CHAPTER 7

RESEARCH FINDINGS
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Research Findings

7.1 Background

The research findings and interpretations of the study based on data analysed in previous chapters provide a clear insight on nature of infrastructural facilities provided by university libraries and researchers’ perceptions of the impact of internet on library usage in universities in Karnataka. In order to assess the impact of internet on library usage, the investigator obtained valuable feedback from research scholars of humanities, social sciences and science disciplines from six UGC-financed universities in Karnataka. The major findings of the study are presented in this chapter and the hypotheses formulated for this study are also discussed in respective sections of this chapter.

7.2 Infrastructure and Other Facilities Provided for Internet Usage in University Libraries in Karnataka

The infrastructure and other facilities provided by six respondent university libraries for their user community have been discussed in detail in chapter 5 and the details are summarized below,

1. It is observed that all the six respondent university libraries in Karnataka do have a good number of computer terminals in their premises for users. Besides library, the individual departments also have some computers earmarked for researchers.

2. It is found that a majority of terminals are internet enabled with server and UPS back-ups.

3. It is noticed that while five universities have separate internet browsing section within the library, Mangalore University has separate centre for internet access.
iv All six university libraries in the study are in LAN, CAN network environment with the support of network topologies like star and tree

v It is observed that all the universities have 10mbps leased line internet connectivity from BSNL. Only Mangalore University has 20 mbps BB connectivity. The Internet access to researchers is free of cost both in library as well as departments.

vi Only Bangalore and Gulbarga Universities have separate library webpage. Whereas, other libraries detail are displayed as part of their parent institution's home page.

vii It is observed that all the six university libraries are members of 'Infonet' an e-consortium of INFLIBNET. Though Infonet is a central agency for database subscription for its members, the access to databases varies from university to university based on some parameters like departments etc.

viii. Though the universities are free to subscribe other databases, there was no mention of other databases subscribed by these libraries.

ix All the Universities are engaged in imparting training/orientation programs for their users.

x. All the university libraries have automated their transactions using commercial library software like NewGenLib, LibSys, SOUL and SLIM. As the software is different, the housekeeping modules also vary.

xi. The book collection ranges from 95,000 to 4,35,000 books and the journal subscriptions range from 280 to 450. The bound back volumes range from 5,385 to 50,000. The Karnataka University library has the depository collection from the World Bank and IMF Publications.
7.3 Respondent Researchers' Brief Profile and Demographic Characteristics

Of 1468 research scholars spread across three broad disciplines namely Science, social science and humanities in six universities, the study received 1077 responses resulting in 73.36% response rate. The 1077 response population includes 731 from science followed by social sciences 228 and 118 humanities disciplines. The similar ratio was noticed in target population too. About 80.00% of respondents are in the age group of 20-30 years.

It is noticed that 42.15% of the research scholars were in the initial stage of their research followed by 32.49% of them in the advance stage and 25.36% in the completion stage of research. It is also observed that researchers in initial stage are more in science discipline (43.77%) as compared to Humanities discipline (33.89%). The spread is even in advanced and final stages of research across three disciplines. (Tables 6.6)

Preference of Information Channels: It is observed from the Table 6.7 that Internet has emerged as primary channel of information search followed by university library, friends and colleagues, teachers and experts, own collection and visit to other library in that order of importance.

_Hypotheses 1: The research scholars prefer to use Internet more as compared to library or other channels of information._

The Hypothesis is sustained in this study as it ranked first in the preferences indicated by research scholars. The rankings of various channels of information preferred by research scholars mentioned in Table 6.7 clearly shows internet as primary channel of information as compared to other channels of information like library, friends and colleagues.
Further, it is observed that the percentage of internet users is very high (89.19%) as compared to the same in Humanities (55.93%). The library as main channel is preferred more by social science researchers (62.71%) as compared to their counterpart in Science discipline (51.29%). The preference to have own collection is high in humanities (44.91%) as compared to science discipline (30.64%).

This also highlights that the emergence and advancement of ICT, particularly internet, is challenging and diminishing the long existing notion of library as the unique channel/source of information provision. In other words, the internet has made it as one of the channels.

**Stages of Research:** It is observed that 3/4th of the researchers are in the initial and advanced stages of their research (42.15% and 32.49% respectively). The remaining 1/4th of them are in the final stages of their research. Further, it may be observed from Table 6.6 that the science researchers are more in initial stages of research (43.77%) as compared to researchers in Humanities (33.89%). The reverse is found to be true in final stages of research.

**Frequency of Library Visit:** The figures illustrated through Figure 6.6 and Table 6.9 highlight that about 31.00% of the researchers are daily visitors followed by another 28.88% who visit the library once in 2-3 days. It is interesting to note that about 1/4th of respondents are occasional visitors.

It's observed that the daily visitors segment contains more social science researchers (39.04%) as compared to science researchers (28.04%). The reverse is true for occasional visitors group to the library. That is the occasional visitors' segment consists more of science researchers than social science researchers. This could be due to the need for their presence in laboratory or field for conduct of experiments related to science research. But they are heavy users of internet.
Frequency of Internet Usage: It is observed that all the respondents use internet for their research activity. Further, it is observed that a majority of them use internet on daily basis (76.79%). The figures showed in Table 6.11 shows that the order of usage is almost uniform across three disciplines. It is noted that the daily internet users are found slightly more in science discipline (78.50%) as compared to other disciplines.

Location of Access to Internet: It is observed from figures presented in Table 6.12 that 69.46% of the respondents' access internet through their respective department in the university followed by access in University library (37.51%), private cyber café (19.60%), hostels/homes (18.95%) and computer/internet centres (18.29%). There is no significant difference in user communities of three disciplines. The provision of internet access beyond library premises indicates the research promotion efforts done by authorities and network capabilities. This also reinforces that accessing internet enabled resources is not limited to the geographical boundaries of libraries or organizations.

Time Spent on Access to Internet: It is observed from Figure 6.8 that in a day, nearly half of the respondents (48.30%) use internet for about 1-2 hours and nearly 1/3 of them (31.60%) use internet for about ½ an hour to 1 hour. About 11.50% of them use internet beyond three hours and about 08.40% of them use for less than 30 minutes. Among researchers who use internet for 1-2 hours, the 66.00% of them are from science discipline followed by 24.00% of them from social science and 10.00% from humanities disciplines.

7.4 Research Scholars’ Skills and Knowledge for Using Internet

Computer Literacy: It is very interesting to note that almost all researchers in response population (96.40%) are aware of know-how of using computers. The trend is found similar across all the disciplines. In other word, almost all research scholars are computer literates.
Familiarity and Mode of Training for Computer Usage: It is observed from Table 6.16 that 60.40% of respondents have undergone some training program for using computer either formally or informally. The respondents who stated they have not undergone any training program expressed that they got familiar with use of computer through their friends and colleagues followed by online tutorials, library manuals and library staff. Friends and colleagues are the major source of guidance for obtaining inputs for computer usage.

Internet Training: Unlike computer training where 60.40% have claimed that they have undergone some training programmes for using computers, it is interesting to note that only 16.40% of respondents claimed that they have undergone some training programs and the remaining 83.60% of them have not undergone any training for using internet. In other words, a majority of them have not undergone any training programme to use internet nor felt any need for the same.

It is observed that more than half of them (52.36%) have banked on their friends and colleagues for leaning the tools and techniques of internet usage. About 44.00% of them do venture to learn by trial and error method and about 36.00% try to learn through online tutorials. It is also interesting to note that about 14.00% of them did undergo formal training programs for effective usage.

7.5 Familiarity with Internet Tools and Techniques

Unlike print materials, use of electronic resources requires some electronic devices like desktops, laptops, mobiles etc and some skills on using them. It also necessitates users to be aware of some search engines, different formats of information accessible in internet.

Computing Devices: It is found that about 90% of the respondents use desktops for their internet search either in library or departments (Table 6.20). Besides, about 30.00% of them are observed using laptops too. Since universities have provided
desktops in their departments and library these laptops must have been owned by individual research scholars The percentage of laptop holders is spread evenly across all the three disciplines

**Awareness of Operating Systems:** Familiarity with any system depends on the nature of system prevailing in the host organisation It is found that all the universities are working in windows environment and five of six universities have Linux server too It is observed that almost all respondents (98 70%) are working in windows environment This could be due to monopolistic, ease of maintenance, self learning and menu driven features embedded in windows platform Linux focuses on text based messages and mainly of use for mail servers However, about 9% of respondents are aware of Linux operating system

**Awareness and Use of Internet Browsers:** Browsing on net requires understanding of some web browsers like Internet Explorer, Netscape Navigator, Opera and Mozilla The response discussed through Table 6 22 highlights that about 92 00% of respondents use IE (Internet Explorer) as their main web browser It is interesting to note that about 50 00% of them are using Mozilla browser too A small percentage of researchers use other browsers also like Netscape navigator (4.30%) and Opera (11 60%) However, there was mention of use of Google chrome and safari browsers but the number is negligible

**Choice of Use of Search Engines:** The respondents indicate Google as their most favorite search engine followed by Yahoo, Alta Vista and MSN search engines (Table 6 23) The search engines are considered in their totality as each search engine has a variety of features. Further, it is found that the ranking pattern was evenly spread across all the disciplines This also indicates that the popular search engines like Google and Yahoo are able to cater to the need of research scholars independent of their disciplines
Awareness and Choice of Formats of Internet Information: Unlike print resources, the e-resources are available in various formats (like PDF, HTML, TXT, DOC and PPT) on websites. It was observed that PDF format is the most favourable format for searching on internet followed by HTML and text format. The security, originality and protection against any modifications are the primary features of PDF format that makes it acceptable by all.

Internet Tools and Services: The features mentioned in Table 6.25 highlights that the most important features or services that users see in internet services are WWW (web links), email provisions, powerful search engines, websites of organizations, downloadable software, news flashes, file transfer tools, web-OPACs, chatting, FAQs, and remote access. Further it is found that

The researchers need the web links of important organisations and resources for access. They require powerful search engines for searching and retrieving the quality materials. They need email and chatting facilities on internet for discussing and exchange of views with colleagues and experts. As many file types require download of special software, the researchers need the provision for the same that too free of cost. They also require FAQs for clarifying any doubt or confusion raised while retrieving a file from internet.

Free or Paid Internet Access: It is observed that about 60.00% of respondents are accessing internet free of cost at university library or department. There are about 40% of researchers who are accessing fee-based internet. The locations could be hostels, residences or cyber café. The cost varies from one service provider to another and from one location to another.

7.6 Purpose of Internet Access

Purpose of Using Internet: The results of this study presented in Table 6.26 show the main purpose of using internet is to 1) search for research related
information, 2) e-journals and databases, 3) finding literature for self publication, 4) to keep abreast of current trends in the field, 5) communicating with friends and experts, 6) to know about seminars/conferences in their field. Reading of e-books, advertisements, career opportunities and newspapers are not in their priority.

It is also found that the ranking order of purposes of internet search appears to be almost similar across all the disciplines indicating a homogeneity in priorities of researchers' community.

**Hypotheses 2:** The main purpose of use of internet by researchers' is to search for research related information and e-journals.

At the outset the hypothesis is sustained. From Table 6.26, it is very clear that among many purposes, the researcher considers their primary purpose of internet as to search for literature related to their field of research and look for e-journals or journal articles in their research area. Related literature and journal articles are invaluable resources available to researchers during their initial and advanced stage of research. Even while writing the thesis, the researchers do refer to journal articles for support of their arguments.

**Type of Electronic Information Resources:** The mean values above 3.4 computed on 5-point scale presented in Table 6.29 reveals that the popular specific resources preferred to be searched by research scholars are e-journals/full text articles, online encyclopedias and electronic theses/dissertations, websites of organizations, e-books and online library catalogues. There are many other specific resources like blogs, maps, newspapers etc. but the response is not encouraging to quote them as popular resources. The infant nature and inadequacy of availability of relevant information in these resources could be one of the factors for less usage.

**Use of UGC-Infonet:** The UGC through infonet is trying to create awareness and promote e-resources among the university teachers and research community. All
the six university libraries considered for the current study are the members of infonet consortia. It is observed that while 53.20% of the respondents expressed their awareness about the existence of the service in their library, the other 46.80% expressed their ignorance about the same. The response pattern is almost similar across all the disciplines.

It is interesting to note that 51% of (Table 6.28) respondents are utilizing the services of infonet provided to them. The usage pattern is almost similar among the researchers of different disciplines. The ignorance of the facility signals lack of promotional efforts to reach the users or lack of resources with the facility provided. It is observed that the infonet has more science related databases as compared to other disciplines. There is need for increasing the resources on social science and humanities disciplines.

7.7 Access Related Problems While Using the Internet

Perception of Adequacy of Internet Facilities: It is observed that 65.46% of respondents do express their happiness about the nature of connectivity in their university library and department. The remaining 34.54% have express that the current system is not adequate enough to cater to their needs. The results shown in Table 6.19 reveal the homogeneity among research scholars' perception of adequacy of internet connectivity in their university. In other words, the percentage of adequacy and inadequacy expressed by total respondents is almost same across all the disciplines highlighting the insignificant difference that exist among user researchers, community.

Hypotheses 3: There is significant difference in the nature of infrastructure facility for internet access among university libraries.

The hypothesis is not sustained by this study as about 2/3rd of researchers opined that the internet connectivity in their university is good. However, the
remaining 1/3rd of respondents expressed the existing inadequacy, which cannot be ignored. On examination of infrastructural facilities provided by individual universities it is observed that while five universities have 10mbps internet connectivity in their campus, one university has upgraded it to 20mbps connectivity. Further, the equipments used for networking also have some impact on connectivity. It is observed that four universities are still using switches for LAN connectivity and two universities are using Hub for the same. Normally networks connected through hub work faster as compared to switch technology.

Though the hypothesis is supported in this study, it signals to the authorities to focus on meeting the needs of significant number of dissatisfied respondents.

**Access Related Problems:** Though the adequacy impression is placed on internet connectivity by researchers, they indicated several problems while accessing the internet.

It is observed that about 2/3rd of respondents (63.70%) have encountered problems while accessing internet and the remaining 1/3rd (36.30%) of them said they did not have such problems. The humanities segment experience more problems as compared to science segment. This might indicate the nature of infrastructure or e-resources available to Humanities discipline as compared to science discipline. Among the 1/3rd of respondents (36.30%) who stated that they don’t have any problem, the science discipline (38.45%) takes a bigger share as compared to humanities discipline (25.42%).

**Nature of Problems of Internet Access** The specific problems encountered by researchers are enumerated in Figure 6.12 previous chapter. It is observed from figure that 1) delay in display of web pages due to network clogging or traffic jam, 2) difficulty in finding relevant information from the large number of hit results, 3) frequent power failures causing disruption in connectivity, breakdowns, 4) security
5) non compatible software, 6) hardware related problems, and 7) time restrictions are the frequently encountered problems in that order

7.8 Impact of Internet on Information Resource and Services

The advancements in technology particularly ICT have changed the academic world drastically. They are changing constantly and will continue to change in future too. It is a challenge and opportunity for all library professionals to adopt and adapting to the new technologies. The impact of technology, in particular internet, is clearly visible in all functions of library. The technology intervention is clearly visible through library automation, digitisation, storage media and the mode of providing access to resources in digital media. The most common functions/areas that are effected by ICT are automated library transactions, creation of digital library, transformation from physical access to online/remote access, revolution in storage devices, diminishing geographical barriers and time zones, enhanced professional capabilities, changing formats of information resources, changing needs of customers and great pressure on financial allocations.

As described in previous chapters, assessing the impact of any process or technology involves the study situations pre and post introduction of any product or service in organisations like libraries. This type of study generally requires respondents who have experienced or witnessed both pre and post introduction of any new service in library. But in academic institutions like universities, the pre and post study including same respondents is difficult due to the nature of courses and users’ departure after the completion of the same. Hence, the current study attempts to obtain the respondents’ perceptions on impact of internet on library resources and services and its impact on their academic efficiency and quality of research.

Users’ Perception of Impact on Internet on Academic Efficiency: It is a welcome feature that a majority of respondents do acknowledge that they are using internet regularly for their research activities. From Table 6.32 it is observed that
a. About 65% of researchers state that the internet has influenced their overall academic activities, their reading habits (61.93%) and time spent on internet (58.77%)

b. Nearly half of them (48.9%) express that it has influenced their professional competency

c. Less than half of them have express that it has impacted their writing skills (43%) and publications (46.5%). The “no” (negative reply) from more than half of them might indicate the difficulty in judging the impact on writing skills. The opinion about less impact on publication could reveal that their internet usage has not resulted in publications. This could be attributed to the fact that 42.15% and 32.49% of respondents (Table 6.6) are in the initial and middle stages of their research.

d. The respondents are not very sure about the impact of internet on their communication skills (37.20%) and to what extent it has impacted in expediting the result of their research (30.50%)

In other words, while acknowledging the impact of internet on reading, professional efficiency and overall academic activities, the researchers are not very sure about the nature of impact on their communication skills and speedy outcome of result of research output.

**Users’ Preferences Towards Print and Electronic Resources:** It is observed from the figures presented in Table 6.33 that more than 2/3rd of respondents (68.62%) prefer to use electronic resources and other 1/3rd of them (31.38%) express their choice towards print resources.
Hypotheses 4: The researchers prefer to use more internet based resources than print resources

This hypothesis is sustained as researchers’ preference to access e-resources is more than print resources. As mentioned above, 68.62% of respondents prefer to use e-resources against print resources. However, the preference for print resources by 31.38% also cannot be ignored. This indicates the user’s choice is leaning towards electronic resources. Further, it is observed that researchers of science discipline prefer to use more of e-resources as compared to researchers in humanities. It is observed that the UGC’s infonet e-consortia to which, all the respondent libraries are members, includes more e-resources in science disciplines as compared to humanities and social sciences. The lack of resources also has an impact on their usage.

User’s Choice on Storage Media of E-resources: It is very interesting to observe from Table 6.34 that half of the respondents (51.20%) would like to preserve their results in electronic devices like pen-drives and CDs as well as in print form. This is followed by another 1/3rd of them (35.70%) who prefer to preserve them only in digital form. It was noted that there is no significant difference in the interest expressed by respondents across all the disciplines indicating the homogeneity in the pattern of information storage.

The above pattern clearly shows that the print resources still play a significant role even in internet driven era. The significant percentage of storage in secondary media (37.5%) also indicates the increased dependency on electronic storage devices.

User’s Perceived Advantages of Internet Vs. Print Resources: The Figures in 6.13 highlight that the users’ perceived advantages of internet over print resources are 1) it is time saving (96.47%), 2) It is more updated and more helpful (94.61%),
3) It is more informative (88.95%) and 4) Less expensive (87.65%). In other words, the researchers opine that the internet is time-saving, updated, more informative and less expensive as compared to print resources. It is to be noted that the cost of acquiring electronic resources is expensive, but its volume of coverage and multiple access points make it less expensive as compared to single point accessible print resources.

Users’ Choice of Media of Specific Information in University Libraries: From Table 6.35, it is observed that researchers prefer to use print as well as electronic resources for their research. The availability of electronic information resources from the library along with print documents is an advantage for the users as they have a choice to use either of these as per their convenience. This also indicates that many resources that are not available or are difficult to get on the internet can be accessed from print resources in the library. The print and electronic resources in library supplement and complement each other. The researchers prefer to use more of e-resources w.r.t. web-OPAC, Online dictionaries and encyclopaedias, reports and standards, preprints as compared to print forms.

Impact of Internet on Quality of Research: One of the parameters of assessing impact of internet in academic environment is by its impact on research and its output. The research output is normally viewed in the form of the number of publications in national and international publications. The following hypothesis is formulated to examine this phenomenon.

**Hypotheses 5:** Internet does have positive impact on quality of research in university libraries.

The hypothesis is sustained as majority of researchers agree that the internet has influenced their research study.
It is interesting to note that a majority of respondents (84.40%) agree that the internet has influenced their research (Table 6.36). The remaining 15.60% of them expressed that they are not able to assess the nature of impact of the internet on their research. There is no significant difference in the opinion expressed by respondents across the disciplines.

As mentioned earlier, one of the parameters to assess the impact of the internet on research is its output. It is observed from the Table 6.37 that 3/4th of respondents (76.00%) have not published any article and the remaining 1/4th (24.00%) have published their articles. On analysing the reasons for this situation, it is observed that 25.36% (Table 6.6) of them are in final stages of their research and 42.15% of them are in initial stages of research. Generally, in initial and middle stages of research, the researchers focus on literature and design of suitable research method for conducting the research. Hence there could be more scope for publications or research outputs in the final stages of research.

**Impact of Internet on Library Services:** It is interesting to note from the Figure 6.14 that 70.66% of respondents express that the internet will not replace libraries. In view of more and more publications of print resources, the internet may not replace the library even in near future. Further, the current technological and infrastructural problems prevailing in this country may not allow the library with print collections to disappear from the scene.

Though the respondents do not foresee the disappearance of the library, more than half of the respondents (55.70%) do express that the internet has impacted their library usage (Table 6.39). This is also coupled with their preference attached to internet, and frequency of its usage as compared to library (Table 6.8 and 6.9). In other words, the researchers don’t perceive the exit of library by internet but however they do have seen its significant impact on library functions and services.
Users' Perceptions of Impact of Internet on Library Products and Services:
Through an open-ended question the respondents were asked to indicate the areas where they could see the visible impact of Internet and technology on library resources and services not limiting to their institute's library. Their responses have been consolidated on two important areas namely i) Access to library resources and ii) IT supported facilities and services.

Perceived impact access related areas are Access to information resources through Internet and intranet, Emergence of digital library, availability and access to e-books and e-journals, availability and access to electronic databases, access to archives of journal articles, access to CD-based e-materials, increased publication of book and journals in print format, availability of resources at an early time, access to online publications, and speedy access to books.

Perceived impact on the IT supported facilities are internet, ease of searching a specific book, OPAC (library catalogue, quick information retrieval, and Wi-Fi access.

7.9 Overall Satisfaction with Internet and Library Cooperation

Researchers' Overall Satisfaction of Internet Facilities: The mean score of 3.97 on 5-point scale indicates the satisfaction level of respondents. In other words, 80.70% (of which, 33.90% highly satisfied) of respondents expressed their satisfaction with current status internet facilities provided in their universities (Table 6.40) About 12% of them indicated their dissatisfaction for the same. The rating pattern is almost same and there is no significant change among respondents of the three disciplines.

Satisfaction with Library Staff Co-operation and Their Experience with Them: It is observed that 71.60% of respondents indicate that the library staff members are cooperative with them during library transactions. However, the other 28.40% of...
them have expressed their dissatisfaction regarding the co-operation from the library staff.

More than half of those who have endorsed the cooperation of library staff, also state that their interaction with them is good and satisfactory.

7.10 Impact of Internet on Library Resources and Services as Perceived by University Librarians

The data collected from university librarians considered for the current study reveals important functions of libraries which are impacted by technology and internet. The librarians’ perception of visible impact of internet and technology on functions and services of library are networking, no of copies, library services, infrastructure, library management, collection development, resource sharing, communication and preservation.

It was attempted to obtain their views on electronic resources too. On observing the response on print as well as electronic resources, it is observed that the number of copies concept in print as well as electronic resources differ to some extent such as:

a) They say that they are satisfied with quantity of print copies in their library. But they feel it is expensive to acquire multiple copies of e-documents as compared to print resources.

b) They feel that the provision of organisational support for electronic resources is bit difficult as compared to print resources. This could be attributed to the opinion that the e-resources like databases come as bundled product as compared to single copy of print resource.
c) They feel that the use of physical resources is constrained by time and they feel that the use of electronic resources is not constrained by this feature.

d) They feel the budget provision to electronic resources is good as compared to print resources.

e) They feel that the security issues are more predominant for electronic resources as compared to print resources. They opine that the security issues have been addressed adequately by their network department.

To sum up, this chapter presents the major findings of the study derived from data analysis carried out in previous chapters. The major findings related to respondents characteristics, different facets of internet and its usage have been presented here. The study unearthed many interesting facts and identified some areas which need further probing. It also witnessed the homogeneity among researchers of different disciplines indicating the research need and usage pattern is almost similar in researchers of science, social science or humanities. This chapter also explains the library products and services that have been impacted by internet and technology as perceived by researchers. It also mentions the key library functions that are impacted by technology as opined by university librarians.

Based on the findings of the study, the conclusion, recommendation, and direction for the future research are presented in the next chapter.