or remotely via a network. **Reitz (2005)** has refered to software applications, text or bibliographic databases, etc" in the category of electronic resources. So different forms of information resources now constitute a part of library collection. Positive impact of digital technology in terms of fast searching and discovery, development of new skills, collaborations with colleagues, repurposing library space etc. has been realized. Technological advancements have led to the development of innovative tools such as COUNTER, Transaction log Analysis (TLA), Citation matrix etc. that have helped the librarians in checking the usage of electronic resources in order to justify the investment. Online usage statistical data can be obtained through COUNTER(Counting Online Usage of Networked Electronic Resources) which has been designed for librarians, vendors and intermediaries who require such data in order to justify the investments. It enables librarians to have comparative statistical information from different vendors which

further help to make better-informed purchasing decisions, and further effective planning (**COUNTER, 2022).** Transaction Log Analysisis ―the study of electronically recorded interactions of on-line information retrieval systems with the persons who search for information found in those systems **(Peters, 1993)**. Citation Analysis technique refers to analysis of cited documents **i.e.** the more frequently cited publications are the more valuable, will continue to be used heavily, and, consequently, are more important to have in the library collections (**Johnson, 2014).** These online tools are very helpful to the library administrators to know about their Return on Investments (ROI) thus help in better decision making for collection development. Earlier traditional measures like absolute size of the collection, size of the rare collection, size of subject, date, language, etc.; Number of volumes per user, number of volumes per document circulated, current growth rate, etc.; Amount of collection used; and Expenditure on collection, etc. were usually considered for evaluating collection**(Rao, 1997)**.However, all these measures are insufficient to evaluate a librarycollection in the context of recent advances of ICT. Consequently, in addition to the above mentioned conventional measures following new measures are now also equally important, which include ―Availability of electronic resources such as Databases-Abstracting and indexing databases, databases of journals, theses, books, number of databases subject-wise; frequency of updating, possibility of its remote access, availability of multimedia databases, etc.; Access to Internet success rate—how much is really accessed, number of records accessed and downloaded, number of accesses to other electronic publications, response time, and the cost of accessing**(Arora, 2009).**

3.5.2 Impact on Library Services: Changing Trends

Brick and mortar libraries that store information within constrained physical space is transforming to data centers that integrate data sources around the globe by way of networking. Library services have undergone tremendous change and are still continue to evolve with the new emerging technologies. Electronic services tend to develop in response to technological, financial and cultural changes which have resulted in higher user expectations. So libraries need to adopt technologies for proactive services to stay ahead in the competition **.**Libraries are trying to explore

their full potential and are adapting the ongoing changes. No institution can be self-sufficient to fulfill the ever-increasing demands of its users. Libraries in India alsolike of most other developing countries are also suffering from inadequate funding or budget and thus cann't provide all the resources solely of their own. Accordingly, cooperative solution resulting from this situation was to pool the resources thus resulted in development of library consortia **(Henning, 2003)** to fulfill the information needs of users efficiently. Information technology has helped the libraries to automate all the in-house activities. Information revolution has enabled the libraries to present their collection and services online thus extended their scope worldwide. It has positive impact on productivity and has offered better solutions to achieve greater level of efficiency, productivity and excellence in providing library services **(Cholin, 2005).**Implementation of RFID technologies in libraries is a step further towards improvement in library services as it fastens the library operations thus help in saving the time of the reader. It is the right technology investment for all the stakeholders for long term security of the library **(Gupta & Margam, 2017).** Portals are the becoming first choice for the library users in searching for any information. Libraries with mere books and journals will no longer lend credible support to academic community. Information resources in various formats have compelled the libraries to provide services in an integrated manner through single point of contact which is called as web portal. The web has now become an indispensable tool for providing direct access to research information sources with or without the intervention of the human intermediaries. It has now become possible for the libraries to extend their services beyond library hours through use of networking technologies thus help in improving the library visibility and ultimately making the users aware of what the library has to offer **(Madhusudhan & Nagabhushanam, 2012).** Therefore web-based library services are now considered invaluable.Library portal better known as the mirror of library that can provide personalized servcies to its user. Libraries are the organizations which are responsible for creation and maintenance of innovative information systems for dissemination as well as preservation of knowledge irrespective of the format. They are common places for intellectual community where there is interaction of people and ideas in both real and virtual environment to expand

learning and thus helps in creation of new knowledge. Library websites are becoming the most convenient and effective medium to access information resources so refinements in terms of content selection, updating and interactivity are the focus areas of library website. **Pan et al (2004)** enumerates that typical academic library portal include tools for resources and discovery; personalization and customization that would help the individual users to automatically direct to required resources, cross linking, cross searching etc. Users' generally access the library website to find study material like journals, books etc., to get his account information regarding checkout books, fines and to find library related information like location, opening hours etc. Academic library websites particularly the university library websites offer digital resources, full-text databases, bibliographic abstracting and indexing databases, research tools as well as useful links for study and research. Certain library services like opening hours, suggestions for collection development, reservation of particular material, overdue status, fine etc. earlier provided physically are now offered electronically in the networked environment. Library users can ask reference question online, perform searches in databases, search the article online and send inter library loan request electronically **(Connell, 2008).** Content linked through library portal is authenticated, superior and trustworthy as compared open access content available on web. It has also become effective medium in reaching out to library users and in promoting use of electronic resources. User friendly interface, currency, interactivity, attractive design along with assistive tools are considered to be the important features for educational websites nowadays as it is the first contact point for any information. Academic library web presence has been felt by the users through fast, easy and organized access to library resources and services from institution website. Library website establishes the means to interact asynchronously in both attracting new users and promoting information literacy for the existing users. It helps to push both information & content on the patron side and assist the library staff in evaluation and management of information content. In this manner they are serving remote users in efficient way **.** Mobile based services are becoming popular and have considerable impact on information seeking behavior of the users. Smart phones are now being widely in use due to its easy affordability and penetration. User wants to

access library resources anytime, anywhere through smart phone so mobile app development by the library is another smart way to reach the user which is more convenient and time saving thus result in service improvement . Most of the libraries are using Web 2.0 technologies and social media tools to market their resources and services. “Social media features are having great importace as it involvesactive participation, sharing and creation of content” **(Sriram, 2016).** Social media tools like facebook, Twitter, LinkedIn etc. are very useful for quick sharing of information with the users. They are helpful in improving the image and visibility of the library so that more users are attracted to the library which is the main goal library **(Gupta, 2015).** Blogs can be used as promotional as well as feedback tool through which library patron can provide information about their experience and suggest forfurther improvemants **(Mandal, 2011).** RSS feeds can be integrated with library catalogues and journals database just to inform the user about new purchases and publications **(Kajewski, 2007).** To arouse the interest of user in patronizing the library and use of resources information communication technologies play significant role in publicizing library resources and service.Emerging web tools 2.0 and 3.0 provide new directions for quick and better services to the users **(Khare&Patil, 2017).**Web-based document delivery service has emerged as value added service available to the user as user can directly request for the required information while searching. **Lukasiewicz (2007)** discussed about podcasting and wiki as way of attracting the user. On the other hand, chat reference which is synchronous way of communication has a special advantage as compared to e-mail **(Nielsen and Hummelshoj, 2008**) as immediate help can be provided to the user. **Hvass and Myer (2008)** also pointed out that instant messaging (IM) reference service fits nicely into the existing range of help services. **Hanson and Cervone (2007)** viewed Wiki, Blog, Really Simple Syndication (RSS), Instant Messaging (IM) and podcast are the best Web 2.0 tools for serving the users of academic libraries. **Bhatnagar (2005)** stressed that virtual library tours are replacing the image maps on main campus websites largely. **Krubu and Osawaru (2010)** enunciated that “Besides, automating different library activities ICT implementation has helped in effective library cooperation through resource sharing networks, development of institutional repositories, digital libraries: and initiation of ICT based

information literacy programmes for library users."Some of the innovative services provided by libraries include Electronic document delivery, Online instructions, E-mail based services, OPAC, Virtual reference desk, virtual tour, podcasting, vodcasting, library blogs, social networks, alerting services etc. The changing trends in services can be depicted as follows

Table 3.5: Library Services: changing trends

Facet	**Traditional library**	**Library in electronic age**
Collection	Print, Microform, A-V material	Electronic resources e-books, journals, databases etc.
Instruction	In-person instruction in classroom/Library	Online instructions/Tutorials
Circulation	In-person check-in/checkout, reservation etc.	Online reservation, online account information
Catalogue	Card catalogue, Local OPAC	Online catalogue (Web OPAC), Remote accessibility.
Reference	In person reference desk	Virtual reference, email, chat
Interlibrary loan and Document delivery	In person ILL request, books	Online ILL request and delivery

Source: (Yi, 2005)

Emerging ICT and Web Enabled Services are enumerated as under

(a) **Electronic Document Delivery:** It implies delivery of electronic version of the document that might involve the reproduction of an electronic copy of the document even if not available in electronic format **(Gupta &Arora, 2009).** Nowadays libraries are providing electronic copies of the journal articles and other documents through ICT based lending system in PDF, DOC or HTML format.

(b) **E-Mail Based Services:** Email based service is used by the libraries for various purposes like answering queries of the users, alerting user about new additions,

reminder for overdue books, notices etc. It is the cheapest and cost-effective service

(c) **OPAC:** Providing online access to library catalogue for searching and providing information about the library resources. Most of the libraries keep their catalogue web-based so that user can search and access the collection.

(d) **Virtual Reference desk:** Reference librarians were earlier available to the user in person or on phone. But now with the development of web technology libraries can provide assistance virtually to the user through web form.

(e) **Virtual tours:** Virtual tour created by the librarians available at website help in describing the library to the user. User any time can have virtual tour of the library.

(f) **Podcasting:** These are the audio recordings usually in MP3 format of interviews, talks and lectures which can be played at any time on desktop or wide range of MP3 devices. These can be used by the libraries for providing library instructions and information literacy programs **(Dash, 2009).**

(g) **Vodcasting:** VOD stands for "video-on-demand". It is similar to Podcasting and is used to deliver video files instead of audio **(Arora, 2009).**

(h) **Online Instructions:** Online tutorials for searching information from online resources and bibliographic use instruction are provided to the user **(Islam & Islam, 2006).**

(i) **Library blogs:** It is a website maintained by an individual or organization with regular entries of commentary or description of events or other materials such as video, graphics etc. **(Arora, 2009).** It links to other blogs, website as well as other media related to the topic. It is a tool which can be utilized for promotion, publicity of library resources and services. Information about new resources and events can be disseminated.

(j) **Social Networks:** User centric services can be provided through social networking platforms. It can be used for providing and sharing information with library users and other stakeholders **(Mishra, 2008.).**

(k) **Alerting services:** The timely information can enhance the creativity of scientific community so libraries with the use of technologies can keep the user informed of latest journal contents.

Agricultural university libraries and information centers have to go long way in designing and improving their websites to make in user friendly and interactive. The Agricultural libraries have good visibility over the web although more in static form **(Singh, 2012).**

3.5.3 Staff skills and Competencies: Changing Role and Importance

The performance and attitude of individuals in any organization play a key role in any of the quality development program as it is only the people who are performer of every action. Competencies are the capabilities, technical knowledge and attributes that helpsomeone to get success in particular position whereas as skill is the capability acquired by a person through training to successfully complete particular task. The essential skills required by contemporary library professionals include personal, generic and domain specific knowledge. Competent and knowledgeable staff can provide access to vast amount of information avaible regardless of format with in library or at remote place **(Dash and Padhi, 2010).** The librarian's role now has been redefined and emerged as information mediators. Librarians have to add more value to the information by repackging it which does not come passively just relying on information they receive from producers and passing it on to the consumers. The added value to the information not only comes from searching for quality products at reasonable price and but library's own ability in organizing, linking, retrieval and access systems **(Dillon, 1999).**Technology has changed the way information is generated, processed, distributed and stored thus resulted in increased pressure on the library professionals which can be managed through adequate training. Training assists a person in enhancing efficiency and effectiveness by updating knowledge and skills relevant to the work. New technologies have posed various challenges for the library professionals who can convert it into opportunities by grasping new skills and knowledge to become innovative educator of their community thus can help the academic community in effectively managing the information. Due to ongoing technological developments there is always a need for continuous upgrading of skill

sets at all levels of organization. For effective services, behavior and attributes which the customer value must be identified. To ensure consistency in service delivery appropriate training must be provided as it supplements knowledge, task-analysis as well as skills directly associated with job performance. Staff the main conduit between users and service has to continuously improve their capability to serve users in better way. Staff should be given support, motivation and resources to keep up their skills so that they can keep their focus on delivering higher quality services. Staff development is needed in all areas like training on information analysis tools, technical skills troubleshooting and other software related aspects. Lack of skills leads to lack of confidence which may be the cause of resistance to change. Lack of technical support for non technical staff can also be one of the reasons for lack of skills. Supportive environment enables the staff to learn and perform well. The new competence, experience and learning agility lead to more effectiveness for users and other stakeholders. The trained library staff better help the users in handling online information resources. It is therefore necessary for the workforce of library to update themselves with necessary skills required to provide services in better way **(Meadows, Yates-Mercer &Mcvey, 1997).** Training of the staff is necessary component in provision of quality services to the users as they can better satisfy the user information needs. Thorough knowledge and preparedness affect the customer satisfaction whereas courtesy, professionalism and attentiveness are believed to be important in face to face encounter rather than in technology mediated context **(Froehle, 2006).**As ICT requires user's involvement therefore skills of the users should also be improved in accessing the resources and services of the library through the use of technology **(Syed, 2006).**Lack of awareness and poor skills to use technology are the primary reasons for less utilization of library resources. Effective user education helps in active learning techniques which is essential for lifelong learning. It becomes imperative for library staff to publicize the library activities for optimum utilization of resources and services of the library. Thus, libraries can play crucial role in providing access to global knowledge and information resources at one place by educating the user. Therefore, marketing skills are also necessary for optimum use of digital resources. Effective marketing strategies bring resources and

user closer **(Sukula &Babbar, 2016)** and calls for the involvement as well as coordination of the entire library staff towards single objective which is user satisfaction. Marketing activities create awareness among the library users which prompts them to make use of resources and services. Information technology has impact on users' expectations which affect the service quality**.** Necessary skills of the librarians and competencies are necessary to be more successful in mediating user information needs . In a dynamic environment like university libraries library professionals should be competent in service delivery for all types of print and electronic information **. Bhatt (2011)** considered skills like technical skills, time management skills, communication skills, presentation skills, and evaluation and assessment skills to be indispensible for the librarian in order to survive in this competitive environment. **Tennant (1999)**on the other hand stressed upon technical skills like "—imaging technologies, optical character recognition (OCR), mark-up languages like HTML, XML etc, cataloguing and metadata, indexing and database technology, user interface design, programming, web technology and project management" vital for managing digital libraries. **Dadzie (2009)** commented on competence among library professionals as "knowledge about growing information resources, its access and the ability to use this knowledge as a basis for providing quality information services". **Canadian Association of Research Libraries (2010)** highlighted seven areas of competencies designed especially for academic librarians and professionals. These include Foundational knowledge, interpersonal skills, leadership, & management, collections development, information literacy, ICT skills as well as research & contributions to the profession. In addition to ICT literacy library professionals must have technical expertise such as database management system programming, networking, troubleshooting etc. **.** There is a shift from ownership to access so library professionals must also have knowledge of licensing, negotiation skills, copyright issues, procurement and budget management skills.**(Premchand-Mohammed, 2011).**It is not only essential for the library professionals to identify and facilitate access to electronic information resources but also make the library users proficient as how and when to access so that they can use it of their own. **(Bhatt, 2011).Walimbe (2009)** therefore pointed out the best practices

which include “offering of the exact information required by the users; guiding users in locating the desired information, make the library management user friendly; easy access to the information resources; weeding of the documents; applications of the new technologies for providing better services; and finally ability to accept the challenges and marketing the services” **.**Their roles are expanding in exciting ways such as information intermediaries, interface designers, trainers, coordinators, corporate information leaders, net navigator, information consultant and educator **(Khan,2003).** Emerging web based digital libraries require change in librarians’ role and interaction patterns for their acceptability as well as effectiveness otherwise users’ will feel threatened **(Adams & Blandford, 2004).Chakaravarty and Sharma (2016)** pointed towards strong need to facilitate all the domains of competencies with much emphasis on technical competencies in the networked environment and organization should play role by providing opportunities to their employee to attain higher level of competencies**.**So library professional core competencies should be predominantly user oriented and technology driven. They not only help in identifying and accessing the required information resources but also orient the library users about how to access them.

3.6 Library Assessment Techniques:

Library assessment is the procedure which is undertaken by libraries to know about the needs of users and to evaluate how well they support their needs in order to improve library facilities, resources and services**. Sumaira (2017)** discussed in her study about various library assessment methods adopted by different researchers which are explained as under. The varied components of libraries that need critical assessment are collection, facilities, staff, service delivery and quality **(Jantti, 2006).** According to **Johnson (2014)** more the libraries discover about their collection and services better they can satisfy the users’ needs thus help them to know about the shortcomings and how these can be rectified.

Assessment can be either quantitative in nature dealing with numbers and statistical data or Qualitative in nature measuring attitude and human behavior **(Ciszek& Young, 2010)** or with respect to collection can be collection centric and use-and-user centered assessment . Collection centered approach use library collection as their base

and includes methods like citation analysis, overlap studies etc. Traditional measures like circulation count, reference queries answered, books acquired etc. were earlier used for assessment activities are now not considered to be meaningful in assessment process. Proliferation of electronic information resources cause problem for collection evaluation activities and have compelled librarians to device some other method of evaluation as they want to have both in-library and extra-library use activity analysis. Therefore, new evaluation methods need to be developed that work in both access and ownership environment. User-based approach could be more revealing as it is based on assessment provided by patrons for whom collections are developed. There is a shift from collection centered assessment to clientele-centered interpretation **(Osburn, 1992).** User focused surveys considered to be useful for getting meaningful data. User satisfaction survey is an important technique of assessment in university libraries which provide useful insights about perception and user satisfaction with the library resources and its services **(Min & Yi, 2010).** So methods of library evaluation and assessment can be broadly categorized under the following headings:

a) Quantitative techniques
b) Qualitative techniques
c) Mixed method (Comprising of both quantitative and qualitative techniques)
d) Collection centered techniques
e) Use and user centered technique: Surveys can be locally designed or customized tools like SERVQUAL, LibQUAL+, survey, SERVPERF , DigiQUAL etc. can be used to assess perception about library by measuring the satisfaction level of the user.

a) Quantitative Techniques: These methods constitute counts or frequencies, percentages etc. that document the existence or absence of the problems, occurrences and behaviors. This type of data can provide representative and generalized information. These methods are usually objective and more comprehensively can be implied to gather and investigate statistical data pertaining to various activities and processes **(Crawford, Leahy, Holden & Graham, 2006).** In library context it may refer to number of

users, loans, visits, exhibition, and staffing, financial provisions etc. that act as statistical indicators. Statistical data collected manually such as enquiry logs, electronically by vendors or through close ended survey designed to examine some specific issues

(b) Qualitativetechniques: These are aimed to generate information from non-numeric data such as written responses to open-ended questions in survey, interview or focus group transcripts, journal entries etc. Qualitative research methods in library and information science are often considered as an addition to quantitative methods of getting understanding of the attitudes or behavior of the user towards process or service that inform statistics (**Crawford, Leahy, Holden & Graham, 2006)**. Observations, Discussions, Focus group, open ended question are the examples

(c) Mixed method: It refers to adoption of both i.e. the mix of quantitative and qualitative techniques of evaluation.

(d) Collection Centered Techniques: This technique revolves around size, growth, coverage, depth, variety and balance of library information resources taking into consideration some external standards procedures or the holdings of one or more libraries.

(e) Use and User-Centered Techniques: These approaches take into consideration as who are using the collection and what are their expectations. These studies take into account the approach of the user towards collection/services and their success as well as failures in getting the required information locally or how alternative can be used **(Johnson, 2014).**

Libraries are striving to find ways to identify their user, what they value and how they evolve collection as well as services to meet the demands **(Covey, 2002).** Collection centered and user centered techniques may be quantitative or qualitative.

I . Quantitative

(A) Collection Centered: It includes

(a) Collection size/Growth: It is the comparison of collection size and/or growth to that of other libraries.

(b) Budget size: It is the comparison of budget size and/or growth to that of other libraries.

(c) Collection size standards & formulas: In this collection is compared to an ideal based on a formula like volume per students, per subject fields or published standards to assess the effectiveness of collection.

(A) User centered: It includes

(a) In-library use: It corresponds to all the items of library stock consulted by the user in the library or use of study space but the methodology tends to be laborious and time consuming and not suitable for electronic collection.

(b) Interlibrary loan Statistics: This technique provides mean of identifying weakness in the collection as it indicates the information needs of the users which are unmet by the library. By identifying the books and journals collection of the library can be strengthened.

(c) Circulation and use statistics: Circulation data is useful in assessing and evaluating library collection as it is revealed from it that which documents users select and use to satisfy their needs. Circulation and in-house data together provide more clear view of collection use so decision regarding multiple copies, storage, preservation and weeding can be taken **(Johnson, 2014)**

II. Qualitative Techniques

(a) Collection centered: It includes

(a) List Checking (Catalogue or Bibliography): It involves comparing of library holdings to standard bibliography **(Ciszek & Young, 2010).** List of titles in particular subject area can be analyzed with library holdings. The list may be bibliography, library catalogue or another specialized list **(Johnson, 2014).**Web based analysis method called Worldcat Collection analysis is helps to compare one library collection with the other libraries in World Cat bibliographic database of OCLC

(b) Expert Opinion: Opinion of faculty as a process of evaluating collection development will assist in identifying areas of strength and weaknesses in the collection so that gaps and inadequacies can be filled **(Oseghale, 2008).**

(c) Collection mapping: It is " the method to examine both quantitatively and qualitatively the state of information resources in certain subject area, and also helps to identify the strength and weakness of certain field collection so that further improvements can be done (**Hyodynmaa, Kannisto &Nurminen, 2010)**

(A) Use-and user centered: It includes

(a) User satisfaction surveys are important in assessing the library collection **(Min & Yi, 2010).** They help in gathering data on perception, performance and satisfaction with library resources and services **(Jantti, 2006).** It is considered to be one of the best method in determining how well the library collection is meeting the needs of users . Surveys can be locally designed or customized surveys like SERVQUAL, LIBQUAL+, SERVPERF, WEBQUAL, DigiQUAL .

(b) User observation: It is the method in which first hand data is collected about process, program or behavior under study.

(c) Shelf availability studies: These are the studies intended to find out if an item that library is supposed to own can be located and retrieved by the user. They are also called retrieval studies **(Johnson, 2004).** This method reveals whether patron have any difficulty in locating the required information and evaluator on analysis can propose solution for the problem can inhibit or decrease the use of collection .

(d) Mystery shopping: In this method, a substitute can act as a user and rate his/her experiences based on criteria provided by the employer. (**Wiele, Hesselink & Iwaarden,2005).**

(e) Citation studies: This method presume that more recurrently cited publications are important that will continue to be used substantially and are vital to be in the library collection. Information generated from such studies can be used to make key decisions about collection development **(Johnson, 2014).**

Due to technological and socio-economic developments concept of evaluation has been modified from quantitative measures to qualitative measures. In the words of

Herbert(1994) ''When Library and customer quality are not in harmony the library may be meeting its internal standards but may not be performing well in the eyes of its customers". In the customer centric environment customers' judgment is the most important of all. Huge amount of money is invested onthe building, furniture, manpower, equipments; documents etc. for generating various services from these resources. Users' attitudes and interests in different forms of resources have highly affected library services. If the services offered are not as per requirements of the users then these may not be adequately used resulting in the wastage of resources. Hence it is very important to know the users' expectation from the library and plan the services accordingly. Libraries in addition to traditional methods of assessments and must also apply some marketing techniques to know the actual requirements of the end user. Therefore, it is necessary to for the libraries to have some system through which user needs are identified. Measuring service quality is challenge and libraries can use in-house developed strategies or can use some external frameworks based on suite of services that libraries used to provide, track and understand. In a broader sense service quality has two components of which one is deliverables and other is interactions. Various service quality models have been discussed for better understanding of service quality dimensions.

3.7 Conceptual framework of the study: Technology has penetrated in every field and library working has also transformed with the application of information technology. Proliferation and use of information communication technologies in libraries has changed the way in which services are produced, delivered and consumed so provision of quality information services is of paramount importance to stay ahead in this competitive environment. Various new services such as access to digital or electronic collections such as e-books, e-journals, e-theses, online databases and digitized collection), web portals, virtual reference, online help & library instructions and online document delivery have been introduced in the service delivery process of the libraries thus resulted in improved access to pertinent, current information at much faster speed. The provision of automated services started long back **(Collier, 1983).** Technology has helped in improving the service delivery process as better services can be provided to the customer with ease and convenience

(Sachan, Ali & Gupta, 2007). Traditional services which involve human-human interactions are largely being replaced by interaction of human and technology **(Bitner, Brown and Meuter, 2000).** Technology based service(s) may or may not involve customer interaction with employees. In self-service technologies environment like kiosks, vending machines, online retailing etc. human-human interactions are completely being replaced by human-technology interactions. Since libraries are in transition phase provide services which can be called as hybrid services involving mix of human and technology channels for delivering services to the users. Though technology is being used by the libraries for service delivery still human interaction is needed for service delivery process. A great deal of human interaction is required during initial service subscription, service consumption and or problem solving or any other support service to fulfill the information needs of the users. Web services are sometimes defined as free from direct human-interaction but in library services relationship of user and librarian cannot be ignored. Studies on service quality of conventional services using SERVQUAL by Parasuraman et. al have been used in various service sectors including libraries whereas technology-based services using E-S-QUAL by **Parasuraman, Zeithmal and Malhotra (2005)** have been done in the past. Various service instruments have been evolved to assess the service quality.

Libraries have transcended from being conventional service to hybrid one as a result of introduction of technology-based channels internet, website, remote access etc. Due to wider application of technology the focus is now on convenience and perceived ease of use the services. In libraries, service quality demands cooperative relationship between library and its patrons. Libraries should able to meet the new challenges in service delivery process which have been posed due to adoption of technology. As the user apart from online resources need print resources of the library so there are occasions when during which human-human interactions happen in the library service transactions such as issue-return of documents etc. Hybrid service quality model proposed by **Ganguli and Roy (2013)** suggested that customer perceptions of hybrid service quality reflected through three primary dimensions (a) Interaction Quality (IQ) (b) Technology Quality (TQ) (c) Auxiliary Quality (AQ). The

first dimension is about interaction of customer with service provider called interaction quality (Brady, Cronin & Brand, 2002). The perception of interaction quality depends upon the competence and behavior of employee. The second dimension about the technical quality of tools through which service is accessed and the third-dimension auxiliary service quality refers to the service environment in which the service is provided and consumed by the customer. Service quality can be measured at any of these levels thus help to get the desired information and decision can be taken accordingly. These three primary dimensions are driven by nine sub-dimensions which are (i) Service provision (ii) Employee competence under dimension IQ, (iii) information security & quality (iv) technology usage convenience (v) technology reliability under dimension TQ (vi) image (vii) price (viii) tangibles (ix) ease of subscription under dimension AQ. The underlying factors such as Service provision, Employee competence, information security & quality, technology usage convenience, technology reliability and tangibles of hybrid service quality model with few modifications can be considered for service quality assessments of academic libraries.

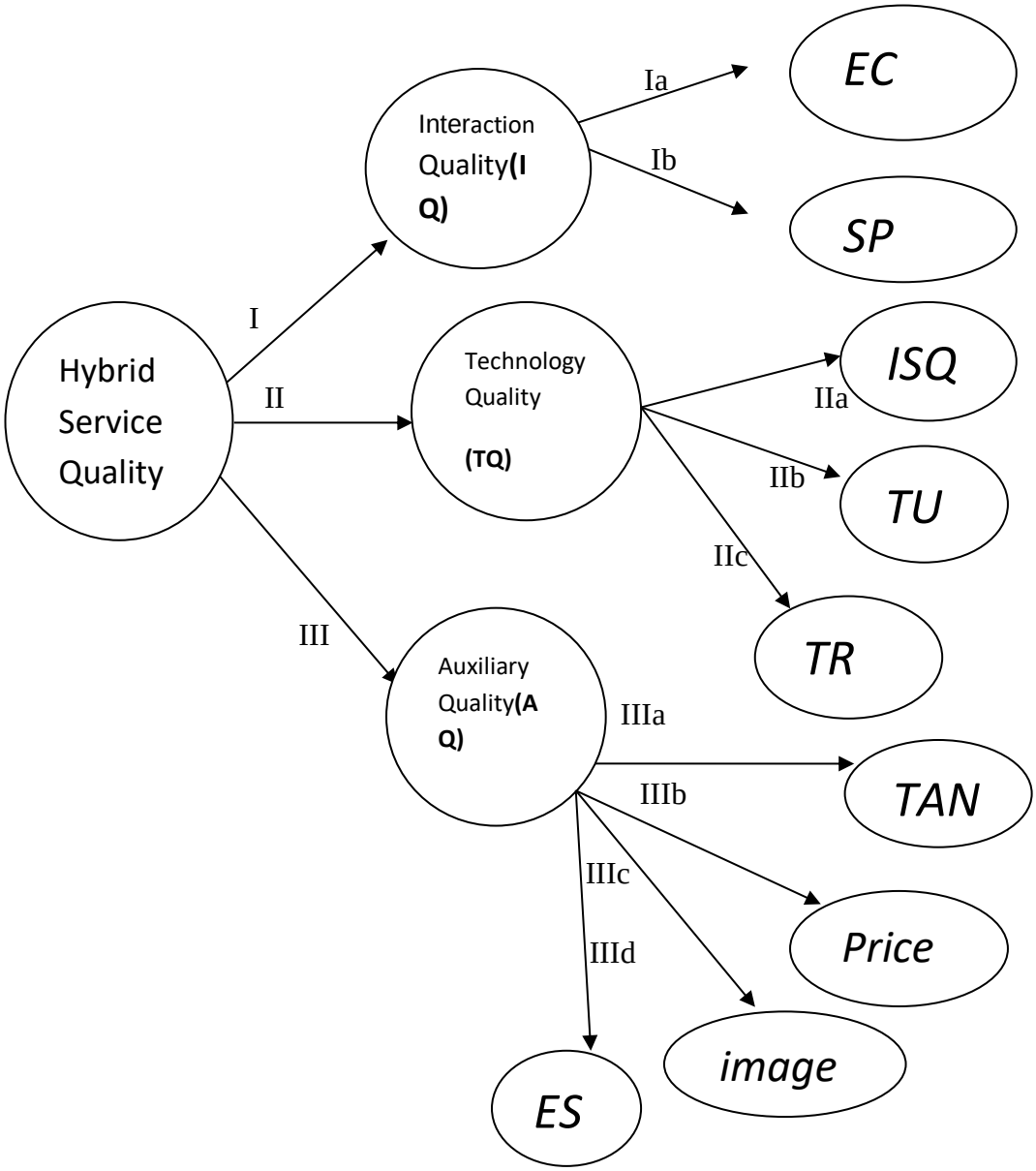

Figure 3.7 :Hybrid Service Quality Model

Ganguli & Roy (2013)

3.7.1 Service quality assessment: Traditionally library statistics such as daily circulation count, reference queries answered and books acquired or processed in day, month or year etc. were used for library assessment activities. This kind of assessment approach was solely based on the perception of service provider describing particular phenomena and was one-way application. Though these statistics provided useful information to library managers but were not considered to be meaningful alone for

service improvement process. It was realized to involve library users who actually use the system in the assessment process to obtain valid results. Various methods such as user survey, focused group interviews, and complaint analysis were used for systematic data collection from the users. This kind of approach included the user's perspective which called for proper planning of library assessment activities. User perception of service quality, user expectations and user satisfaction have been reported in management literature as essential elements discussingvarious service industries assessment activities as well as of the libraries too. User evaluation of service quality is well accepted concept now in-service organizations likelibraries so library managers and researchers are more interested in examining better assessment tools for assessing various library operations. Today most of the libraries are in transition phase and are providing services to the users physically as well as through digital contact to the remote users. In order to assess theservice quality of academic library it is necessary to identify quality dimensions of library services involving human as well as the technology factors **(Ganguli & Roy, 2010).** Invaluable insights about the library can be obtained through customer assessment which further helps in re-orienting collection, activities and services in order to effectively meet the information needs of the users.

In any service encounter there are three types of service forms depending upon the interaction involved between the types of entities involved in service process. It can be human-to-human also called the traditional form, human-to-digital interaction which is digital service form in which web portal serves as a mediator between service provider & customer and the third category comprises both physical as well as digital component during interaction called hybrid form. It can be represented as

Table 3.7: Library service forms: traditional, digital and hybrid

Form of Service	Service description	Factors for service quality
Traditional	Face to face contact (Service provider & customer)	Human behavior, Knowledge, relations, environment & tangibles
Digital	Digital contact (Service provider & customer)	Web service or Portal (Self services)
Hybrid	Physical and or digital (Service provider & customer)	Traditional as well as digital factors(IT functionality & employee behavior)

Source: Hartwig & Billert (2018)

3.7.1.1 User Focused Library System (UFLS):

Successful organization is the one that which is able to achieve customer satisfaction. **Hossain (2013)** proposed **U**ser **F**ocused **L**ibrary **S**ystem **(UFLS)** model to find out the factors responsible for users' dissatisfaction and frustration. According to this model the main aim of library marketing should be to understand its users and vaiouus factors influencing its effective use. It requires clear understanding of the users' information needs as well as how to fulfill those needs. This process asks the users to give their feedback regularly and consider them in regular assessment of existing service quality. Employees being the mediator between library resources and users are mainly responsible for successful marketing of library services. The main focus of this model is users' goals thus inviting not only the new users but keeping the exisitng users back to the library. It stresses that quality of library has been seen as a direct result of quality of library service which ultimately depends upon the physical and human resources of the library. All greatly influence the user satisfaction as well as loyalty. The model has been divided into five functional segments (i) Need assessment & recognition (ii) Delivery of Service (iii) Service quality Assessment (iv) Service recovery and solution (v) System's output and result.

(i)Need assessment & Recognition: Need assessment is the first and foremost step for the library authority in any service quality assessment process.It is necessary to

identify and assess users' needs as well as service personnel for servcie quality fulfillment process. Since the service personnels are in close contact with customer during service transaction thus have direct impact on users' perception of overall service quality and value. So employees' need as the role of service providers should also never be avoided. They are crucial for emotional connect and development of long term relationship with the user.

(ii) ***Delivery of service:*** Delivery of service includes information resources / learning resources, services, environment and people. Quality is important with all the attributes as user satisfaction is the ultimate goal.

(a) *Information resources:* It refers to learning resources without which existence oflibrary can't be imagined. Quality learning resources like relevance, adequacy, up-to-datedness etc. are of immense importance for gaining user satisfaction.

(b) *Information services:* It is a process which link user with the desired resource. Service quality refers to the ease and convenience with which user get access to resources and gets up to date information which can meet the distinct information needs of the user in efficient way. Customer satisfaction is greatly influenced by the quality of interaction between library user and service personnel. Information providerqualitites involve abilities, proficiencies, responsibilities and good behaviour. All these greatly influence the users' overall perception of service quality.

(c) *Service environment:* It is physical place where service delivery or transaction occurs. A sound environment is important both for users as well as for employee in effective service delivery. Comfortable reading space, ventilation, proper furniture, cleanliness, equipment etc. affect customer perception of service quality.

(d) *Information providers:*Satisfaction of the customer is greatly affected by the kind of interaction between customers have with service personnel during the service transaction process. For quality service delivery staff should be competent enough to resolve the problem occurring during

service transaction. Positive changes in the employee attitudes lead to positive changes in customer satisfaction.

(ii) ***Service quality assessment:*** Library is growing organism so it never stays same. It responds to the changing environment so service quality must be monitored on regular basis to assess any serviceprocess improvement which is the first step in retaining customers. For delivering high quality services it is necessary to know the customer's perception of service quality, identify the causes of shortfall and take appropriate measures to improve fill the gap **(Zeithaml et al., 1990).** Quality is in the eyes of beholder (Hernon & Altman, 1996). So quality assessment efforts on the basis of end-user's viewpoint are of major concern. User focused library system model considered factors viz. users' need recognition (Active & Domain), information product quality, provider's quality, customer service factors, physical factors in quality assessment effort. Users' need recognition relates to involvement of users in selection of needed material, extent to which product or services meet their needs and satisfaction of the user. Information product quality is the authoritativeness, up-to-datedness of documents, resourcefulness and coverage. Quality of service providers includes reliability and responsiveness in providing information to the user. Qualified, skillful and courteous staff influences the customer satisfaction. Sound environment positively affect the user as well as staff which ultimately affect the service quality.

(iii) **Recovery of Service:** An effective complaint management by the staff affects the service quality.

(v) System output and Result: Users are the main focus from all perspectives of library fucntioning and only the user focused process can helps in ensuring quality, satisfaction and loyalty.

Quality is the most researched topic and in service marketing field defining service quality is the challenging task. It is a subjective concept due to features like intangibility, heterogeneity; inseparability, customer involvement etc. thus make each service unique and therefore attributes of service quality when necessary can be adapted to fit as needs of an organization. **Parasuraman et al. (1985)** defined service

quality as ‘customer judgment or attitude in realtion to superiority of the service‘. **Gronroos (1984)** proposed a model in which he discussed two related and measureable quality aspects: Technical (output) and functional/Operational (process). Technical is what was supposed to be delivered (output) to the customer, while functional is concerned with how that output was delivered to the customer. Various scales have been developed for measuring service quality to determine service effectiveness of any organization. Library is one of the service professions where listening to the user and knowing their specific needs is first important step towards quality services. There has been change in the concept of evaluation from quantitative measures to the qualitative ones as library may be best from point of view of management but user/customer view point may differ and it is the user who justifies the library’s existence Only customers are capable of judging the quality all other measures are irrelevant **(Zeithamal, Parasuraman & Berry, 1993).** Various theories and lot of work has been done to develop scales for measuring service quality which would help service organizations to find out their service effectiveness. **Parasuraman et al. (1985, 1988)** posited that ‘operationalized service quality is the difference between the consumer wants (Expectations) and their perceptions of what they get.’ They developed service quality model based on gap analysis. They proposed a service quality measurement scale called SERVQUAL. **Nitecki (1996)** used SERVQUAL to measure customer attitude towards quality of services offered by the library. Service quality can also be applied to specific departments within academic library. Other scales based on servqaul have been proposed like SERVPERF scale is one such scale that was put forward by Cronin and Taylor (1992) in the early nineties. **Cronin and Taylor (1992)** suggested that expectations of the users were difficult to measure accurately and it is the performance of the service which was critical and more meaningful. For measuring customer expectations in special library settings SERVQUAL, and SERVPERF may be useful. SERVQUAL measures both customer expectations and perceptions. It has been extensively tested across various service settings such as hotels, restaurants, airlines, banks etc. LibQUAL+ survey developed by Association of Research Libraries (ARLs) , Washington D.C. evolved from conceptual model based on SERVQUAL has also been used particularly in the library

settings to assess the library services . Both SERVQUAL as well as LIBQUAL+ model are based on gap theory and measure the service quality as the difference between expectations and perception of the users whereas SERVPERF instrument on the other hand is the performance only measure. Library Service Quality Assessment **(LSQA)** scale was also developed to measure the users' perception of service quality in libraries which contain 44 items grouped under dimensions namely Library staff, Library collection, Library services and Library infrastructure **(Dash & Padhi, 2016)**.

3.7.1.2 Service quality assessment model SERVPERF: SERVPERF scale having the service quality dimensions similar to SERVQUAL based on performance only model proposed by Cronin & Taylor 1992 is modified and used to assess the service quality in the present study. Some studies also showed that perception score alone could explain the service quality performance since the rating on expected service is memory based may be biased by actual service received hence cannot measure performance correctly **(Cronin and Taylor, 1992, Andaleeb and Simmonds, 1998).**The attributes of the service quality depend upon the specific users' group. They were of the view that service quality is attitude of the consumer towards the service and the performance only measure is the better mean of measuring service quality of actual performance. It was claimed that utilizing difference scores is neither a reliable nor a valid measurement for operationalizing the service quality construct for an information system services provider so expectation component of SERVQUAL should be discarded and instead performance component should alone be used. Therefore they proposed SERVPERF performance-only measurement subset which measures service based solely on user's perception. Consequently the other studies conducted by number of other researchers at different times also revealed that performance alone can better exhibit the reliability and validity than the difference scores of the SERVQAUL model **(Landrum et al., 2008)**. This instrument was also consisted of twenty-two statements similarly worded to those in SERVQUAL but does not repeat the set of statements as expectations items. It measures the perception of actual performance and summarizes the services into five dimensions (a) Tangibles (b) Reliability (c) Responsiveness (d) Assurance and (e) Empathy. They tried to measure service quality and its relationship with consumer satisfaction and purchase

intentions. It was maintained that performance instead of Performance-Expectation determines the service quality. Since the service quality is evaluated by perception only without expectations thus can be put as formula below

$$SQ = \sum_{J=1}^{k} P_{ij}$$

Where SQ = Overall service quality

k= the number of attributes

P_{ij}= Performance perception of stimulus i with respect to attribute j

3.7.1.2 E-Services and Libraries: Libraries are expending into virtual spaces so there is change in library service environment. Services of today's libraries are not limited to physical building but can be accessed from home, work place or any other location through internet. E-resources have become format of choice due to features like convenience, fast searching ability and speed of communication. Users now get linked to virtual libraries, online catalogue and databases so it has become necessary to equip users with necessary skills/instruction in order to optimally exploit these resources. Though the direct contact between user and the library staff decreases in internet-based services still their competencies continue to play crucial role. Since e-services are based on technology so firstly there is need to understand quality as conformance to technical specification and secondly as the marketing approach. Since technology enabled mechanism help in attaining better productivity and satisfaction of the user so it has become necessary to evaluate the services of academic libraries in new electronic environment or E-services also.

E-service is defined as content-oriented and interactive service driven by the customer integrated with organizational customer support to strengthen customer service relationship **(Liu, 2012)** or more broadly it can be “all the phases of customer interaction with the website **(Parasuraman et. al, 2005).** Thus E-service is characterized as the service which is accessible with in the electronic environment and is consumed by the user through internet. User has to participate more actively in electronic environment and quality of service also depends upon the ability of the users to use the technology in order to use the service. Effective communication and

reliable feedback give confidence to e-service user so two-sided channel is extremely important. E-services may involve user staff interaction or can be used independently by the user thus can be termed as indirect e-services or direct e-services respectively. In case of remote access quality of service associated with particular electronic resource or service is of paramount importance. Remote user requires point-of-need (Just in time) help thus there is great need for assistance and instruction. Self-service technologies (SSTs) can helpful in effective, proficient and better service productivity. It may result in enhanced customer service perception as customer can quickly and conveniently complete the transaction. **Meuter et al. (2000)** has defined self-service technologies as "technological interfaces which enable the customer to get service free from the direct involvement of firm's employee." Different aspects of website like use, content, design, usability etc. must be considered for improving the web service quality. So the quality dimensions like responsiveness, reliability, courtesy along with access, personalization, security, communication and involvement should be included. Perceived service quality is affected by user experience, information competence and skills combined with their willingness to participate in the process. Technology readiness influences the self-service technology usage. Actual behaviour depends on frequency or level of technology system usage. E-service quality depends on the factors like potential quality of service provider, customer capabilities, skills and willingness to participate, the process quality and output quality. Since modern library services involve both human factors as well as machine during service encounter so service quality attributes like human attitude and behaviour as well as digital factors must be taken into consideration while assessing the service quality of library. Without timely feedback library systems could deteriorate such that recovery or meeting users' satisfaction is difficult if not impossible. Therefore quality assessment efforts based on end users' view point are of major concern for library managers in order to identify strengths and weaknesses.

3.7.1.3 Attributes of service quality: The attributes of service quality are depend on the specific requirement of the service field and specific users group to be served. Some of the attributes are common to all and or can be suitably modified to measure service quality of specific sector. Library provides knowledge intensive services with

the use of ongoing technologies involve physical and/or digital interaction in the service delivery encounter. The attributes which are most likely used by the library users involve both human as well as digital factors. These include Resources, Staff/Employee competence, services, environment and web service quality or E-service attributes

Resources: The basic requirement for any service providing organisation are the resources which include financial and human resources. In library context resources can be broadly classified into leaning resources, financial resources and human resources. All the documents of library like print books, journals subscribed, theses, reports and E-resources constitute learning resources whereas funds availability referes to financial resources and library staff providing various services is covered under human resources.

Comprehensive collection: Service quality of any library depends upon the kind of resources it possesses. Libraries are considered to be the hub of an intellectual activity because of its collection. It is the collection that determines its users and services. Richness or comprehensiveness of the collection which fulfils the instructional and research needs of the users is more important. The comprehensiveness of library collection is determined through its extensiveness, range, uniqueness and depth **(Cook & Heath, 2001).ALA (2006)** emphasized on usability, comprehensiveness, diversity of library collection and stipulating that "the library should provide varied, authoritative and up-to-date resources that support its mission and needs of undergraduates, postgraduates and faculty staff".

Staff/Employee: Staff or Employees are the backbone of any service providing institution. They are activators of functions and services **(Osinulu&Amusa, 2010).**Good or bad image of an institution depends upon the attitude of workforce/Manpowwer. Skills, knowledge, attitude and behaviour of an employee have an effect on services received by the users. Thus, they play very significant role and are the most crucial part in service delivery process.

Responsiveness: It is the willingness of library staff to help the user and provide library services in time. They should be proactive and manage the resources in such a way that required information is available to the user in time as and when demanded

by the user. It is also expected here that user must be informed promptly if the document is not readily available. Timely action on customer grievances/complaints is also important service quality indicator on the part of library staff.

Reliability: It refers to the ability of service provider to deliver the promised service dependably and accurately so that user can rely on it. Consistency seems to be very important in any service delivery process from customer point of view. It is expected that library should keep their records/databases updated and ready to use as and when needed by the user. Reliability dimension of SERVQUAL instrument in the library context has ranked as the most important all other dimensions **(Cook & Heath, 2001)**

Empathy: Feelings of care and consideration play key role in developing human relationship. Polite and friendly behaviour affect the service quality during service interaction. It instils confidence among the library users regarding use of library resources.

Guidance & Communication: Proper guidance given to the user of library helps in proper utilization of services which can affect the service quality. It is essential for the library staff to keep user informed about various services and operations. These must be communicated to the user in the language understandable to the user through any medium. Enhancing library use skills among the users is also feature of good communication. So it is essential for the staff to make the library user self-reliant through library orientation/user education / information literacy programs. Users become confident in navigating the information world and make optimal use of the services.

Access: It is not only important for any library to possess documents but also make provisions for their effective use by the users of the library. Various traditional methods such as open access system, catalogue, bay guides, site map, signage, proper display of reading materials etc. encourage access to the collection. With the help of technology, it has become easier for the library user to access resources and services of the library. Flexible library hours and reliable catalogue promote further access to library collection. Libraries are not only providing bibliographic information but also the full text access to databases, e-journals, e-books and other related resources through web page of the library. Interactive and richer media provide more flexibility

to meet individual needs in self directed learning. Technology has helped the user not only to access the resources of library at local level but globally also thus libraries are facilitating the users in getting the required information from other libraries through document delivery request. Virtual tours, library blogs, face book and other social media tools help in communication and sharing of information. These are also becoming popular means of publicizing the library resources and services of the library.

Tangibles/Environment: It refers to the ambience in which services are provided. Library is still considered to be a place of academic importance and Intellectual learning in the current technological settings. It serves as home away from home for serious readers. It includes physical facilities like attractive modular library building, comfortable furniture for seating, cleanliness, ventilation, and lightening, cooling and drinking facilities. For providing efficient and prompt service equipment like photocopier machine and adequate number of computer terminals should be properly maintained. Cleanliness seems to be the vital factor among the tangible elements **(Nitecki, 2001).** Neat and clean shelves, flooring and toilet create inviting service environment. User friendly software and its updating is very crucial part of entire service delivery process. Since all the electronic services related to customer are dependent on software and customer is expected to interact with software so the decision regarding selection of software is very important. As a result, selection of user-friendly software and techniques are the deciding factors for determining the e-service quality of service providing organization.

3.7.1.4 Web service or E-service quality attributes: Electronic services which are provided through the use of information & communication technologies composed of three main components like e-service provider, receiver and e-service channels. Online library web presence of an institution has increased the library visibility. With the incorporation of Web 2.0 tools libraries are strategically incorporating innovative services for their users. Web based service quality service quality refers to an extent to which web based technology services facilitate effective and efficient communication, purchases as well as delivery of product or services **(Li, Tan & Xie, 2002).** The qualities of e-service(s) or e-quality affect the customer satisfaction and

loyalty. In order to stay ahead and to achieve success it is important to understand as well as satisfy users of the electronic services by improving the e-service quality. **Santos (2003)** defined e-service quality as "overall assessment and judgement of the customer with regard to excellence and quality of electronic service delivery in the virtual environment".Success of any information system depends on information quality, system quality and service quality of the system **(Alotaibi & Osman , 2020).** Information quality refers to availability of accurate, complete, reliable and useful information; system quality is performance of system in terms of ease of use, user friendliness, adaptability, response time whereas service quality includes safe transactions, attention and readiness for the service. Library websites are libraries' virtual presence to the world and provide access to various online resources such as databases, e-books, e-journals, library catalogues and other digital resources. In addition other online library services such as book renewal, research assistance, interlibrary loan, book recommendations, book reservation etc are can also be provided through it. It has become first point of contact for getting the information. The libraries web portal is intended to effectively facilitate teaching, learning and research. Today's library users often make use of online services in all sphere of their lives so it has become important for the library managers to know the user's perception about library websites. In developing a new library website cross-departmental communication and consistent framework are vital in generating ideas to improve access, creation and dissemination electronic content. **Santos (2003)** proposed set of online service quality dimensions broadly divided into two categories as incubative and active dimensions. Ease of use, content, appearance and linkage were included under incubative dimension whereas active dimension consisted of reliability, efficiency, communication, security and support. Aspects like aesthetic appeal, overall navigation, presentation of electronic resources, type of content etc. are considered to be important while designing any library website **.** Aesthetics, structures, reliability and security are considered to be the core dimensions of e-service quality of virtual operations **(Madu & Madu, 2002).** Electronic technology acceptance model **(ETAM)** proposed factors like usability, performance, trust, design, training, support, content, interaction etc. for user acceptance of technology. Factors

like quality, security, satisfaction and intention to use e-services significantly influence the adoption of e-service by the users **(Taherdoost, 2018).** Service value should be included to assess the degree of customer satisfaction. Usability, Aesthetics, Interactivity and Reliability are the critical determinants of web service particularly when customer expects value from service providers. Various scales such as E-S-QUAL scale and SITEQUAL scale were developed to measure the electronic service quality in which design, navigation, processing speed, security etc were proposed to be determinants of E-Service quality **(Zeithaml, 2002) (Yoo&Donthu, 2001). Hernon and Calvert (2005)** were pioneers of library e-service work and opined that e-service quality is multidimensional construct which include ease of use & access, content,reliability,aesthetics,support,security, flexibility and customization/personalization. Other authors also focused on quality of library web pages**. Kiran and Diljit (2012)** proposed web service, delivery and outcome as three main dimensions of e-servcie quality. Web service included (Access, Collection & Equipment) , Delivery covers (Personalization & customer support) & outcome denotes (Reliability, functional benefits) as dimensions of e-service quality. eUTLibQual performance only based instrument identified four factors communication, content, access and website design which affectthe e-service quality **(Einasto, 2019).** SSTQUAL scale by **Lin and Hsieh (2011)** consisted of seven dimensions namely Functionality, Enjoyment, Security, Design, Assurance, Convenience and customization. Functionality dimension include features like reliability, ease of use and responsiveness whereas Enjoyment and design relates to aesthetics. Security/Privacy is associated with personal concerns of the customer and assurance relates to repute associated with service provider. Security and privacy are serious concern of e-service users and is main barrier of e-service usage. Convenience is ease with which services can be accessed and customization relates with needs and wants of customers to shape the services accordingly. To stay apart it is essential for any service firms to get higher level of satisfaction and loyal customer base. Information Technology could be used to improve service quality dimensions like reliability, responsiveness, competence, access, communication, security and knowing

the customer **(Berkley & Gupta, 1994).**Service quality and information system strategies must be tightly aligned.

Since performance only based measurement of quality has been undertaken so the factors identified under eUTLibQual instrument has been taken and statements have been modified and used for assess the e-service quality in present study. The dimensions are

(i) Design (ii) Content (iii) communication (iv) Access

(i) Design: It refers features like ease of use, attractive lay out design, easy navigation and logically constructed so that desired information can be easily located. Inadequate navigation and search engine capabilities will limit the ability of the user to locate the desired information from the site.

(ii) Content: User want to access the desired information easily so information content quality includes reliability, accuracy, relevance, and timeliness customization and completeness.

(iii) Communication: Customer support and assistance by the staff can resolve the issue thereby increasing the customer loyalty.

(iv) Access: It relates to user-information system interaction. It includes user friendliness, speed, assurance, security

3.8 Service Quality and Customer satisfaction: The basics of service quality evaluation points towards satisfaction of the user. The best result is when the user is satisfied and evaluates the service positively. User satisfaction has been considered as important measure of library performance.Customer satisfaction can be described as fulfillment of one's wishes, desires, expectations or needs. It has been defined by **Diaz and Ruiz (2002)** as "an affective reaction to an incident during the dispensing of service." It can be viewed as consumer's response or judgment about product or service providing pleasurable level of fulfillment. In library context in order to measure the user satisfaction there are two approaches- the objective and subjective. The proportion of items that library can provide on demand is measure of user satisfaction in objective approach whereas users' opinion of how well the library has performed in satisfying the demands is measure of satisfaction in subjective approach. Satisfactionis affective orcognitive state of mind which the user experience while

using and evaluating library services. So quality of library service can be inferred either directly from degree of user's satisfaction or indirectly by knowing personal and self-reported assessment of user's experience at the library. By measuring the user satisfaction we can know users' opinion about library performance **.** High satisfaction has been reported as evidence of the quality of library services by American Library Association **(ALA, n.d.).** In any information system user's opinion of system performance that uses is measured in terms of user satisfaction. Customer satisfaction is a function of service quality **(Iacobucci, Ostrom& Grayson, 1995 ; Zeithmal, Berry &Parasuraman, 1993)**

CS = f(SQ) and in performance only measurement service quality is function of performance which can be written as SQ = f(P). Since customer satisfaction is function of service quality and satisfaction is directly related to perceived performance of the service therefore customer satisfaction is the function of performance and can be written as CS = f(P)

In digital environment D&M IS success model precisely explains the relationship between attributes of information system and user satisfaction. Performance of any Information system depends on its information quality, system quality and service quality. Information quality refers to precise, up-to-date, reliable and useful information whereas system quality points toward performance of information system in terms of convenience, useful, response time and adaptability.

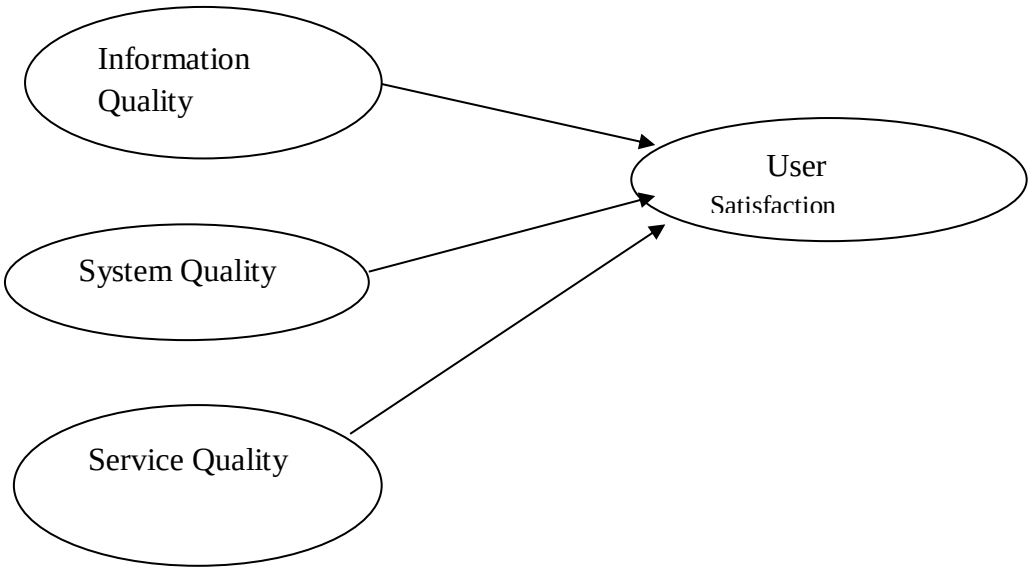

Figure3.8 : D & M IS model

Support to the user by the system in terms of responsiveness, readiness and empathy affects the service quality. Poor user support tremendously affects user satisfaction therefore readiness for service; safe transaction, availability and attention are considered to be important in assessing the service quality. Library service quality is positively correlated with user satisfaction. The delivery of high quality service results in satisfied customer **(Nadiri & Mayboudi, 2010).** E-service quality shapes the initial impression of website's value and determines user's behavior for present as well as future searches on the web site **(Yang, Jun and Peterson; 2004).** Dissatisfied customer may do nothing or may complain, take overt action and never return. E-service quality has impact on customer satisfaction and loyalty. Satisfaction of user with library services has positive correlation with overall image of the university thus has impact on loyalty. Therefore by measuring user satisfaction level library performance can be judged, strength and weakness of specific service(s) can be diagnosed which ultimately affects the future behaviour of user toward the library.

3.8.1 Role of staff skills, knowledge and competence in service quality:

Individual efforts and performances set the customer's perception over the quality of services.The success and survival of any organization depend on the skills and competencies of its work force. Human resource representing the living asset of libraries is responsible for mobilizing the financial and physical resources of the

library. They actually transform the library building into dynamic knowledge dissemination centre. American Library Association lays out specific skills, qualities, and areas of knowledge organized around 8 main areas which are Foundation professional knowledge, Information resources, Organization of recorded knowledge, Technological knowledge and skills, reference and user services, research, continuing education and lifelong learning and administration and management. Federer identified a range of skills like data management, IT, evaluation and assessment, instructions and outreach. Information literacy and instruction continue to be the major area for academic libraries. Though ICT applications have totally changed the outlook of libraries yet the prime objective of every library is to provide user with required information either through bricks or clicks **(Massis, 2006).** Thoroughness, knowledgeableness and preparedness of service employee contribute to customer satisfaction regardless of richness of the medium used whereas courtesy, professionalism and attentiveness important in face-to-face encounter **(Froehle, 2006).** Their emotional connection and long term relationship with user play crucial role in customer satisfaction. Poor employee behavior and lack of competencies results in customer dissatisfaction **(Helms & Mayo, 2008).Hossian (2013)** in his **U**ser Focused Library System **(UFLS)** included ability and proficiency of employee, responsibility and manner to be the main factors contributing towards quality service delivery. Librarianship is emerging as significant sector of service industry and in the new society professionals of e-world are required to be open minded, flexible and prepared to adapt them to changing needs **(Sridhar, 1999).** Effective delivery of library services depends upon proper manpower planning which aims for optimum utilization of human resources by assessing the future skill requirements and training needs. The quality of service can be improved optimally if the staff of library is qualified, knowledgeable having good communication skills, decision making ability and subject knowledge in the area of interest of client. The terms skill and competency have been used interchangeably in the literature. Skill may be viewed as an action in the manner someone performs the given task whereas competencies are concealed within person however persuades the way how they exercise their skills **(Clarkson, 2001).Sridhar (1999)** discussed about professional, IT and managerial

skills which vary depending on the task. He further stressed that along with knowledge and skills; will or attitude is also important for achieving success. Training is positively associated with employee job satisfaction which further affects the performance. Training brings change in employee attitude which is consistent. Staff should be committed to provide quality service which depends upon the attitude, behavior and staff involvement in planning as well as decision making **(Tiemensma, 2009). Lalotra and Gupta (2010)** found that library professional require extensive training and adequate support system to acquire new skills in the technology driven society. Further user education was found to be preferred service as per rating of the users. In this changing environment librarians and library professionals require to have strong competence to deliver better in print and electronic information retrieval services **(Bamidele et al. , 2013).** They should always try to connect with the users for needed information but means available to fulfill that mission are changing drastically with electronic access. So they will have to play dynamic role in order to serve the users in a better way. The roles played by the library in scholarly communication process are becoming more proactive, collaborative and assertive **(Phipps, 1993).**

3.8.2 Library Awareness and Service Quality: The increasing competition due to multitude of information resources, technological development and changing demands set a new framework for promoting library services. Marketing of product is essential for any company to increase sales and earn profit whereas for any library how better users can be informed about the services it offers and their experiences are typically part of overall marketing plan for library. The 4 key elements that make up marketing mix often referred as 4P's Product, Price, Place, Promotion **(Kotler)** have been expanded to 7P's in library context which includes People, Physical evidence and process in addition to above elements . People here refers to library staff who come in contact with users so staff behavior, skills and attitude play a key role, Physical evidence denotes environment in which services are offered and finally the Process which is the effectiveness in managing resources and functions to meet the users' needs. The adoption of marketing mix and adaptation of its elements in the library space results in identifying factors related to user's satisfactions which

ultimately help the librarians to develop. The main purpose of promotion is just to educate the user about effective use of library resources of his own. Training allows end users to acquire the skills and confidence for optimum use of the system. . Before formulating a plan to improve quality of services and increase user satisfaction libraries must first gauge the patrons' awareness about library services as patrons cannot be dissatisfied with services if they don't know about them **(Loprinzo, 2009).** It has become imperative for the libraries to demonstrate their value in relation to investment of resources that their institutions provide them **(Oakleaf, 2010).** Lack of promotion and training hinders the utilization of services **(Mokotjo & Kalusopa, 2010).** Increased usage of resources as well as services is its sole profit which calls for promotional activities to be carried out by the library in order to create awareness among the library users. The library needs to make better use of opportunities to orient both students and faculty to value the library assistance in learning how to use the library's authoritative resources and in educating users so that they are trained in using library products for independent study and better research products **(Smith,2011).** Information availbility doesn't mean accessibility and utilization unless library stimulates demand for its product and service through promotional programs. Since the promotion of services has grown and widely recognized so the marketing mix strategies have been refined and adapted to include services not just the products **(Moikan Mollel, 2013).** Libraries are now focusing on distinctive competencies, value delivery, continuous improvement and customer-focused organizational culture. User-focused approach demands relationship marketing. Librarians being the essential intermediaries play an important role in designing, promoting and training people to use information resources and knowledge tools to ensure quality information services. In library context marketing refers to set of activities which help to understand users' need, determining market niche and building customer relationship to fulfill their goals. Information systems can have significant positive impact on task performance if sufficient education or training is provided to all level of users **(Nelson & Cheney, 1987).** Training also raises the awareness about services which in turn can have positive effect on the perception of service quality. In other words, it is ensured that users must be aware aboutthe

resources and services of the library. Today libraries are facing challenges like dwindling budgets, ICT dominating environment and changing information requirements for teaching and research. Academic libraries are no longer the only choice for students, researchers and teachers to go for information which necessitate the library staff to find ways to promote the resources and services of library to their patrons as effectively as possible. There is also a need to increase the awareness about digital resources of the library and their potential to support the specific user's needs. With easy availability of internet search engines and web-scale research support tools academic libraries should device strategies for increasing its recognition in providing important value added services. Publishers are viewing CAS as value added service that is offered free of charge to encourage reader to access to their collection. Marketing and outreach of e-resources is necessary to ensure the optimal use. There is always a need to maintain personalization in information services to bring out recent publications in the notice of users **(Mahesh & Gupta, 2008).** Promotional activities should be designed in such a way that user attention is gained; providing a reason to select library resources and services over other competing services **(Chartered Institute of Marketing, 2009).** All promotional efforts are used to convey the value of services to the target audiences so that these may be used optimally to get return on investment. The main objective is to achieve high level of customer's satisfaction and enhance the perceived value of the services **(Patil &Pradhan, 2014).** New web 2.0 technologies like blogs, facebook, wikis, twitter etc. can play key role in promoting library activities and library professionals also have an opportunity to improve the image of an institution by providing innovative value added services to the users. Various social media tools such as facebook, twitter,YouTube, linkedin etc. which enable the customers to share, communicate and collaborate are now being used by the academic libraries in their promotional campaign**.**Academic libraries in addition to traditional media like posters, handouts, newsletters, brochures and library publications are also making good use of digital media such as library website, emails, blogs, podcasts, vodcasts, facebook, twitter etc. to reach out to their users. A good website helps to unify all the resources and services in such a way that target users can access it. Library websites and social media are found to be the most

effective promotional techniques **(Yi, 2016; Khan &Bhatti, 2012).** RSS (Really simple syndication or rich site summary) feed allow user to learn new blog entries or website updates thus helpful in creating user awareness. Some library catalogs even offer feeds to notify patrons when new item has been added to the library holdings. Further there is need to improve faculty awareness of services and offerings to strengthen the use of library and its resources by the students. So user awareness and attitude of the library staff play an important role in determining the overall quality of services. Feedback from the user helps in taking timely corrective measures for further improvement in the system.

3.9 Conclusion: It is clear that libraries are in transition phase where both print and electronic resources are being used in the libraries. Information communication technologies have profound effect on the working of academic libraries and significantly affected the way user is seeking the information. Further with new emerging technologies there is also need to upgrade the necessary skills of the staff to satisfy the information needs of the users. User based feedback is important to bring overall improvement in the library system. So, it is essential to have periodic feedback from the user by applying locally designed survey or using instruments like SERVQUAL, SERVPERF, LIBQUAL etc. designed for the purpose. Since most the information is now accessible from the website so it is essential to include e-service quality attributes along with other parameters while assessing the service quality of library in this changing environment. Web search tools are helpful in providing value added services to the user. Promotional activities using emerging web tools can be helpful in conveying the value of library services to the target users thus can enhance the perceived value of services. It is therefore necessary to assess library resources, services and awareness program of the library while formulating any quality improvement programs of the library.

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Chapter -4

Data Analysis and Interpretation

4.0 Introduction

Data gathered from different sources has been analyzed and interpreted with aim to present the existing status of collection, services and other important facets associated with agricultural libraries of Punjab, Haryana and Himachal Pradesh. In this regard two different questionnaires were framed to collect the data from

a) Librarians/Incharges of the selected University libraries

b) Library users which included teachers, research scholars and postgraduate students of selected university libraries

The data gathered through the responses of respondents have been tabulated, analyzed and interpreted using suitable statistical techniques to arrive at appropriate findings. The data analysis with regard to various parameters selected to assess the collection and services of agricultural university libraries under study has been presented under following sections

4.1 Analysis of responses from University Librarians/Library In-charges

This section provides the analysis of response received from University Librarian/ Library in-charges of the select universities with regard to questions relating to collection, budget, staff and services available in the agricultural university libraries.

4.1: Infrastructure facilities

Infrastructure facilities of library include reading space, adequate seating capacity, proper ventilation & lightening, congenial environment for study, basic amenities like clean drinking water, and neat washrooms along with modern facilities like Internet Wi-Fi connectivity, computer workstations and mechanism for security surveillance. Physical facilities is one of the important parameterwhile assessing the quality of service so it is essential to know the present infrastrucutre facilities available for the

users of agricultural libraries under study. Information about various infrastructure facilities in selected agricultural libraries is given below:

Table 4.1: Infrastructure facilities in agricultural libraries

Sr. No.	Library infrastructure facilities	PAU	HAU	HPKV
1	Separate Building	Y	Y	Y
2	Clean and Calm Environment	Y	Y	Y
3	Air-Conditioning facility	Y	Y	Y
4	24X7 outer reading hall	Y	N	N
5	Power backup	Y	Y	Y
6	Special facility for Research Scholars/Teachers	Y	N	Y
7	Drinking water and washroom	Y	Y	Y
8	CCTV surveillance	Y	Y	Y
9	Network connectivity	Y	Y	Y
10	Lift/Ramp	Y	Y	Y
11	Seating Capacity	850	730	200
12	Total computers terminals	45	72	25

It is evident from the above Table 4.1 that all the agricultural libraries under study have separate air-conditioned library building along with amenities of clean drinking water and neat washroom. All are providing ventilated calm and clean environment for study. Only PAU library has outer reading hall facility for late hour study which is open all time for the readers. Special private reading space facility in the form of research carrel is provided to the Research scholars and teachers of PAU and HPKV library. All the libraries have installed CCTV cameras for security of the library user. All libraries have been modernized and providing automated services to their users. All libraries have well developed internet connectivity and computer terminals for providing electronic services to their users. HAU library has highest number of computer terminals 72 out of which 32 terminals are for the library staff and 40 for

the library readers whereas PAU library has total of 45 computer terminals out of which 25 terminals are for library staff and 20 for the library users. HPKV library has only 25 computer terminals out of which only 15 computers are for the users and 10 for the library staff. Greater number of the users of HAU and PAU have opportunity for accessing electronic services as compared that of HPKV. Seating capacity of PAU is the highest which can accommodate 850 readers at one time followed by 730 readers of HAU and 200 readers of HPKV. Seating capacity can also be attributed due to geographical limitations. Though seating capacity is one of the criteria for assessing the library but the kind library service environment can turn physical space into living space. It is not the number of seats but the number of visitors using the library counts in library assessment activities.

4.2 Library Staff: Staff plays an important role in providing access to required document. It acts as link between user and document. Staff strength of different agricultural libraries under study is as under:

Table 4.2 :Library staff

Sr. no	Library staff	PAU	HAU	HPKV	Total
1	Librarian	1	1	1	3
2	Deputy Librarain(s)	2	1	0	3
3	Assistant Librarian(s)	3	3	1	7
4	Professional Assistant	4	15	06	25
5	Library Attendants	6	10	2	18
6	Other supporting staff	20	7	3	30
	TOTAL	36	37	13	86

Table 4.2 depicts information about library staff. Staff in HPKV library is much less as compared to other two libraries viz. PAU and HAU library. The strength of library staff is not adequate in all the agricultural libraries.HAU library is in better position as compared to other two agricultural libraries under study.

4.3 Library Resources: Libraries are working in hybrid mode and in this age of information technology libraries have not only restricted to print collection but have also enriched its collection with electronic resources to satisfy the information needs of the library users in best possible manner. Though electronic resources are increasing but can't replace the print resource and are complimentary to print resources. Data with regard to available print as well as electronic information resources of different agricultural libraries is presented as under:

4.3.1 Status of Library Resources: To ascertain the size and status of resources available in the libraries' concerned heads were requested to provide the details which are as under

Table 4.3.1 Status of Library Resources

Sr no.	**Print Resources**	**PAU n(%)**	**HAU n(%)**	**HPKV n(%)**	**Total n(%)**
1	Total Collection	419179 (47.1)	375352 (42.3)	93887 (10.6)	888418 (100)
2	Books	265820 (46.3)	249304 (43.4)	58703 (10.3)	573827 (100)
3	Theses/Dissertation	41232(69)	13834(23)	4833(8)	59899
4	Bound Journals	104941 (43.6)	105449 (43.8)	30351 (12.6)	240741 (100)
5	Current Journals	35(9.4)	221(59.5)	115(30.1)	371 (100)
6	Magazines	15(30)	20(40)	15(30)	50(100)
7	Newspapers	12(27)	16(36.5)	16(36.5)	44(100)
8	Manuscripts	0	0	0	0

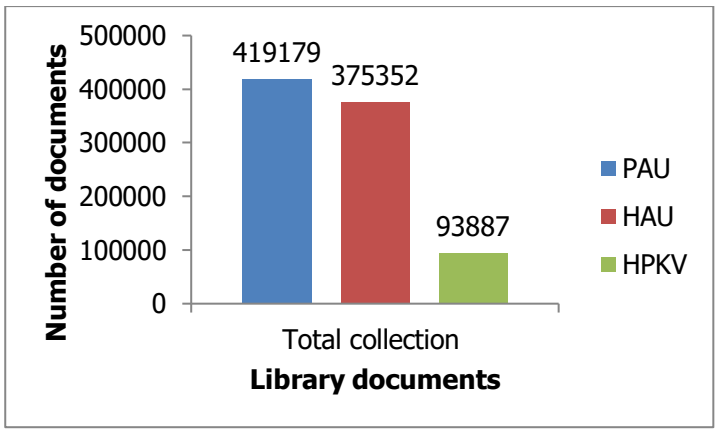

Figure 4.3.1a Library Resources: Total Collection

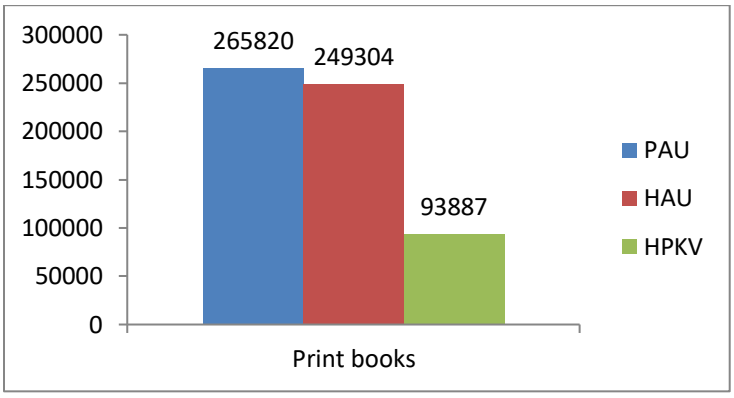

Figure 4.3.1b Library Resources: Print Books

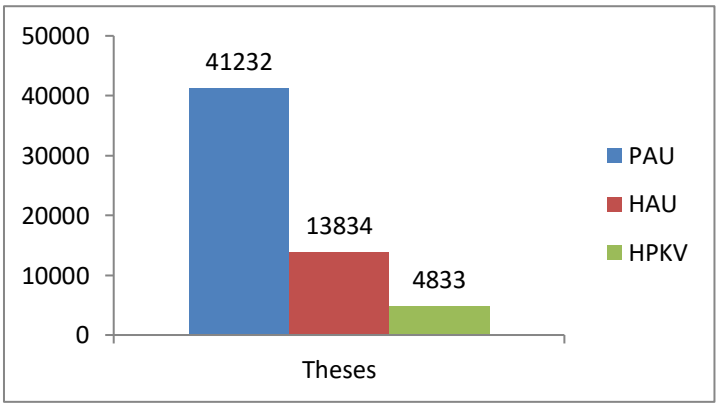

Figure: 4.3.1c Library Resources: ThesesCollection

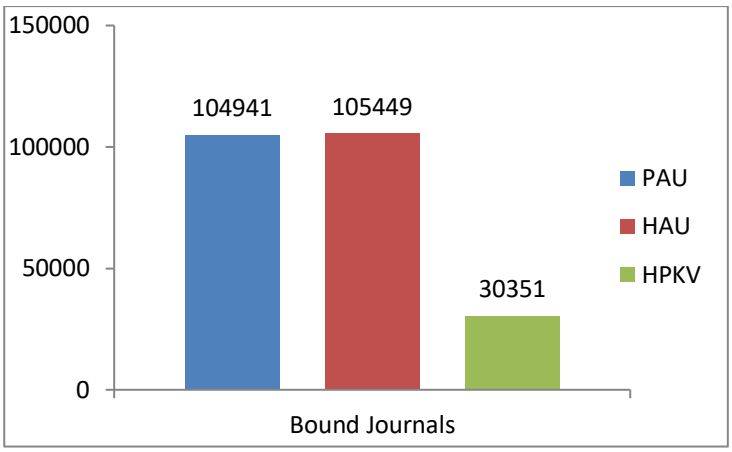

Figure 4.3.1d Library Resoruces : Bound volumes of Journals

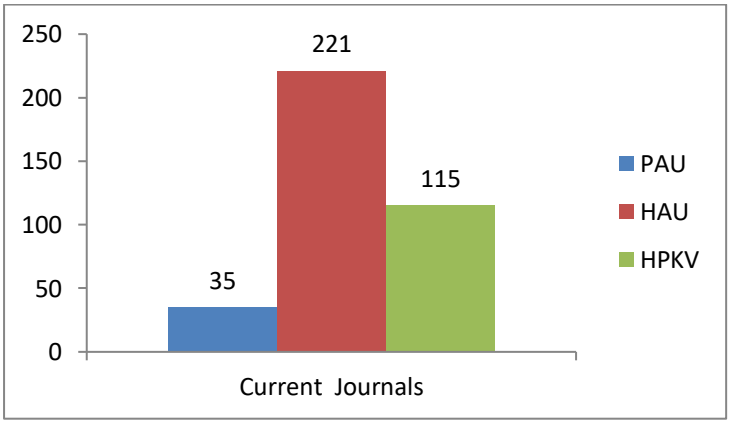

Figure 4.3.1e Print Resources : Current Journals

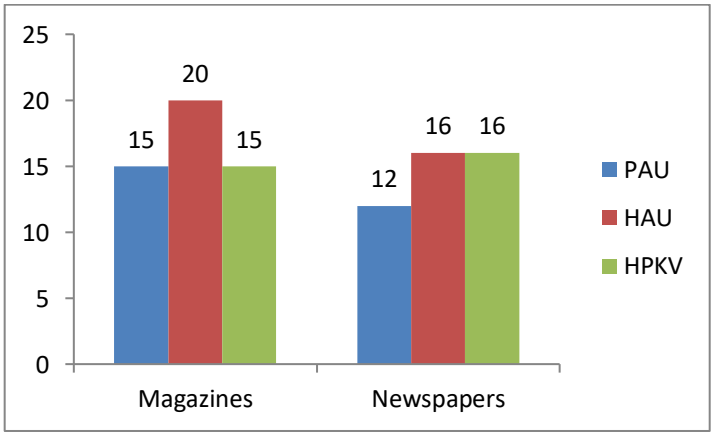

Figure 4.3.1fPrint Resources : Magazines and Newspapers

Table 4.3.1 clearly shows that all the three agricultural libraries surveyed have rich collection of print resources. Majority of print resources constitute book, Bound journal and Theses/Dissertations were the main resources among universities. Further it is evident from the table that books are the major constituent of library collection in all libraries followed by bound journals and theses. Though there is variation in collection with regard to number of print books, bound journals, theses, current journals; magazines and newspapers yet all libraries have acquired print resources as per policy to fulfill the information needs their users. However, among all the selected agricultural libraries PAU with 265820 print books emerge as leading library followed by HAU with 249304 whereas HPKV has a collection of 93887 print books as shown in fig 4.3.1a. The response with regard to print journal collection reveals that in spite of dominant electronic environment agricultural libraries are also subscribing print journals of national and international repute. Figure 4.3.1e clearly depictsthat among all agricultural libraries HAU library subscribes to highest no. (221) current journals followed by HPKV library with 115 titles whereas research PAU library currently subscribes to only 35 print titles. As far as the back files of print journals are concerned HAU library is leading with maximum no. of bound volumes (105449) followed by PAU library with collection of (104941) bound volumes whereas HPKV has lowest collection of 30351 bound volumes as per figure 4.3.1d. Further table shows that all the libraries under study have impressive collection of theses which indicate the research activity of parent institutions. PAU library emerged out as number one rank with highest no. of Theses and Dissertation (41232) followed by HAU (13834). On the other hand, among all the lowest no. of Theses and Dissertation (4833) is available in HPKV library. In response to collection of newspapers and magazines HAU library subscribe to highest no. of newspapers and magazines whereas HPKV library subscribe equal no. of magazines as that of HAU but subscribe a greater number of newspapers as compared to PAU library as shown in fig 4.3.1f.

4.3.2 Status of Electronic Resources: Electronic resources are becoming important part and parcel of modern-day library services. The status of various electronic resources is presented in the table 4.3.2

Table 4.3.2 Status of Electronic Resources

Sr. No.	Electronic Resources	PAU	HAU	HPKV
1	Ejournals	22	86	101
2	Ebooks	385	773	888
3	E-Theses	17850	13537	4400
4	E-Standards	1016	0	1
5	CDs/DVDs	6704	5694	0
6	Online Databases	5	8	3

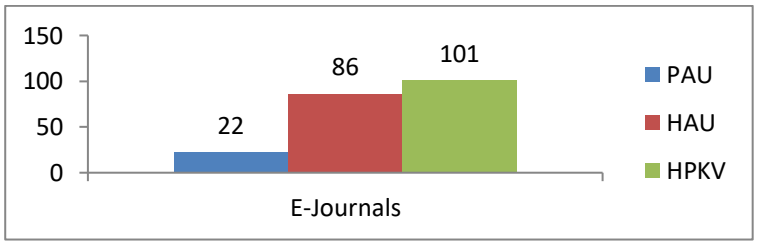

Figure: 4.3.2a Electronic Resources: E-Journals

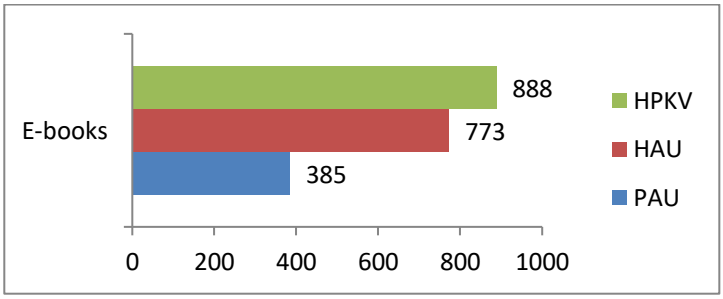

Figure: 4.3.2b Electronic Resources: E-books

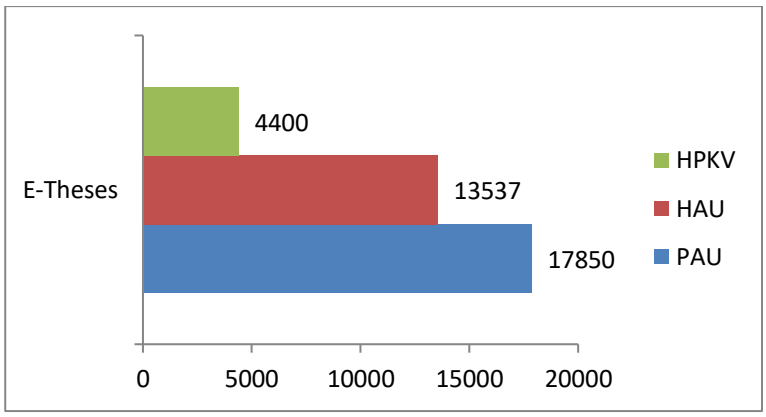

Figure: 4.3.2c Electronic Resources: E-Theses

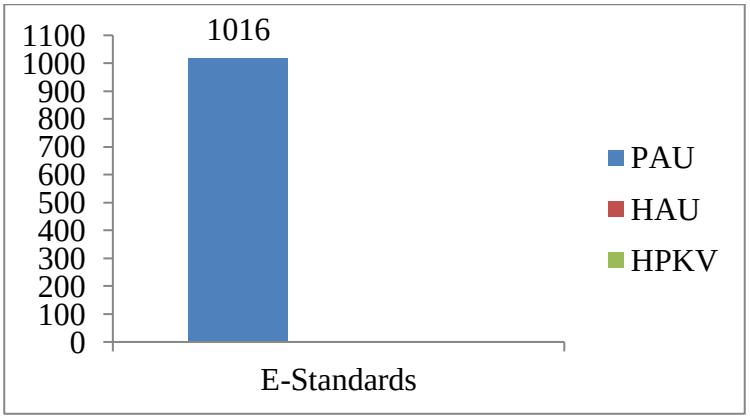

Figure: 4.3.2d Electronic Resources: E-Standards

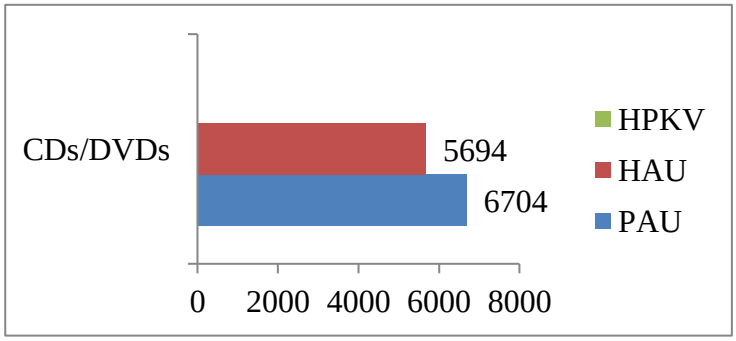

Figure: 4.3.2e Electronic Resources: CDs/DVDs

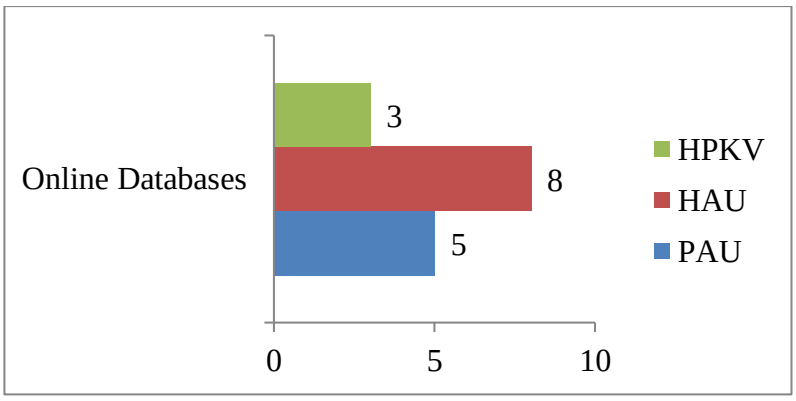

Figure: 4.3.2f Electronic Resources: Online Databases

It is clear from the table 4.3.2 that all agricultural libraries are offering access to variety of electronic resources. To cater the diverse information needs of their users all the agricultural library are providing access to different electronic resources such as e-journals, e-books, e-theses, e-standards, CDs/DVDs and online databases. HPKV library is leading with subscription to (101) electronic journals followed by HAU library with (86) electronic titles whereas PAU library subscribes to (22) titles that is through database as evident from figure 4.3.2a. Further it is clear from figure 4.3.2b HPKV library has also procured highest number of e-books (888) followed by HAU library with (773) whereas PAU has only (385) e-books in its electronic collection. With regard to e-theses PAU has taken lead with (17850) e-theses whereas HAU has (13537) e-theses and HPKV has only (4400) e-theses titles in its collection as shown in figure 4.3.2c. PAU library subscribe to 05 databases in comparison to (08) 0nline databases of HAU library whereas HPKV library subscribe only (03) online databases as shown in Fig. 4.3.2f. PAU library has enriched its electronic collection with addition of (1016) e-standards where as HPKV has only one and HAU library is not having any standard in its collection as in Fig 4.3.2d

4.3.3 :Growth of Information Resources in Agricultural Libraries: Library is a growing organism so its collection grows with time to fulfill the diverse needs of its users. Library collection has grown with addition of print as well as electronic resources over the preceding years by addition of resources like print books, bound volume of periodicals, theses, e-journals , e-books, CDROM databases and online data bases. Data with regard to growth of information resources from 2013-2018 has been tabulated as under

Table 4.3.3a : Growth of Print Books

Year	PAU	HAU	HPKV
2012-13	252228	229370	52775
2013-14	254435	235165	54337
2014-15	254568	238282	55813
2015-16	254797	241062	56241
2016-17	254890	244025	57333
2017-18	255918	245050	58686

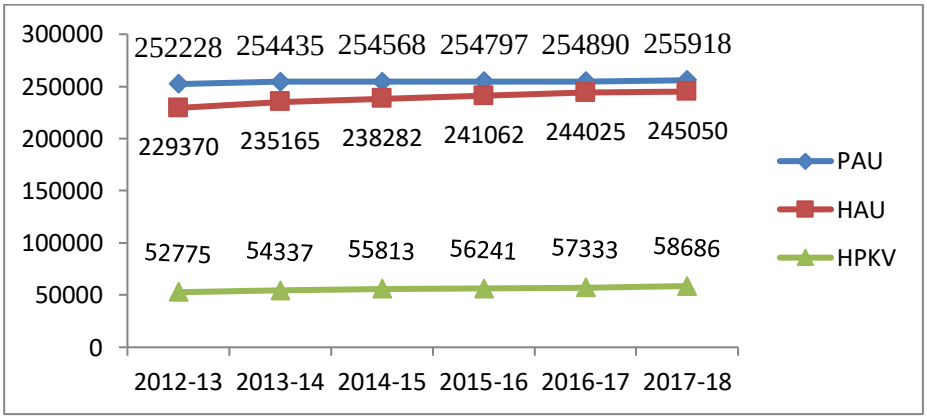

Figure 4.3.3a : Growth of Print books

Table 4.3.3b: Growth of Bound Journals

Year	PAU	HAU	HPKV
2012-13	102569	100192	28206
2013-14	103190	101022	29436
2014-15	103769	101794	29662
2015-16	104125	102768	29874
2016-17	104322	103431	30044
2017-18	104483	104089	30280

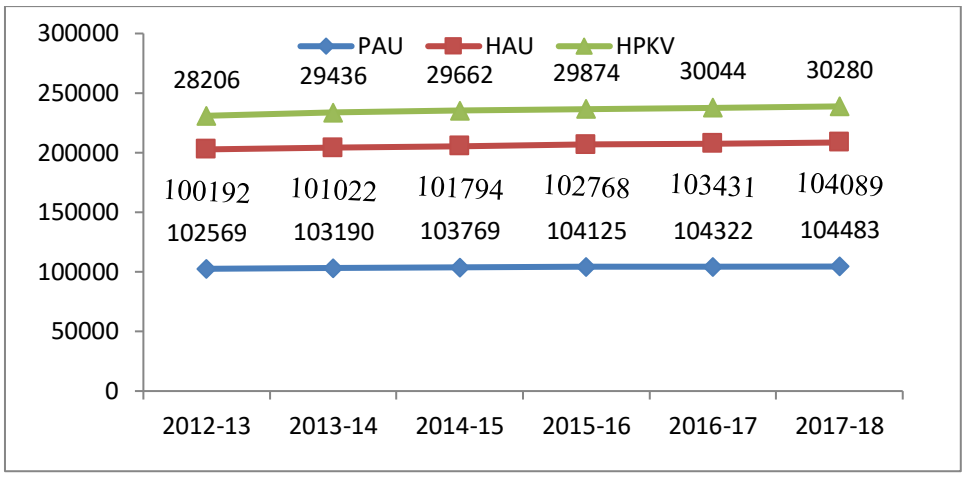

Figure 4.3.3b : Growth of Bound Journals

Overall growth of print books and bound journals during the preceding years (2012-13 to 2017-18): It is clear from the table 4.3.3c and 4.3.3d that HAU library was able to add more number of print books as well as bound volume of the journals in the preceding years (2013-2018) in comparison to PAU and HPKV library.

Table 4.3.3c: Total number of print books added (2013-18)

University	Number of Print Books
PAU	3690
HAU	15680
HPKV	5911

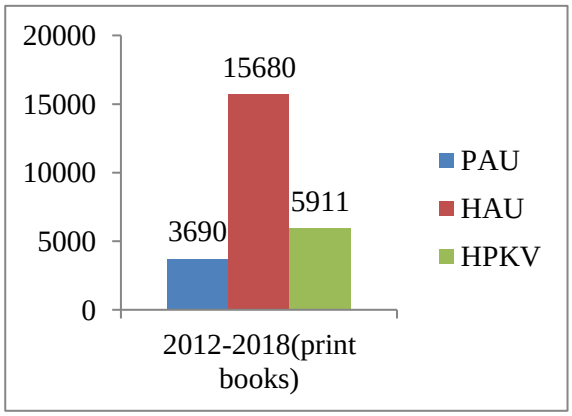

Figure 4.3.3c:Total number of print books added (2013-2018)

Table 4.3.3d: Total number of bound journals added (2013-2018)

University	Number of Bound Journals
PAU	1914
HAU	3897
HPKV	2074

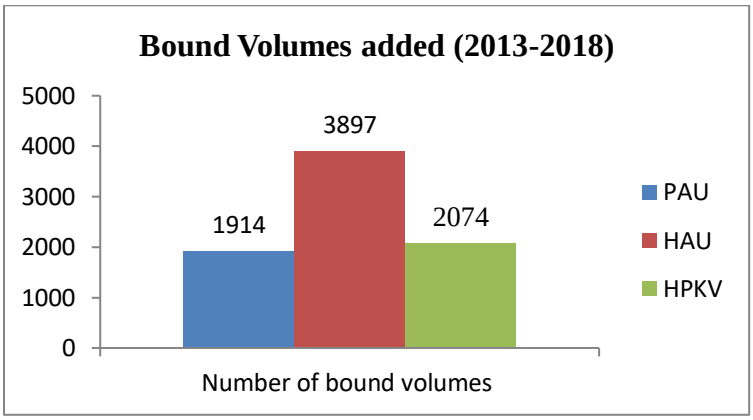

Figure 4.3.3d: Bound volumes of journals added (2013-2018)

Table 4.3.3f: Growth of Electronic Journals

Year	PAU	HAU	HPKV
2012-13	2948	2902	3200
2013-14	3402	3407	3200
2014-15	3727	3780	3500
2015-16	3761	3730	4000
2016-17	2812	2840	4000
2017-18	3976	4000	4000

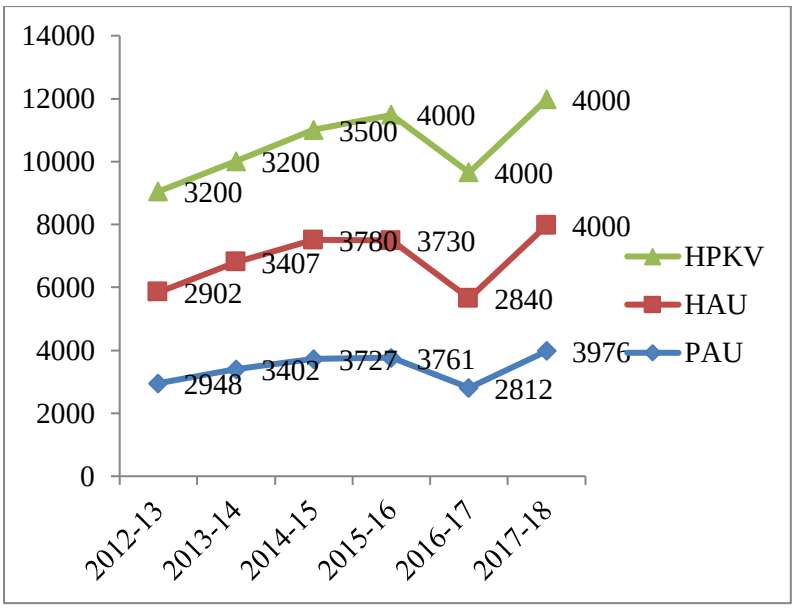

Figure 4.3.3f: Growth of Electronic Journals

Table 4.3.3g: Growth of CDROM databases (2013-2018)

Year	PAU	HAU	HPKV
2012-13	2	4	2
2013-14	2	4	2
2014-15	1	3	2
2015-16	1	2	2
2016-17	0	2	2
2017-18	0	2	2

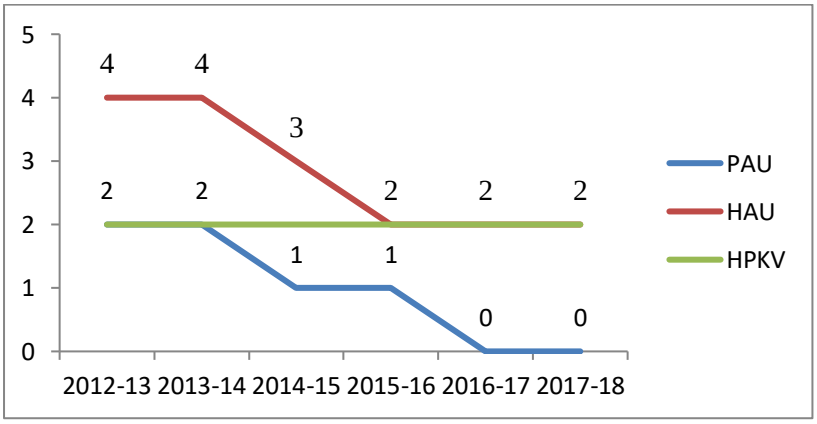

Figure 4.3.3g : Growth of CDROM databases (2013-2018)

Table 4.3.3h: Growth ofonline databases(2013-2018)

Year	PAU	HAU	HPKV
2012-13	3	5	0
2013-14	3	5	1
2014-15	2	3	2
2015-16	2	3	2
2016-17	2	5	1
2017-18	2	5	1

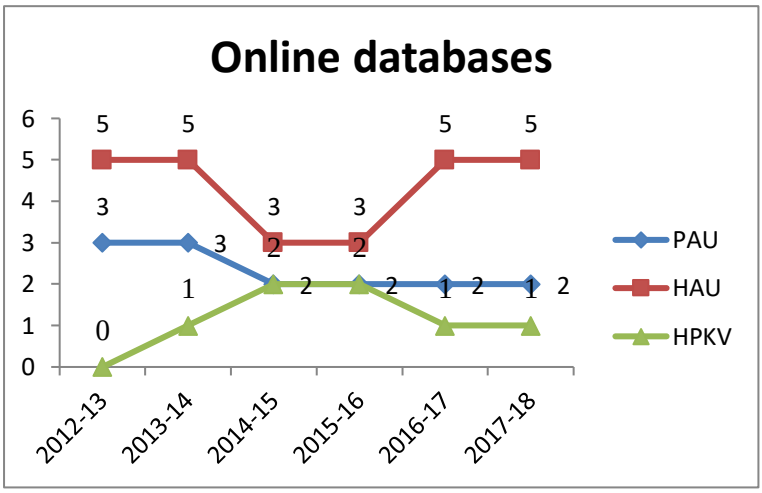

Figure 4.3.3h: Growth of online databases(2013-2018)

Table 4.3.3i: Growth of E-books (2013-2018)

Year	PAU	HAU	HPKV
2012-13	0	0	0
2013-14	0	0	0
2014-15	0	0	0
2015-16	33	247	0
2016-17	137	413	0
2017-18	199	541	888

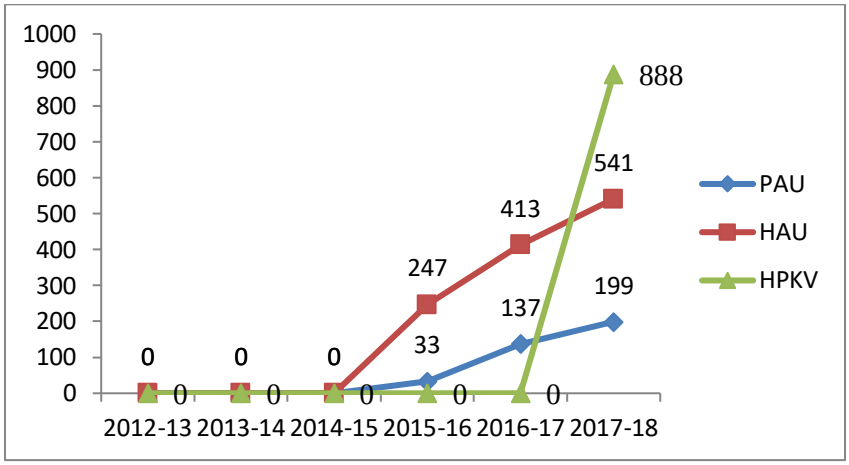

Figure: 4.3.3i: Growth of E-books (2013-2018)

Tables 4.3.3 clearly indicates that all the agricultural libraries have strengthened their library collection with the addition of print as well as online resources during the preceding years to fulfil the information needs of their users. To see the growth pattern of information resources data for the preceding years from select agricultural libraries have been analyzed. The year-wise data related to growth in print books shows that PAU added **3690** books from 2012-13 to 2017-18 whereas HAU added **15680** books and HPKV library added **5911** print books. Further data related to back files of the print journals during the preceding years revealed that print journal collection grew by **(1914)** bound volumes in PAU library whereas HAU bound journal collection swelled by**(3897**) bound volumes and HPKV library added **(2074)** bound volumes to its collection as shown in figure 4.3.3b. Agricultural libraries have also added electronic documents to their collection over the years in response to technological changes and changed information seeking behavior of the user. HPKV library took lead with (888) e-books in its electronic collection followed by HAU library with (541) e-books whereas PAU library added only (199) e-books to its collection as per figure 4.3.3i. As far as the e-journal collection is concerned all the libraries are member of CeRA (Consortium for E-resources in Agriculture) consortium through which access to e-journal collection is provided to the user. Apart from consortia journals agricultural libraries also subscribe to e-journal as per the

requirement of the users. With regard to growth of e-journals, HPKV library provided access to more e-journals from 2015-16 to 2017-18 as compared to PAU and HAU library. On the other hand, HAU library lead the table in providing access to e-journals from 2013-14 to 2014-15 and PAU library provided access to more no. of e-journals during 2012-13 as shown in figure 4.3.3f. CDROM and online database is very important resource for the researchers. Agricultural libraries provided access to agricultural literature through CDROM and online databases. Though there is overall decrease in subscription to CDROM and online databases over the years, HAU library has subscribed to more no. of CDROM and online databases as compared to PAU and HPKV library as in Fig 4.3.3g and 4.3.3h respectively.

4.4 Library Expenditure: Library budget plays an important role in procurement of library resources through which library can able to provide various library services to the users.

Table 4.4 Library Expenditure (In Rs.) during (2013-2018)

Years	**PAU**	**HAU**	**HPKV**
2012-13	14950616	54337680	5000000
2013-14	6499973	54740020	5000000
2014-15	6499950	60491145	5000000
2015-16	7800000	74740837	7800000
2016-17	5194384	70143278	4650000
2017-18	7896000	15035463	5900000

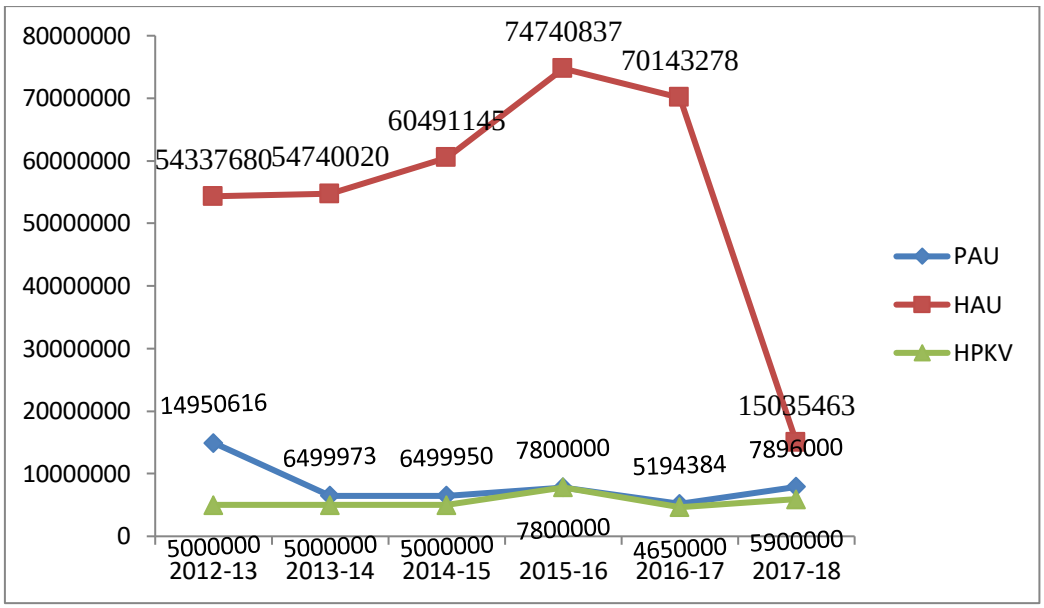

Figure 4.4 Library Expenditure

It is evident from the table 4.4 HAU library has received sufficient amount of library budget as compared to PAU and HPKV library which has helped HAU library in strengthening its print as well as electronic resources. HAU has added highest no. of print books and bound volumes of the print journals to its collection in the preceding years as there seems to be no financial constraints in HAU library. Further HAU library has managed to add more number of electronic resources such as electronic journals, CD-ROM and online databases owing to easy availability of financial resources as compared to PAU and HPKV library as shown in Fig 4.4

4.5 Collection development/Human Resources: Agricultural libraries adopt various ways to strengthen library collection that best match the information needs of their users. Table 4.5 apparantly shows that all the agricultural libraries involve user in building library collection. PAU and HPKV library have book selection policy whereas HAU library doesn't have any such policy Whereas PAU library doesn't have any weeding out policy of library document. All the selected agricultural libraries are member of CeRA and KRISHIKOSH developed under the NAIP project of ICAR which provided the user in getting access to a greater number of online

agricultural resources. Further PAU library and HPKV have developed institutional repository for preservation and access to institutional output.

Table 4.5 : Collection development

S No.	Collection Development	PAU	HAU	HPKV
1.	Book Selection Policy	Y	N	Y
2	User's opinion in building library collection	Y	Y	Y
3	Weeding out policy	N	Y	Y
4	Member of CeRA	Y	Y	Y
5	Member of KRISHIKOSH	Y	Y	Y
6	Institutional Repository	Y	N	Y

Table 4.5.1: Library Staff Strength

S No.	Statements	PAU	HAU	HPKV
1	Library staff strength adequate	N	N	N
2	Is the library staff professionally qualified	Y	Y	Y
3	Do the staff attend seminar/conferences/workshops/trainings	Y	Y	Y

The staff is professionally qualified and attends seminar/conferences/ workshops/training etc. to update their knowledge and skills.

4.5.2 Training/ workshop attended by the library staff: It is essential for the staff of an organization to update their knowledge and skills to satisfy the information needs of the user. Staff updates their knowledge and skills by attending seminar, workshops and training. Data with regard to workshop/seminars/training attended by the library staff is as under:

Table 4.5.2 Training/Workshops/Seminars attended (2013-2018)

Sr. No.	Training/Workshop/seminars attended	PAU	HAU	HPKV
1	No. of training/workshop/seminars	30	58	24

Table 4.5.2 depicts clearly that Staff of HAU library have attended total of 58 training programs during the last five years whereas as staff of PAU have attended 30 training/workshops followed by 24 programs by HPKV staff

4.6 Library membership: Library membership determines the popularity of library among the teachers, students, researcher and staff of the university. Library members enjoy the library privileges by becoming the member.

Table 4.6 Library membership

Library Members	PAU	HAU	HPKV
	4446	4805	1757

Table 4.6 shows that among the three selected agricultural libraries HAU library has enrolled 4805 members followed by 4446 members of PAU library whereas HPKV library has enrolled only 1757 members.

4.7 Loan privilege: Library user can get the library documents from the library for limited period of time. Different categories of the users have different loan privilege. Teachers/Scientists in all the selected agricultural libraries can get 8 documents whereas research scholars and PG students of PAU and HPKV library get four documents whereas HAU library issue eight documents to Research scholars as well as postgraduate students as depicted in table 4.7

Table 4.7 Loan privilege

Sr. No.	Member category	PAU	HAU	HPKV
1	Teachers/Scientists	8	8	8
2	Research Scholars	4	8	4

3	PG Students	4	8	4

4.8 Agricultural library services: University library offers different type of services which includes Lending, Reference, current awareness, Abstracting and indexing service, Reprographic services etc. Traditionally these services were provided manually however due to technological developments these services are now provided through the use of technology to fulfill the diverse information needs of their users. Information regarding availability of service in selective agricultural universities and the way it is offered to the users is presented as under

Table 4.8 Agricultural library services

Sr. No.	**Library provides**	**PAU**		**HAU**		**HPKV**	
		Manual	**Electronic**	**Manual**	**Electronic**	**Manual**	**Electronic**
1	Reference service	Y	Y	Y	Y	Y	Y
2	Current Awareness Service	Y	Y	Y	Y	Y	Y
3	Selective Dissemination of Service	Y	N	Y	Y	N	Y
4	Abstracting and Indexing Service	Y	Y	Y	Y	Y	Y
5	Check-in-Check-out of books	Y	Y	N	Y	N	Y
6	Book Reservation	Y	N	N	Y	Y	N

7	Reissue of book	Y	N	N	Y	N	Y
8	Interlibrary loan/Document Delivery request	Y		Y		Y	
9	Reprographic service	Y		Y		Y	
10	Scanning of documents	N		N		Y	
11	Property counter	Y		Y		Y	
12	New Arrivals	Y	Y	Y	Y	Y	Y
13	Promotional activities	Y	Y	Y	Y	Y	Y

Table 4.8 clearly depicts that Reference service, Current Awareness Service, Selective Dissemination of Information, Lending service, Abstracting &Indexing Service, Document Delivery Service and Reprographic service etc. are the main services offered by all of three surveyed agricultural libraries. However, there is mixed kind of response the way these services are provided to the users. All the three agricultural libraries offer manually as well the computer mediated reference, current awareness service and abstracting & indexing service to their users. On the other hand, PAU provides selective dissemination of information manually whereas HAU and HPKV library provide manually as well as through the use of computer. Lending of library documents is provided electronically by HAU and HPKV library whereas PAU library offers it in hybrid mode i.e. manually as well as through computers. Book reservation and book reissue facility is provided manually by PAU library whereas these are provided electronically by other two agricultural libraries. All the agricultural libraries provide interlibrary loan facility electronically to their users and

also have xerox as well as property counter facility for their users. Users are informed about new documents manually as well as through computers by the select agricultural libraries. All the agricultural libraries under study promote their resources and services manually as well as through the user of media.

4.8.1 ICT/Web enabled library services: Technology has greatly impacted the working of libraries and there is paradigm shift in library services. Today's user wants information at their desktop so all the agricultural libraries are now offering web-based library services to their users.

Table 4.8.1 ICT/Web enabled services

Sr No.	ICT Based Library Service facilities	PAU	HAU	HPKV
1	Internet/Intranet services	Y	Y	Y
2	Wi-Fi Facility	Y	N	Y
3	Campus wide access to electronic resources	Y	Y	Y
4	Remote access to library resources	Y	N	Y
6	Webpage/ Library page	Y	Y	Y
7	Digital library for the user	Y	Y	Y
8	OPAC/WEBOPAC	Y	Y	Y
9	Library Blog, Wikis etc.	N	N	N
10	Barcode generation and access	Y	Y	Y
11	RFID Security system	Y	Y	Y
12	Mobile based services	Y	Y	N
13	Digital collection of the library	Y	N	N
14	CCTV surveillance	Y	Y	Y

Table 4.8.1 vividly depicts that all the agricultural libraries under survey have developed their library websites which emerges to offer various web-based services. All the select agricultural libraries are providing automated services to their users. All

offer services like OPAC/WEBOPAC and Networked information resources. All the libraries offer campus wide access to its resources and have separate digital section for their users. PAU and HPKV library also provide remote access to library resources whereas HAU library lack this service. All the agricultural libraries have installed RFID security system and CCTV surveillance. None of the agricultural library reported the availability of library blog, wikis etc. to reach out to its users. Only PAU has developed institutional repository for providing access to institutional content.

4.8.1.1 : Library automation : Data with regard to automation of in-house activities of all agricultural libraries under study is shown as under

Table 4.8.1.1: Library housekeeping operations

Sr. No.	Library housekeeping operations	PAU	HAU	HPKV
1	Acquisition	Partial	N	N
2	Cataloguing	Y	Y	Y
3	Serials	Partial	Y	N
4	Circulation	Y	Y	Y
5	Reference	Y	Y	Y

To determine the status of automation in selected agricultural libraries data pertaining to automation of library housekeeping operation was collected and tabulated in table 4.8.1.1. Fron the table we can see that all the libraries are providing automated services to their users. All the three agricultural libraries have automated their house keeping operations such as its cataloguing, circulation and reference services whereas PAU library partially automated its acquisition system. On the other hand, HAU and HPKV library are doing acquisition work manually. Only HAU library has automated its serial control system whereas in PAU library it is partially automated and HPKV library handling the serial work manually.

4.8.1.2 E-Reference Queries: Reference service helps the user in utilizing library resources in best possible way which is the ultimate aim of any library. Traditionally reference service is the help rendered to the user in provision of required information

while visiting the library. Nowadays technology has helped the librarians to reach out to their users. Reponses regarding the way reference query is answered have been tabulated as under

Table 4.8.1.2: E-Reference queries

Sr. No.	E-Reference service	PAU	HAU	HPKV
1	Email	Y	Y	Y
2	Chat	N	N	N
3	Ask a Librarian link	N	N	N
4	FAQ	N	N	N

It is apparent from the table 4.8.1.2 that email is the most widely used method by all agricultural libraries in providing reference services to the users. No library is using links like Ask a Librarian or FAQ or Chatbot service to answer the reference queries.

4.8.1.3 Current Awareness Service: Current awareness service helps the user in updating their knowledge. Responses from the agricultural libraries under study have been tabulated in table 4.8.1.3. It is evident from the table that PAU and HPKV update their user by forwarding the title list through email. On the other hand, only HAU library provides table of content list of journals. All the selected agricultural libraries display list of new arrivals whereas both PAU and HAU library also notify their users about conference and seminar through email list

Table 4.8.1.3 Current awareness service

Sr. No	User is updated through	PAU	HAU	HPKV
1	Forwarding accession list through email	Y	N	Y
2	Table of contents of journals	N	Y	N
3	New Arrivals	Y	Y	Y
4	Notification about conference, seminars through mail	Y	Y	N

4.9 User Awareness activities: User education programs of the library keep the user informed about resources and services of the library. Responses with regard to user education facilities available in selected agricultural libraries have been tabulated in table 4.9

Table 4.9 User Awareness

S No.	Library facilities for user awareness	PAU	HAU	HPKV
1	Orientation/User education program	Y	Y	Y
2	Separate room for user education program	Y	Y	Y
3	Tutorials/videos on webpage	N	Y	Y
4	Publisher's presentation/training for users	Y	Y	Y
5	Printed booklet/brochure	Y	N	Y

Table 4.9 clearly depicts that all the selected agricultural libraries organize orientation/user education program to create the awareness about library resources as well as services of the library. All libraries have separate room to conduct such programs. Both HAU and HPKV library provide tutorial/video to educate their users. PAU library as well as HPKV uses printed booklet/ brochure containing information about library activities to inform their users. All the libraries arrange publisher's presentations for their users about particular information product or service.

4.9.1 Methods used for user awareness: Library adopts different methods to create awareness among the users about resources and services of the library. Data has been tabulated about methods adopted by different selected agricultural libraries as under:

Table 4.9.1 User education techniques

S No.	User awareness activities	PAU	HAU	HPKV
1	Orientation lectures	Y	Y	Y
2	Handbooks, Brochures etc.	Y	N	N
3	Social media like blog, facebook, twitter	N	N	N

4	Literacy programs	Y	Y	Y
5	Web page	Y	Y	Y
6	Email	Y	Y	Y

Table 4.9.1 clearly indicate that all agricultural libraries organize orientation program for their users. Only PAU library provides printed brochure of library resources and activities to its users. All the agricultural libraries have mechanism to provide updated information through library webpage and conduct information literacy programs for the research students and teachers of the university. Email is most widely used method to inform about new resources and services of the library by all agricultural libraries. No library makes use of social media platform such as blog, twitter, facebook etc. to reach out to its users.

4.9.2 Target group for education/training: All the select agricultural libraries offer education/ training programs for different categories of users viz. Undergraduate as well as postgraduate students, research scholars and the teachers of the university. Further library staff of all the university also updates their knowledge and skills through training programs organized by the libraries.

Table 4.9.2 Target group for user education/training

Sr. No.	User education/ training program	PAU	HAU	HPKV
1	PG & Research Scholars	Y	Y	Y
2	Faculty	Y	Y	Y
3	Undergraduates	Y	Y	Y
4	Library staff	Y	Y	Y

4.9.2.1 Number of user education/training programs

It is evident from the table 4.9.2.1 that overall PAU library has organized maximum number of training programs for library users in the last five years. PAU library conducted more training programs for Faculty and Research scholars whereas for undergraduate students HAU has taken the lead whereas staff of PAU library updated their professional skills by attending more number of training programs as compared to HAU and HPKV library.

Table 4.9.2.1 Total no. of programs organized during the preceding five years

Sr. No.	No. of education/Training programs	PAU	HAU	HPKV
1	PG & Research Scholars	20	3	01
2	Faculty	80	10	02
3	Undergraduates	10	12	04
4	Library staff	10	2	04

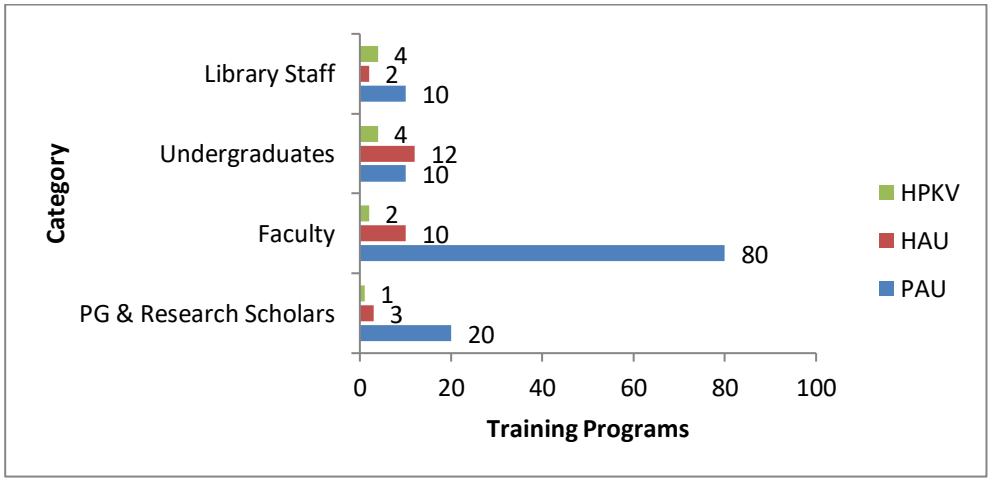

Figure 4.9.2.1: Total no. of training/user education programs

4.10 Librarian's Perception towards application of IT & service Quality: There has been considerable improvement in routine day to day routine operations of the library with the use of information and communication technology. With the intervention of technology library services like issue-retrun , refrence service , document searching etc have improved. To know the perception of librarians with

regard to application of information technology in service improvement response on five-point Likert scale 1 for Strongly disagree to 5 for strongly agree was tabulated and analyzed as under

Table 4.10: Perception of librarians towards IT & service quality

Sr. No.	ICT & Service Quality	PAU					HAU					HPKV				
		SD	D	NAD	A	SA	SD	D	NAD	A	SA	SD	D	NAD	A	SA
1	Document searching easier & faster					Y					Y					Y
2	Scientific Literature search easy & fast					Y					Y					Y
3	Issue/Return fast and time saving				Y						Y					Y
4	Reference service improved					Y					Y					Y
5	Time considerable				Y				Y						Y	

	saved															
6	Electronic access to more no. of resources					Y					Y					Y
7	Convenience of place, time, format					Y					Y					Y
8	ILL/required article from other libraries					Y					Y					Y
9	Overall services improved					Y					Y					Y

Table 4.10 depicts that all the agricultural librarians strongly agree with statement 'Documents searching has become easier and faster'. All the librarians strongly agree for the statements that with the use of information technology scientific literature search has become easy. All the librarians agree that with the use of ICT Issue return of the library document has become faster. Further there is strong agreement for services improvement like Reference service, Request for document from other libraries and convenience of place, time is due to technology interventions in the library. Further all the librarians strongly agree that information technology has

enabled access to more number of electronic resources at one time. All librarians strongly agree for overall improvement in library services due to ICT applications.

4.11: Analysis of response of library users: In the contemporary era user's need analysis has gained importance to assess the quality of library services. It is not the number of documents in the library but its usage which is of paramount significance. It is imperative to determine how well the library collection and services are able to meet the patron's information needs which in true sense is indicative of quality services offered by particular library. So, the rationale of assessment is to perceive the end user insight about collection and services offered by the library. It is not only sufficient to offer high quality information resources and services but also to determine whether users are aware or not about it. Further a step ahead is to determine whether the users are satisfied or not so that remedial measures may be taken for improving the situation. This section reveal the details about analysis and interpretation of the data of 801 users comprising of Teachers, Researchers and Postgraduate students of state agricultural universities of Punjab, Haryana and Himachal Pradesh. An outline of this section is as under

4.11 Demographic profile of users: Gender-wise, Category wise distribution

4.12 Library use pattern: Duration of library use, library website, way to use of library resources, place of accessing library resources, media used and time spent online resources

4.13 Library awareness: Information about new resources, User education and Information literacy programs, services awareness, Reference query, user updating methods etc.

4.14 Method of using library

4.15 Source of awareness about new resources and services

4.16 User Education/Awareness/Literacy programs

4.17 Awareness of library services

4.18 Perception of users about ICT application and library service improvement

4.19 Perception of user about service quality

4.11.1 Gender-Wise distribution of users: Gender-wise analysis in the table 4.11.1 shows that users' population constitute49 % Males (391) and 51% female (410) respondents.

Table 4.11.1 Gender-Wise distribution

Gender	Frequency (801)
Male	391(48.81%)
Female	410(51.19%)

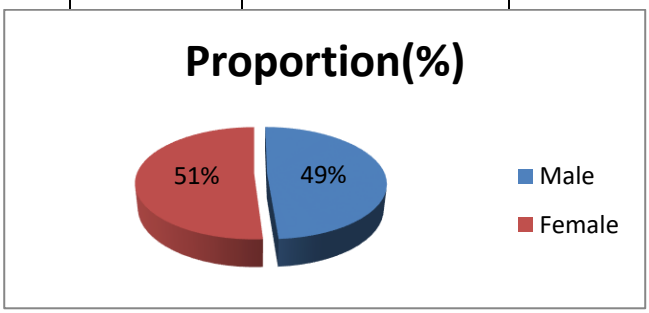

Figure4.11.1 :Gender wise distribution

Table 4.11.2 Category-wise distribution of Users

S No	Category	N (801)
1	Teachers	23
2	Research scholars	159
3	Postgraduate Students	399

The respondents under study encompass Teachers, Researchers and Postgraduate students of the select agricultural universities. Table 4.11.2 Shows that the total sample of 801 respondents consists of 243 teachers, 159 Research scholars and 399 are postgraduate students

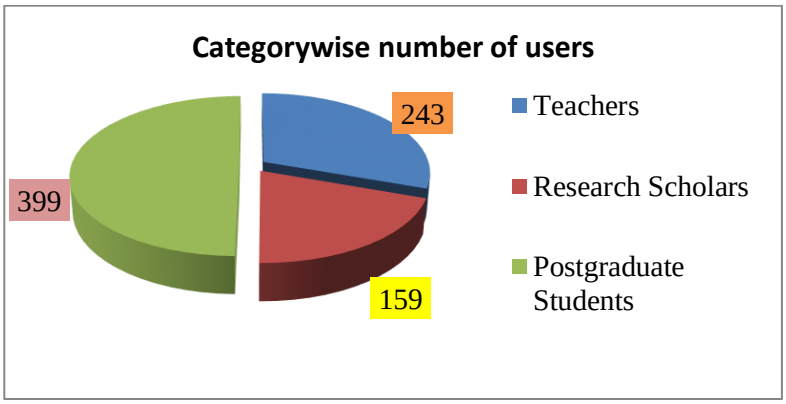

Figure 4.11.2: Category-wise no. of respondents

4.12 Library-use pattern: To assess the collection and services of any library it is essential to know how users are library using the library. This section shows the analysis of library use pattern like duration of use, frequency of use of library, and library webpage, place of using library resources, media used for accessing electronic resources, time spent etc.

4.12.1 This section is an attempt to analyze library use pattern based on parameters like duration of use, frequency of use of library, place of use, frequency of using library page, Media used in accessing library page.

4.12.1aDuration of use: Users of the library get more acquaintance with library as they use the library. So, it is important to know since how long users are using the library. Response in this regard has been analyzed as under

Table 4.12.1a: Duration of library use:overall

Duration	**FRQ (N=801)**	**Percentage**
6 Months	122	15.25%
1 Year	162	20.25%

2 Years	202	25.25%
More than 2 Years	315	39.25%

Table 4.12.1a clearly depicts that majority of the users population around (65%) are using the library for two or more than two years followed by the users (20%) using the library for last one year. Reponses from the users who are using the library for the last six months have also been analyzed which constitute around 15% of the total population as in Fig 4.12.1a

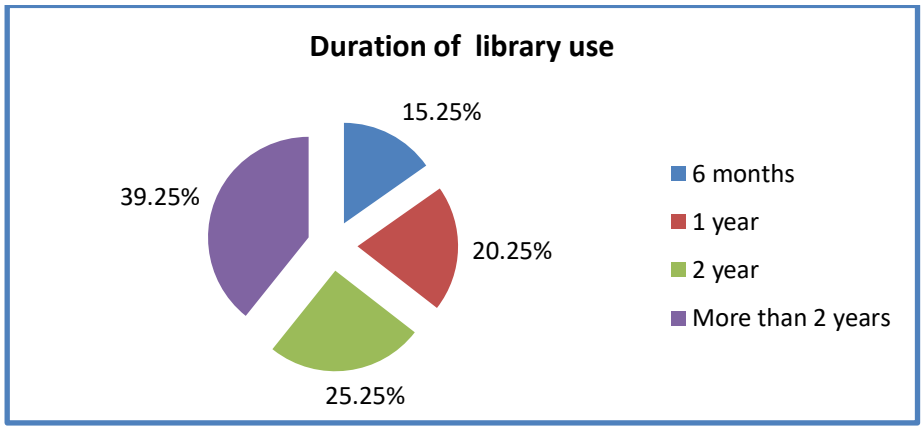

Figure 4.12.1a: Duration of use: Overall

4.12.1b Duration of library use university-wise: Data relating to duration for which users of different agricultural libraries are using the library is analyzed as under

Table 4.12.1b: Duration of using library among universities

Duration	**PAU n (%)**	**HAU n (%)**	**HPKV n (%)**	**Total n (%)**
6 month	33(13.0)	23(8.6)	66(24.7)	122(15.4)
One year	67(24.9)	58(21.7)	37(13.9)	162(20.2)
Two year	65(24.2)	79(29.6)	58(21.7)	202(25.2)
More than 2 year	102(37.9)	107(40.1)	106(39.7)	315(39.2)

Total	267(100)	267(100)	267(100)	801(100)

Table 4.12.1b represents the duration of using library by user among universities. Majority of user used library more than2 year (37.9%) followed by two year (24.2%), one year (24.9%)and very few used library 6 month(13%) respectively in PAU, where more than 2 year (40.1%) followed by two year (29.6%), one year (21.7%)and very few used library 6 month(8.6%) respectively in HAU and whereas more than2 year (39.7%) followed by two year (21.7%), one year (13.9%)and 6 month(24.7%) respectively in HPKV as shown in Figure 4.12.1b

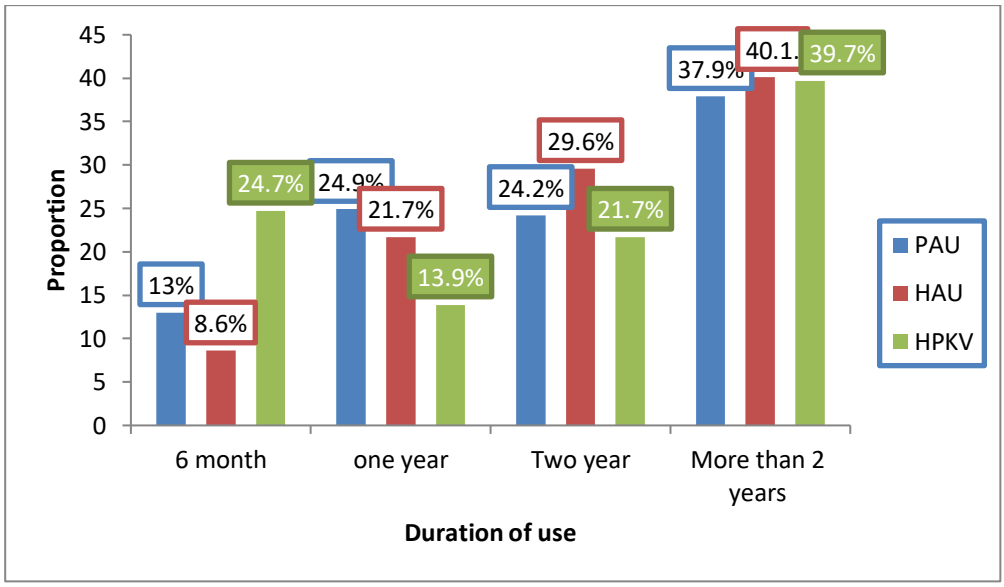

Figure 4.12.1b : Duration of use:universities-wise

4.12.1c Frequency of using library: To know how frequently users are visiting and using the library to fulfill their academic needs data of the user population is as presented as under

Table 4.12.1cfrequency of library visit :overall

Frequency	Percentage
Daily	11%
Once a week	25.91%
Twice a week	31.42%

Once in fortnight	14.77%
Rarely	16.90%

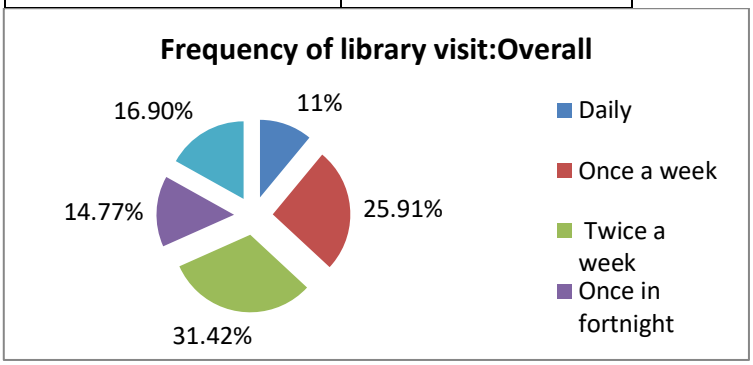

Figure 4.12.1c:Frequency of library visit:overall

4.12.1d Frequency of visit to library: University-wise: To see difference in frequency of visit to library among different agricultural universities data is analyzed as under

Table 4.12.1d : Frequency of library visit :university-wise

Frequency of visit	PAU n (%)	HAU n (%)	HPKV n (%)	Total n (%)
Daily	38(14.1)	80(30)	115(43.1)	233(29)
Once a week	59(21.9)	65(24.3)	53(19.9)	177(22)
Twice a week	82(30.5)	96(36)	57(21.3)	235(29.3)
Once in fortnight	43(16)	21(7.9)	33(12.4)	97(12.1)
Rarely	45(17.5)	5(1.9)	9(3.4)	59(7.6)
Total	267(100)	267(100)	267(100)	801(100)

Table 4.12.1d represents the frequency visit of library among universities. Majority of user visited library twice a week (30.5%), followed by once a week (21.9%), daily (14.1%), once in fortnight (16%)and rarely (17.5%) respectively in PAU whereas 36 % of HAU users visited library twice a week followed by daily(30%), once a week (24.3%), once in fortnight (7.9%)and rarely (1.9%) . On the other hand in HPKV

43.1 % visited daily followed by twice a week (21.3%), once a week (19.9%), Once in fortnight (12.4%) and a very few rarely (3.4%) as shown in Figure 4.12.1d

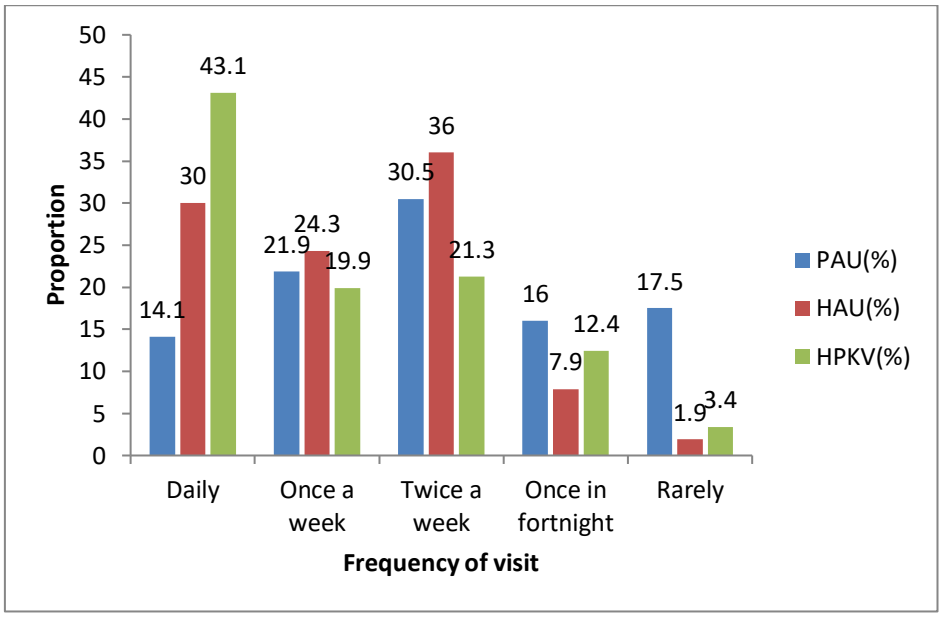

Figure 4.12.1d:University-wise frequency of visit to library

4.12.2 Library membership: With the emergence and use of information technology libraries are providing campus wide full text access to online resources like e-journals, e-books, e-theses, e-reports etc at their place through its webpage. Users are also making good use of online resources in addition to print ones to fulfill their information requirements. Data has been analyzed to know about library membership of users' population which is as under

Table 4.12.2aLibrary membership: overall

Membership (801)	**Library member (745)**	**Not a Member (66)**
Percentage	93%	7%

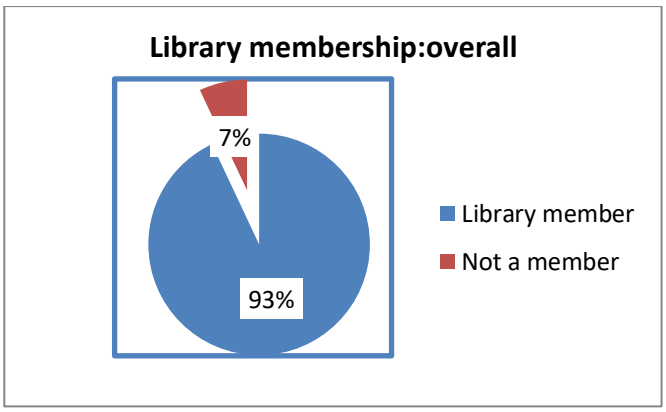

Figure : 4.12.2a Library Membership

Table 4.12.2a show that majority of the users' population posses the membership of the library. Around 93% of the user population as in fig 4.12.2a enjoy all the privileges of library where as few of the users say 7% have not taken membership of the library.

Table 4.12.2b :Library membership: university-wise

	PAU n (%)	**HAU n (%)**	**HPKV n (%)**	**Total n (%)**	**Chi-squre value**	**p-value**
Yes	232(86.2)	263(98.5)	251(94)	746(92.9)	31.2	0.00**
No	35(13.8)	4(1.5)	16(6.0)	55(7.1)		
Total	267(100)	267(100)	267(100)	801(100)		

**Significant at 0.01 level

Table 4.12.2b represents the membership of the library among universities. Library membership showed significant association (Chi-square =31.2,p<0.01) among universities at 0.01 level of significance. Majority of users of PAU library 86.2% have library membership whereas 13.8% of the users do not have it whereas in HAU 98.5% of the users possess membership of the library and 1.5% do not have it. As far as HPKV library is concerned 94.0% of the users have library membership and 6 % do not possess it. From the above discussion, we found that HAU library has

more number of registered users (98.5%) as compared to HPKV (94%) and PAU (86.2%) as shown in fig 4.12.2b

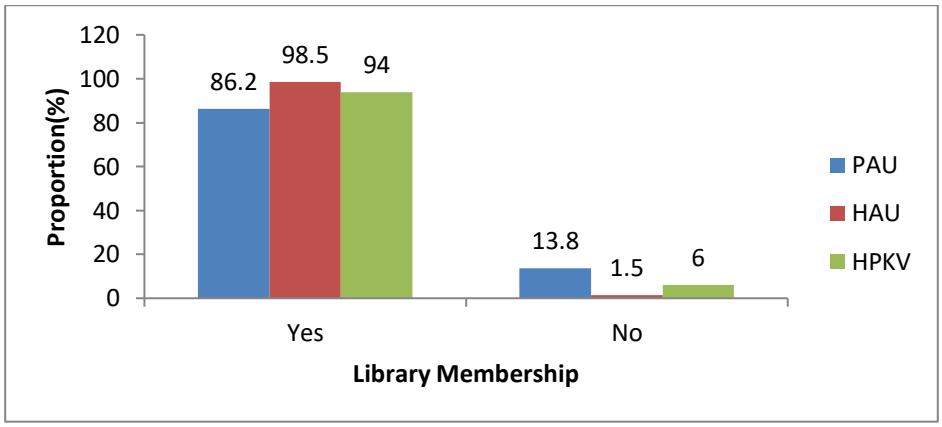

Figure 4.12.2b: Library membership:university-wise

4.13 Awareness of Resources and Services of the Library: Awareness about library plays crucial role in utilization of its resources. In order to assess the awarenss of user about the resources and services available in library data of selected universities have been analyzed as under

Table4.13: Awareness of Resources and Services of the Library

	PAU n (%)	**HAU n (%)**	**HPKV n (%)**	**Total n (%)**	**Chi-square value**	**p-value**
Yes	220(81.8)	252(94.4)	229(85.8)	701(87..3)	20.0	0.00**
No	47(18.2)	15(5.6)	38(14.2)	100(12.7)		
Total	267(100)	267(100)	267(100)	801(100)		

*

*Significant at 0.01 level

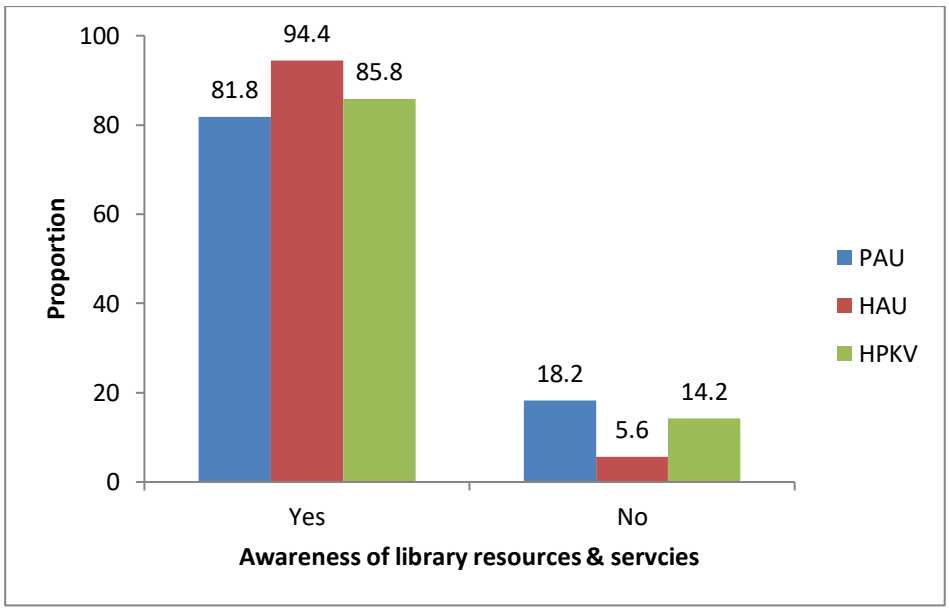

Figure 4.13: Awareness of resources &services of the library

4.13a Frequency of using library webpage: Libraries are providing access to online resources through its webpage. Various innovative online services are being provided to the users of modern agricultural libraries. Users access online resources through library webpage in addition to print resources to fulfill their information needs. So it is essential to know how frequently webpage of the library is accessed by the users. Data related to use of library page by the users of different agricultural libraries is presented as under

Table 4.13a: Frequency of accessing library website among universities

	PAU n (%)	HAU n (%)	HPKV n (%)	Total n (%)	Chi-squre value	p-value
Daily	21(7.8)	32(12)	38(14.2)	91(11.3)	36.7	0.00**
Once a week	75(27.9)	73(27.3)	59(22.1)	27(25.8)		
Twice a week	73(27.1)	109(40.8)	70(26.2)	252(31.4)		

Once in fortnight	47(17.5)	30(11.2)	41(15.4)	118(14.7)		
Rarely	51(19.7)	23(8.6)	59(22.1)	133(16.8)		
Total	267(100)	267(100)	267(100)	801(100)		

*

*Significant at 0.01 level

Table 4.13a represents the significance of frequency of accessing library websites among universities. Frequency of access showed significant association (Chi-square=36.7,p<0.01) among universities at 0.01 level of significance. Majority of user access websites once a week (27.9%) followed by twice a week (27.1%), rarely (19.7%) and once in fortnight (17.5%), respectively in PAU, whereas twice a week (40.8%), once a week (27.3%), once in fortnight (11.2%), daily (12%) and rarely (8.6%) respectively in HAU, and twice in week (26.2%), once a week(22.1%), once in fortnight (15.4%), daily(14.2%) and rarely (22.1%) respectively in HPU. From the above, we found that majority of user access the website twice a week in HAU (40.8%) followed by PAU (27.1%) and HPU (26.2%) respective as shown in Figure 4.13a

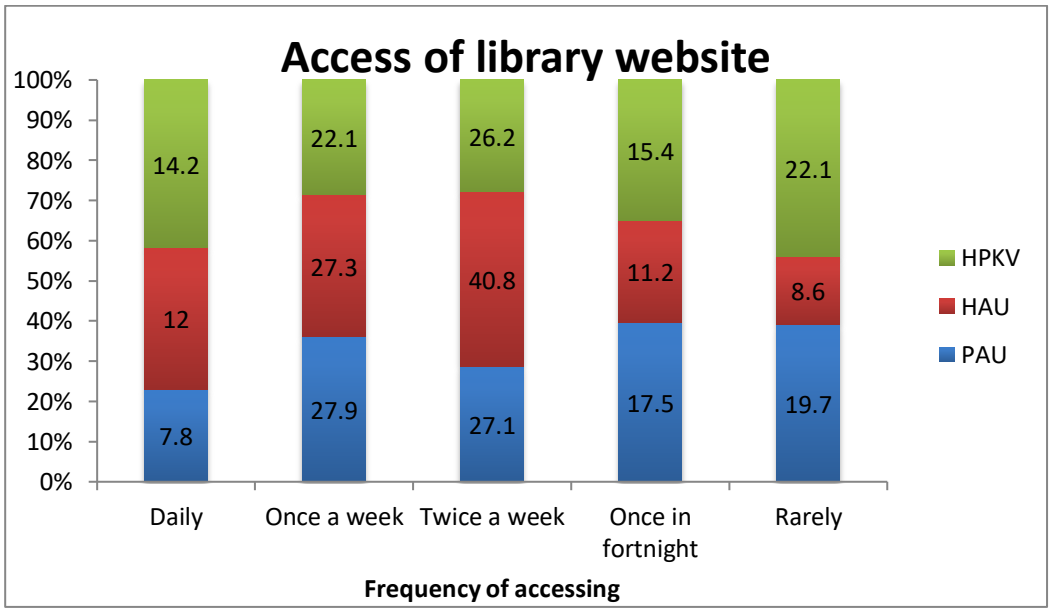

Figure 4.13a : Frequency of accessing library website among universities

4.13b Source of awareness about library resources: Library plays an important role in creating awareness about resources and services of the library by organizing various orientation/user education and training programs. Further in this era of digital technology library website has become an important medium to know about various resources and services of the library. To know the sourcefrom where the users of different agricultural libraries got information about various library resources and services data has been analyzed presented as under

Table 4.13b: Sources of awareness about resources and services of library among universities

	PAU	HAU	HPKV	Chi-square value	p-value
From library staff	126(46.8)	204(76.4)	91(34.1)	580	0.00**
Through faculty/colleague	111(41.3)	102(38.2)	134(50.2)		
From friend	76(28.3)	85(31.8)	104(39)		
From library site	89(33.1)	100(37.5)	91(34.1)		

**Significant at 0.01 level

Table 4.13b represents the significance of association for source of awareness about resources of the library among universities. It showed significant association (Chi-square=580, $p<0.01$) among universities at 0.01 level of significance. Mostly user came to know about resources and services of library through library staff (46.8%) followed by faculty/colleague (41.3%), library site (33.1%), friend (38.3%) in PAU and whereas library staff (76.4%) followed by faculty/colleague (38.2%), library site (31.8%) and friend (37.5%) in HAU and library staff (52.4%) followed by faculty/colleague (43.2%), library site(34.9 %) and friend (34.1%) in HPKV respective as shown in Figure 4.13b

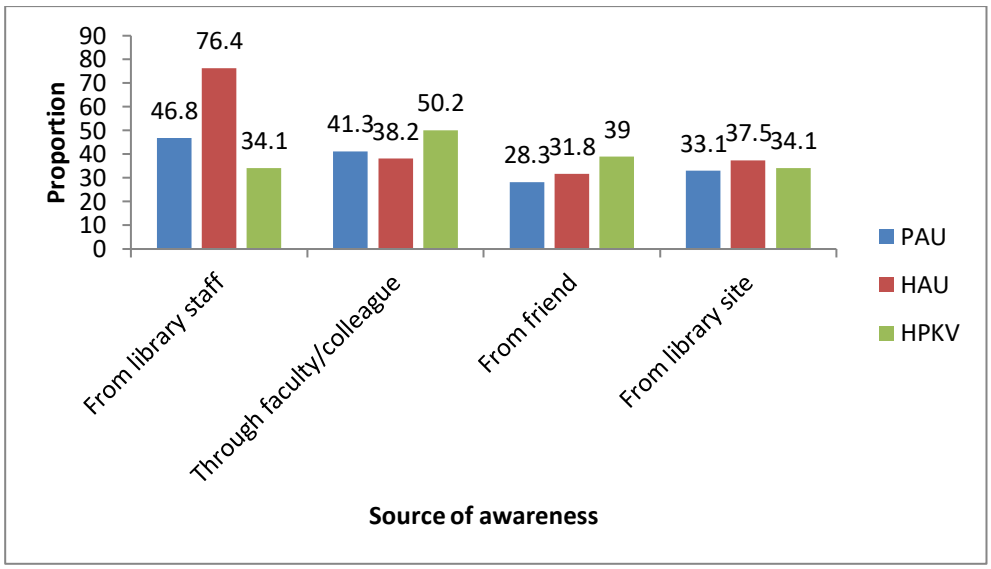

Figure 4.13b: **Source of awareness about library resources**

4.14 Method of using library: Emerging technologies have made possible to deliver library services to the users at their place. Information seeking behavior of the user has also changed. User wants quick and easy access to resources. So, it is interesting to know the behavior of user about using the library resources

Table 4.14: Method of using library among universities

	PAU n (%)	**HAU n (%)**	**HPKV n (%)**	**Chi-square value**	**p-value**
By personally visiting library	49(18)	52(19.2)	82(30.7)	49.8	0.00**
Through library website	42(15.8)	7(2.6)	13(4.9)		
Both	176(66.2)	208(78.2)	172(64.4)		
Total	267(100)	267(100)	267(100)		

** Significant at 0.01 level

Table 4.14 represents the significance of useof library resources and library services among universities. We found significant association for use of resources and services

(Chi-square =49.8, p<0.01) among universities at 0.01 level of significance. Mostly users preferred say (66.2%) preferred to visit personally as well as through library web page followed by visiting library personally (18%) and library websites (15.8%) in PAU, and where in HAU 78.2 % user use library by personally visiting as well as through library website followed by visiting library personally (19.2%) and library websites (2.6%) respectively and whereas in similar fashion users preferred option both (64.4%) followed by visiting library personally (30.7%) and library websites (4.9%) respective in HPKV as shown in Figure 4.14

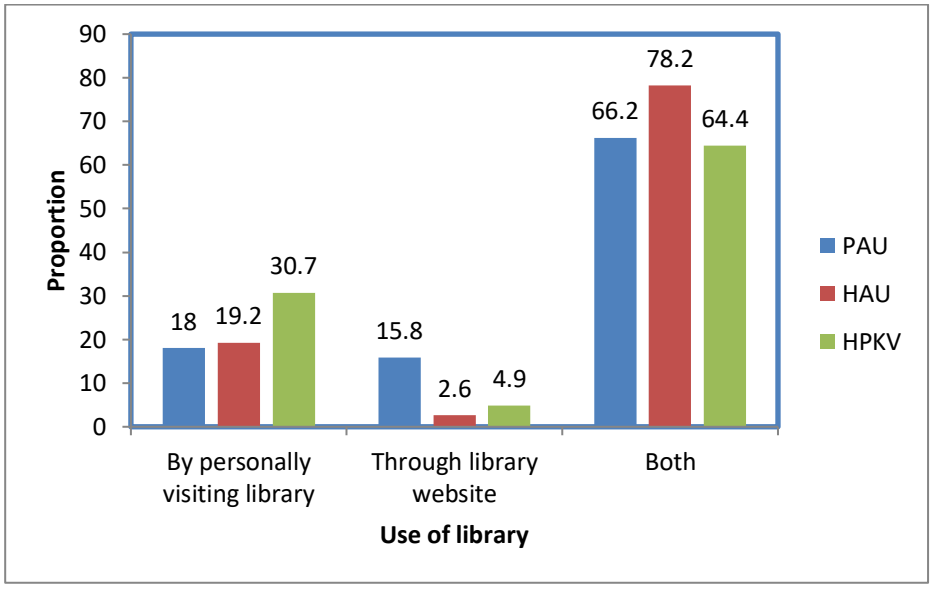

Figure 4.14: Method of Use of library resources

4.14a Place of accessing electronic library resources: Library provides campus wide online access to its resources which enable users to use the resources as per their convenience. Universities provide access to various online resources by providing terminals in the library for the users to access the online resources where teachers, students and researchers of different departments can also have access at their departments. Data has been analyzed as under to see the preferred place of accessing the electronic resources.

Table 4.14a: Place of Accessing electroniclibrary resources among universities

	PAU n (%)	HAU n (%)	HPKV n (%)	Chi-square value	p-value
From Library Premises	41.6	74.9	58.1	23.6	0.00
From Department	46.8	43.8	39.7		
From Hostel	32	33.3	27.7		
Any Other	1.1	3.4	0		

Table 4.14a represents the significance of association for access of online resources of library among universities. User showed access of online resources significant (Chi-square =23.6, $p<0.01$) among universities at 0.01 level of significance. Mostly user preferred to access online resources from the department (46.8%) followed by library premises (41.6 %), hostel (32%) and home (1.1%) in PAU, whereas user in HAU most of the users preferred to access from library premises (74.9 %) followed by department (43.8 %) , hostel (33.3%) and a few around (3.4%) access from their residence respectively. Further, we see that user access online resources from library premises (58.1 %) followed by department (39.7 %) and hostel (27.7%) respectively in HPKV as shown in Figure 4.14a.

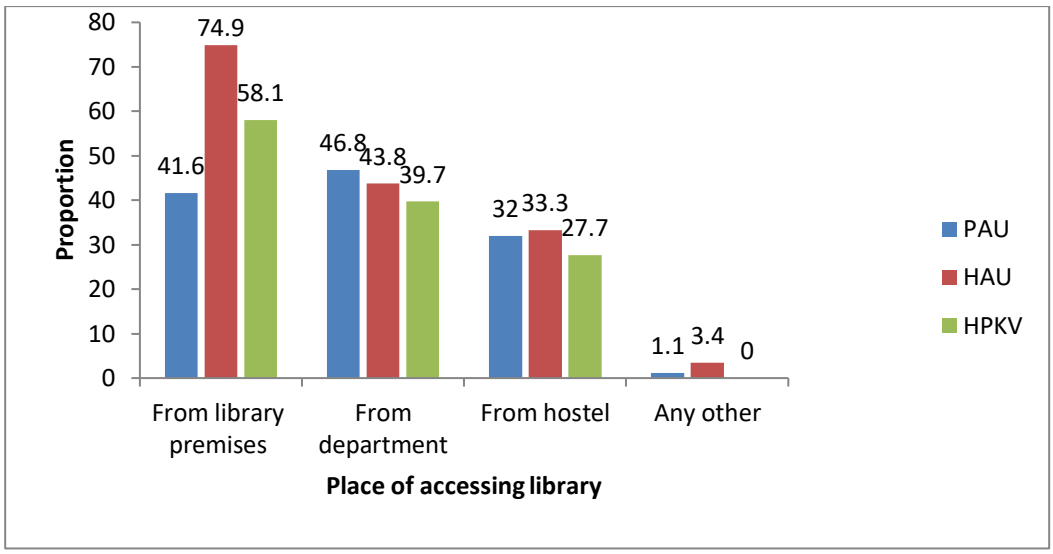

Figure 4.14a: Place of accessing library resources

4.14b: Media used in accessing library resources: Various types of media devices from desktop to smart phones are being used to access online resources of the library. With the use of technology users can now access the required information irrespective of place and time barriers. Any device like Desktop, Laptops, Tablets and mobile can be used to as per the convenience of the user. Bring Your Own Device (BYOD) concept in the libraries has resulted in increased use of laptop, tablets and mobiles for accessing online resources of the library. Data with respect to device used in utilizing various electronic resources of the library has been analyzed as shown in table 4.14b

Table 4.14b: Media used in accessing online resources of library among universities

	PAU n (%)	HAU n (%)	HPKV n (%)	Chi-square value	p-value
Desktop	86(32)	188(70.4)	137(51.3)	65.1	0.00**
Laptop	142(52.8)	180(67.4)	141(52.8)		
Mobile	122(45.4)	52(19.5)	98(36.7)		
Any other	0	1(0.4)	1(0.4)		

**Significant at 0.01 level

Table 4.14b represents the significance of association for media device used for accessing online resources of library among universities. User showed significant (Chi-square =65.1, p<0.01) association for Use of media in accessing online resources among universities at 0.01 level of significance. User preferred accessing online resources as Laptop (52.8%), Mobile (45.4%) and Desktop (32%) respectively in PAU, whereas user in HAU preferred Desktop (70.4%), Laptop (67.4%), Mobile (19.5%) and any other (0.4%) respectively and at last in HPKV user access online resources as Laptop (52.8%), Desktop (51.3%), Mobile (36.7%) and any other (0.4%) respectively as shown in Figure4.18

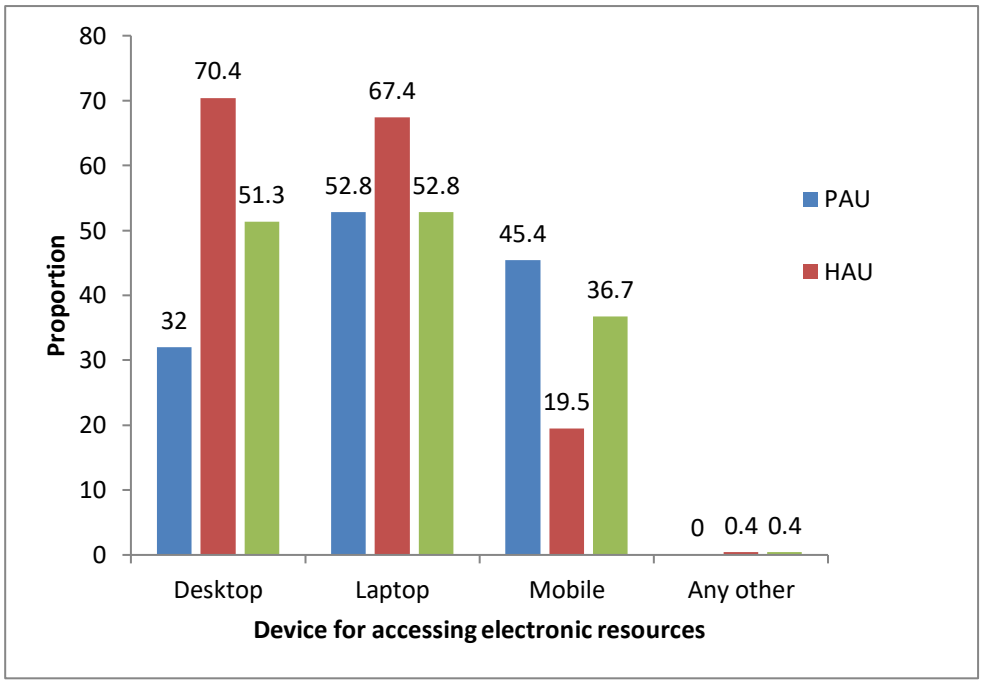

Figure 4.14b Media used for accessing E-resources

4.15 Source of awareness about new resources/services of the library: To know the sources of awareness of user about new resources and services of the library data from different agricultural libraries has been analyzed to find any significant association among different libraries which is depicted as in table 4.19

Table 4.15 Awareness about newly added resources and services of the library

	PAU n (%)	HAU n (%)	HPKV n (%)	Chi- square	p-value

				value	
From library staff	106(39.4)	206(77.2)	96(36)	103.8	0.00**
Library notification on Library webpage	120(44.6)	170(63.7)	178(66.7)		
Email	71(26.4)	15(5.6)	50(18.7)		
Any other	13(4.8)	0	3(1.1)		

**Significant at 0.01 level

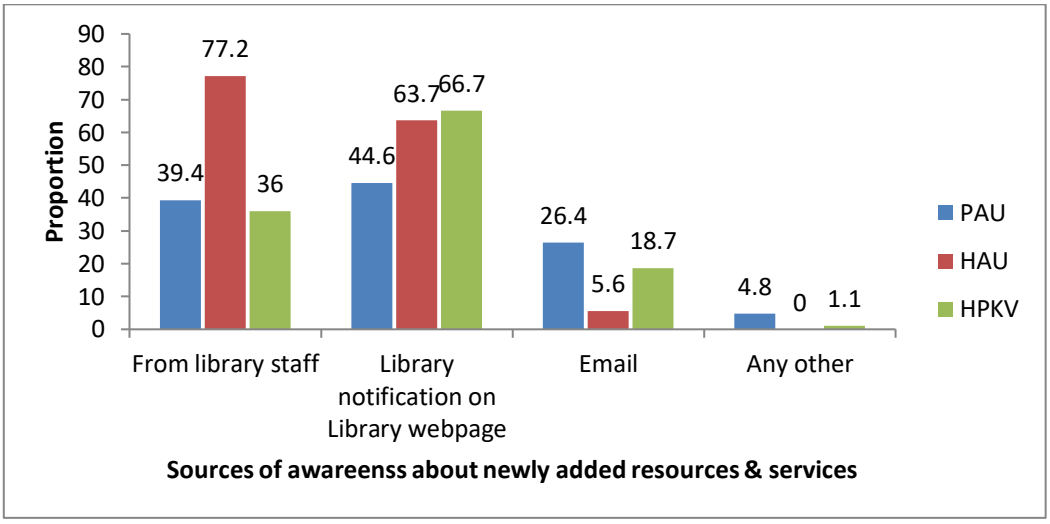

Figure 4.15: Source of awareness about new resources/services of library

4.16 User awareness/education/literacy activities: User education/Information literacy programs of library aim to teach and refine the skills of the user in retrieving the required information from the resources available with the library. It helps the users to learn about various intricacies of information storage and retrieval so that they can search the required information of theirown and become independent learners. Data with regard to attending of any user awareness programs of the library is analyzed as under in the table 4.16

Table 4.16a: Participation in User awareness/orientation/training literacy programs among universities

Response	PAU(n%)	HAU(n%)	HPKV(n%)

Yes	241(89.6)	262(98.1)	259(97.0)
No	26(10.4)	5(1.9)	8(3.0)
Total	267(100)	267(100)	267(100)

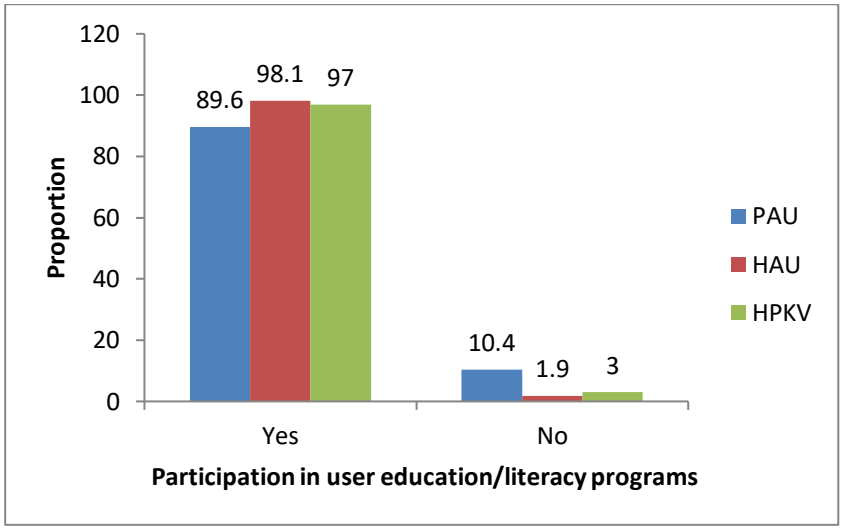

Figure 4.16a: User awareness/orientation/training literacy programs among universities

Table 4.16a represents the significance of attending any user awareness/orientation/training/ literacy programs among different universities. The significant association (Chi-square =23.8, $p<0.01$) was found for attending any user awareness/orientation/training literacy programs at 0.01 level of significance. Majority 89.26% user attended user awareness/orientation or training literacy programs, whereas 9.74% user has not attended any orientation/education/ literacy program in PAU. In HAU, most of user (98.1%) attended user awareness/orientation/training literacy programs whereas 1.9 % user did not attend any such program, whereas 97.0% of the users in HPKV attended user awareness/orientation/training literacy programs and 3 % did not attend any of the programs in HPKV as in figure 4.16a

4.16b Usefulness of user awareness/education/Literacy programs:

	PAU n (%)	HAU n (%)	HPKV n (%)	Chi-square value	p-value
Highly informative & useful	60(22.5)	62(23.7)	64(24.4)	12.8	0.04*
Informative & useful	159(59.5)	140(53.4)	120(45.8)		
somewhat informative &useful	44(16.5)	61(21.4)	78(27.9)		
Not useful	4(1.5)	4(1.5)	5(1.9)		
Total	267(100)	267(100)	267(100)		

To know the attitude or behavior of the user towards usefulness of user education/ literacy programs data has been analyzed as per the table 4.16b

Table 4.16b: Usefulness of awareness/orientation/training literacy programs among universities

**Significant at 0.05 level

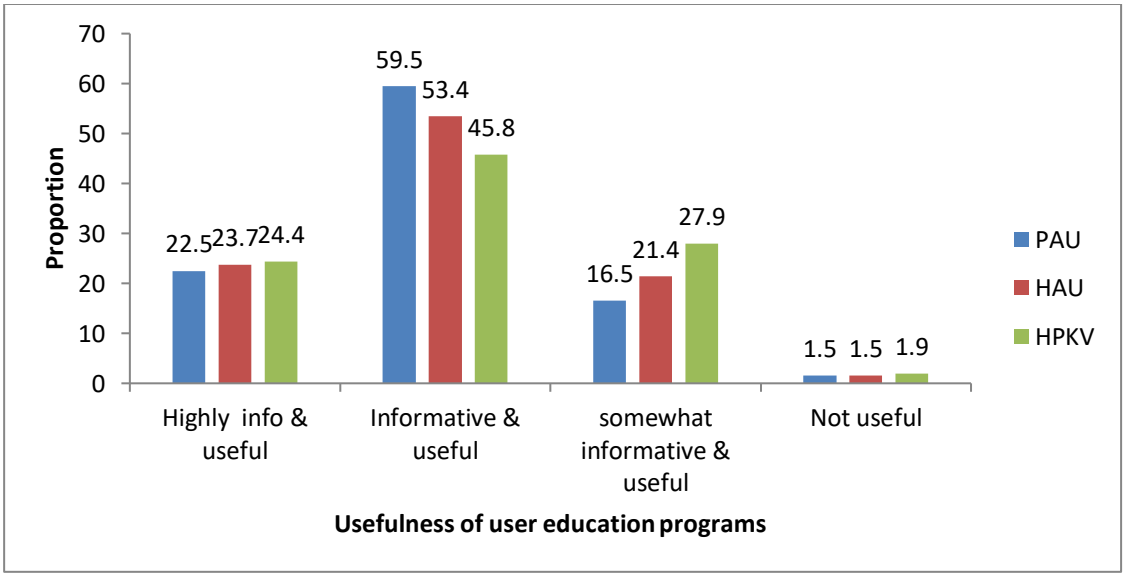

Fig 4.16b: Usefulness of Awareness/Literacy programs

Table 4.16b represents the usefulness of attending user awareness/orientation/training literacy programs by the user among different agricultural universities. The significant association (Chi-square =23.8, p<0.01) was found for usefulness of the awareness/orientation/training literacy programs at 0.01 level of significance. Majority of the users of all the libraries found orientation /user education/literacy programs informative and useful. In PAU around 23 % of the users found the programs highly informative & useful followed by 59.5% users who consider it informative and useful whereas 16.5 % say somewhat informative & useful and a very few percentage of the users 0.7% say it is not useful. Almostsimilar trend is shown by users of HAU and HPKV library where 23..7 % and 24.4% users found it highly informative & useful followed by 53.4% and 45.8 % who found it informative and useful in their respective libraries. Small percentages of the users around 21.4 % and 27.9% are having the view as somewhat informaive & useful followed by scant percentage of users 1.5 % and 1.9% saying it of no use in both universities respectively as in Fig 4.16b

4.16c Impact of user education/information literacy programs: User education/literacy programs make the users aware about various resources and services of the library. The main aim is to help the user in achieving self-sufficiency in using the library resources and services. All the libraries under study conduct user education/Literacy programs for the users. Data was analyzed to assess the effect of library user education/literacy programs in enhancing the user's knowledge about information searching among different universities as under

Table 4.16c: Impact of literacy program on knowledge about information searching among universities

	PAU n (%)	HAU n (%)	HPKV n (%)	Chi-square value	p-value
Considerable enhance	40(14.9)	39(14.6)	51(19.1)	12.2	0.06
Enhance	153(57.3)	162(60.6)	141(52.8)		

Somewhat enhance	62(23.2)	58(34.7)	67(25.6)		
No Impact	12(4.6)	8 (2.1)	8(2.9)		
Total	267(100)	267(100)	267(100)		

Table 4.16c represents the significance of impact of literacy program on knowledge about information searching among university among universities. The non-significant association (Chi-square =12.2, p>0.05) was found for impact of literacy program on knowledge about information searchingat 0.05 level of significance. The user gave responses as considerable enhance (14.9%), enhance (56.9%), somewhat enhance (23.8%) and very few showed no impact (4.5%) respectively in PAU, where user in HAU showed responses as considerable enhance (14.2%), enhance (62.1%), somewhat enhance (22.2%) and very few showed no impact (1.5%) respectively, whereas considerable enhance (19.5%), enhance (53.8%), somewhat enhance (25.6%) and very few showed no impact (1.5%) respectively in HPKV as in Figure 4.16c.

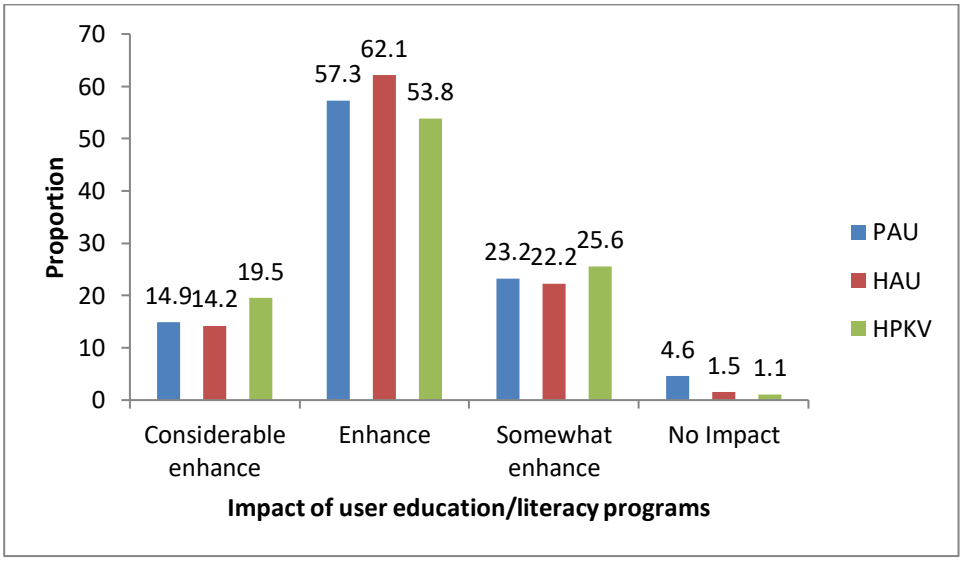

Fig 4.16c Impact of user education/Information literacy program

4.17 Awareness of library services: To assess the awareness level of user with regard to various services of the library users were requested to tick against various service(s) of the library which they were aware. Table 4.17 represents the significance

of awareness about various library services among different agricultural universities. All the agricultural libraries are providing wide range of services covering traditional as well as modern library services. Analysis with regard to different services is as under

Table 4.17 : Awareness of library services among different universities

Services of library	PAU n (%)	HAU n (%)	HPKV n (%)	Chi-square value	df	p-value
Internet net/Wi-Fi services	236(87.7)	254(95.1)	242(90.6)	9.24	2	0.00**
Online catalogue OPAC/ WEBOPAC	216(80.3)	245(91.8)	234(87.6)	15.53	2	0.00**
Issue/Return book	225(83.6)	259(97)	240(89.9)	27.00	2	0.00**
Reservation of books	127(47.2)	85(31.8)	119(44.6)	14.93	2	0.00**
Reissue books	190(70.6)	185(69.3)	176(65.9)	1.47	2	0.48
Reference books	137(50.9)	133(49.8)	154(57.7)	5.80	2	0.21
Web site of Library	206(76.6)	250(93.6)	210(78.7)	32.73	2	0.00**
Online resources/services	195(72.5)	222(83.1)	185(69.3)	14.99	2	0.00**
Online Thesis& Dissertation/E-thesis(KRISHIKOSH)	193(71.7)	238(89.1)	182(68.2)	38.53	2	0.00**
Online/E-journals data base (CeRA)	151(56.1)	237(88.8)	181(67.8)	70.92	2	0.00**
Interlibrary loan/Document Delivery Request)(ILL/DDR)	75(27.9)	65(24.3)	83(31.1)	3.03	2	0.22
Online books/E-books	148(55)	165(61.8)	131(49.1)	8.76	2	0.00**

Online abstracting/indexing database search	86(32)	94(35.2)	111(41.6)	7.27	2	0.12
Digital collection(Institutional repository of articles, thesis, reports etc)	85(31.6)	100(37.5)	96(36)	2.08	2	0.35
Blogs, wiki, Podcast, Vodcastetc based services for awareness and access	63(23.4)	27(10.1)	42(15.7)	17.61	2	0.00**
Open access resources	107(39.8)	83(31.1)	99(37.1)	4.72	2	0.09
Mobile based access to the electronic services	106(39.4)	66(24.7)	71(26.6)	16.84	2	0.00**

**Significant at 0.01 level

Internet/ Wi-Fi services:Internet is used to access various electronic resources of the library and most of the universities are providing it. All selected universities are providing Internet/Wi-Fi facility to their users which showed significant association (Chi-square value=9.24,$p<0.01$) at 0.01 level of significance. HAU (95.1%) users are more aware about internet/Wi-Fi service of the university as compared to HPKV (90.6%) and PAU (87.7%) respectively as shown in Fig 4.17

Online catalogue OPAC/ WEBOPAC: Catalogue of the library helps the user to know the document avaibility in the library. It is useful tool in locating documents in the library. Card catalogues were earlier used to find the document but with the use of information and communication technologies catalogue of almost all the libraries are available on Intranet/Internet accessible online through computer which is Online Public Access Catalogue (OPAC)/WEBOPAC. Catalogue of all the selected university is available online and showed significant association (Chi-square value=15.53,$p<0.01$) at 0.01 level of significance.. HAU users (91.8%) are more aware about OPAC/WEBOPAC service than HPKV(87.6%) and PAU (80.3%) users respectively.

Issue/Return book: Library users can get the printed books on loan from the library to fulfill their information needs. Issue/Return of books is one of the basic services provided by all the libraries. Issue/Return of book service showed significant association (Chi-square value=27,$p<0.01$) at 0.01 level of significance. HAU (97%) users showed more awareness for issue/return service than HPKV (89.9%) and PAU (83.6%) users respectively.

Reservation of books: Library provides book reservation facility to the users for those documents which are in great demand. Reservation of books facility showed significant association (Chi-square value=14.93,$p<0.01$) at 0.01 level of significance. PAU users (47.2%) showed more awareness towards this service than HPKV (44.6%) and HAU (31.8%) users respectively.

Reissue of books: User can reissue the document if it is not required by the user. Reissue of books service by different agricultural libraries showed non-significant association (Chi-square value=1.47,$p>0.05$) at 0.05 level of significance. PAU (70.6%) users are

more aware about Reissue of books service of the library followed by HAU (69.3%) and HPKV (65.9%) users respectively.

Reference books: Reference collection of library is important collection used by the users for different purposes. It includes different types of documents.Awareness about reference collection by the users of different agricultural librariesshowed non-significant association (Chi-square value=5.80,p>0.05) at 0.05 level of significance. As in the above table HPKV (57.7) users showed more awareness about reference collection as compared to PAU (50.9) and HAU (49.8) users respectively.

Web site of Library: Internet has brought revolution in sharing and exchange of information. All the institutions of higher learning have developed their webpage for sharing and access of institutional information. Agricultural libraries in addition to print information are now providing plethora of information through variety of electronic resources of the library. It is therefore necessary to assess whether users of agricultural libraries know about website of the library.Web site of library service showedsignificant association (Chi-square value=32.73,p<0.01) at 0.01 level of significance. HAU (93.6%) users are more aware about website of library than HPKV (78.7%) and PAU (76.6%) respectively.

Online resources/services: Different types of electronic resources of selected agricultural libraries are accessible through library webpage. It istherefore essential to know their awareness about electronic resources/services which showed significant association (Chi-square value=14.99,p<0.01) at 0.01 level of significance. HAU (83.1%) users showed more awareness in comparison to PAU (72.5%) and HPKV (69.3%) users respectively.

Online Theses& Dissertations/E-theses(KRISHIKOSH) Institutions are showing their research output through availability of online theses through repository. All the agricultural universities are providing access to online theses through central repository KRISHIKOSH database. All the selected agricultural libraries are member of KRISHIKOSH and are uploading their research work on the portal. Online theses database service showed significant association (Chi-square value=38.53, p<0.01) at 0.01

level of significance. Users of HAU (89.1%) library showed more awareness towards this services than PAU (71.7%) and HPKV (68.2%) respectively.

Online/E-journals (CeRA) : Online journals are becoming popular in scientific communications and are widely being used by the faculty, researchers and students of agricultural libraries. Access to electronic journals through consortia has given new directions to scientific research. To strengthen the agricultural research ICAR developed CERA consortium for providing access to wide variety of electronic journals in the field of Agriculture & allied areas. Awareness about online journals showedsignificant association (Chi-square value=70.92, $p<0.01$) at 0.01 level of significance. All the agricultural libraries under study are the member of CeRA and are providing access to electronic journals through it. HAU (88.8%) users showed more awareness for online journals than HPKV (67.8%) and PAU (56.1%) users respectively.

Interlibrary Loan (ILL)/Document Delivery Request (DDR): Information technology has made possible to get the documents (Journal articles) from other libraries for the user. Users have the facility to request for desired information from other library if not available in their library. ILL/DDR service showednon-significant association (Chi-square value=3.03, $p>0.05$) at 0.05 level of significance. All the users have less awareness about interlibrary loan/DDR service. 31.1 % users of HPKV are aware about ILL/DDR service followed by PAU (27.9%) and HAU (24.3%) users respectively.

Online books/E-books: In addition to print books libraries are also procuring electronic books in their collection keeping in view the changed user behavior in accessing the information. All the agricultural libraries are providing access to online books through their portal to meet the academic demands of their users. E-books service has shown significantassociation among different agricultural libraries (Chi-square value=7.27, $p<0.01$) at 0.01 significance level. Further HAU (61.8) users show more awareness for E-books followed by PAU (55%) and HPKV (49.1%) respectively.

Digital collection(Institutional repository of articles, thesis, reports etc): Institutions are now developing digital collection to show more visibility of institutional research output through institutional repositories. Users can access wide variety of documents

through these repositories. To see the awareness level of users of different agricultural libraries data has been analyzed as in table 4.23 which showednon-significant association (Chi-square value=2.08, p>0.05) at 0.05level of significance. HAU (37.5%) showed awareness towards digital collection preserved in the form of digital repository followed by HPKV (36%) and PAU (31.5%) respectively.

Blogs, wiki, Podcast, Vodcastetc based services for awareness and access: Web 2.0 technology has significantly impacted the way services are delivered to the users. Libraries are also using web 2.0 tools like blogs, wiki, podcast, vodcast etc. for sharing of information. Users of different agricultural librariesshowed significant association (Chi-square value=17.61, p<0.01) at 0.01 level of significance out of which PAU (23.4%) showed more awareness for these services than HPU (15.7%) and HAU (10.1%) respectively.

Open access resources: Open access movement is picking up for more visibility and access. It is a platform which provides access to the scholarly content. There are number of open access resources which are available for free under fair use policy. Researchers have unrestricted access to the scholarly content under creative common license. Awareness of the agricultural users of selected agricultural librariesabout open access resourcesshowed non-significant association (Chi-square value=4.72, p>0.05) at 0.05 level of significance. Around (39.8%) PAU users responded for awareness about open access resources followed by HPKV (37.1%) and HAU (31.1 %) respectively.

Mobile bases access to electronic services: Technology has made possible to access the information any time anywhere. Further smart phones have changed the way information is accessed and shared. Most of the library users are having smart phones which they use for different purposes. Today library users are accessing electronic services through their mobiles. Awareness about mobile based access to resources of agricultural libraries showed significant association (Chi-square value=16.84, p<0.01) at 0.01 level of significance. PAU (39.4%) showed more awareness services than HPKV (26.6%) and HAU (24.7%) respectively.

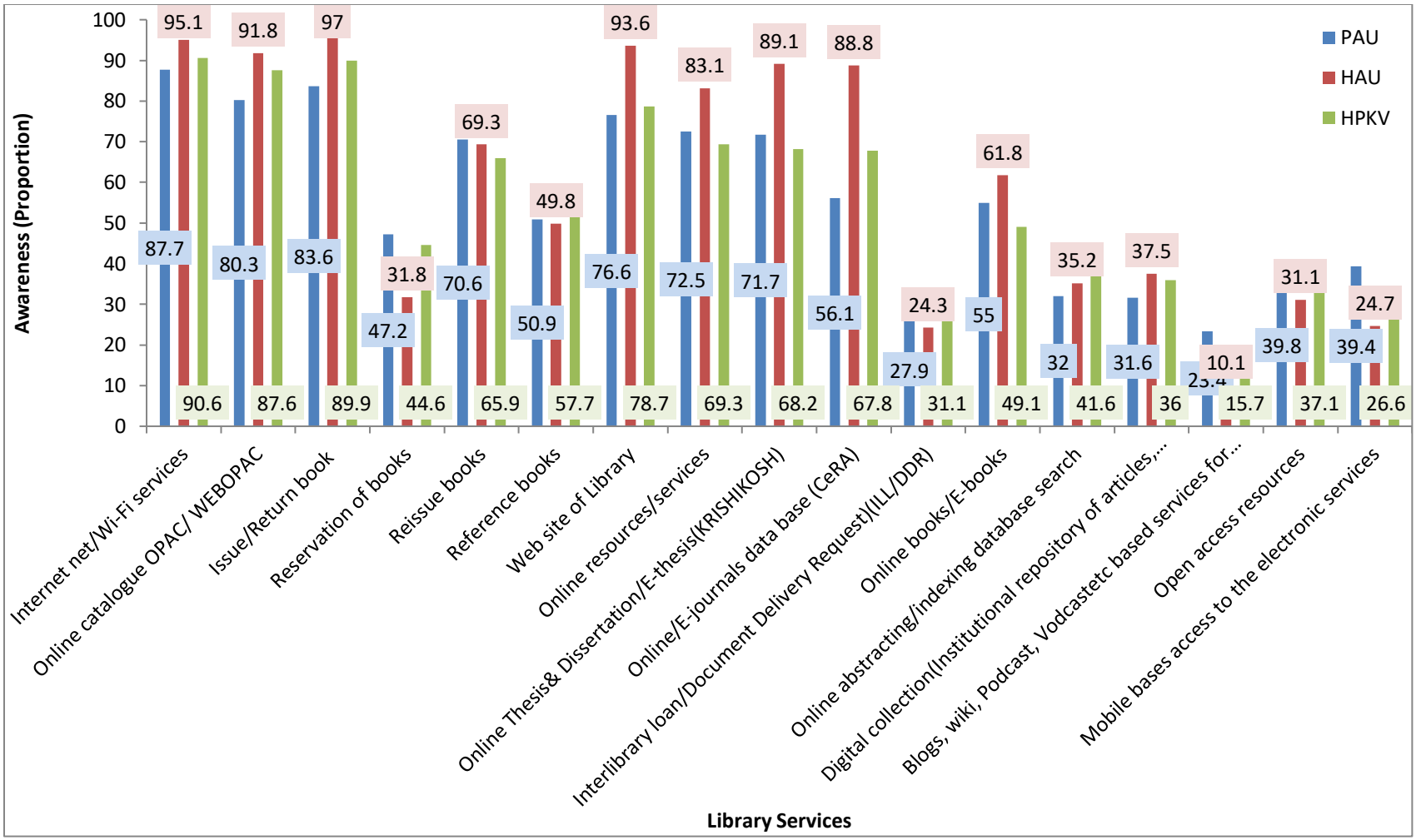

Fig 4.17 Awareness of library services among universities

4.18 Perception of users about ICT application and library service improvement: Library routine operations have been improved with the use of computer. New innovative services can be proviced through it. Internet has made possible to access the information from remote locations. With the feature like fast searching and easy access of electronic resources library services has improved. It has now become easy for the researcher to search any information with the use of ICT. To know the perception of user towards application of ICT in library service improvement responses of the library users were measured on five point likert scale from strongly disagree to strongly agree. Mean and Standard deviation was calculated to see the difference and results have been analyzed as in table 4.18

Table 4.18: User's Perception towards use of ICT in library service improvement in different universities

Item No.	ICT & service quality	PAU		HAU		HPKV		F-value	p- value
		Mean	SD	Mean	SD	Mean	SD		
1.	Document searching has become easier and faster with ICT	3.85	1.13	4.28	0.59	4.04	0.85	15.57	0.00**
2.	Scientific literature search has become easy and fast with ICT	3.92	0.94	4.29	0.54	3.98	0.81	17.13	0.00**
3.	Issues Return of documents has become faster and time saving with ICT	3.71	0.91	4.22	0.70	3.93	0.88	25.44	0.00**
4.	Reference services has improved with use of ICT	3.78	0.87	4.11	0.68	3.86	0.87	12.03	0.00**
5.	Time is considerably saved with use of ICT	4.02	0.87	4.34	0.63	4.01	0.89	14.38	0.00**
6.	ICT is libraries help me to update and inform in my area of research	3.82	0.89	4.08	0.70	4.02	2.62	1.82	0.16
7.	Access to more resources at time helps me in fulfilling my research needs.	3.82	0.89	4.16	0.60	3.95	0.80	13.84	0.00**

8.	ICT helps me to use library resources as per my convenience of place, time and format	3.84	0.95	4.13	0.61	3.93	0.84	9.21	0.00**
9.	ICT helps me to get article from other libraries to fulfill my information needs.	3.76	0.91	3.90	0.77	3.80	0.83	1.83	0.16
10.	ICT helps me to know about new resources and services of the library quickly.	3.88	0.82	4.02	0.71	3.90	0.81	2.73	0.07
11.	Overall Library services a have remarkably improved with use of ICT	4.04	0.80	4.19	0.60	4.05	0.79	3.55	0.03*
	ICT and Library services	42.49	7.49	45.73	4.65	43.46	6.96	17.65	0.00**

**Significant at 0.01 level and *Significant at 0.05 level

Table 4.18 represents the significance of ICT applications in improving the Library services among different agricultural universities. Out of eleven items indicating the importance of ICT towards service improvement significant mean difference was obtained for eight items at 0.05 levels and non-significant mean difference was found for three items. Table 4.24 depicts that more number of HAU respondents are in agreement with statement 'Document searching has become easier and faster with ICT' with mean value (x= 4.28, SD=0.59) followed by HKPV with mean (x=4.04, SD=0.85) and PAU with mean (x=3.85, SD=1.13). Similarly highest mean value for HAU users was found for the items 'Scientific literature search has become easy and fast with ICT '; 'Issue return of the documents become faster and time saving with ICT' which is (x=4.29, SD=0.54) and (x=4.22,SD=0.70) respectively followed HAU having mean (x= 3.98, SD=0.81) and (x=3.93, SD=0.88) and PAU with mean(x= 3.92, SD=0.94), (x=3.71, SD=0.91) for the above two respective items. In similar manner HAU users showed highest means(x=4.11, SD=0.68; x=4.34,SD=0.63; x=4.08, SD=0.70) for items 'Reference services has improved with use of ICT'; Time is considerably saved with use of ICT and ICT is libraries help me to update and inform in my area of research' followed by HPKV users with means (x=3.86, SD=0.87, x=4.01, SD=0.89, x= 4.02, SD=2.62) and PAU respondents with means (x=3.78, SD=0.87; x=4.02, SD=0.87, x=3.82, SD=0.89) for above three items. Highest mean values (x=4.16, SD=0.60; x=4.13, SD=0.61; x=3.90, SD=0.77; x=4.02, SD=0.71) were also reported by HAU users for remaining items like Access to more resources at time helps me in fulfilling my research needs, ICT helps me to use library resources as per my convenience of place, time and format, ICT helps me to get article from other libraries to fulfill my information needs and ICT helps me to know about new resources and services of the library quickly followed by HPKV users with (x=3.95, SD=0.80; x=3.93, SD=0.84; x=3.80, SD=0.83; x=3.90, SD=0.81) and PAU users with (x=3.82, SD=0.89; x=3.84, SD=0.95; x=3.76, SD=0.91; x=3.88, SD=0.82). Mean value with regard to general perception of user towards overall improvement of service with use of ICT is also highest for HAU users with mean (x=4.19, SD=0.60) followed by HPKV (x=4.05, SD=0.79) and PAU (x=4.04, SD=0.80). The total mean value calculated for all items is highest for HAU (x=45.73, SD=4.65) followed by

HPKV (x=43.46, SD=6.96) and PAU (x=42.49, SD=7.49) which indicates that HAU users have more positive perception towards the use of ICT in library service improvement.

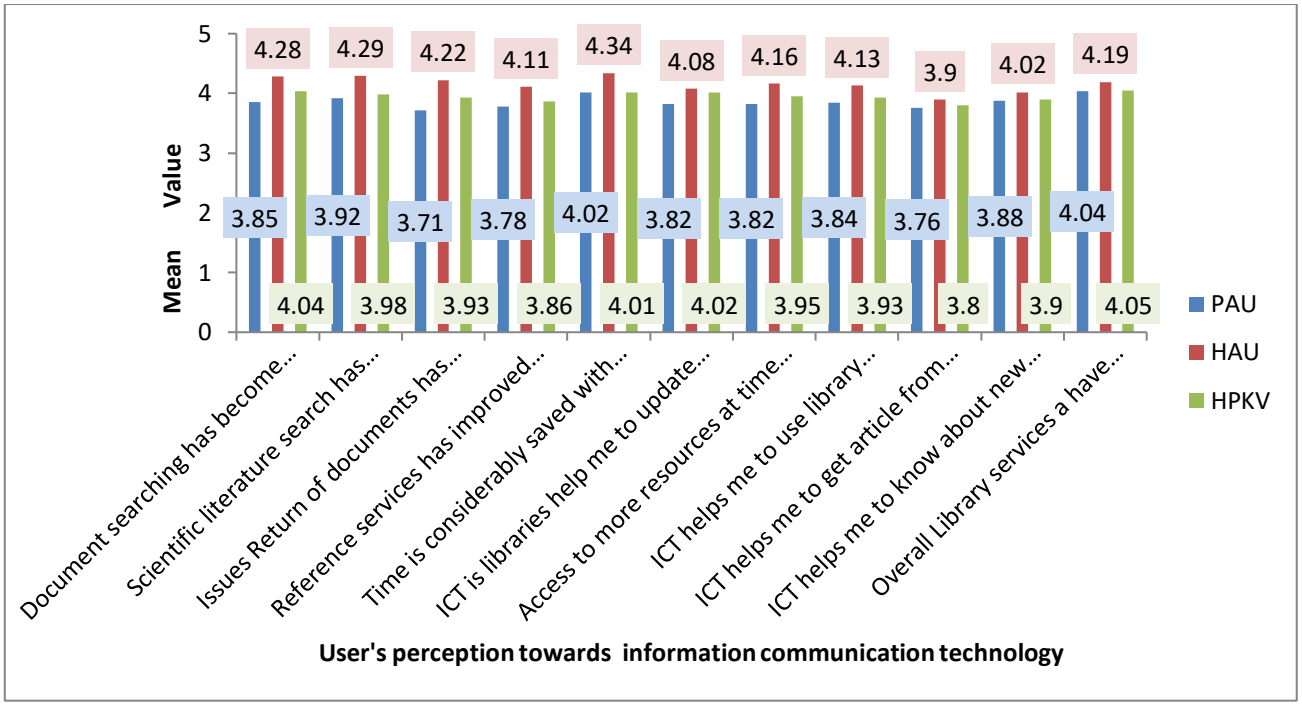

Figure 4.18: Perception towards use of ICT in library service improvement in different universities

4.19 Users' Satisfaction with Library Services: Organization can keep its customers satisfied with high quality service. High quality services induce increased satisfaction and high percentage of customer loyalty. There is positive and direct relationship between quality of service and customer satisfaction. To know the user's perception towards service quality it is essential to measurethe level of satisfaction of the user towards various dimensions of service quality. We can say level of user satisfaction varies with performance of library which ultimately affects the perception about library. Performance of the library can judged through satisfaction levels of the user. The level of service quality can be very good to very poor just like the satisfaction level of the user from highly satisfied to highly dissatisfied. If the user is highly satisfied then it can be inferred that service quality is very good. Likewise if user is highly dissatisfied then we can say that say that service quality is very poor.

So in the present study modified SERVPERF scale which is performance only based instrument has been used in the study for evaluating the service quality. SERVPERF scale like SERVQUAL has all the dimensions like Tangibles, Reliability, Responsiveness, Empathy and Assurance. In addition satisfaction level has also been measured to know digital service quality for which various statements covering features of website quality like Navigation, Security, Communication, and Access and of Online Public Access Catalogue have been taken into account. Library services have been divided as into peripheral, core and frontline services covering all the dimensions of service quality which were measured through the level of satisfaction on five point scale from 1for highly dissatisfied to 5 for highly satisfied. Data with regard to satisfaction against various items covered under library services have been analyzed as in table 4.25

4.19.1 Peripheral Services : Peripheral services of the library include elements like Library building, location , working hours, lightening , Ventilation , cooling facilities, comfortable furniture, Directional signs, Drinking water facility, Washrooms, Lift/Ramp, Seating capacity etc. One way ANOVA (Analysis of Variance) was used to find the significant mean difference in satisfaction level of the users for various items among the selected university. Significant mean difference for four items like

modular building, accessibility, working hours; lightening, ventilation, cooling & heating facilities; clean drinking water and lift/ramp facility was found at .01 level of significance where as for the remaining peripheral services which include comfortable furniture, silence reading, safety, directional signs, clean washrooms and seating space showed non-significant difference at 0.05 level of significance as shown in table 4.25.1. The overall mean for peripheral services was also found to be non-significant as the P value is 0.10 which is greater than .0.05 at 0 .05 level of significance. It is clear from the figure 4.25.1 that HPKV users are more satisfied with modular building, its layout design, accessibility and working hours as the mean comes out to be 4.10 followed by PAU library with mean value 3.84 and HAU library having mean of 3. 76. Similar results were also shown for lightening, ventilation, cooling & heating facilities by the users of HPKV library as mean for it comes out to be 4.03 followed by 3.89 of HAU and 3.79 of PAU respectively. No significant mean difference was observed for furniture &silent reading space, directional signs among the select universities as the means for HPKV users are 4.10, 3.91 followed by 4.03, 3.80 and 4.00, 3.86 respectively. In providing other basic amenities like fresh drinking water, clean washrooms HAU library users are found to be more satisfied than HPKV and PAU library users for which mean comes out to be 4.05, 3.66 whereas for HPKV users it is 3.78, 3.57 and for PAU users is 3.70 and 3.49 respectively. As far as seating space facility is concerned HPKV users are more satisfied as compared to PAU and HAU users as the mean value for it found to be 4.04 followed by PAU users with mean value3.97 and 3.90 for HAU users. Most of the PAU users are more satisfied with Lift/Ramp facility of the library as the mean for it is 3.28 as compared to HPKV users with mean value 3.18 followed by HPU users with mean 3.18 respectively.

Table 4.19.1 : Users' satisfaction with peripheral services

Item No.	Items	PAU		HAU		HPKV		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
1	Modular building, easily accessible, attractive lay out & flexible working hours	3.84	0.99	3.76	0.91	**4.10**	0.91	9.39	0.00**
2	Good Lightning, Ventilation, cooling & heating facilities	3.79	1.01	3.89	0.80	**4.03**	1.03	4.38	0.00**
3	Clean, Comfortable furniture, space for silent reading, personal safety	4.00	0.89	4.03	0.86	4.10	0.96	0.89	0.41
4	Provide directional Signs which are clear & helpful	3.86	0.93	3.80	0.82	3.91	0.96	0.97	0.38
5	Basic amenities like Fresh & clean drinking water	3.70	1.03	**4.05**	0.63	3.78	1.06	10.78	0.00**
6	Neat & clean washrooms	3.49	1.07	3.66	0.83	3.57	1.09	1.85	0.16
7	Lift /Ramp facility	**3.28**	1.17	2.75	1.15	3.18	1.19	15.48	0.00**
8	Seating space/ capacity	3.97	0.97	3.90	0.67	4.04	0.90	1.84	0.16
9	Peripheral services	29.98	5.22	29.84	4.02	30.71	5.76	2.30	0.10

**Significant at 0.01 level

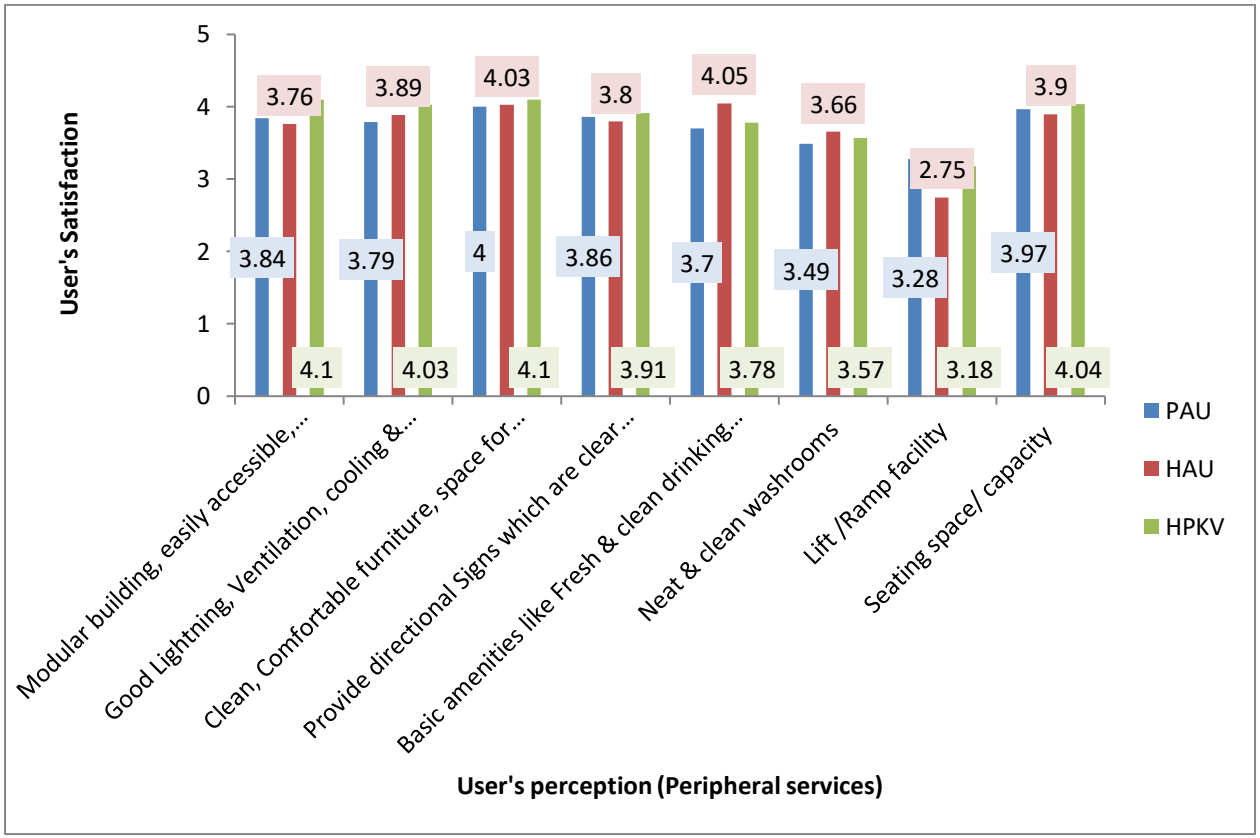

Figure : 4.19.1 Users' satisfaction with peripheral services

4.19.2 Library equipment: Library also provides photocopy facility to the user so that user can get photocopy of the required information in case when the document can't be issued or due to some other reasons. In digital environment access to the electronic resources are provided to the users. Further with online public access catalogue user can easily search the required document through the use of computer terminals placed for it. So it is very essential for the library to have robust ICT infrastructure with working computer terminals and networking facility in order to provide effective online services. Data with regard to library equipment has been analyzed as in table 4.19.2

Table 4.19.2: User's satisfaction with library equipment

Items	PAU		HAU		HPKV		F-value	p-value
	Mean	SD	Mean	SD	Mean	SD		
Photocopiers are in working order and readily available	3.97	0.90	3.93	0.76	**4.13**	0.84	4.62	0.00**
Has adequate no. of working and readily available computer terminals	3.78	0.97	3.84	0.73	**4.02**	0.90	5.53	0.00**
Library Equipment in my library	7.76	1.59	7.76	1.30	8.16	1.57	6.30	0.00**

Table 4.19.2 represents the significance of equipment in libraryamong different agricultural universities. Significant mean difference was obtained for the items listed under library equipment at 0.01 level of significance. HPKV users are found to be more satisfied with photocopy facility of the library as the mean value found to be 4.13 followed by PAU users and HAU users with mean values of 3.97 and 3.93 respectively. Further HPKV users are also more satisfied with working and availability of computer

terminals in the library as the mean for which found to be 4.02 followed byHAU user with mean 3.84 and PAU users with mean value 3.78 as shown in figure 4.19. 2

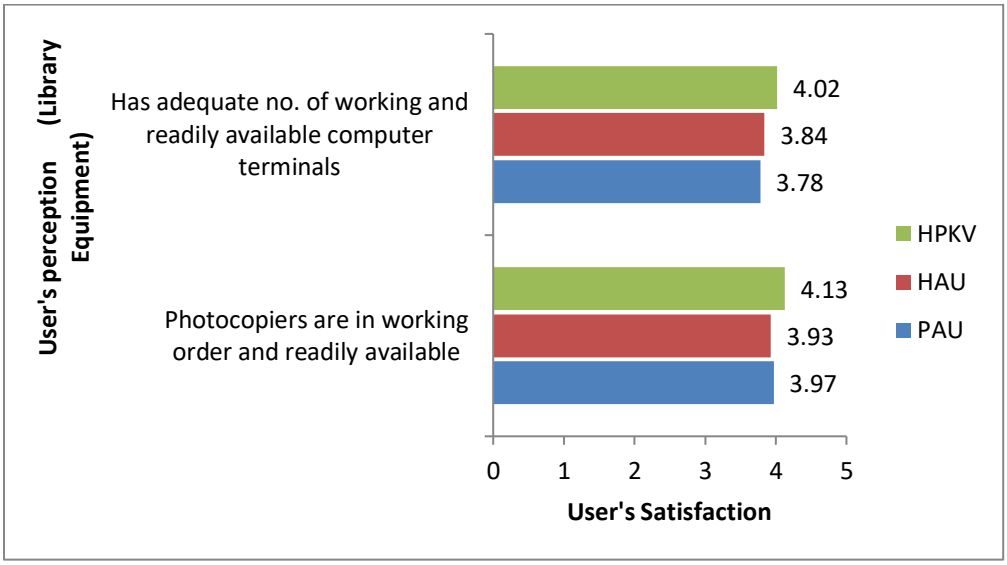

Figure 4.19.2 : User's satisfaction toward library equipment

4.19.3 Core Services: The basic purpose of university library is to fulfill the information needs of its users by providing relevant information from the sources available inside or outside the library. Library procures various print as well as online resources which are managed by trained and qualified library staff to fulfill the academic needs of its users. In addition library staff also organizes various user education/training/literacy programs to create awareness about the library resources and its services. So, collection and documents, users and the staff are at the core of library services. The following section analyzes the users' satisfaction level with regard to library resources, equipment and supportof library staff in utilizing various resources of the library. User's satisfaction level with library resources was measured in terms of its adequacy, relevance & currency of information, accessibility and status. Library staff support plays critical role in optimum utilization of the resources. They are the vital link between the user and resources of the library. Staff interaction, behavior and competence are crucial in determining user satisfaction and loyalty. Staff helps the users in building confidence to

make use of library resources of their own independently. User's satisfaction with library staff component includes responsiveness, attitude, knowledge and behavior in providing the information

Collection development is one of the important activities of university library. Library procures books and other documents keeping in view the aims and objectives of an institution. User's involvement in collection development helps in procuring those documents which are in line with the demands of the users. So, the one of the important core activity of library is to build adequate, relevant and updated collection in order to satisfy the user. Analysis of user's satisfaction with library resources is tabulated and presented as in table as under

Table 4.19.3.1 : User's satisfaction with library resources in terms of adequacy, relevance, currency, accessibility and status

S.No	Name of Items	PAU		HAU		HPKV		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
1.	Adequate print resources like Books, journals, theses, magazines, Newspaper etc.	4.02	0.85	4.00	0.70	4.01	0.94	0.03	0.97
2.	Course/curriculum supporting resources, meet my teaching/research needs	3.95	0.78	3.91	0.69	**4.01**	0.84	1.27	0.28
3.	Library acquire information resources as per user requirements/needs	4.16	3.15	3.96	0.66	3.96	0.89	0.94	0.39
4.	The resources I get are current and accurate	3.88	0.84	3.84	0.69	3.88	0.90	0.30	0.74
5.	Handbooks, yearbooks, Encyclopedia and related reference books etc are adequate	3.97	0.86	3.86	0.72	3.85	0.93	1.67	0.19
6.	Easy to browse ,find and locate	4.10	0.83	3.99	0.69	3.98	0.92	1.63	0.20

	books and other print material								
7.	Books and other documents shelved and re-shelved properly	3.89	0.99	4.00	0.66	3.96	0.98	0.95	0.39
8.	New books are helpfully displayed	4.08	0.87	3.81	0.73	3.93	0.99	6.27	0.00**
9.	When I request, I am always informed about the status	4.00	0.90	3.93	0.76	3.84	0.91	2.26	0.10
	The library print material	**36.07**	6.15	35.29	4.04	35.43	6.23	1.51	0.22

**Significant at 0.01 level

Table 4.19.3.1 represents significance of print learning resources among different selected universities. Analysis of variance was used to find the significant mean difference in satisfaction level of the users towards library print resources among different agricultural universities. User's satisfaction was analyzed for adequacy, relevance, currency, variety and helpfulness in locating the print resources of the library. Significant mean difference was found for the item New books helpfully displayed at 0.01 significanct level whereas non-significant mean difference was obtained for rest of the items. The mean value was found to be 4.08 by PAU respondents followed by 3.93 of HPKV and 3.81 of HAU respectively. Users of all the select agricultural libraries are more or less equally satisfied with print collection of their libraries. All users have also shown more or less equal satisfaction for relevancy in term of meeting their information needs, currency & accuracy. Further all the library users are satisfied with reference collection of their libraries. As far as the display and retrieval of print reading material was concerned, all the users' of selected agricultural libraries showed more or less equal satisfaction. Furthermore users' of all agricultural libraries are more or less satisfied with information regarding status of required document which points towards proper record maintenance of the library.

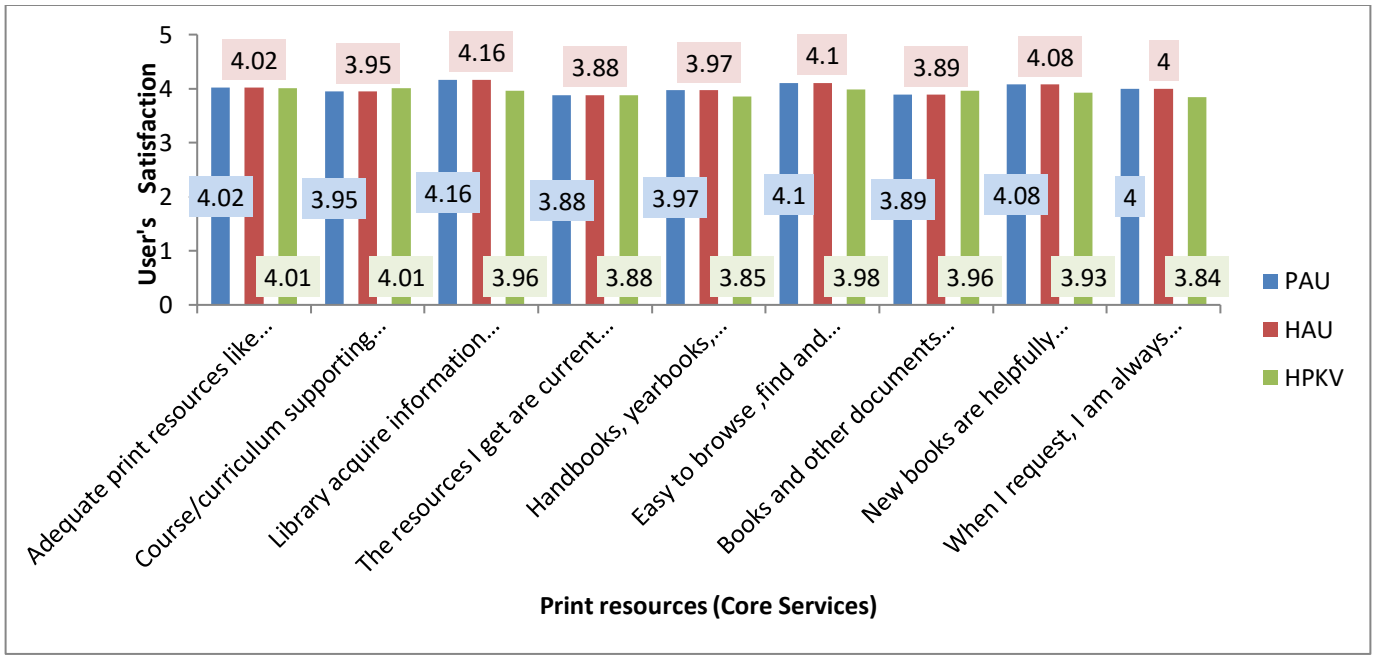

Figure 4.19.3.1 Users' satisfaction with print resources among select agricultural universities

Table 4.19.3.2 : User satisfaction with library staff among universities

S.No	Name of Items	PAU		HAU		HPKV		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
1.	Approachable and available during need	3.94	0.88	**4.22**	0.59	4.03	0.88	8.25	0.00**
2.	Polite and behave nicely with me	4.11	0.86	**4.38**	0.65	4.12	0.86	9.73	0.00**
3.	Always willing to help me	3.98	0.90	**4.44**	2.53	3.90	0.93	8.56	0.00**
4.	Professional and able to find information related to my discipline	4.04	0.77	**4.23**	0.65	4.02	0.84	6.40	0.00**
5.	Help me to identify the resource I need	4.07	0.78	**4.21**	0.72	3.94	0.91	7.64	0.00**
6.	Generally able to answer my enquiries	4.12	0.78	**4.18**	0.59	3.96	0.88	6.35	0.00**
7.	Provide prompt service to me and do it in certain time when promise to do	4.03	0.78	**4.23**	0.68	3.97	0.91	7.86	0.00**
8.	Put sincere effort and interest in locating the required document/Information	4.04	0.82	**4.51**	3.16	4.00	0.86	5.50	0.00**
9.	Sympathetic and attend me in personal way	3.98	0.87	**4.20**	0.66	3.87	0.83	11.90	0.00**
10.	Make me feel that I can depend on the library staff for fulfilling my needs	3.91	0.89	4.03	0.71	3.86	0.92	2.90	0.06
11.	Knowledgeable & updated to provide best	4.04	0.87	4.12	0.65	3.96	0.85	2.85	0.06

	services as per my needs								
12.	Library staff is able to use technology efficiently in fulfilling my needs	4.05	0.78	4.00	0.66	3.95	0.85	1.07	0.34
13.	Educate me about use of library services	**4.00**	0.82	3.82	0.75	3.93	0.90	3.35	0.04*
14.	Informative and useful library education programs have helped in fulfilling my information needs in a better way.	**4.02**	0.81	3.86	0.73	3.86	0.88	3.39	0.03*
15.	Awareness and education programs of library instill confidence in me to use library at my own	4.00	0.76	3.83	0.72	3.92	0.84	3.02	0.05
	Library staff	60.38	9.07	**62.26**	7.74	59.29	10.14	7.38	0.00**

**Significant at 0.01 level and *Significant at 0.05 level

Table 4.19.3.2 represents satisfaction of user with services rendered by the library staff which ultimately depends on the knowledge, skills and behavior of the staff. Overall significant difference has been observed for library staff support among selected agricultural universities. Significant mean difference was observed for all items under library staff except item no. 10, 11,12 and 15. HAU users are more satisfied with staff accessibility during need as the mean found to be 4.22 followed by HPKV with mean 4.03 and PAU with 3.94. HAU library also lead as far as the politeness and behavior of staff is concerned for which mean value observed was 4.38 as compared to 4.12 and 4.11 of HPKV and PAU respectively. HAU users also find their library staff more helpful, professional and competent in identifying the needed resource as compared to PAU and HPKV library users as the observed mean value found to be 4.23, 4.21 4.1,4. 8 respectively for HAU users followed by PAU users with values 4.04, 4.07, 4.12 and 4.02, 3.94 and 3.96 for HPKV users. Further HAU users showed more satisfaction towards staff promptness, sincerity and sympathetic behavior in providing the library service as compared to PAU and HAU users as the mean value was found to be 4.23, 4.51, 4.20 respectively followed by PAU users with mean values 4.03, 4.04, 3.98 and 3.97,4.00 and 3.87 for HPKV users. On the other hand non-significant difference for assurance, staff knowledge and technical know-how was found as the mean values for HAU users were found to be 4.03, 4.12, and 4.00, for PAU users were 3.91, 4.04, 4.05 and 3.86, 3.96 and 3.95 for HPKV users. On the other hand users of PAU libraryare more satisfied with user awareness programs as the mean values for items like educating user about library use; education program useful & informative; confidence in using library through user education programs was found to be 4.00, 4.02 and 4.00 respectively. On the other hand HAU users mean value for the items comes out to be 3.82, 3.86 and 3.83 whereas HPKV users show less satisfaction for user education activities with mean value 3.35, 3.39 and 3.02 as shown in figure 4.19.3.2

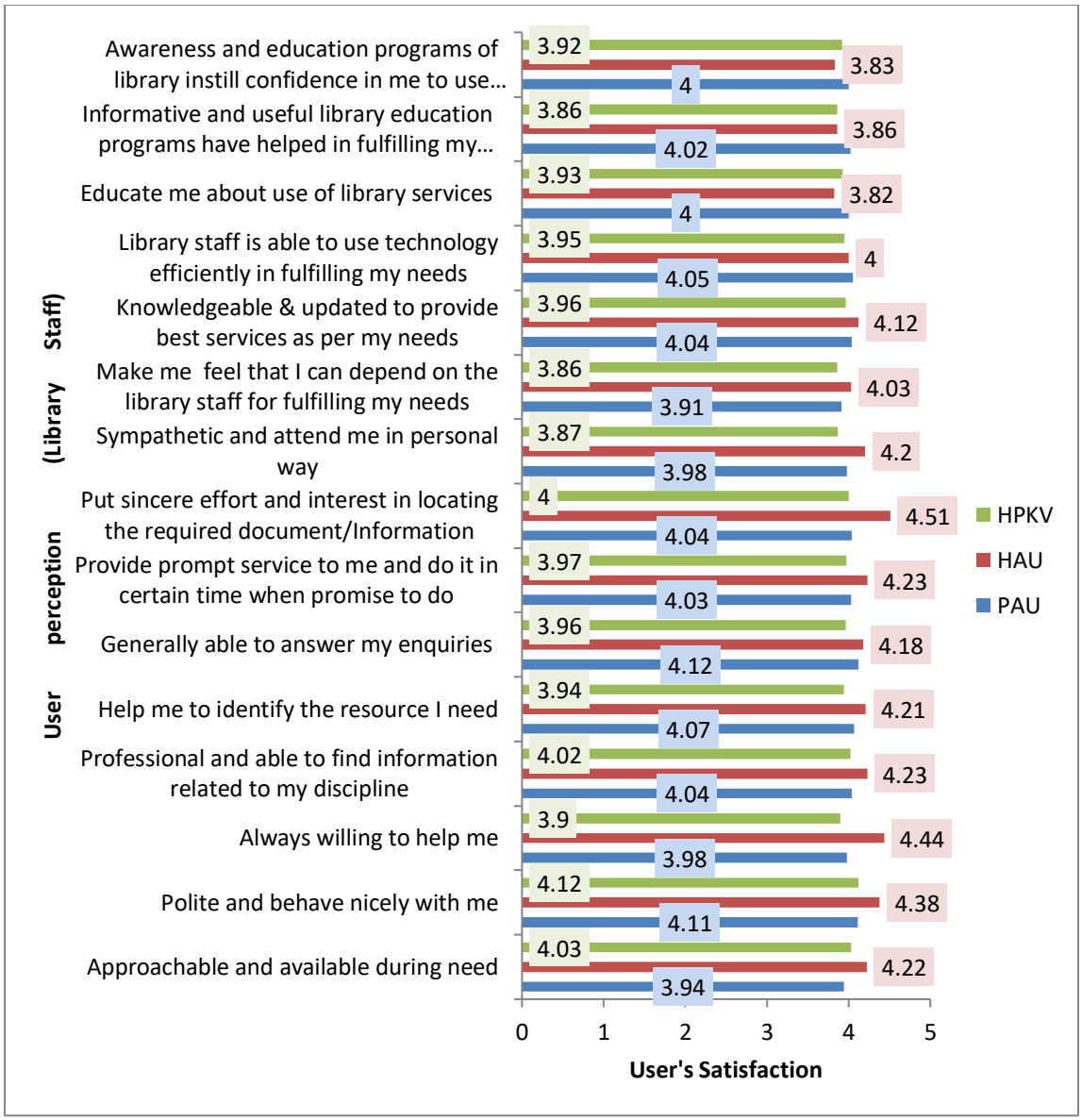

Figure 4.19.3.2 Users' satisfaction towards library staff among different universities

4.19.3.3 Frontline services: Library catalogues are accessible online on intranet and internet. Users visiting library can search the library documents online through OPAC for which terminals are available in the reference area of the library. Furthermore online resources are also being added to library collection and are nowadays accessible from the

webpage of library. So users in addition to getting print documents are also utilizing online resources of the library. All the university libraries have developed their webpage for quick delivery of information. Library procures documents which are technically processed for their easy retrieval and use. Hence library services basically include technical services and public services. Technical services of the library deal with the procurement and processing of the library documents whereas public services involve direct interaction of user with the library staff available at the front desk. Frontline services include plethora of services like issue-return of documents, reference services, online public access catalogue, and digital services etc. which are rendered by the library staff available at the desk. Further library staff available at the reference desk is there to extend help in using the resources and services of library. So satisfaction level of the user is greatly influenced the way users are treated. Data with regard to satisfaction of user with frontline services covering various features OPAC, library website, Issue-Return of document and Reference services have been presented in table 4.19.3.3

4.19.3.3..1 E-Service quality: With the use of ICTs there is a sea change the way library services are provided to the users. Further user behavior has also changed in seeking the information. Users want information which should be accurate and quickly available. All library activities have been automated and are also providing access to e-resources through library webpage. All libraries are now providing electronic access to the catalogue as well as digital services to their users. So it is essential to assess e-service quality in digital environment by measuring the users' satisfaction with OPAC/WEBOPAC and webpage of the library. User friendly interface, up-datedness, perceived usefulness etc. are found to be key determinants of e-service quality. Statements related to website design, security, easy navigation, content and access has been taken to measure the satisfaction level of user. It is interesting to note that all the libraries are providing online services which are above 'Average' as the mean score is more than 3 which indicate most of users are satisfied with online services of their libraries.

Table 4.19.3.3.1a : Satisfaction with OPAC/Web OPAC among universities

	OPAC/WEBOPAC	PAU		HAU		HPKV		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
1.	Easy to use and understand	4.00	0.86	4.07	0.68	3.89	0.95	3.09	0.05
2.	Indicates location of the item	4.03	0.76	4.03	0.61	3.98	0.89	0.37	0.69
3.	Display information that is clear and easy	4.07	0.83	4.12	0.63	3.98	0.92	1.94	0.14
4.	Provide accurate information about all the material held by the library	4.01	0.82	4.15	0.68	3.94	0.88	4.90	0.00**
5.	Provide information about items	4.00	0.87	3.94	0.78	**4.02**	0.89	0.55	0.58

	whether available on shelf or Check-out								
6.	Allow me to reserve items online	**3.76**	0.89	3.32	1.12	3.64	1.02	13.40	0.00**
7.	Enable me to search the document easily, quickly & save my time	3.95	0.89	3.83	0.77	3.94	0.93	1.55	0.21
8.	Easily accessible from outside the library building	4.03	0.88	3.87	0.75	3.89	0.97	2.62	0.07
	The OPAC/Web OPAC	31.87	4.77	31.33	4.05	31.28	5.67	1.18	0.31

**Significant at 0.01 level

Table 4.19.3.3.1a shows the satisfaction level of the user with regard to various features of online public access catalogue. Overall non-significant difference was observed in the satisfaction level of the users among selected universities at 0.05 level of significance as the P value is >0.05. Overall the users of all agricultural libraries are satisfied with OPAC/WEBOPAC services provided by their libraries. Significant mean difference was obtained for item no.4 & 6 at 0.01 level of significance and whereas non-significant mean difference was obtained for the remaining items at 0.05 level of significance. PAU users showed more satisfaction for reserving document online through OPAC with mean value 3.76 followed by 3.64 of HPKV and 3.32 of HPU. On the other hand HAU users were more satisfied with accuracy of information provided about material available in library with mean value 4.15 followed by 4.01 of PAU users and 3.94 of HPKV users respectively as shown in figure 4.19.3.3.1a

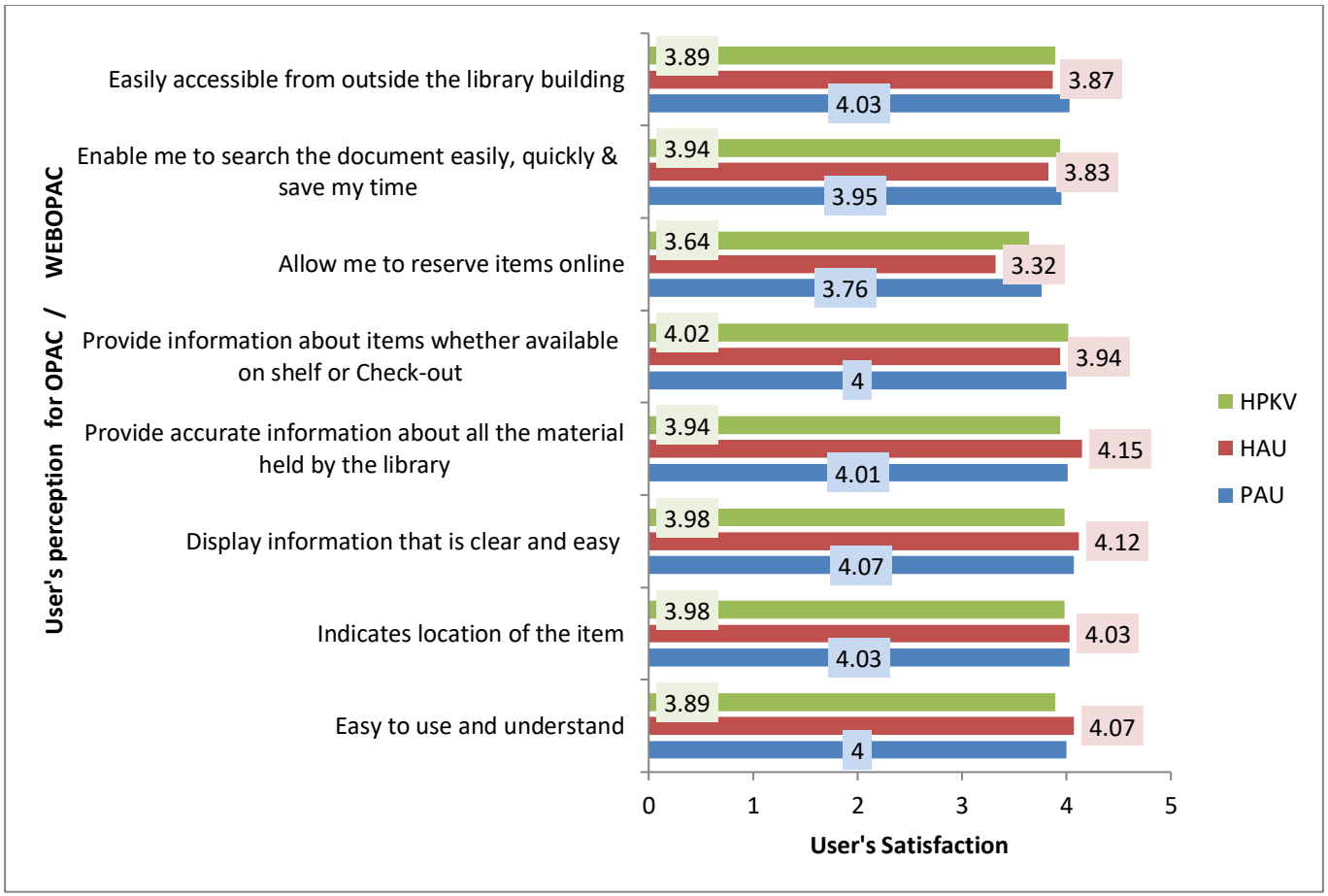

Figure 4.19.3.3.1a Users' satisfaction towards OPAC/WEBOPAC among different universities

Table 4.19.3.3.1b :*Satisfaction withLibrary website among universities*

	Library website	PAU		HAU		HPKV		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
1.	Enables me to log on easily whenever I want, Secure &Safe	4.01	0.85	4.03	0.64	4.00	0.83	0.08	0.93
2.	Has a good layout & attractive	4.00	0.77	4.08	0.62	3.96	0.85	1.65	0.19
3.	Easy to understand and navigate	4.01	0.81	4.08	0.69	3.96	0.90	1.58	0.21
4.	Enables me to interact with staff	3.69	0.91	3.43	1.01	**3.83**	0.99	11.21	0.00**
5.	Enables me to access variety of online resources of the library	3.93	0.85	3.86	0.74	3.90	0.90	0.45	0.64
6.	Enables me to search published literature in my area easily and quickly	3.92	0.81	3.97	0.59	3.93	0.89	0.34	0.71
7.	Provide remote access to resources as per my	3.93	0.85	3.85	0.71	3.92	0.88	0.83	0.43

	convenience of place and time								
8.	Enables me to send request for desired research articles from other libraries	3.87	0.86	3.79	0.74	3.91	0.80	1.42	0.24
9.	Enables me to know about new resources and services of the library	3.87	0.84	3.80	0.73	3.91	0.97	1.19	0.31
10.	Includes online request forms	**3.88**	0.80	3.09	1.05	3.64	1.05	46.88	0.00**
11.	Always provide updated information about library	**4.00**	0.83	3.74	0.76	3.84	0.92	6.40	0.00**
	Library website	**43.15**	6.27	41.72	5.44	42.81	7.34	3.64	0.03*

**Significant at 0.01 level and *Significant at 0.05 level

Table 4.19.3.3.1b represents users' satisfaction with various web site service quality dimensionsamong different agricultural university libraries. Overall significant mean difference was observed for website service quality at 0.05 significance level as the mean value of 4.00 was observed for PAU followed by 42.81 of HPKV users and 41.72 of HPKV users. Significant mean difference was obtained for item 4 i.e. enables me to interact with staff, item 10 i.e. includes online request form and item 11 i.e. provide updated information about library at 0.01 significance level whereas non-significant difference for rest of the items at 0.05 level of significance. From the mean value it is clear that HPKV users are more satisfied with regard to interaction with staff through webpage as the mean value is 3.83 as compared to PAU with mean value 3.69 and 3.43 of HAU users. On the other hand PAU users are more satisfied with availability of request form and updated information about library as the mean values found to be 3.88;4.00 followed by 3.64;3.84 of HPKV users and HPU users found to have mean values 3.09;3.74 respectively as shown in Fig 4.19.3.3.1b

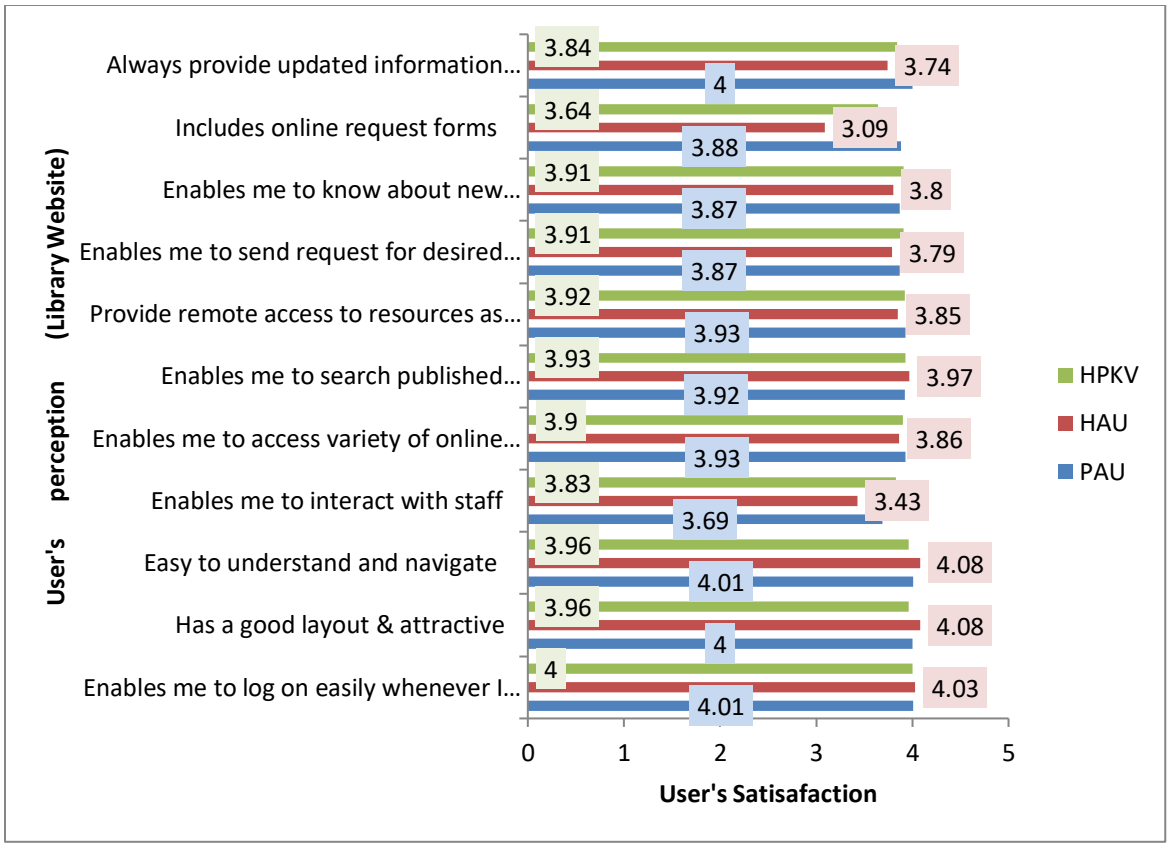

Fig 4.19.3.3.1b: Users' satisfaction with website

4.19.3.3.1c Automated issue-return of documents and Reference Query: Most of the users visit library to get the documents issued from the library. Further references services are there to help the user in finding the required document/information. Since the library services have been automated and data was analyzed to see the satisfaction of the users with automated issue-return of the documents and reference query as under

Table 4.19.3.3.1c : Satisfaction with issues and return of document and getting reference query answer among universities

Name of Items	PAU		HAU		HPKV		F-value	p-value
	Mean	SD	Mean	SD	Mean	SD		
Automated issue/ return	3.68	0.84	4.07	0.71	3.77	0.92	16.12	0.00**

service save my time. I do not have to wait more to borrow library book								
With ICT I do not have to wait more to get assistance from reference desk	3.87	2.04	3.92	0.75	3.74	0.91	1.25	0.29
Issue and return of document	7.57	2.36	7.99	1.31	7.51	1.61	5.61	0.00**

**Significant at 0.01 level

Table 4.19.3.3.1c represents the significance of issues and return of document and getting reference query answer among different agricultural universities. Significant mean difference was obtained for item no.1 (Automated issue/ return service save my time. I do not have to wait more to borrow library book) at 0.01 level, whereas non-significant mean difference was obtained for items no. 2 (With ICT I do not have to wait more to get assistance from reference desk) at 0.05 level. From mean value, it was cleared that HAU users are more satisfied as value found to be 4.07 followed by 3.77 of HPKV users and for PAU users 3.68 mean value was observed. On the other hand mean value for quick reference reply was found to be 3.92 for HAU followed by 3.87 of PAU and 3.74 of HPKV users as shown in Figure 4.19.3.3.1c

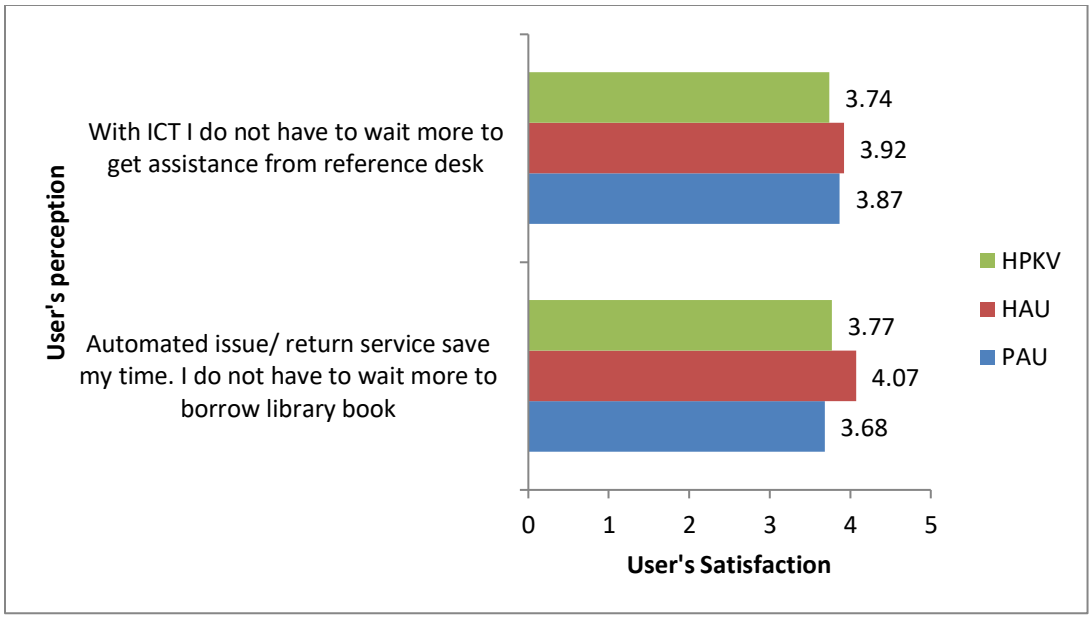

Figure 4.19.3.3.1c : Users' satisfaction towards automated issue/return & reference service among different libraries

Chapter-5

Findings, Conclusion and Suggestions

The research has discussed about the assessment of resources, awareness level and service quality in state agricultural libraries of the universities of Punjab, Haryana and Himachal Pradesh. Service quality is a continuous process which requires patience and implementation of service quality management in any of the academic institution must sustain top level commitments in all the areas. It is a step towards betterment in order to achieve the mission of any organization.

In this chapter, for the present study entitled "Evaluating resources, awareness and service quality in agricultural university libraries of Punjab, Haryana and Himachal Pradesh" significant findings, conclusions, suggestions and recommendations for the future studies have been made. The major objectives of the study were to assess the resources and services of agricultural libraries; to evaluate the role of ICT and competence in providing quality library services; assessing the awareness and users satisfaction with regard to various services of the library. The key findings includes existing status of resources and services of the select agricultural libraries, user's demographic profile, purpose of visit, place of access, source of awareness, media used in accessing library resources, user's involvement in collection, awareness about various library services, source of awareness, user education/literacy programs and its usefulness and Perception towards ICTs in libraries. Further users' satisfaction with library services based on dimensions of performance only measurement scale SERVPERF i.e. Tangibles, Reliability, Responsiveness, Assurance and Empathy have been measured under Peripheral services, Core services and Frontline services. Accordingly, based on the data analyzed in the previous chapter major finding are as under

5.1 Major findings of the study

5.1.1 Library facilities, resources & services: The fundamental task of university library is to provide congenial atmosphere to the readers for study. Further resources and services should be in line with the needs and demands its readers. Thus it is essential for every library to have proper infrastructural facilities in order to provide calm and inviting atmosphere for reading. Infrastructure facilities include proper reading space, adequate seating capacity, comfortable furniture, neat and clean washrooms and other modern facilities. Further university libraries need to develop a collection that is proficient in meeting the changing needs of current and prospective users. Accordingly, library facilities in terms of infrastructure facilities, resources and services of selected agricultural libraries were analyzed to assess their strengths and weaknesses. Significant findings in respect of infrastructure facilities, resources and services are as under

5.1.1.1 Infrastructure facilities: It is apparent from the table 4.1 that adequate infrastructure facilities are available in all the selected agricultural libraries. Findings show that

- Overall PAU library take a lead in providing more infrastructure facilities as compared to HAU and HPKV library.
- Only PAU library provides 24*7 outer reading hall facility for its readers whereas HAU and HPKV library is lacking this facility. Further PAU library also has highestseating capacity as it can accommodate 850 readers as compared to 730 of HAU library and 200 of HPKV library.
- Special reading space for research scholars in the form of research carrel is provided only by PAU and HPKV library whereas this facility is not available in HAU. Therefore researchers of PAU and HPKV can have an edge over HAU in terms personal quite reading space during research.
- All the libraries are equipped with computer &networking facilities and providing computer based services to their users out of the three selected university.

- HAU library provided more number of computer terminals for its users followed by PAU and HPKV library.

5.1.1.2 Library Resources: Library caters to the information needs of its user by providing relevant document or information from the documents available in the library. Library acquires different kinds of documents like books, journals, theses, reports, magazines etc, to fulfill the academic needs of its users. In addition to print resources libraries are also adding electronic documents in their collection.

5.1.1.2.1 Print Resources

- Among all select agricultural libraries PAU library took the lead in total collection size of 4.19 lakh documents followed by 3.75 lakh of HAU whereas HPKV library has only 93 thousand documents.
- Books, Theses and Bound journals constitute the bulk of print collection in all the libraries under study.
- PAU library has highest number of print books and theses among all the agricultural libraries with 265820 books and 41323 theses in its collection whereas HPKV library reported 58703 books and 4833 theses which are lowest among all libraries under study.
- On the other hand PAU library lags among all agricultural universities as far as the current print journal and newspapers are concerned.
- HAU library is the frontrunner in bound journal collection with 105449 bound volumes and current journal subscription with subscription to 221 titles.
- On the other hand HPKV library ahead of PAU in subscribing 115 current titles as compared to only 35 titles by PAU library.
- Further HAU library added highest number of magazines in its collection.
- No library possesses manuscripts in its collection.

5.1.1.2.2 Electronic Resources: In the changing environment electronic resources are becoming integral part of library collection. All agricultural libraries in addition to print resources are also adding wide variety of electronic resources like e-books, e-journals, e-theses, CDs/DVDs and online electronic databases etc.

- HPKV library has taken lead in procuring both electronic journals as well as e-books followed by HAU library whereas PAU library comes at the last in subscription to electronic journals and E-books.
- PAU surpassed both HAU and HPKV library as far as collection of electronic theses and electronic standards are concerned whereas HAU library subscribed to highest of electronic databases in comparison to other two agricultural libraries.
- HAU library lacks e-standards in its collection whereas HPKV library doesn't have CDs/DVDs in its collection whereas PAU managed to enrich its collection both with e-standards as well as CDs/DVDs. PAU library has collection of 6704 CDs/DVDs whereas HAU library added 5694 CDs/DVDs.

5.1.1.2.3 Growth of Information Resources (Year-wise): Library collection grows with addition of different kind of information resources. All the agricultural libraries have added print as well as electronic resources at different point of times during the previous years to meet the information needs of their users. It is clear from the table 4.2.3

- HAU library has shown overall increase in growth of print as well as electronic information resources of the library during previous years. Every agricultural library has added print books in its collection during the previous years.
- Above all HAU has added highest number of print books as well as bound volume of the journal in the library collection in comparison with HPKV and PAU library from the year 2012-13 to 2017-18.
- Further HAU also took lead in subscription to more number of electronic databases CDROM and online as compared to HPKV and PAU library.

- HAU library also reported to have highest number of electronic books which were added to the collection in the previous years.
- Though there is overall decrease in subscription of CDROM and online databases over the years, however HAU library managed to subscribe more no. of CDROM and online databases as compared to PAU and HPKV library
- It is clear from the above that HAU library leads in enriching its collection with addition of more number of print as well as electronic resources.

5.1.1.3 Library Budget: Financial support is important for procuring important resources which are helpful in supporting effective library services. Adequate budget should be allocated to the library in order to fulfill the changing demands its readers. Library budget analysis from 2012-13 to 2017-18 divulge that

- Among all the three selected agricultural libraries HAU library has strong financial support as compared to HPKV library and PAU library.
- Since HAU library had received sufficient budget in the previous years' which had helped it in strengthening and enriching its print and online collection in terms of adding more number of print as well as online resources. HAU library had been able to add more number of print books, back volumes of the print journals, more number of CDROM and Online databases and other resources etc.

5.1.1.4 Collection development: Library is a growing organism so collection development activities involve addition of new documents and weeding out of the documents which are damaged and no more required. Library collection should be adequate and must meet the information needs of the users so user's perception regarding what must be included in the library collection is more important as they are better judge as to what is available and what is required in library. User's involvement in document selection help in building relevant collection that can be helpful in satisfying the needs of the users. Collection development data of agricultural libraries revealed that

- All the select agricultural libraries involve their users with objective of building user centric library collection that can meet the needs and demands of their users .Data with regard to involvement of user in document selection showed significant association as p value <0.01. **Khan and Bhatti (2016)** also reported that participation of users especially Research Scholars and PG students in selection process particularly in the present online era where user's expectation of what can and should be included have been stimulated.
- All the agricultural libraries are member of consortium (CeRA) and central repository to provide access to more number of resources under one umbrella
- Only PAU and HPKV library has developed institutional repository thus have more accessibility to the content as compared to HAU library.

5.1.1.5 Library staff: Library staff is the vital link between user and resources of the library. Adequate staff strength, skilled and qualified staff plays major role in providing effective library services to their users. Data pertaining to library staff revealed that

- Library staff strength is not adequate in all the selected agricultural libraries but staff in all the libraries is professionally qualified and update themselves from time to time through trainings/workshops.
- With regard to present staff strength HAU library take a lead whereas HPKV library has least number of library professional staff. Only HAU library has full time professional librarian whereas other two agricultural libraries are managed by Professor In charge

5.1.1.5.1 Staff trainings*:* Qualified and skilled staff has an impact in providing quality library services to their users. Therefore it is important for university library to provide every opportunity to the library staff in developing their skills through various training/ seminars/conference programs so that they can equip themselves better to satisfy the needs of its users. Data pertaining to human resource development in selectedagricultural libraries during the preceding five year shows that

- HAU library staff members have attended maximum number of training programs followed by PAU library and HPKV library.

5.1.1.5: Agricultural Library Services: With the application of ICTs there is a drastic change in provision of library services to the users. Most of the university libraries are working in hybrid mode and are providing mix of traditional as well as modern library service which includes Lending, Reference, Indexing & Abstracting services, Reprographic services, Current awareness services, User education etc. Data with regard to provision of various agricultural library services reveal that

- All the selected libraries are providing manual as well as computer mediated services to their users. All the agricultural libraries are providing most of the library services manually as well as through use of computers except check-out of library document which is fully automated by HAU and HPKV library whereas PAU library is providing automated as well as also keeping the library card record.
- Further all the libraries have maintained online catalogue of the library collection thus providing automated library document search facility.
- Only HPKV library provide scanning facility to their users.
- All the agricultural libraries also provide interlibrary loan service, new arrivals, property counter and reprographic services whereas book reservation service is provided by PAU and HPKV library.

5.1.1.5.1 Web enabled services:Web technologies have enhanced the provision of information to the users by transforming the mode in which information is offered. The finding revealed that

- All the agricultural libraries under study provide web-based services through 'Library website' developed by all these libraries.

- All the libraries provide internet/intranet services whereas Wi-Fi facility is available in PAU and HPKV library. All the libraries provided access to documents through OPAC/WEBOPAC.
- No library is using web 2.0 tools like library blogs, wikis etc.
- Campus wide access to the electronic resources is available in all select agricultural libraries
- For providing faster service to the user RFID technology is used by all the agricultural libraries under study. CCTV enabled security is provided in all the surveyed agricultural libraries.

5.1.1.5.2 Library automation: All the libraries are providing computer mediated library services to their users. Almost all the libraries have more or less automated their library activities like acquisition, cataloguing, Serial control, Circulation and Reference through the use of library software KOHA. Finding revealed that

- No library has completely automated all its operations
- Circulation, Reference and cataloguing services of the library have been automated by all the selected libraries whereas book procurement activity is only partially automated by PAU library only.
- As far as the Serial control activity HAU library has automated it whereas PAU has done partial automation and HPKV is doing it manually.

5.1.1.5.2.1 E-Reference Service:Technology has helped the librarians to reach out to their users. Various emerging technologies can be used to improve the user experience in getting the information. Data with regard to use of technology in providing reference service showed that

- Email is the only most widely used medium in answering the users' queries by all the selected agricultural libraries.

- No library is using chat, FAQ or Ask a Librarian link service in answering the reference queries of the user.

5.1.1.5.2.2 Current Awareness Service: There are various ways of alerting the user about the newly added resources and services of the library. Study showed that

- Both PAU and HPKV library inform their members about resources by forwarding the list through mail whereas only HAU library provide TOC service to its users.
- List of new arrivals is most common in all the selected libraries whereas information about seminar. Conferences etc. is forwarded through mail to the users by PAU and HAU library.

5.1.1.5.3 User awareness/Education:User education/awareness programs of the library help in better utilization of resources and services of the library by its users. Findings with regard to user education/awareness programs of selected agricultural libraries are as under

- All the selected libraries have well developed facilities like separate room for sharing information with users.
- All the libraries also involve users in publisher products presentations.
- Related tutorials/videos regarding library are made available to the users by both HAU and HPKV library whereas PAU library doesn't provide this facility.
- Orientation lectures and literacy programs are the common used methods for raising the awareness of users by all the libraries.
- On the other hand printed brochures/handbook is made available by PAU library only.
- No library is taking advantage of various web 2.0 tools blogs, facebook and twitter etc. in reaching out to its user for promotion of library services whereas webpage and email used by all the library to share information regarding library.

- Further all the libraries involve every category of users like undergraduate as well as postgraduate students, research scholars and teachers for education/training regarding awareness and use of library resources.
- As far as the total number of user's training programs/activities organized in the preceding years PAU library has taken a lead and organized maximum number of training programs for their users followed by HAU and HPKV library. Moreover PAU library has interacted more with faculty, Research scholars and Postgraduate students as compared to HAU and HPKV library.

5.1.2 Librarian's perception towards ICTs in service improvement: ICT enabled library services are time saving as these help in reducing the time gap between information generation, dissemination and utilization by the end user. Data pertaining to perception of agricultural librarians of selected agricultural libraries towards use of ICT in improvement of library services revealed that

- Out of nine statements under the item ICT & service quality all the librarians of selected agricultural universities were strongly agree to seven statements about improvement the way information is accessed through the use of ICTs . All strongly agree for statements viz. 'Document searching become easier and faster; scientific literature search become easy & fast, Reference service has improved; ICT has enabled access to more number of resources at a time; Convenience of place & time; help to get article from other libraries and Overall library services have improved'
- For the remaining two statements i.e. Issue return service has improved for which PAU library agree with it whereas HAU and HPKV library strongly agree. For the other statement 'Time is considerably saved with ICT' HAUneither agree nor disagree whereas other two libraries PAU and HPKV agree for it.

It is clear from above that librarians of all the agricultural libraries under study have positive perception towards ICTs in library service improvement and consider that ICTs

applications has improved the channels for provision of information to the user thus resulted in meeting the needs of the user in effective manner. These findings are in tune with **Sumaira (2017)**who in her study on university libraries of Delhi and Jammu region also reported that ICT has resulted in effective, efficient, dynamic and improved library services.

5.1.3: Users' assessment of library usage, awareness, perception towards library resources and services

Users' surveys nowadays are found to be the most reliable methods in library settings to identify shortcomings as they are the actual consumers of the service which can provide better picture thus are helpful in improving the services of the library. It is the awareness and usage of resources which is of paramount importance not the number of documents in the library. The present section revealed important findings about library usage, library awareness and perception of the users' toward various library services of selectedagricultural university libraries. The findings are as under

5.1.3.1:Gender-wise distribution of users:Users' population constitute 49 % male and 51% female participants.

5.1.3.2 Category-wise distribution: The total users' population sample of 801 respondents constitute 399 postgraduate students, 159 research scholars and 243 teachers

5.1.3.3 Library Membership: Out of the total surveyed population it is revealed that most of the user population around 93% of the user population has taken the membership of library whereas very few percentages around 7% are the non-members.

5.1.3.3a Library Membership-University-wise:For university-wise analysis of library membership showed signification association at 0.01 level of significance for library membership among different agricultural universities under study as the p value <0.01. Findings revealed that maximum usersof HAU 98.5% possess library membership followed by 94% of HPKV library and 86.2% of PAU library respectively.

5.1.3.3b Library use pattern: The findings related to duration of use, frequency of use, place of access, frequency of using library webpage, media used in accessing electronic resources etc. among selected agricultural universities have been discussed as under

5.1.3.3c : Duration of Use: Overall analysis : To know for how long the users are using the library data has been analyzed and it was found that out of 801 respondents 315 users are using the library for more than two years followed by 202 users who are using for two years whereas 162 users are using the library for one year. Some of the users say 122 have also been found using library for last six months.

5.1.3.3d: Duration of use- University-wise:To know the duration of use by the users of different agricultural libraries data revealed that

- Almost equal number of users reported using the library for more than two years which is 107 users of HAU followed by 106 users of HPKV and 102 users of PAU.
- The number of users using the library for last two years is also reported higher by HAU library which is 79 followed by 65 of PAU and 58 of HPKV library.
- 67 users of PAU library responded that they are using the library for the last one year followed by 58 of HAU and 37 users of HPKV.
- As far as the number of users using library for last six months is concerned it is 66 HPKV library users who responded for it followed by PAU with 33 users and 23 of HAU library.

5.1.3.4 Frequency of use: In the digital era in addition to print resources users have access to number of other electronic resources to fulfill their information requirements. Findings of the study divulge details pertaining to frequency of visit overall and university wise as under

5.1.3.4a: Frequency of use: Overall Users' population data has been analyzed to see how frequently the users are visiting the library. The findings are as under

- Majority of the user population around 31.42% visiting twice a week followed by 25.91% users visiting once a week whereas 14.77 % of the users visiting once in fortnight and 11% daily visiting as per their information requirements. 16.90% of the target users' population rarely visits the library which can be attributed to online availability of resources.

5.1.3.4b: Frequency of use-University-wise:

- Findings related to frequency of library use by the users of selected agricultural universities revealed that majority of the users of HPKV library around 43.1 % daily visit their library followed by 30% of HAU and 14.1% of PAU users.
- On the other hand HAU users reported maximum number of users around 61% who visited library once or twice a week whereas most of the PAU users around 34% reported for visiting their library fortnightly or rarely as compared to very few users say 10% of HAU and 15% of HPKV respectively. It can be attributed to availability and dependency on online resources by the users of PAU library.

5.1.3.4 Frequency of using webpage: In the digital environment libraries are providing access to online resources through its webpage. Various online resources are available to the users of modern agricultural libraries. In addition to print resources users also access these online resources through library portal to fulfill their information needs. Data was analyzed to know how often the users of selected libraries access the online resources which showed

- Significant association (Chi-square=36.7,$p<0.01$) among universities at 0.01 level of significance among universities was found.
- Majority of user access websites once a week (27.9%) followed by twice a week (27.1%), rarely (19.7%) and once in fortnight (17.5%) in PAU. In HAU (40.8%) users access twice a week, (27.3%) once a week , (11.2%) once in fortnight , (12%) dailyand (8.6%) rarely followed by HPKV library users with twice in

week (26.2%), once a week(22.1%), once in fortnight (15.4%), daily(14.2%) and rarely (22.1%).

- Findings revealed that majority of user access the website twice a week in HAU (40.8%) followed by PAU (27.1%) and HPU (26.2%) respectively.

5.1.3.5 Library awareness: For effective utilization of library resources user should be aware about it. User education and literacy program is one of the important activities carried out by the library to increase the user's awareness about various resources and services of the library. Findings about awareness of resources and services among different agricultural libraries showed significant association at 0.01 level of significance as $p<0.01$. Majority of the users of selected agricultural libraries are well aware of resources and service of their libraries. Majority of HAU users 94.4 % followed by 87.3% of HPKV and 81.8% of PAU library responded that they are well aware about their libraries which showed that all the libraries put sincere efforts for effective utilization of their resources.

5.1.3.5.1: Source of awareness:

- Findings of the study showed significanceof association (Chi-square=580, $p<0.01$) among universities at 0.01 level of significance for source of awareness about resources of the library among universities.
- For most of the users of HAU it is library staff which made them aware about resources and services followed by PAU users whereas in case of HPKV library faculty/colleague/Friend was the main source of awareness for majority of the users.
- Web page of the library also provides latest information about library activities. It was found that users of all agricultural libraries also accessed webpage of their respective library to get the information about library. 37.5 % of HAU users followed by 34.1% HPKV s and 33.1% of PAU accessed the library website to enhance their awareness about library.

5.1.3.6 Use of Library: With the use of ICT it has become possible to get the information without physically visiting the library. Users can fulfill their information needs by making use of various online resources. So it is essential to know the way users are using the library.

- Findings of the study showed significant association for use of resources and services (Chi-square =49.8, $p<0.01$) among universities at 0.01 level of significance.
- Most of the users (78.2 %) of HAU library prefer to use library by personally visiting the library as well as online through library website followed by PAU users (66.2%) and HPKV users (64.4%)

5.1.3.7Place of accessing the electronic resources: Information communication technologies have enabled access to information overcoing the place and time barrier. User can know access the library resources any time and from anywhere. Networking technologies have enabled campus wide access to library resources which can be access anywhere. Further remote access technologies have allowed access from anywhere. So it is significant to know the user preference for accessing the information.

- Data was analyzed and findings of the study showed significantassociation (Chi-square =23.6, $p<0.01$) among universities at 0.01 level of significance for access of online resources of the library among universities.
- In PAU the most of users preferred their department followed by library and hostel is the third preferred spot whereas in HAU library is the most preferred place followed by department, hostel and residence. Similarly in HPKV library is most preferred followed by departments and hostels.

5.1.3.8 Media used for accessing electronic resources: Various types of media devices from desktop to smart phones can be used foraccessingonline resources of the library. Any device like Desktop, Laptops, Tablets and mobile can be used to as per the convenience of the user. Bring Your Own Device **(BYOD)** concept in the libraries has

resulted in increased use of laptop, tablets and mobiles for accessing online resources of the library. Libraries are also providing dedicated computer terminals for accessing the online information.

- Findings of the study revealed significance of association for media device used for accessing online resources of library among universities. User showed significant (Chi-square =65.1, $p<0.01$) association for use of media in accessing online resources among universities at 0.01 level of significance. Laptop is found the most preferred device by PAU and HPKV users whereas most of the HAU users use desktop in accessing the information from electronic resources. Mobile phones are the second most preferred media used in PAU whereas it is laptop by HAU users and desktop by HPKV users. Both HAU and HPKV users prefer less to use mobile for accessing library resources as compared to PAU users.

5.1.3.9 Source of awareness about newly added resources: User awareness about newly added resources and services of the library results in its better utilization by the user which is ultimate aim of any library.

- Significant association (Chi-square =103.8, $p<0.01$) at 0.01 level of significancewas found about awareness of newly added resources among different agricultural universities. Most users of PAU and HPKV library use library webpage for new updates whereas it is through the library staff of HAU information is provided. Email is also the preferred method for updating their users by PAU as compared to HAU and HPKV library.

5.1.3.10 User education/awareness/literacy programs: User education/awareness/literacy programs help the users to learn about various intricacies of information storage and retrieval so that they can search the required information of their own and become independent learners. Data was analyzed with regard to its usefulness and impact on the knowledge of user.

- Findings of the study revealed that most of the users of selected agricultural libraries have attended the user education/awareness/literacy programs of the library.
- The significant association (Chi-square =23.8, $p<0.01$) was found for usefulness of the awareness/orientation/training literacy programs at 0.01 level of significance.
- Majority of the users of all the libraries found the program informative and useful.
- To know the impact of user education program on the knowledge of users data was analyzed which showed non-significant association (Chi-square =12.2, $p>0.05$). Majority of the users (62.1%) from HAU responded for enhancement in the knowledge followed by (56.9%) and (53.8%) users of PAU and HPKV library respectively.

5.1.3.10 Awareness of various library services among users of different agricultural libraries:

Library provides varied kind of services to its users and the utilization of the service depends upon the awareness level of user as well as its usefulness. Findings about awareness of different library services among select agricultural universities reveal significant association for awareness about11 service items out of 17 mentioned under ' Services of library'. Significant association was found for Internet/Wi-Fi services; Online catalogue OPAC/WEBOPAC; Issue-Return of book; Reservation of Book; Website of library; Online resources/services; Online Theses/Dissertation KRISHIKOSH; Online journals CeRA; Online E-books; Blog,Wi-Ki, Podcast; and Mobile based access to resources as the $p<0.01$

Internet/Wi-Fi facility showed significant association (Chi-square value=9.24,$p<0.01$) at 0.01 level of significance. Majority of the users' of selected agricultural libraries are aware of Internet/Wi-FI service. HAU users are more aware about Internet/Wi-Fi facility of the university as compared to HPKV and PAU

Online catalogue OPAC/WEBOPAC: Catalogue is the most basic service provided by university library and catalogue of almost all the libraries are accessible on Intranet/Internet through computer as (OPAC)/WEBOPAC which showed significant association (Chi-square value=15.53,$p<0.01$) at 0.01 level of significance. Most of the HAU users are aware of OPAC/WEBOPAC followed by HPKV and PAU users.

Issue-Return of books: Every library loan out documents for certain period of time to the user for study. It is one of the basic services of library for which significant association (Chi-square value=27,$p<0.01$) at 0.01 level of significance was found about its awareness among users of different agricultural libraries. HAU users are more aware followed by HPKV and PAU users respectively.

Reservation of book: Book reservation facility is provided to the library user for those documents which are less and are in demand. This facility showed significant association (Chi-square value=14.93,$p<0.01$) at 0.01 level of significance for which PAU users are more aware followed by HPKV and HAU users respectively.

Reissue of book:Findings revealed non-significant association (Chi-square value=1.47,$p>0.05$) at 0.05 level of significance among different universities for awareness about reissue of book service.

Reference books: Reference collection of the library is generally referred to get some specific information which can be general or subject specific. Agricultural library possess different kinds of reference documents like Encyclopedia, yearbooks, handbooks, atlases etc. Data was analyzed to know the user awareness about reference collection among users of select agricultural libraries which revealed non-significant association (Chi-square value=5.80,$p>0.05$) at 0.05 level of significance. Around (57.7%) HPKV users are aware about reference documents followed by (50.9%) of PAU and (49.8%) of HAU users respectively.

Website of Library: Information about library, its resources and services is accessible electronically through webpage nowadays. Electronic resources of the library can be accessed to get the desired information. Users awareness about library website showed significant association (Chi-square value=32.73,$p<0.01$) at 0.01 level of significance. It was found that 93.6 % HAU users know about library website of their university followed by (78.7%) of HPKV and (76.6%) of PAU users respectively.

Online resources/Services: Various online resources and services are available to the user through online platform library webpage for providing quick and relevant information. Findings revealed significant association (Chi-square value=14.99,$p<0.01$) at 0.01 level of significance. for awareness of the users among different agricultural universities about online resources/services with (83.1%) HAU users are aware followed by (72.5%) of PAU and (69.3%) of HAU users respectively.

Online Theses & Dissertation (KRISHIKOSH): All the agricultural universities are providing access to online theses through central repository KRISHIKOSH database. All the selected agricultural libraries are member of KRISHIKOSH and are uploading their research work on the portal. Findings for awareness about KRISHIKOSH among users of different agricultural libraries showed significant association (Chi-square value=38.53, $p<0.01$) at 0.01 level of significance with (89.1%) users of HAU library are aware about KRISHIKOSH followed by (71.7%) users of PAU and (68.2%) of HPKV library.

Online/E-journals (CeRA):Access to electronic journals through consortia has given new directions to scientific research. CeRA consortium provides access to wide variety of electronic journals in the field of agriculture & allied areas. Awareness about online journals among the users of selected agricultural libraries showedsignificant association (Chi-square value=70.92, $p<0.01$) at 0.01 level of significance where (88.8%) of HAU users are aware of CeRA followed by (67.8%) of HPKV and (56.1%) of PAU.

Interlibrary loan/DDR service: ILL/DDR service showednon-significant association (Chi-square value=3.03, $p>0.05$) at 0.05 level of significance. Less number of users are

aware of interlibrary loan/DDR service. It was found that 31.1 % users of HPKV are aware about ILL/DDR service followed by PAU (27.9%) and HAU (24.3%) users respectively.

Online books: In addition to print books full text electronic/e-books are also available. Awareness about e-books among the users of different agricultural libraries showed significant association libraries (Chi-square value=7.27, $p<0.01$) at 0.01 level of significancefor which HAU (61.8%) users responded followed by PAU (55%) and HPKV (49.1%) respectively.

Digital collection/Institutional repository: Formore visibility of institutional research output universities are now making their publications available to wider community through institutional repositories. Findings with regard to awareness about institutional repositories among users of agricultural libraries show non-significant association (Chi-square value=2.08, $p>0.05$) at 0.05 level of significance where (37.5 %) HAU users showed their awareness followed by (36%) HPKV and (31.5%) PAU users respectively.

Blogs, Wikis, Podcasts etc.: Significant association (Chi-square value=17.61, $p<0.01$) at 0.01 level of significance among the users of select agricultural libraries were found for awareness about blog, wikis, podcast etc.

Open Access resources: There are number of open access resources which are available for free under fair use policy. Researchers have unrestricted access to the scholarly content which can be used to fulfill their research needs. . Awareness of agricultural users of selected agricultural librariesshowed non-significant association about open access resources (Chi-square value=4.72, $p>0.05$) at 0.05 level of significance.

Mobile based accessed: Smart phones have enabled to access library resources anytime anywhere. . Awareness about mobile based access to resources of agricultural libraries showedsignificant association (Chi-square value=16.84, $p<0.01$) at 0.01 level of significance where (39.4%) PAU users showed awareness for it followed by HPKV users (26.6%) and HAU users (24.7%) respectively.

5.1.3.11 ICT and Service Quality: With the features like fast searching and easy access to electronic information irrespective of time and place has influenced the way library services are offered. It is perceived that library services have improved with the use of information communication technologies.

- Findings of the study revealed significant difference for eight items and non-significant for remaining items under ICT & Service quality. Significant difference were found for items 'Document searching become easy; scientific literature search become easy & fast; issue-return become fast ; Reference service improved; Time saving; access to more no. of resources ; use of library resources as per convenience of place, time; Overall library services have remarkably improved at 0.01 and 0.05 level of significance
- Non-significant difference was found for items 'ICT help me to update and inform in my research area; help me to get articles from other libraries; help me to know about new resources and services quickly'.
- Overall significant mean difference was observed for all the items under ICT & service quality at 0.01 level of significance. Overall highest mean value of 45.73 for all the items under ICT & service quality was reported by HAU library users followed by the users of HPKV library with mean value 43.46 and 42.49 by PAU library which showed that HAU users more positively perceived for improvement in library service with the use of information communication technologies. Highest mean values for allthe items werealso reported by HAU library

5.1.3.12 Users' satisfaction with library services: Performance of the library can judged through satisfaction levels of the user. The level of service quality can be very good to very poor as per the satisfaction level of the user from highly satisfied to highly dissatisfied. If the user is highly satisfied then it can be inferred that service quality is very good. Likewise if user is highly dissatisfied then we can say that say that service quality is very poor. So the satisfaction level can determine the perception of user towards library service quality. Library service have been categorized as Peripheral, Core

and Frontline services covering all the dimensions of service quality like Tangibility, Reliability, Responsiveness, Assurance and empathy of SERVPERF scale. In addition satisfaction level with e-services covering OPAC and website service quality covering dimensions navigation, access, communication, and security were measured to assess the e-service quality. To ease the description rating on five point scale which can be matched with performance scale of 0%-100%, where 0%-20% = Very poor, 21%-40%=Poor, 41%-60%=Average, 61%-80%=Good and 81%-100%=Very good

Peripheral services: Statements of service quality under tangibles dimensions of SERVPERF scale have been modified and are included under peripheral services of the library in present study to measure the user's satisfaction with physical facilities like library building, location, working hours, lightening,ventilation, cooling facilities, comfortable furniture, directional signs, drinking water facility, washrooms, Lift/Ramp, seating capacity etc.Eight statements under peripheral services cover various physical facilities of the library.

Overall satisfaction with peripheral services among agricultural universities

- Findings of the study revealed overall non-significant difference as (P-value>0.05) at 0.05 level of significance for peripheral services among different agricultural libraries which was found to be 0.10.
- Overall peripheral services are found to be **'Good'** by all universities however significant difference was found for some of the items.
- Among the selected universities significant difference was found for item 1'Modular building, easily accessible, attractive lay out & flexible working hours' ;item 2'Good Lightning, Ventilation, cooling & heating facilities; item 5 'Fresh & clean drinking water' and item 7 'Lift/Ramp facility under peripheral services.
- Users of HPKV library were found to be more satisfied with library building, layout working hours, lightening, ventilation, cooling and heating facilities of their library whereas HAU users show more satisfaction for civic amenities like

drinking water, neat & clean washrooms facility and PAU users were more satisfied with lift/Ramp facility.

Item-wise satisfaction with peripheral servicesamong agricultural universities

- Users of PAU library are satisfied with most of the tangible items of service quality listed under peripheral services of library. Among peripheral services users showed highest satisfaction for comfortable furniture, silent space and safety; followed by seating capacity; directional signs; modular, easy accessible and ventilated building.. User showed little less satisfaction for neat clean washrooms and fresh drinking water in comparison to other elements . Service quality found to be '**Good'** for all the items under peripheral services of library as the mean value is comes out to be 4.0
- User of HAU library are satisfied with most of the tangible items listed under peripheral service as the mean for all item is more than 3 except for lift facility. Among the peripheral services highest satisfaction was shown for clean drinking water facility followed by clean comfortable furniture, silent reading space, safety; seating capacity; Good lightening ventilation ,cooling, heating; modular building, accessible, flexible hours and neat washrooms. Users are dissatisfied with lift facility of the library. So service quality is found to be 'Good' for all the items except lift facility which is found to be **'Average'**
- Users of HPKV library seem to be most satisfied with the peripheral services of the library as the overall mean is found to be highest for it. HPKV users showed highest mean for modular building, accessibility, flexible hours of library ; clean comfortable furniture, silent space, safety followed by ventilation, cooling, heating facility; directional signs; fresh drinking water; neat washroom. Users showed little less satisfaction for lift facility as compared to other elements of peripheral services. Service quality found to be **'Good'** for most of the items under peripheral services and found to be **'Very Good'** for "Modular building,

layout design & flexible working hours; as well as for comfortable furniture, space for silent reading and personal safety.

- Among all agricultural libraries HPKV users are more satisfied with modular building, easily accessible, attractive lay out & flexible working hours; Good Lightning, Ventilation, cooling & heating facilities, clean, comfortable furniture, space for silent reading, personal safety; provide directional signs which are clear & helpful and seating space/ capacity whereas HAU users showed more satisfaction for basic amenities fresh clean drinking water, neat and clean washrooms among select agricultural universities. PAU users showed more satisfaction only for lift facility as compared to other universities and service found to be **'Good'**

Library Equipment: Library provides photocopy facility to the user to get xerox copy of the information from the library document in case required by the library user. Further for digital services of the library like electronic access to catalogue and other electronic resources easy availability of computer terminals should be there.So, In order to provide effective library services to the users all library equipment should be in proper working order.

- Significant mean difference was observed for both the items at 0.01 level of significance.
- HPKV users are found to be more satisfied both with photocopy service as well as availability of working computer terminals as compared to HAU and HPKV library.
- Photocopier service found to be 'Very Good'in HPKV library whereas it is 'Good' in PAU and HAU library. On the other hand for computer terminal availability it is found to be 'Good' in all agricultural libraries under study.
- HAU users seems more satisfied with availability of computer terminals in their library as compared to PAU library whereas in case of photocopy service PAU users are found to be little more satisfied than HAU users.

Core Services: The main aim of every university library is to provide the relevant information to their users to fulfill their academic needs through the provision of resources of the library including print and online resources managed by the skilled workforce of the library. So the easy availability and accessibility of information is important for effective library services to the users. It is therefore essential to measure the satisfaction level of users with regard to adequacy, relevance, currency, variety and accessibility of library resources as well as the response and behavior of library staff

User's satisfaction with library resources: Overall and Item-wise findings

- Overall findings of the study revealed non-significant difference among the users of different selected agricultural universities for satisfaction towards print resources as P value is 0.22 which non-significant at 0.05 level of significance.
- Further non-significant difference was observed for all the items under print resources except for item 8 'New books are helpfully displayed' which showed significant difference among different agricultural universities as P value < 0.01.
- Regarding print resource adequacy found to be 'Good' as 80% of users of all universities are satisfied.
- With regard to relevance of print resources in meeting their course curriculum needs it is found to be 'Average" for PAU and HAU users whereas it is 'Good' for HPKV users.
- Users of PAU library found to be more satisfied with acquiring of library documents as per their needs as compared to HAU and HPKV users. The mean value found to be 4.16 so it is reported 'Very Good' for PAU and 'Average' for other two libraries.
- Regarding collection of reference books and currencyof information sources it is found to be 'Average' for all the universities as the mean is reported less than 4.0
- For browsing and easy access of print resources PAU users are most satisfied as mean value is found to be 4.10. It is 'Excellent' for PAU and 'Average' for other libraries.

- Proper shelving and re-shelving of library documents service reported to be 'Very Good' for HAU library and for the rest of the libraries found to be 'Average'.
- Library makes the user aware about new documents by displaying it in proper manner for which PAU users are most satisfied and this service is 'Very Good' whereas it is reported 'Average' for both HAU and HPKV library
- Users of the library sometime may not find the required document on shelve due to some reason. Users of PAU library found to be more satisfied with regard to information about its status provided by the library as compared to other two libraries. It is rated 'Good' for PAU and 'Average' for HPKV library and HAU library.

Users' satisfaction with knowledge, skills, behavior and attitude of library staff:

Overall and Item-wise findings

Library staff acts as a conduit for user and the required information thus play an important role in providing effective services to the users. Their knowledge, skill and behavior significantly influence the environment in which the service is provided to the user which ultimately affects the user's perception towards library service quality. Library staff response to user's query involves their responsiveness and attention in answering the query up to the level of user satisfaction.

- Finding of the study revealed overall significant difference for library staff services as P value<0.01. The overall mean for satisfaction of the user with the services rendered by the library staff found to be highest for HAU followed by PAU and HPKV users respectively. Thus overall findings the study showed that services provided by the staff of HAU library are superior as compared to that by the staff of PAU and HPKV library.
- All the items under library staff showed significant difference except for item 10 'Make me feel that I can depend on the library staff for fulfilling my needs' and

item 11'Knowledgeable & updated to provide best services as per my needs' as P>0.06 which greater at 0.05 level of significance.

Item-wise findings:

- HAU library staff found to be available and approachable more during need as reported by their users in comparison to response of the users of PAU and HPKV users for their staff. It is rated as **'Very Good'** for HAU followed by **'Good'** for HPKV and PAU library.
- Most of the users of all agricultural libraries are highly satisfied with the way they are treated by their library staff. Behavior and attitude of library staff towards the user is rated **'Very Good'** for all agricultural libraries as mean for all found to be more than 4.0. Staff is found to be more polite in HAU library followed by HAU and PAU library.

- As far as the knowledge in identifying the required source it is found to be better by HAU staff as compared to other two libraries and rated 'Very Good' whereas it is 'Good' for PAU and HPKV staff.
- Users' of HAU are also more satisfied with resolving of most of their queries by the library staff whereas users' of PAU and HPKV are little less satisfied with it. The service was found to be 'Very Good' for both HAU and PAU where as it is 'Good' for HPKV library.
- With regard to responsiveness dimension i.e. promptness, sincerity and interest in providing service to the userit was found to be 'Very Good' for HAU library 'Good' for PAU and HPKV library as the users of HAU library were found to be more satisfied for it in comparison to the users of PAU and HPKV library.
- Library users prefer to visit the library if they are attended in personal sympathetic way. It is therefore necessary to understand the user's emotions. HAU library staff took lead among all agricultural universities in mean score

calculated for the empathy dimension followed by PAU and HPKV staff. It is 'Very Good' for HAU and 'Average' for the other two libraries.

- Users depend on library to get the required information for which they want assurance from the library staff their information requirements. Response received for assurance dimension of service quality was highest from HAU library users followed by Pau and HPKV library users. It was found 'Good' for all the three library .
- Staff knowledge, skills and ability in using technology for providing information services considerably affect user's satisfaction and perception towards library services. It is therefore essential for the library staff to upgrade their knowledge and skills from time to time in providing effective services to their users. Staff of HAU library found to be more updated and knowledgeable as compared to PAU and HPKV library. It is found 'Very good' in case of HAU followed by 'Good' for PAU and HPKV library.
- Technology has significantly influenced the way library services are provided to the users. Further there is change in seeking the information by the users as they require pinpointed, accurate and quick information irrespective of place and time. So in this changed scenario it is very essential for the library staff to be technological proficient in meeting the information requirements of present day users. They must upgrade their technological skills with the ongoing technological developments. All the agricultural libraries are providing computer based online services for which users of PAU find library staff technologically more competent in handling the queries followed by HAU and HPKV library. Technical skills found to be 'Good' for PAU, HAU and HPKV library.
- User education programs of the library aim to raise the awareness of user and help in proper utilization of library resources. Findings revealed that users of PAU library were more satisfied with user education activities of the library followed by users of HPKV and HAU library. Further PAU users were also found to be

more satisfied for the knowledge and confidence they gained through these programs as compared to other two libraries. User education/Literacy programs of all the selected libraries were rated 'Good' as the mean score was 4.0 for PAU library and between 3.0 & 4.0 for other libraries.

User's Satisfaction with Frontline Services: User interacts with the reference staff in order to get assistance for required document/information and go to circulation counter for issue of document. Furthermore user access online services from thecomputer terminals available in the digital and reference area of the library which include OPAC/WEBOPAC, Webpage of library, Digital reference services. Automated issue return of library documents, digital reference and online services all these bundle of services constitute frontline services for which user satisfaction was measured. E-service quality dimensions like Navigation, Ease of use, Security, Communication and Access were measured for e-services.

User's satisfaction with OPAC/WEBOPAC services: OPAC help in searching the library documents therefore its various features like user friendliness, ease of use, information about library documents, quick searching and accessibility affect the user's satisfaction which ultimately influence user perception towards online public access catalogue services.

- **Overall findings** of the study revealed non –significant difference towards OPAC/WEBOPAC services among selected agricultural libraries as value of P>0.05. The overall OPAC/WEBOPAC services were found to be 'Good' for all libraries. The overall mean value for all the items for satisfaction towards OPAC/WEBOPAC services was found to be more for PAU followed by HAU and HPKV library.
- **Item-wise findings** for OPAC/WEBOPAC: Findings of the study showed non-significant difference for all the items under OPAC/WEBOPAC services except for **item 4** 'Provide accurate information about all the material held by the library'

and **item 6** 'Allow me to reserve items online' for which significant difference was observed among agricultural universities at 0.01 level of significance.

- As far as the ease of use and understanding of OPAC it is found 'Good' by the users of HAU , PAU and HPKV users . Users of all the libraries found their catalogue 'Good 'for indicating the location of an item available in the library
- For accuracy of information about library records HAU user found to be more satisfied as compared to PAU and HPKV users and the record accuracy is 'Very good ' for HAU, 'Good' in case of PAU and HPKV library.
- Ability of OPAC in providing the status of items it is HPKV library users which are most satisfied followed by PAU and HAU users. The service found to be 'Good' for HPKV, PAU and HAU library.
- Regarding online reservation of library documents through OPAC users of PAU library showed more satisfaction followed by HPKV and HAU users but the service is found to be 'Good' for all the three libraries.
- Similarly for easy, quick search and time saving feature of OPAC, PAU users were found to be more satisfied than HPKV and HAU users. The service was found to be 'Good' for all universities.
- Users want to access the catalogue any time anywhere outside the library for which most of the PAU users showed their satisfaction followed by HPKV and HAU users. It is found to be 'Good' for all the libraries.

User's satisfaction with website: Website is found to be the most common medium for getting the information. Almost all the universities have developed their web page for providing access to scholarly information through various electronic resources like e-journals, e-books, e-theses, e-databases etc. of the library. It is thus important for every user to understand and navigate through the ocean of information available at the webpage of library. It is also equally important for library staff to make user feel secure while accessing information and provide help at the time of need. Library staff through their information literacy programs helps the users to become independent learners. So in

order to determine the e-service quality it is essential to assess the satisfaction of the user with various dimensions like Easy navigation, Attractive design,Security, Access and Communication.

Overall findings: for users' satisfaction for Library website

- Findings of the study revealed significant difference for overall satisfaction towards library website among the users of different agricultural libraries as P value is less at 0.05 level of significance. Overall users of PAU library showed more satisfaction for the items listed under library website followed by users of HPKV and HAU library. Overall service with regard to use of library website found to be 'Very Good' for all selected agricultural libraries.

Item-wise analysis: for users' satisfaction for Library website

- Non-significant difference was observed for all the items except item 4 'Enables me to interact with staff'; item 10' Includes online request forms' and item 11'Always provide updated information about library' which showed significant difference.
- Users of HPKV library are found to be more satisfied with communication with staff as they show more satisfaction for their interaction with staff as compared to HAU and PAU library. It is rated 'Good' for all the libraries.
- On the other hand for updated library information and for availability of online request form PAU library satisfy their user more as compare to HPKV and HAU library. The service is found 'Good" for updated information of library as well as for online request forms in all the libraries.
- For logging and security features all the users are more or less equally satisfied and service found to be 'Good' for all libraries.
- HAU users found their library website more attractive and easy to navigate as mean value for satisfaction is more as compared to PAU and HPKV users. It is found 'Good' for all agricultural libraries.

- The mean value for access to information found to be more for PAU library followed HAU and HPKV library. The service was found to be 'Good' for all the libraries.
- For quick and easy searching of published literature HAU library user are little more satisfied as compared to HPKV and PAU library and service is rated 'Good' for all libraries.
- For remote access facility users of PAU show more satisfaction followed by HPKV and HAU library. As the mean score is less than 4 for all libraries therefore this service is rated 'Good".
- With regard to online availability of article service from other libraries and information about new services HPKV library users showed more satisfaction and services found to be 'Good' among all agricultural libraries.

User's satisfaction with automated issue-return and Reference service: Library services like issue-return of library documents/ Reference service have improved with the use of technology. Perception of the user among different agricultural libraries as under

- Findings of the study revealed significant mean difference for automated issue return service and non- significant difference for reference service among different agricultural universities.
- HAU users were found to be most satisfied with automated issue-return service as well as reference service whereas HPKV library user show more satisfaction for issues return service than PAU library users and PAU library users are more satisfied with digital reference service as compared with HPKV library. Both the services rated 'Good' as the mean value is found to be less than equal to 4.

5.1.4 Testing of Hypotheses:

Ha_1: The resources and services differ on the basis of financial resources available with university libraries.

Tables 4.3.3 shows year-wise growth of information resources during the previous years (2012-2018) among the selected agricultural libraries. It is apparent that the year-wise growth of information resources is better by HAU library as compared to other two libraries. HAU library added highest number of print books and journals to its collection as compared to PAU and HPKV library. Further HAU library also managed to add good number of electronic resources like e-books, e-journals and CD-RM databases to its collection in comparison to other two libraries. Thus collection of HAU library got richer with more number and variety of resources during the previous selected years. Further Table 4.4 depict the financial support to the library during the previous years which clearly indicate that HAU library is financially most sound among all selected agricultural libraries. It is clear from figure 4.4 that HAU library has received highest amount of budget which enabled it to add more number of information resources in the library as compared to two other libraries. Though no particular statistical test is applicable on it still we can infer from the findings that financial support has helped to strengthen infrastructure in terms of avaibility of resources print as well as electronic resourcesand services of HAU library. Therefore for quality education and effective library services it is important for every government and funding agency to provide sufficient funds to the library in meeting the needs and demands of the users. Library adds as per priority and availability of funds. It can be inferred that financial support is important for effectively managing the resources and services of university libraries. Sohypothesis resources and servcies differe on the basis of financial resources avaible with university libraries is accepted

Ha_2: The competencies of human resources play significant role in providing quality services

Staff of library plays an important role by bringing together user and his desired document/information which ultimately depend on the knowledge and skills of the workforce. Adequate library staff along with the necessary skills and competencies is essential to meet the expectations of the users. It is therefore necessary for the library to

have professionally qualified staff who should upgrade their knowledge and skills with the changing environmentin order to provide effective library services to the users. Staff strength is not adequate in all the agricultural libraries. The staff of all the libraries is professionally qualified and has attended conference/seminar/trainings to upgrade their knowledge. Table 4.5.2 depicts that the staff of HAU library attended maximum number of training programs followed by PAU and HPKV library. . Table 4.25.3.2 shows various facets of service quality related to competence, responsiveness, sincerity and politeness of library staff. Table 4.25.3.2 represents the significance of library staff support in providing effective library services. Significant mean difference was found for Items 4, 5, 6 & 13 at 0.01 and whereas difference was non-significant for items 11 & 12 meant for staff competence. The highest mean value was shown by HAU library for items 4 to 6 whereas mean value for item 13 was highest for PAU library among selected agricultural universities. Therefore hypothesis competencies of the staff play significant role in providing quality services is partially accepted

Ha_3: The application of information communication technologies in libraries has enhanced the quality of services and richness of resources.

Table 4.24 represents the significance of ICT & library services among different agricultural universities. . The highest mean value was found for HAU library followed by HPKV and HAU library. Significant mean difference was obtained for all the items under ICT & library services at 0.01 & 0.05 level of significance except three itemswhere non significance difference was found at 0.05 level of significance. Users of all the libraries showed positive perception for information communication technologies application in enchacing the quality of services. Therefore the hypothesis the application of information communication technologies in libraries has enhanced the quality of services and richness of resources is accepted.

$H0_4$: There is no difference in the awareness among the users' of different agricultural university libraries

Table 4.23 depicts difference in awareness of library services among agricultural universities.

Internet net/Wi-Fi services showed significant association (Chi-square value=9.24,p<0.01) at 0.01 level of significance. HAU (95.1%) showed more awareness than HPKV (90.6%) and PAU (87.7%) respectively.**Online catalogue OPAC/ WEBOPAC** showed significant association (Chi-square value=15.53,p<0.01) at 0.01 level of significance.HAU (91.8%) showed more awareness than HPKV(87.6%) and PAU (80.3%) respectively.**Issue/Return book** showed significant association (Chi-square value=27,p<0.01) at 0.01 level of significance. HAU (97%) showed more awareness than HPKV (89.9%) and PAU (83.6%) respectively.**Reservation of books** showed significant association (Chi-square value =14.93,p<0.01) at 0.01 level of significance. PAU (47.2%) showed more awareness than HPKV (44.6%) and PAU (31.8%) respectively.**Reissue books** showed non-significant association (Chi-square value=1.47, p>0.05) at 0.05 level of significance. **Reference books**showed non-significant association (Chi-square value=5.80,p>0.05) at 0.05 level of significance. **Web site of Library showed** significant association (Chi-square value=32.73,p<0.01) at 0.01 level of significance. HAU (93.6%) showed more awareness than HPKV (78.7%) and PAU (76.6%) respectively.**Online resources/services** showed significant association (Chi-square value=14.99, p<0.01) at 0.01 level of significance. HAU (83.1%) showed more awareness than PAU (72.5%) and HPKV (69.3%) respectively.**Online Thesis& Dissertation/E-thesis**(ETD) showed significant association (Chi-square value=38.53, p<0.01) at 0.01 level of significance. HAU (89.1%) showed more awareness than PAU (71.7%) and HPKV (68.2%) respectively.**Online/E-journals** databaseshowed significant association (Chi-square value=70.92, p<0.01) at 0.01 level of significance. HAU (88.8%) showed more awareness than HPKV (67.8%) and PAU (56.1%) respectively.**Interlibrary loan/Docum**ent delivery services showed non-significant association (Chi-square value=3.03, p>0.05) at 0.05 level of significance. **Online books/E-books**showed significant association (Chi-square value=8.76, p<0.01) at 0.01

level of significance for which HAU (61.8%) showed more awareness than PAU (55%) and HPKV (49.1%) respectively.**Online abstracting/indexing database** search showed non-significant association (Chi-square value=7.27, p>0.05) at 0.05 level of significance. **Digital collection (Institutional repository of articles, thesis, reports etc showed** non-significant association (Chi-square value=2.08, p>0.05) at 0.05 level of significance. **Blogs, wiki, Podcast, Vodcastetc based services for awareness and access** showed significant association (Chi-square value=17.61, p<0.01) at 0.01 level of significance. PAU (23.4%) showed more awareness than HPKV (15.7%) and HAU

From above the hypothesis that there is no difference in the awareness among the users' of different agricultural university libraries is rejected

$H0_5$: There is no difference in the satisfaction level among the users' of different agricultural university libraries.

Satisfaction level of users among different agricultural libraries was measured for peripheral, core and frontline services of the library.

Out of eight items under peripheral services significant mean difference was observed for four items (1,2,5,7) and non-significant difference for rest of the items (3,4,6,8). The overall Peripheral services showed non-significant mean difference (F=2.30, p>0.05) at 0.05 level of significance.

Out of nine items for print material under core services non-significant difference was found for all the items except item 8. Overall library print material showed non-significant mean difference at 0.05 level of significance. For library equipment significant difference was obtained for one item and non-significant difference for the other item under library equipment.

Out of fifteen items under library staff significant mean difference was observed for ten items whereas non-significant difference was observed for other five items. Overall library staff support showed significant mean difference at 0.01 level of significance.

Out of eight items for OPAC/WEBOPAC under frontline services non-significant difference was observed for six items whereas significant difference was observed for two items other two items. Overall non-significant difference was observed at 0.05 level of significance for OPAC/WEBOPAC under frontline services

Out of eleven items for web site services of the library non-significant mean difference was observed for four items at 0.01 and 0.05 level of significance whereas significant difference was observed for other four items. Overall significant difference was observed for satisfaction of users towards library website services. So the hypothesis there ***is no difference in the satisfaction level among the users' of different agricultural university libraries was rejected.***

5.1.5 Conclusion:

All the agricultural libraries have modular infrastructure and equipped with modern amenities as well as sufficient resources and services. PAU library take lead in availability of infrastructure facilities to the user among all agricultural libraries. Only PAU library provides 24*7 reading hall facilities whereas personal reading space in the form of research carrel is provided by both PAU and HPKV library whereas HAU library lacks these facilities.

All libraries are running in hybrid mode and procuring print as well as online resources to satisfy the information requirements of their users. Majority of the print resources constitute books, bound journal and Theses/Dissertations in all the libraries. All the libraries under study have wide variety of electronic resources also including online journals or e-journals, e-books, e-theses, e-standards, CD-ROM and online databases. HAU library subscribed to highest number of print journals as well as CDROM databases among agricultural universities whereas PAU library has highest number of electronic theses in its collection. PAU library is offering more ICT based services whereas HAU is providing less number of services among the selected agricultural universities. The users of PAU as well HPKV library have freedom to access the required information anywhere

in the campus or outside whereas HAU library has not extended this facility to its users. Only PAU library has developed institutional repository to have better control over institutional publications. No library is exploiting web 2.0 technologies like blogs, wikis, Podcasts etc. for making library services more users centric.

All the libraries have enriched its collection over the years with addition of print as well as online resources. Though there is variation but overall HAU library has added maximum number of books, journals and CDROM/Online databases in its collection owing to strong financial support to the library in comparison other two universities under study. All the libraries involve their users in document selection for making library collection more user centric. Furthermore all the libraries are member of CeRA consortium and Krishikosh repository of ICAR. All the libraries have professionally qualified staff and attend training programs to update their knowledge and skills but all the librarians feel that the staff strength is not adequate.

All the agricultural libraries provide mix of traditional as well as online services to the users. Though there is variation in extent to which the automated library services are provided to the users. All the selected libraries are providing automated circulation and cataloguing services whereas serial control and acquisition services are not fully automated. All the libraries are providing most of theweb enabled services through webpage which are accessible campus wide accessible as well as outside in PAU and HPKV library only whereas remote access facility is not available in HAU library. No library is exploiting web 2.0 tools in promoting and publicizing their services. All the libraries have installed CCTV cameras for better surveillance and security of the library.

Among the computer based reference service email is the most commonly used method whereas for current awareness list of new arrival is forwarded for the information of users. No library is providing FAQ, Ask a librarian link service. All the libraries have developed facilities to carry out user education activities and conduct user orientation

/literacy programs for their users. Web 2.0 tools like blogs, wikis, twitter, facebook are not being used by any library for promotional activities of the library.

All the librarians as well as users of the different agricultural libraries have positive perception towards service improvement in libraries through the use of information communication technologies.

Users' population constitute 49% male and 51% females. Majority of the users of all the libraries are using library by personally visiting the library as well as accessing the services through webpage of the library.

Majority of the users' population is aware about resources and services of their libraries though there is variation in awareness with respect to certain services. There is also variation among users population for the source of awareness. HPKV users responded less for library staff in raising their awareness towards library services. In addition to the library access to electronic resources of the library is also extended to departments and as well as hostel by all the agricultural universities for which majority of PAU library users preferred department/hostel whereas library is the preferred place for accessing electronic resources in other two libraries. Different media device like desktop, laptop, mobiles, tablets etc. are being used by the users of all libraries for assessing the resources of the library.

Majority of the users' of all the selected agricultural libraries found user education programs informative and useful and their knowledge has enhanced. Most of the users' of all selected agricultural libraries showed their awareness for the services offered by their libraries though there is variation in awareness towards different services among different libraries. Low awareness was observed for services like interlibrary loan/DDR, Institutional repository, open access resources and mobile based services of the library among all agricultural universities.

Overall peripheral services of the library are found to be 'Good' for all the libraries. Users of PAU library users are less satisfied with civic amenities like drinking water facility, washrooms whereas these service are better in HAU library but are less satisfied for lift facility of the library and it is found 'Average'. On the other hand HPKV user showed highest satisfaction for most of the peripheral services and service found to be 'Good'. For the library service equipment like photocopier, computers etc. users of HPKV library are most satisfied and photocopy service found 'Very Good' and for computers it is 'Good'. HAU users are least satisfied with photocopy service and PAU users are least satisfied for availability of computer terminals.

Core services:

Overall highest mean was observed for item Print resources under core services among the users of PAU library and service found to be 'Good' as users are highly satisfied to Satisfied for all the items. Users of all the libraries satisfied with print collection of their libraries. PAU users are more satisfied for acquisition of resources as per their needs as compare to HAU and HPKV library. For books browsing facility PAU library users show more satisfaction whereas HPKV library users are less satisfied. Regarding status of book not found on shelf users of PAU library are most satisfied and HPKV library users are least satisfied. For shelving and re-shelving of library documents HAU users most satisfied and PAU users are least satisfied. For item Library resources in term of adequacy, relevance, currency, accessibility and status under Core Services of library it is found to be 'Good' for all the agricultural libraries.

Overall highest mean was observed for item Library Staff under core services for the users of HAU library. Users for HAU library are most satisfied with attitude, behaviour and response of the staff in rendering library services. Overall services found to be 'Very Good' for HAU library and 'Good' for PAU and HPKV library. Users of HAU library are highly satisfied to Satisfied for Reliability, Responsiveness, Empathy, competence of the staff whereas for user education activity they showed less satisfaction as compared to

PAU library and HPKV library. Users of HPKV library are least satisfied for most of the items under library staff of Core services.

Overall highest mean for the item OPAC/WEBOPAC under frontline services was observed for PAU library. Users of PAU are more satisfied with OPAC/WEBOPAC services of the library followed by users of HAU and HPKV. Service is 'GOOD' for all the libraries. For the item ease of use and understanding, for location of item in OPAC, HPKV users showed less satisfaction as compared to PAU and HAU users and service was found to be 'Good' for them. For accuracy of information again HPKV users are less satisfied whereas HAU users are most satisfied. Service was found to be 'Very good' for HAU library 'Good' for PAU and HPKV library. With Online reservation facility of OPAC, PAU users are most satisfied and HAU users are least satisfied. For remote access feature users of PAU seems to be more satisfied and HAU users are least satisfied. Service is found 'Good' for PAU all the agricultural libraries.

Overall highest mean value for the item Web site service quality under core services was found to be highest for PAU library and lowest for HAU library. HPKV users are most satisfied for Interaction with staff feature of website as compared to HAU and PAU library though the service is rated 'Good' for all libraries. PAU library update their information on catalogue more quickly and users showed more satisfaction for it as compared to HAU and HPKV library. HAU users are more satisfied with 'Ease of use and navigation facility of their website whereas HPKV are least satisfied for it. Website service quality found to be 'Good' for all the agricultural libraries.

For automated issue-return and reference services users of HAU were most satisfied with issue return whereas for reference services HPKV users found to be more satisfied. Both the services found to be 'Good' for all libraries.

5.1.6 Suggestions:

1. Out of the all selected agricultural universities only PAU library provides 24*7 reading hall facilities which make it distinct from other libraries. As the users find library quiet and comfortable place for study which can affect the user's perception towards service quality so efforts should be made in this direction by HAU and HPKV library also. Further personal reading space is also available for the users in PAU and HPKV library whereas HAU lack it. HAU library should also think towards strengthening this facility for its users.
2. To fulfil the research needs all the agricultural libraries should make provision for availability of journal articles in print or online medium. Though availability of online journals through consortium has helped in providing access to more number of journals still PAU library lags far behind HAU and HPKV library as far as the current print journal subscription is concerned. So to strengthen the research activities of the university library authorities of PAU should make every effort to strengthen its print journal collection.
3. Financial support is important for acquiring different resources to meet the academic and research needs of library users. Effective library services can be provided through provision of document/information available in the library. Library being service providing organization can't run of its own so sufficient funds should be allocated by the funding agencies and government agencies for procurement of resources.
4. Institutional repositories (IR) provide more visibility to the content hosted by an institution. They are fast evolving platform for displaying institutional output thus users have better opportunity to publish and share their work. HAU library should also develop institutional repository for their users.
5. It is essential for the library to have adequate strength for providing efficient services to the users. All the librarians of selected agricultural libraries feel that staff strength is less so university authorities should pay attention towards

recruiting more technically qualified library staff for providing optimum services to the users.

6. No library is making use of Web 2.0 tools to reach out to its users which is very important in promotion and publicizing of library services. So all the agricultural libraries should exploit the emerging web technologies to catch the attention of reader in this digital era.
7. No library is using FAQ/ Ask a Librarian link, chat boot services etc. in resolving reference .queries. These services influence the perception of user towards library thus all the selected libraries should make efforts to provide reference services in more interesting way through the use of technology.
8. As tutorials and videos about library are very helpful in sharing the information so PAU library should also develop virtual tours and related video in educating the user about library.
9. Web 2.0 tools like Blog, Facebook, twitter are mostly widely used nowadays which are helpful in reaching out to the user in disseminating information about library products and services. Since no agricultural library is taking its full advantage of it to show its presence so it is suggested for all the libraries to develop their blog, facebook page, twitter page to keep the user informed about library.
10. Though most of the users' have taken membership and few are not members. So all the libraries should find out more ways for non-members to become members of the library.
11. HAU users showed more awareness for library services as compared to HPKV and PAU users. It is therefore imperative for HPKV and PAU library to put more efforts for raising the library awareness through various user contact methods.
12. Most of the HPKV library users responded for less awareness about the library from the library staff as compared to HAU and HPKV library. It is suggested for HPKV library to have collaborative programs with the faculty for more interaction with the students and faculty.

13. Though library staff make every effort to inform the user still with the use of technology information can be reached quickly and easily. As most of the HAU users depend on library staff for new updates about library whereas library webpage is nowadays is faster way to get the latest information quickly. Efforts should be made by HAU library to keep the webpage updated, attractive and accessible to its users for quick exchange of latest information.
14. HAU library lacks remote access facility which is provided by the other two libraries. Users nowadays want access anytime and anywhere in this digital era which ultimately influence the user's perception towards library. So HAU library should also provide remote access facility to their users.
15. As services can be improved with the use of technology so all the library staff members should learn the skills and make use of emerging technologies from time to time for providing quality services to the users.
16. Web page of the library is common contact point for accessing the library information so it is essential for every library to keep updated information about the resources and services of the library.
17. Low awareness was observed for some of the services like ILL/DDR, Institutional repository, and open access resources among all agricultural libraries. Since the concept of institutional repositories and open access resources is new emerging so special programs may be organized by the libraries for more awareness and use of these services. Further related videos can made available for the information of the user.
18. All the agricultural libraries need to make some improvements in their infrastructure facilities to achieve more satisfaction of the users with regard to peripheral services. PAU library must pay more attention towards provision of better civic amenities whereas HAU library should strive to provide 24*7 reading hall as well as research carrel facility to their users. Further HAU users are less satisfied with photocopy and lift service which need attention on the other hand

PAU library need to pay attention towards availability of working computer terminals for the users.

19. HAU and HPKV library need involve their users more in selection and acquisition of library documents. Further staff of both the libraries needs to work for helpful display of library documents as well as for informing the user about status of document. PAU library need to pay more attention for quick re-shelving of the library documents as compared to other two libraries. Library staff of HPKV and PAU library needs to pay more attention for responsiveness, reliability, assurance and empathy dimensions to achieve more user satisfaction. HAU library and HPKV library need to improve their user education activities for more user satisfaction. Library staff of HPKV should work more among all the agricultural libraries on all the dimensions of library staff like responsiveness, reliability, assurance, empathy and competence to achieve more user satisfaction.
20. In order for more satisfaction towards e-services there is strong need to educate HPKV users by the staff of HPKV library. More training programs for use of OPAC should be organized by the library. Further users are least satisfied with accuracy of information in catalogue for which library authority should pay attention towards accuracy of library records. HAU library authorities should make efforts for providing remote access facility to their users in order to access library records anytime anywhere.
21. As staff support is important in online access of resources so both HAU and PAU library should pay more attention in this area whereas with regard to easy navigation and understanding HPKV library staff need to involve their users more for its better understanding and use. With regard to updated library information both HAU and HPKV library need to work for it. Further there is need for both the libraries to make sure the availability of online request form of the library on library website.

5.1.7 Recommendations for future studies:

In the present study resources, awareness and service quality was evaluated in state agricultural universities of Punjab, Haryana and Himachal Pradesh. Perception only measurement scales SERVPERF scale was used to assess the service quality in selected agricultural libraries. In India no study using SERVPERF scale has been carried out to assess the service quality of agricultural libraries so there is vast scope to research the service quality of different libraries.

Future research may be conducted on other libraries of India.

Further gender wise and category wise research to know the differences can be conducted to know the user perception towards service quality.

Further study may be carried out using qualitative methods.

Further research may be carries out to know the difference among different academic disciplines.

Checking the validity of SERVPERF instrument can be further subject of study.

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APPENDIX-I

Questionnaire for Librarians

(A) General Information :

Name of the Library: Year of establishment:

Email: URL:

Total no. of working days in year _____ Working hours :In Summer :
In winter:
On holidays :

(B) Infrastructure facilities

Q.1Total covered area of library _____ Seating capacity_____

Total no. of computer terminals_____ (a) for Staff_____ (b) for users_____

Q.2 Please tick [√] "Y/N" in the relevant box for the library facilities available and furnish the relevant information

Sl.	Library facilities		Y	N	Sl.	Library facilities	Y	N
i	Separate building				ii	Clean and calm environment for study		
iii	Air-conditioning facility				iv	24X7 reading hall facility, If Y then specify its seating capacity		
v	Power back-up facility				vi	Any special facility for Research students/Teachers		
vii	Drinking water and washroom facilities				viii	CCTV surveillance		
ix	Network connectivity for providing ICT based services. If Y then tick type of network connection.	Dialup			x	Network bandwidth Please specify_____		
		Broadband						
		VPN						
		Any other(Pl. specify)						
xi	Lift /Ramp facilities				xii	Any other(Pl. Specify)		

(C) Library Collection: Please furnish the information about library collection

Total collection of the library:

Q.1 Please furnish the information about print resources.

Library documents	**no.**	**Library documents**	**no.**	**Library documents**	**no.**
Books		Current journals		Manuscripts	
Theses/Dissertations		Magazines		Any other(Pl. specify)	
Bound Journals		Newspapers			

Q.2 Please furnish the information about electronic resources.

E- Resource(s)		**no.**	**E- Resource(s)**	**no.**	**E- Resource(s)**		**no.**
E-journals	Subscribed		E-Standards		Databases	CDROM	
						Online	
E-books			CDs/DVDs		Any other(Pl. Specify)		
E-Theses			Microfilms/Microfiche				

Q.3 Please tick [√]"Y/N" in the box and furnish the required information.

Sl.	**Collection development**			**Y**	**N**	**Sl.**	**Collection development**			**Y**	**N**
i	Has the Library any written book selection policy					ii	Does library consider the user's opinion in building library collection				
iii	Has the Library any weeding out policy					iv	Is your library member of any journal consortium. If Yes, Pl. tick and specify the total no. of journals available	Consortium	No. of journals		
								CeRA			
								UGC-Infonet			
								INDEST			
								Any other (Pl. Specify)			
v	Is your Library member of any electronic theses respository(ETD	Repository	Total records			vi	Has library developed any institutional repository? If Y then please specify (a) Total no. of records_____ (b) Software used (Pl tick)				
		Shodganga									
		Krishikosh									

	) If Yes Pl. tick and specify the total no. of records available	Shodsindhu					(i) Dspace (ii) GSDL (iii) Eprints (ii) Any other		
		Any other (Pl.Specify)							

Q.4 Please specify the information for the document(s) acquired by library during the preceding years:

Library Resources (Total no.)		**Year(s)**					
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Books	Print						
	E-books						
Journals	Print						
	E-journal						
Database(s)	CD-ROM						
	Online						
Any other							

Q.5 Please state expenditure of the library during the preceding years.

Year	**Total Library budget(in Rs.)**				
	Information resources		Equipment/Maintenance etc.	Any other (RFID, Digitization etc.)	Total
	Print	Electronic			
2012-13					
2013-14					
2014-15					
2015-16					
2016-17					
2017-18					

Q.6 Please specify the finance assistance (In Rs.) received during the preceding years.

Financial source	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**
State Govt.						
UGC/ICAR						
Univ. resources						
Any other						

(D) Library staff, services and user awareness

D.1 Library Staff : Please furnish the information about library staff.

Q.1 Please mention the staff strength along with qualification and experience in the library.

Professional	**no.**	**Qualification & Experience**	**Semi-professional**	**no.**	**Qualification & Experience**	**Supporting Staff**	**Qualification & Experience**	
Librarian			Professional assistant(s)			Sr. Astt,		
Deputy Librarian(s)			Senior Lib. Assistant(s)			JrAstt		
Assistant Librarian(s)			Jr. Lib assistant(s)			Clerks		
Information Scientist(s)			Library attendant(s)			Sweepers		
Any other			Any other			Security/Chow--kidar		

Q.2 Please tick [√]"Y/N" for the statements regarding library staff.

	Library staff	**Y**	**N**
(a)	Do you feel that present staff strength is adequate		
(b)	Do all the technical staff is professionally qualified		
(c)	Do all the technical staff attend seminars/Workshop/Training in-house or outside etc regularly to update their knowledge		

Q.3 Please specify total no. of seminar/workshop/training etc. attended by the staff during the preceding years

Designation	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-2018**

D.2 <u>Usage of library & Services</u>:

Q.1 Please specify the total no. of Library members_____

Library Member(s)	**Category**	**Number**
Teachers/Scientists or Equivalent	Professors or Equivalent	
	Associate professors or equivalent	
	Assistant Professors or equivalent	
Research Scholars		
PG Students		

Q.2 Loan privilege to the member(s)

Category	**No. of books**	**Loan period**
Teachers/Scientist/ Faculty		
Research Scholars		
PG students		

Q.3Please tick [√]"Y/N" for the user library services provided in your library.

	Service(s)		**Y**	**N**
(a)	Does library provide reference service	*Electronic*		
		Manual		
(b)	Does library provide current awareness service(CAS)	*Electronic*		
		Manual		
(c)	Does library provide selective dissemination of information (SDI)	*Electronic*		
		Manual		
(d)	Does library provide abstracting & indexing services	*Electronic*		
		Manual		
(e)	Does the library provide Check-in-check out of books	*Electronic*		
		Manual		
(f)	Does the library provide book reservation facility for the user	*Electronic*		

		Manual		
(g)	Does the library facilitate the user with reissue of book	*Electronic*		
		Manual		
(h)	Does the library provide Interlibrary loan/Document delivery Service			
	Does the library provide Reprographic/Xerox services	Owned		
		Outsourced		
(i)	Does the library provide scanning of document facility for the user			
(j)	Does the library provide property counter facility			
(k)	Does the library inform the user about new arrivals	Electronic		
		Manual		
(l)	Does the library display notices, admission news and other information on the board			
(m)	Does the library provide book bank facility			
(n)	Does the library hold promotional activities of its products & services If Yes Pl tick[√] the method(s)	Library bulletin/Brochures		
		Display/Poster in the library		
		Personal intimation		
		Web based activity		
		Any other(Pl specify)		

Q.4 Pl. Tick [√]"Y/N" for the ICT based services provided in your library.

	ICT Service(s)	**Yes**	**No**
(a)	Does the library provide Internet/Intranet services		
(b)	Has the Library Wi-Fi facility		
(c)	Does the library provide automated library services to the users		
(d)	Does the library provide campus wide access to the electronic resources		
(e)	Does the library provide remote access to electronic resources		
(f)	Has the library developed web page for providing electronic information services		
(g)	Has the library separate section for accessing electronic services		
(h)	Does the library provide OPAC/WEBOPAC facility for the user		
(i)	Does the library make use of social tools like blogs, wiki, mashups etc. to interact with user		
(j)	Does the library generate Bar-codes for the books		
(k)	Has the library RFID security system		

(l)	Has the library self check/checkout facility		
(m)	Does the library provide mobile based services to the users		
(n)	Has the library digitized its collection. If Yes Please specify the type of collection & total no. of records _____		
(0)	Has the library CCTV surveillance facility to help the user		

Q.5 Which of the following library operations are automated/Computerized (Pl. Tick[√])

☐ Acquisition ☐ Cataloguing ☐ Serials ☐ Circulation ☐CAS/SDI ☐ Any other

Q.6 Name of the library management software being used for automation _____

Q.7 If the reference query is provided electronically then tick the method (multiple replies welcome)

☐Email ☐ Chat ☐ Ask a librarian ☐ FAQ ☐Any other (Pl. specify)

Q.8 If current awareness service provided electronically then tick the method (multiple replies welcome)

(a) Forwarding accession list through mail (b) Current content of subscribed journals (c) New arrival lists

(d) Notification about conference seminar through mail (e) Any other(Pl. specify)

D.3 <u>User awareness /Education programs</u>

Q.1 Please give your response for the following statement regarding user education programs

	User education programs	**Yes**	**No**
(a)	Does the library organize orientation/user education program for the users		
(b)	Does the library conduct such programs in separate room		
(c)	Does the library provide tutorials/videos on website to guide the user in using library		
(d)	Does the library organize workshop/training of publishers etc for the users		
(e)	Has the library mechanism to provide its service at users' convenient place		
(f)	Is there any printed booklet/brochure about library for the user		

Q.2 Please tick[√] for following (Multiple replies are welcome).

(a) Which of the following methods are used by the library to keep the library user informed about resources & services of the library?

□ Orientation Lectures □ Handbooks, Brochures □ Social media □Literacy programs Web page Email Any other(Pl. specify)

(b) Which method is used by the library to serve the users at their place?

□ Campus wide access □ Document delivery service □E mail □ By telephone □ Any other

(c) For whom do you conduct regular user awareness programs?

□For PGs & Research Scholars □ For Faculty □ Undergraduates □ Library Staff

(d) What do you do for promoting library products and services?

□ Put information on website □Email announcements □ Put on Library blog

□ Display on the notice board □ Any other(Pl. specify)

Q.3 Please furnish the information for user awareness programs conducted by the library during the last five years.

	Category	no. of Awareness programs
(a)	Postgraduates & Research Scholars	
(b)	Faculty	
(c)	Library staff	
(d)	Undergraduates	

(E) **IT and Service Quality:** Please tick [√] in the appropriate box for the following statement(s) regarding use of ICT in libraries.

(a)	**ICT & Library Service(s)**	**SD**	**D**	**NAD**	**A**	**SA**
(b)	Document searching has become easier and faster with use of ICT					
(c)	Literature search has become easy and fast with use of ICT					
(d)	Issues Return of documents has become faster and time saving with use of ICT					
(e)	Reference service has improved with use of ICT					
(f)	Time is considerably saved with the use of ICT					
(g)	Electronic access to more no. of resources of the library at one time helps in fulfilling the information needs of the users.					

(h)	ICT application facilitate in providing access to library resources as per users' convenience of place, time & format					
(i)	ICT applications in the library enable the staff to help the user in getting the required article or material from other libraries in order to fulfill his/her information needs.					
(j)	ICT has helped in improving the overall services of the library					

SD-Strongly Disagree, **D**-Disagree, **NAD**-Neither agree neither disagree, **A**-Agree **SA**-Strongly Agree

(F) **<u>Barriers in Service Quality</u>:** Please tick[√] in the appropriate box against statement that are presently affecting service quality of your library.

SD-Strongly Disagree ,**D**-Disagree, **NAD**-Neither agree neither disagree, **A**-Agree, **SA**-Strongly Agree

	Factors affecting service quality	**SD**	**D**	**NAD**	**A**	**SA**
(a)	Lack of funds					
(b)	Lack of awareness and knowledge of resources of library on the part of user					
(c)	Lack of support from University Administration					
(d)	Lack of infrastructure facilities					
(e)	Lack of adequate trained staff					
(f)	Library staff resistance to adopt change					
(g)	Any other (Pl. Specify)					

(G) Future plans to further improve the quality of services in the library

Thanks for your kind cooperation.

APPENDIX-II

Questionnaire (For Library users)

Dear Sir/Madam

I am requesting your good self to kindly spare few minutes to fill in this questionnaire on the topic "Evaluating resources, awareness and service quality in state agricultural libraries of Punjab, Haryana and Himachal Pradesh in digital environment. Information provided by you will be kept confidential and will be used for thesis/research purpose only. I solicit your kind co-operation please.

Please tick mark [√] wherever applicable.

(A) General Information

(i) Name (optional): (ii) Gender : M/F (iii) Department:

(ii) Category: **(a)** Teacher or equivalent (Prof /Assoc. Prof./Asstt. Prof) **(b)** Research Scholar **(c)** PG student

(iii) Since how long you are using the library? **a)** 6 months **b)** One year **c)** Two year **d)**More than two years

Q 1. How often do you visit the library?

(a) Daily **(b)** once a week **(c)** Twice a week **(d)** Once in fortnight **(e)** Rarely

(B) Library Awareness & Use(Pl. Tick)

Q 1. Are you member of a library? (**Yes/No**)

Q 2. Are you fully aware about resources and services of the library (**Yes/No**)

Q 3. How often to you access library website.

(a) Daily **(b)** once a week **(c)** Twice a week **(d)** Once in fortnight **(e)** Rarely

Q4. From where did you come to know about resources and services of library? ***(Multiple replies welcome)***

(a) From library staff **(b)**Through faculty/Colleague **(c)** From friend **(d)** From library website.

Q 5. How do you make use of library resources and library services?

(a) By personally visiting the library **(b)** Through Library website **(c)** Both a & b

Q6. From where do you access the online resources of the library? ***(Multiple replies welcome)***

(a) From library premises **(b)** from department **(c)** From hostel **(d)** Any other (Pl. Specify)

Q7. Which of the following media is used in accessing the online resources of the library?

(a) Desktop **(b)** Laptop **(c)** Mobile **(d)** Any other

Q 8. How do you come to know about any newly added resources or services of the library? ***(Multiple replies welcome)***

(a) From library staff **(b)** Library notification on library web page **(c)** E-mail **(d)** Any other (Pl. Specify)

Q9. Have you attended any userawareness/orientation/training/PGS (501) literacy programs etc. of the library? (**Y/N**)

Q10. How you find awareness/ orientation /training/PGS 501 program(s) of the library in fulfilling your research goals?

(a) Highly informative & useful **(b)** Informative & useful **(c)** Somewhat informative & useful **(d)** Not useful

Q 11. What impact library orientation/training program(s) have on your knowledge about information searching?

(a) Considerably enhanced **(b)** Enhanced **(c)** Somewhat enhanced **(d)** No impact

Q12. Which of the following library services you are aware of in fulfilling your academic information needs? (Pl. tick √ in the relevant box under column ***A*** against each service for Awareness about the service)

Sl.	**Library Service(s)**		***A***	**Sl.**	**Library Service(s)**		***A***
I	Internet/Wi-Fi facility			II	Online catalogue OPAC/WEB OPAC		
III	Issue/Return of books			IV	Reservation of books		
V	Reissue of books			VI	Reference services	(a) New Arrival display	
						(b) Provision of documents/articles pertaining to your information needs	
VII	Self-check-in check-out of books			VIII	Web site of library		
IX	Online resources/services			X	Online Theses& Dissertations /E-Theses(ETD)	a)Krishikosh	
						b)Shodganga	
						c)Shodsindhu	
						d)Any other	
XI	Online/E-journals database	a)CeRA		XII	Interlibrary loan/Document delivery Service (Provision of providing article/information from other library if not available in your library)		
		b)UGC-Infonet					
		c)INDEST					
		d)Any other					
XIII	Online books/E-books			XIV	Online Abstracting/Indexing Database search		
XV	Digital collection (Institutional repository of articles, theses, reports etc.)			XVI	Blogs, wiki, Podcast, Vodcast etc. based services for awareness and access		
XVIII	Open access resources			XVI II	Mobile based access to the electronic services		

Q 13. How many hours do you spend in accessing online resources of the library?

(a) 1-2 **(b**) 2-3 **(c)** 3-4 **(d)** More than 4

Q 14. By which methods your references queries are answered by the library staff. ? ***(Multiple replies welcome)***

(a) By visiting at the reference desk **(b)** By mail **(c)** By telephone **(d)** By chat **(e)** Ask a librarian link (f) Any other

Q 15. How library keeps you updated in your teaching/research area. ***(Multiple replies welcome)***

(a) New Arrival display **(b)** Provides table of contents of the journals **(c)** By email

(d) By putting information on library page **(e)** Library blog **(f)**Any other (Pl. specify)

(C) <u>Library Resources</u> (Pl. Tick mark √)

Q 1. Do the library purchase reading material relevant to your course/research needs (**Y/N).**

Q 2. Does the library get requisition from you in selecting the reading material **(Y/N). If Y** then how many of your requisitions during the previous year(s) have been acquired by the library.

(a) All of them **(b)** Half of them **(c)** a few **(d)** None

Q 3. Your opinion about the information resources of your library in meeting your teaching/research needs?

(a) Print & online information resources sufficient
(b) Print resources sufficient but online resources insufficient
(c) Print resources insufficient & online resources sufficient
(**d)** Print & online information resources insufficient.

(D) <u>Information and communication Technologies (ICT) & Library Services</u>(Please Tick mark √)

Q 1. Please give your opinion and tick the appropriate option for the following statement regarding use of ICT in libraries.
SD-Strongly Disagree, **D**-Disagree, **NAD**-Neither agree neither disagree, **A**-Agree, **SA**-Strongly Agree

ICT & library service(s)		**SD**	**D**	**NAD**	**A**	**SA**
a	Document searching has become easier and faster with ICT					
b	Scientific literature search has become easy and fast with ICT					
c	Issues Return of documents has become faster and time saving with ICT					
d	Reference service has improved with use of ICT					
e	Time is considerably saved with the use of ICT					
f	ICT in libraries help me to update and inform in my area of research					
g	Access to more resources at time helps me in fulfilling my research needs.					
h	ICT helps me to use library resources as per my convenience of place, time & format					
i	ICT helps me to get article from other libraries to fulfill my information needs.					
j	ICT helps me to know about new resources and services of the library quickly.					
k	Overall Library services have remarkably improved with the use of ICT					

(E) Library Service Quality and user satisfaction

Q 1. A set of below mentioned statements about features and services of your library. Please share your actual experiences for these features/Services as per your level of satisfaction/dissatisfaction and encircle the corresponding number. If you are highly dissatisfied encircle 1 and encircle 5 if you are highly satisfied against each statement

1= Highly dissatisfied, 2= Dissatisfied, 3=Neither satisfied nor dissatisfied, 4= Satisfied, 5=Highly satisfied

Statement(s)		Scale of responses				
1	**Peripheral Services (*In terms of environment, space, signage etc. I find library*)**					
a	Modular building, easily accessible, attractive lay out & flexible working hours	1	2	3	4	5
b	Good Lightning, Ventilation, cooling & heating facilities	1	2	3	4	5
c	Clean, Comfortable furniture, space for silent reading, personal safety	1	2	3	4	5
d	Provide directional Signs which are clear & helpful	1	2	3	4	5
e	Basic amenities like Fresh & clean drinking water	1	2	3	4	5
f	Neat & clean washrooms	1	2	3	4	5
g	Lift /Ramp facility	1	2	3	4	5
h	Seating space/ capacity	1	2	3	4	5
2	**Core Services(*In terms of library materials, Library equipments, library staff) in my library***					
I	***The library print material***					
a	Adequate print resources like Books, journals, theses, magazines, Newspaper etc.	1	2	3	4	5
b	Course/curriculum supporting resources, meet my teaching/research needs	1	2	3	4	5
c	Library acquire information resources as per user requirements/needs	1	2	3	4	5
d	The resources I get are current and accurate	1	2	3	4	5
e	Handbooks, yearbooks, Encyclopedia and related reference books etc are adequate	1	2	3	4	5
f	Easy to browse ,find and locate books and other print material	1	2	3	4	5
g	Books and other documents shelved and re-shelved properly	1	2	3	4	5
h	New books are helpfully displayed	1	2	3	4	5
i	When I request, I am always informed about the status	1	2	3	4	5
II	***Library Equipments in my library***					
a	Photocopiers are in working order and readily available	1	2	3	4	5
b	Has adequate no. of working and readily available computer terminals	1	2	3	4	5
III	***Library Staff is***					
a	Approachable and available during need	1	2	3	4	5
b	Polite and behave nicely with me	1	2	3	4	5
c	Always willing to help me	1	2	3	4	5
d	Professional and able to find information related to my discipline	1	2	3	4	5
e	Help me to identify the resource I need	1	2	3	4	5
f	Generally able to answer my enquiries	1	2	3	4	5
g	Provide prompt service to me and do it in certain time when promise to do	1	2	3	4	5
h	Put sincere effort and interest in locating the required document/Information	1	2	3	4	5
i	Sympathetic and Attend me in personal way	1	2	3	4	5
j	Make me feel that I can depend on the library staff for fulfilling my needs	1	2	3	4	5
k	Knowledgeable & updated to provide best services as per my needs	1	2	3	4	5
l	Library staff is able to use technology efficiently in fulfilling my needs	1	2	3	4	5
m	Educate me about use of library services	1	2	3	4	5
n	Informative and useful library education programs have helped in fulfilling my information needs in a better way.	1	2	3	4	5
o	Awareness and education programs of library instill confidence in me to use library at my own	1	2	3	4	5
3	**Frontline services (Online catalogue, Library website, Online resources, issues/return and Reference query service etc.)**					
I	***The OPAC/WebOPAC***					
a	Easy to use and understand	1	2	3	4	5

b	Indicates location of the item	1	2	3	4	5
c	Display information that is clear and easy	1	2	3	4	5
d	Provide accurate information about all the material held by the library	1	2	3	4	5
e	Provide information about items whether available on shelf or Checked out	1	2	3	4	5
f	Allow me to reserve items on line	1	2	3	4	5
g	Enable me to search the document easily , quickly & save my time	1	2	3	4	5
h	Easily accessible from outside the library building	1	2	3	4	5
II	***Library website***					
a	Enables me to log on easily whenever I want, Secure &Safe	1	2	3	4	5
b	Has a good layout & attractive	1	2	3	4	5
c	Easy to understand and navigate	1	2	3	4	5
d	Enables me to interact with staff	1	2	3	4	5
e	Enables me to access variety of online resources of the library	1	2	3	4	5
f	Enables me to search published literature in my area easily and quickly	1	2	3	4	5
g	Provide remote access to resources as per my convenience of place and time	1	2	3	4	5
h	Enables me to send request for desired research articles from other libraries	1	2	3	4	5
i	Enables me to know about new resources and services of the library	1	2	3	4	5
j	Includes online request forms	1	2	3	4	5
k	Always provide updated information about library	1	2	3	4	5
III	***Issue/Return of document and Getting Reference query answers***					
a	Automated issue/ return service save my time. I do not have to wait more to borrow library book	1	2	3	4	5
b	With ICT I do not have to wait more to get assistance from reference desk	1	2	3	4	5

Q 1. Which services of the library you like the best?

Q 2. What do you suggest to improve the quality and performance of your library services?

Q 3. Which new service(s) you wish to be provided by your library?

Thanks for your valuable responses