CHAPTER 5
SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

Karnataka State has been recognized as the prominent region for the expansion and development of engineering institutions across the country. It has also emerged as the software capital of the country over a period of time. There are a good number of engineering colleges which are providing the benefit of technical education to the young generation of learners. Advances in ICT have brought about revolutionary changes in the art and craft of content management through digital technology. The LIS professionals have to meet several challenges in the digital era. There is a need to equip the LIS professionals with appropriate ICT skills and enhance their professional competence. A review of literature suggests that LIS professionals should be enabled to make use of the technologies for effective knowledge management in the engineering colleges. The present study evaluated the ICT skill development of LIS professionals of engineering colleges of Karnataka State who are functioning in all the four revenue divisions of Karnataka State. This chapter contains the summary of the study, findings of the study (part I and part II), testing of hypotheses, recommendations, Future scope of research and conclusion.

5.2 Summary of the study

The crucial importance of ICT skills among Library professionals becomes highly relevant in the present times since the world moves towards the knowledge-based society. Public libraries and virtual libraries complement each other’s services instead of competing with each other according to recent empirical investigations. The development of ICTs and application of ICTs in higher educational institutions have changed the intellectual environment in general and the role of LIS professionals in particular. Application of ICT in academic environment in India has increased remarkably in the recent decades. The engineering colleges of Karnataka State are no exception in this respect. The present study examined the ICT skills among LIS professionals in engineering colleges of Karnataka State. The analysis of the data represents the extent and level of ICT skills possessed by the LIS professionals of
these institutions. Modern engineering college libraries have to provide adequate means and methods of acquiring ICT skills by the LIS professionals. Scholars have outlined the ICT skills of LIS professionals which make them suitable for a variety of Designations in the diverse fields such as software, database and information area, publishing trade and outsourcing opportunities. Hence, the present evaluation assumes profound professional significance in the age of content management in networked environment.

Karnataka State is one of the developing states of Indian Republic which has got considerable number of higher educational institutions including professional engineering colleges. Karnataka is also well known in the country as the major software centre. Bangalore city has been rightly identified as the ‘software capital’ of India. Library and information resources are expanded in the State of Karnataka with a fond hope of creating enlightened professionals and citizenry in this age of information revolution. Few researchers have assessed the growth and development of traditional and modern libraries in India and abroad. There are also limited studies dealing with ICT skill development of library professionals. However, quite a few studies are distantly related with the main theme of the present study are briefly presented in this chapter. Prominent among them include – Chen et.al (1996), Srinivasulu (2000), Olamigoke (2001), Zainab and Edzan (2002), Arora (2003), Ramzan (2004), Monk (2004), Abell and Wingar (2005), Hoskins (2005), Haneefa (2006), Sutradar (2006), Obajemu and Ibegwam (2006), Mahmood et.al (2007), Dala (2009), Voss and Procter (2009), Adebisi (2009), Batool et.al (2010), Gnanaleet and Ramakrishnan (2010), Kaur and Preeti (2010), Kongawad (2010), Kumar and Biradar (2010), Safahieh et.al (2010), Yusuf and Nkiko (2010), Santhpathi(2011), Senthilkumaran (2011),Gangadharaiiah and Nalini (2012), Sujatha and Gowda (2012), Manjrekar (2013) and Rajan (2013). The review of literature clearly reveals that no study has been conducted by any researcher in Karnataka State on the Information Communication Technology skills in the library professionals of engineering colleges situated in the state of Karnataka. Hence, the present investigation assumes profound academic significance.

The modern librarians are called upon to develop professional skills and competence in this age of competitive library management. The academic librarians
of the new millennium must be more dynamic since the professional environment has shifted from print sources to electronic resources and services. The LIS professionals are also required to facilitate wider access to information for their clients through systematic application of ICTs in their day to day operations. They need constant training and orientation on all the components of the library automation, networking and digitization. The present study examined the Information Communication Technology skills among the library professionals of engineering colleges of Karnataka State on the basis of systematic survey research method. The primary data were gathered from 133 engineering college libraries and 446 LIS professionals working in the engineering college libraries of Karnataka State. Besides survey method, non-participant observation, informal discussion and secondary sources of information were also used as other methods to study the status, problems and prospects of ICT skills among the LIS professionals of engineering colleges of Karnataka State.

The present investigation reveals that engineering college libraries of Karnataka state have accorded priority for the development of ICT resources and services in order to serve the community of users and have adopted basic IT infrastructure facilities to a considerable extent to provide information services. As regards to the existing resources and services, the data revealed that though these engineering college libraries have acquired considerable ICT resources over a period of time, it is found that the IT infrastructure facilities in most of the engineering college libraries are poor (not advanced) and therefore lag behind in providing advanced information services like Indexing and Documentation List / New Arrival List, E-publishing (in-house publishing), Institutional Repositories, SDI and CAS services, E-bulletin Boards, Creation of Library Blogs, Web designing and Online Reservation services, to their modern users. It is also found that a majority of the engineering college libraries do not have Multimedia Projectors and other latest equipment for extending advanced information services for today’s users. The study observes that the reasons for poor IT infrastructure facilities and services are due to, paucity of funds allocated to the libraries, lack of priority to libraries, lack of encouragement on purchases, apathy (disinterestedness) on the part of the library professional and lack of required library professionals to carry out information services and cater to the needs of its users.
The study also demonstrates that the library professionals working in engineering educational institutions are equipped with basic electronic resources and services in order to acquire basic skills in ICT and cater to the needs of users in the present times. The study further emphasizes that the present information environment demands new roles for LIS professionals from custodian of printed material to knowledge manager on the basis of acquiring sufficient knowledge of new ICT skills. The present study aptly indicates that the LIS professionals working in engineering colleges of Karnataka are to some extent computer literate and have acquired considerable basic ICT skills to manage the libraries. But, lack skills in certain core areas, to render advanced ICT based information services. The engineering college libraries have to race against the time in order to reach out to various users of latest and advanced electronic resources and services on the basis of greater enhancement of ICT skills of LIS professionals. Hence, there is scope for the development of LIS professionals’ knowledge and skills in handling and utilizing ICTs and its tools to a greater extent so that they can enhance the quality of information services to their users (students and faculty). The study reveals that a majority of LIS professionals still lack ICT skills in certain core areas of ICTs and are not familiar with web designing, E-publishing (in-house publishing), E-bulletin boards, indexing and documentation list, creation of library blogs, MS access, MS Excel, HTML, DBMS/RDBMS/Oracle, UNIX, LINUX, C programming, Visual basics, Metadata formats and IPR issues and trends. It is also found that a majority of LIS professionals unanimously have expressed their willingness to undergo ICT based training programs and also have specified their training needs related to their jobs. The LIS professionals of these engineering college libraries have expressed their training needs in the areas such as, basics of hardware and networking, library automation software, digitization of documents, creating institution repositories, OPAC cataloguing and bar-coding, web information resources and services, web designing, blogging, web 2.0, DBMS, access to online journals, access to subject databases and also IPR issues and trends. LIS professionals of engineering college libraries were highly enthusiastic in listing their needs for advance ICT based trainings. Regular trainings update their knowledge and skills to render more effective and efficient in performing their jobs. The study also revealed that there were certain limitations for the LIS professionals in participating/attending training programs offered. The
constraints are, family problems, financial constraints, disinterestedness, health problem and lack of encouragement / motivation from the institutional authorities. Thus, the study carries certain recommendations to overcome such constraints and to develop the Information Communication Technology skills of the library professionals, so that they can face the technological challenges in their profession, irrespective of their positions/designations, serving their respective institutions in a better and effective manner.

5.3 Findings of the Study

PART I: EXISTING IT INFRASTRUCTURE FACILITIES IN THE LIBRARIES OF THE ENGINEERING COLLEGES OF KARNATAKA.

5.3.1 Demographic features of chief librarians

1. Total number of respondents (Chief Librarians) was 133 out of 195 VTU engineering college libraries in Karnataka. When categorized under type of institutions, 11 (8.3%) are Government institutions, 09 (6.8%) are Aided and 113 (84.9%) are Private institutions, out of which, 18 (13.6%) are established before 1980, 32 (24%) between 1980 and 2000 and remaining 83 (62.4%) are the recently established institutions, between 2001 and 2012.

5.3.2 Management of engineering college libraries

2. A majority of 96 (72.2%) out of 133 engineering college chief libraries opined that they had library committees to monitor the day-to-day activities of the libraries while 37 (27.8%) engineering colleges never constituted ‘library committee’ for their college libraries.

3. A majority of 97 (72.9%) out of 133 engineering college chief librarians opined that they had adequate library budget. But 36 (27.1%) of them declared that the funds are inadequate for ICT based library services and facilities. This includes, a majority of 9 (81.8%) government college libraries, 26 (23.0%) private and 1 (11.1%) of aided college libraries.

5.3.3. Limitations and constraints of IT infrastructure facilities in engineering college libraries.

4. A majority of 128 (96.2%), 119 (69.8%) and 103 (77.4%) out of 133 engineering
college libraries possess basic IT infrastructure facilities like computers, printers and scanners respectively. A small segment of 05(3.8%) of them in the study, had no computers, 14(10.5%) of them did not have printers and 30(22.6%) of them never had scanners.

5. A majority of 99 (74.4%) out of 133 engineering college libraries do not possess multimedia projectors. Only 34(25.6%) college libraries had multimedia projectors.

6. It is found that 08 (72.7%) of the government engineering college libraries, 26 (23.0%) of the private college libraries and 02 (22.2%) of the aided college libraries did not have barcode equipment while the remaining 03 (27.3%) of government, 87 (77.0%) of private and 07 (77.8%) of aided college libraries were already using the Bar code equipment for library services.

7. A large segment of 6 (54.5%) and 7(63.6%), out of 11 government college libraries had no printers and scanners respectively.

8. A majority of 9(81.8%) and 8(72.7%), out of 11 government college libraries under the study, had no multimedia projectors and bar-code equipment respectively.

9. A majority of 114(85.7%), 112(84.2%) and 112(84.2%) out of 133 engineering college libraries possess IT infrastructure facilities that include internet facilities, sufficient internet bandwidth and use library automation software respectively. While 19(14.3%), 21(15.8%) and 21(15.8%) do not have internet facilities, sufficient bandwidth and automation software.

10. A considerable number of 5(45.5%) ,5(45.5%) ,6 (54.5%) and 9(81.8%) out of total 11 number of government college libraries lack internet, sufficient internet bandwidth, library automation software and use of additional software facilities respectively.

11. A majority of 97(72.9%) out of 133 engineering college libraries are not using any other additional software apart from the one in use and only 36(27.1%) of college libraries are using additional software.
12. A majority of 08(72.7%), out of 11 government college libraries lack the implementation library automation activity in the areas of acquisition, serial control and cataloguing (OPAC) sections. And 07(63.6%) out of 11 government college libraries are still not using automation software in circulation section.

13. A majority of 98 (73.7%) college libraries are issuing books using barcode technology but 35(26.3%) of them have no such facilities in their libraries, out of which, a majority of 9(81.8%) are government college libraries.

14. A large percentage 74(55.6%) libraries are not providing online reservation services. None of the government college libraries are providing online reservation services. Only a small segment of 59(44.4%) are providing online reservation services that include 04(44.4%) aided college libraries and 55(48.7%) private college libraries.

15. A majority of 97(72.9%) of the college libraries are engaged in providing new arrivals list service, while 36(27.1%) of them do not. This includes 9(81.8%) government college libraries, 26(23.0%) private and 1(11.1%) aided college libraries.

16. 70(52.6%) out of 133 of engineering college libraries are not providing indexing/documentation list service. This includes a majority of 9(81.8%) of the government college libraries, 6(66.7%) aided college libraries and 55(48.7%) private. While the remaining 63 (47.4%) of 133 college libraries extend this service.

17. Out of a total number of 11 government college libraries, only 02 (18.2%) government college libraries are providing indexing/documentation services.

18. A large segment of 68(51.1%), 92(69.2%) and 111(83.5%) out of 133 of engineering college libraries are not providing selective dissemination of information, institutional repositories and in-house publishing services respectively, that includes majority of government college libraries. Only 65(48.9%), 41(30.8%) and 22(16.5%) are extending SDI, Institutional Repositories and E-publishing services respectively.

19. Out of 133 engineering college libraries, a large segment of 79 (59.4%) libraries are providing web based services, while 54(40.6%) of them are not extending web based services.
20. It is also found that, among 133 engineering college libraries, a majority of 9 (81.8%) government college libraries, a considerable number of 42 (37.2%) private college libraries and 3 (33.3%) aided college libraries are not extending web based services to their users.

21. Both institution-wise and year of establishment-wise a large segment of engineering college libraries representing 95 (71.4%) are subscribing regularly for engineering databases and journals. Only 38 (28.6%) engineering college libraries still do not have engineering databases and subscription to online journals.

22. A large number of college libraries accounting to 74 (55.6%), 70 (5.6%) and 68 (51.1%) are not extending the ICT based library services like online reservations, Indexing/documentation list and SDI services respectively.

23. A majority of 87 (65.4%) out of 133 libraries face paucity of funds at various extents varying from 25% to 100% and only 46 (34.6%) of them opine that there is no paucity of funds in their libraries for developing ICT based infrastructure facilities.

24. To a considerable extent, 60 (45.1%) of chief librarians opine that there is apathy (disinterestedness) among the LIS professionals working in their libraries to an extent of 100%. While 32 (24.1%) of them state that this issue does not exist among their library professionals. 7 (5.3%) of them opine apathy among their LIS professionals exists to an extent of 75% only, 14 (10.5%) of them feel apathy to an extent of 50% and 20 (15.0%) of them find its existence to an extent of 25% only.

25. Among the Chief Librarians, 39 (29.3%) of them opine that there is lack of professional staff to an extent of 100% to extend ICT based library services on modern lines. However, 12 (9%) to an extent of 75%, while 14 (10.5%) of them state there is lack of professional staff to an extent of 50% and 32 (24.1%) of them express that there is lack of professional staff to an extent of 25% only.
PART II: ASSESSING ICT SKILLS OF THE LIBRARY PROFESSIONALS

5.3.4 Demographic features of lis professionals by gender, age, qualification, designation, experience and the type of colleges.

26. Total number of respondents was 446 out of 550, out of which, 289(64.8%) were males and remaining 157 (35.2%) are females.

27. Age-wise, 209(46.9%) of the respondents were below the age of 30 years, followed by 160 (35.9%) of the respondents in the age group of 31-40 years, 50 (11.2%) were between 41-50 years and 27 (6.1%) above 51 years.

28. Qualification-wise, 67 (15%) of them were graduates, 71 (15.9%) of them are Post-Graduates, 204 (45.7%) of them hold M.Phil degree and 104 (23.3%) of the respondents possess Ph.D.

29. Designation-wise 146 (32.7%) were working as Chief Librarians, 120 (26.9%) were Assistant Librarians and a large group representing 180 (40.4%) were working as Library Assistants.

30. Further, with reference to the duration of experience, majority of 263 (59%) were with less than 7 years of experience. 109 (24.4%) respondents have 8-15 years of experience, 50 (11.2%) of them possess 16-25 years of experience, and a small group of 24 (5.4%) of them worked more than 25 years and above. In the present study, among the respondents, it is found that a large segment of the LIS professionals belonged to the category of below 7 years of experience.

31. With regard to the type of colleges that LIS professionals belonged to, 23 (5.2%) of them belonged to government college libraries, 67 (15%) of them belonged to aided and 356 (79.8%) of them belonged to private college libraries. A large number of respondents belonged to private college libraries.

5.3.5 Mode of education that helped the LIS professionals in acquiring ICT skills

32. Among 446 respondents, 177 (39.7%) of them belonging to all categories of designations, indicated that formal education was helpful to them to develop
their ICT skills to an extent of 75%, 138(30.9%) of them indicated 50 %, 107(24.0%) of them indicated 100% , 18(4.0%) of them indicated 25% and remaining 06(1.3%) of them offered negative response.

33 A large group of 58(48.3%) assistant librarians opine that formal education was of help to them to acquire ICT skills to an extent of 75 % when compared to librarians and library assistants.

34 A majority of the LIS professionals from all the categories, opine that the formal education has helped them in developing ICT skills between 75 % to 50 %.

35 Among 446 respondents 154(34.5%) of them indicated that distance education was helpful to them to acquaint ICT skills, to an extent of 50 %, 131(29.4%) of them indicated to an extent of 25 %, 96(21.5%) of them indicated negative response, 47(10.5%) of them indicated to an extent of 75 % while only 18(4.0%) of them opined that the distance education was useful to develop their ICT skills to an extent of 100 %.

36 Designation-wise, 57(47.5%) of assistant librarians opined that distance education has helped them in developing their skills to an extent of 50 % when compared to librarians and assistant librarians.

37 A majority of the LIS professionals opine that the distance education has been helpful in developing their ICT skill levels to a lower extent of 50 % to 25 %.

38 A large group of 208(46.6%) LIS professionals indicated that participating in workshops/trainings have helped them to develop their ICT skills, to an extent of 100 %, 141(31.6%) of them indicated up to 75 %, 61(13.7%) of them indicated 50 %, 28(6.3%) of them indicated 25 % and remaining 08(1.8%) of them offered negative response.

39 A large segment of 104(57.8%) library assistants are of opinion that participation in workshops/trainings have helped them to acquaint their job related ICT skills to an extent of 100 %, when compared to librarians and assistant librarians.
Further, (45.1%) of the LIS professionals indicated that conference/seminars are helpful to an extent of 75 %, 105(23.5%) of them indicated 50 %, 94(21.1%) of them indicated to an extent of 100 %, 30(6.7%) of them indicated 25 % and remaining 16(3.6%) of them indicated negative response.

A large group of 64(53.3%) Assistant Librarians opine that conferences / seminars are useful to an extent of 75 % to enhance their job related ICT skills.

A large group of LIS professionals opine that participating in workshops / trainings / seminars / conferences do help them to a larger extent of 100 % to 75% in developing their ICT related knowledge and skills.

A large group of 151(33.9%) of LIS professionals irrespective of their designations, indicated that friends/colleagues are of help in acquiring ICT skills, an extent of 50 %, 105(23.6%) of them indicated up to 75 %, 99(22.2%) of them indicated 100 %, 83(18.7%) of them indicated 25 % and remaining 07(1.6%) of them offered negative response.

Further, 62(42.5%) of the chief librarians are of opinion that friends/colleagues are helpful in developing their ICT skills when compared to assistant librarians and library assistants.

A large group of 220(49.3%) LIS professionals opined that self effort made helped them up to to an extent of 100 %, 112(25.1%) of them indicated self effort being helpful up to 75 %, 96(21.5%) of them indicated it helped to an extent of 50 %, 17(3.8%) of them indicated 25 % and remaining 01 (. 2%) of them offered negative response.

5.3.6. Familiarity of LIS professionals towards ICT based information services, ICT core areas and their teaching skills.

Out of 446 LIS professionals, 238(53.4%) of them rate themselves as good in tracking web information resources, 97(21.7%) of them have rated they are moderate, only 81(18.2%) of them have rated as excellent, while the remaining 30(6.7%) of them have rated themselves as poor.
A majority of 71.6% (18.2%+53.4%) of the entire population of the LIS professionals opine that they are excellent and good in tracking the web information resources. Among which, we also find that a majority of 93.8% (63.0% + 30.8%) of the librarians rate themselves as good and excellent in tackling the web information services when compared to the opinions of assistant librarians and the library assistants.

It is found that 212(47.5%) of them indicated they are good in accessing online journals, 100(22.4%) of them indicated they are excellent, 84(18.8%) of them have rated moderate, while remaining 50(11.2%) of them have rated themselves as poor.

A majority of 76.1% (47.5%+18.8%), of the entire population of the LIS professionals opine that they are moderate and poor in accessing online journals.

Out of 446 LIS professionals, 213(47.8%) of them have rated themselves as poor in creation of blogs, 126(28.3%) of them have rated moderate, 90(20.2%) of them indicated they are good and a small segment of 17(3.8%) of them opined that they are excellent in creation of blogs of which Chief Librarians were the most.

Out of 446 LIS professionals, 209(46.9%) of them have rated themselves as poor. 131(29.4%) of them indicated they are good, 65(14.6%) of them have rated moderate, only a small group of 41(9.2%) of them have rated as excellent, in compiling the documentation/new arrival list.

A majority of 139(77.2%) of the library assistants have rated themselves as poor and lack ICT skills in compilation of documentation/new arrival lists.

A large segment of LIS professionals representing 161(36.1%) rate as good in accessing online engineering databases, while 133(29.8%) of them have rated themselves as poor, 90(20.2%) of them state they are moderate and the remaining small segment of 62(13.9%) opines they are excellent.
Out of 446 LIS professionals, 101 (56.1%) of the library assistants rate themselves as poor in accessing online engineering databases, while a large group comprising 50% of the librarians opine that they are good.

A large segment of 176 (39.5%) LIS professionals indicated they are good in using the library automation software, 165 (37%) of them indicated they are excellent, 67 (15%) of them have rated moderate, while remaining 38 (8.5%) of them have rated themselves as poor in using library automation software.

A majority of 95.2% (58.2% + 37.0%) of the librarians and 86.7% (39.2% + 47.5%) of the assistant librarians have rated themselves as excellent and good, while still we find a segment of LIS professionals lacking the knowledge and skills of handling the library automation software.

A large segment of 164 (36.8%) of them indicated they are excellent, 146 (32.7%) of them indicated they are good in bar-coding techniques, 79 (17.7%) of them have rated moderate, while remaining 57 (12.8%) of them have rated themselves as poor in bar-coding techniques, which is a part in handling ICT based library services.

Further, 84 (57.5%) of the librarians compared to assistant librarians and library assistants, declare that they are excellent in bar-coding services, though, a large group of 30.5% (17.7% + 12.8%) of the total population of the entire LIS professionals rate themselves as moderate and poor, who are not completely well-versed in handling these services.

A majority of 77.6% (30.3%+47.3%) of them indicated they are excellent and good in CD search services. However, 20.6% of them indicated they are moderate, while remaining 1.8% of them have rated themselves as poor.

A majority of 87.7% (45.9% +41.8%) of the Librarians rate themselves as excellent and good in rendering CD search services. Therefore it is evident that not everyone is having the complete knowledge and skill about the CD search services.

A segment of 234 (52.5%) LIS professionals have rated themselves as poor in web designing with HTML, 121 (27.1%) of them have rated moderate,
73(16.4%) of them indicated they are good and only 18(4%) of them indicated they are excellent.

62 A majority of 79.6% (27.1% +52.5%) LIS professionals out of the entire population rate themselves as moderate and poor in web designing with HTML. Among this, library assistants stand the highest accounting to 91 % (13.9%+77.2%) who have rated themselves as moderate and poor in web designing and HTML.

63 Out of 446 LIS professionals, 248(55.6%) of the LIS professionals have rated themselves as poor or lack familiarity to e-bulletin boards, 111(24.9%) of them have rated moderate, 75(16.8%) of them indicated they are good and only a very small segment of 12(2.7%) of them have indicated they are excellent.

64 Out of 446 LIS professionals, a majority of 150 (83.3%) of the library assistants have rated themselves as poor and lack ICT skills in e-bulletin boards.

65 A large segment of 255(57.2%) of them have rated themselves as poor and lack knowledge and skills about e-publishing (in-house publishing) services, 113(25.3%) of them have rated moderate, 60(13.5%) of them opine they are good and the remaining 18(4.0%) of them rate themselves as excellent.

66 Out of 446 LIS professionals, a majority of 151(83.9%) of the library assistants have rated themselves as poor and lack knowledge and familiarity in e-publishing services.

67 A majority of 387 (86.8%) of the LIS professionals from all institutions totally agree that they are assigned ICT based duties and responsibilities at their respective positions. Only a small segment comprising of 59(13.2%) of them opine ‘No’ specific ICT based duties and responsibilities are assigned to them.

68 Out of 446 LIS professionals 212(47.5%) of them have rated themselves as good with regard to the familiarity with OS- windows , 176(39.5%) of them have rated as excellent, 48(10.8%) of them have rated as moderate and only
10(2.2%) of them agree they are poor. Overall it is found that a large percentage of LIS professionals are excellent and good in operating system windows.

69 Out of 446 LIS professionals, 241(54.0%) of them completely lack skills in operating system Linux and have rated themselves as poor. 126(28.3%) of them have rated as moderate, 62(13.9) of them as good and only a small group of 17(3.8) of them as excellent. Overall we find that a large percentage of LIS professionals lack skills in operating system Linux.

70 A majority of 297(66.6%) of the LIS professionals completely lack skills in operating system Linux and have rated themselves as poor. 97(21.7%) of them have rated as moderate, 42(9.4%) of them as good and only a small group of 10(2.2%) of them as excellent. Overall we find that a large percentage of LIS professionals lack skills in operating system Unix.

71 Out of 446 LIS professionals, 200(44.8%) opine themselves as excellent and experts in using MS word, 190(42.6%) of them have rated themselves as good, 48(10.8%) are moderate and a small segment of 8(1.8%) declare poor. Overall we find that a large percentage of LIS professionals are excellent and good. They are completely familiar in using MS word.

72 A large segment of 130(29.1%) rate themselves as poor in MS power point usage. 114(25.6%) of them rate themselves as good, 103(23.1%) of them rate as excellent and 99(22.2%) of them as moderate. However, on the whole, though a larger percentage is familiar with the usage of MS power point, it is evident that not everyone is confident of using MS power point. There is a group of LIS professionals who lack skills in this area.

73 Out of 446 respondents, 259(58.1%) of LIS professionals rate themselves as poor, while, 77(17.3%) of them are moderate, 68(15.2%) of them good and only a small group of 42(9.4%) of them are excellent. Hence it is inferred that a majority of the LIS professionals are not familiar with MS access and lack skills in this regard.
A majority of 298 (66.8%) of LIS professionals opine that they are poor and do not possess skills in DBMS/RDBMS/Oracle, while, 82 (18.4%) of them are moderate, 52 (11.7%) of them good and only a small segment of 14 (3.1%) of them state that they are excellent and familiar with such skills. Therefore, it is inferred that a large percentage of the LIS professionals are not familiar with DBMS/RDMS/Oracle.

A majority of 304 (68.2%) of LIS professionals opine that they are poor and do not familiar with visual basic skills, while, 96 (21.5%) of them are moderate, 36 (8.1%) of them good and only a small segment of 10 (2.2%) of them state that they are excellent and familiar with such skills. On the whole, we find that a large percentage of the LIS professionals are also not familiar with visual basic.

260 (58.3%) of the LIS professionals completely lack HTML knowledge and skills and have rated themselves as poor. 108 (24.2%) of them have rated as moderate, 61 (13.7%) of them as good and only a small group of 17 (3.8%) of them as excellent. Overall, we find that a large percentage of LIS professionals lack skills in HTML.

A majority of 287 (64.3%) LIS professionals rated themselves poor in C programming. 117 (26.2%) of them rate themselves as good, 34 (7.6%) of them rate as moderate and only a small segment of 08 (1.8%) of them rated as excellent and familiar. On the whole, it is found that a majority of LIS professionals lack knowledge and skills in C programming.

A majority of 293 (65.7%) of the LIS professionals completely lack metadata format related skills and have rated themselves as poor. 101 (22.6%) of them have rated as moderate, 39 (8.7%) of them as good and only a small group of 13 (2.9%) of them as excellent and are familiar with metadata formats.

A majority of 284 (63.7%) of the LIS professionals are not completely familiar with IPR issues and trends and have rated themselves as poor. 112 (25.1%) of them have rated as moderate, 39 (08.7%) of them as good and only a small group of 11 (2.5%) of them as excellent. Therefore, it is evident
that a majority of LIS professionals lack familiarity with IPR issues and
trends.

80 A majority of 418(93.7%) of the total LIS professionals belonging to all types
of institutions agree by saying ‘yes’ to ICT based training needs. Among
these, a majority of 336(94.4%) are from Private colleges, who have expressed
their training needs in ICT based library services. Only a small group of
28(6.8%) of them opine ‘no’ to training needs.

81 A majority of 227(50.9%) of the LIS professionals rate themselves as good in
handling of ICT based library services. This includes a majority of 28(56.0%)
of LIS professionals having a work experience of 16-25 years, rating
themselves as good in handling ICT based library services. However,
108(24.2%) are excellent and confident in their day to day activities of their
libraries. 92(20.6%) of them are moderate and only 19(4.3%) of them are poor
in handling ICT based library services.

82 A majority of 227(50.9%) of the LIS professionals are good in handling of
ICT based library services. While 108(24.2%) are excellent and confident in
their day to day activities of their libraries. 92(20.6%) of them are moderate
and only 19(4.3%) of them are poor in handling ICT based library services.

83 A majority of 140(31.4%) of the LIS professionals rate themselves as good in
teaching ICT based library services, which includes a large group of
45(41.3%) of LIS professionals having an experience of 8-15 years.
130(29.1%) of them opine they are moderate, 101(22.6%) of them agree they
are poor and lack teaching skills and 75(16.8%) of them opine they are
excellent and are capable of overall teaching ICT based library services.
Overall, 50% of the LIS professionals having an work experience of 25 years
and above rate themselves as excellent in having teaching capacities on ICT
based library services.

84 A majority of 300(67.3%) of LIS professionals have not attempted to
contribute any publications like journal articles, seminar/conference papers
related to their professional developments. However, among the remaining, it
is found that a large group of 121(27.1%) of them have contributed
publication between 1-5 nos, out of which, 61(41.8%) of them are librarians, 46(38.3%) are assistant librarians and 14(7.8%) of them are library assistants. Further, 17(3.8%) of them have contributed about 6-10 nos of articles and a small segment of 08(1.8%) of them contributed to 11-20 nos. of journal/conference / seminar articles.

5.3.7. LIS professionals’ specific training needs

85 A majority of 261(58.5%) of the LIS professionals are willing to attend training programs to enhance their skills on a long duration. However, remaining 185(41.5%) of them feel that they are not willing to attend training programs on long durations. Further, institution-wise, we find that a majority of 44(65.7%) of the LIS professionals working in aided college libraries, 209(58.7%) from private college libraries and 08(34.8%) of them from government college libraries are willing to attend training programs on long duration. This also includes those who have agreed for short term trainings.

86 A majority of 405(90.8%) of the LIS professionals are willing to attend training programs to enhance their skills on a short duration. However, remaining 41(9.2%) of them feel that they are not willing to attend training programs on short durations. Further, institution-wise, we find that a majority of 61(91.0%) of the LIS professionals working in aided, 324(91.0%) from private and 20(87.0%) of them from government engineering colleges are willing to attend training programs on short duration.

87 A large segment of 144(32.3%) of LIS professionals to an extent of 50%, 79(17.7%) of them opine to an extent of 75%, 14.8% of them to an extent of 100% and 10.8% of them to an extent of 25%. And only 109(24.4%) of them opine they do not need training on basic ICT concepts.

88 A majority of 264(59.2%) opine that they need intensive training to an extent of 100 %, to be familiar with the technology and to extend and maintain ICT infrastructure facilities. Only a small percentage of 32(7.2%) are familiar with the aspect of hardware and networking.
A large percentage of 174(39.9%) of LIS professionals felt that they need intensive training to an extent of 100% as they are not familiar with handling software. Higher degree of training to the extent of 75% to 100% is needed by 282(63.2%) respondents. Only a small segment of respondents need training to a little extent which account for 25(5.6%) in the entire population of respondents in the study.

A large segment of respondents representing 287(64.3%) need intensive and longer duration of training to the highest extent of 100% for digitization of documents and creating of institutional repositories. Considering the extent of 75% to 100%, 357(80%) of the respondent need intensive training to create institutional repositories. On the other hand, a small percentage representing 33(7.4%) feel that they are familiar but need orientation to a little extent. A large segment however is not thorough with the aspect of digitization and creation of institutional repositories.

A majority of 257(57.6%) expressed that they need thorough training to an extent of 100% for OPAC, cataloguing and bar-coding. LIS professionals from government colleges opine that they need trainings of long duration and thorough practice which account to 19(82.6%). This clearly depicts that a large segment of government engineering college LIS professionals and to a moderate percentage of aided and private college LIS professionals need training on cataloguing and bar-coding.

A large segment of 139(31.2%) of the LIS professionals express they need for training in internet/web information resources, to an extent of 50% in internet browsing and accessing web information resources, 85(19.1%) of them to an extent of 100%, 84(18.8%) of them to an extent of 25% and 77(17.3%) of them to an extent of 75%.

Out of 446 LIS professionals, 160(35.9%) of them opine that they do not need training since they are familiar in extending CD search services. It is found that 77(17.3%) of them need training in CD search services to an extent of 25%, 75(16.8%) of them to an extent of 50%, 67(15.0%) to an extent of 100% and 67(15.0%) to an extent of 75%. It is only a small segment of 67
(15%) of LIS professionals opine that they need thorough training to an extent of 100% in CD search services.

94 A majority of 274(64.1%) of them need training to an extent of 100% in web designing and creation of library blogs, 95(21.3%) to an extent of 75% and 51(11.4%) of them to an extent of 50% and 18(4.0%) of them to an extent of 25%. Only a small segment of 8(1.8%) of them state that they are familiar and do not need training in this regard.

95 A large group 194(43.5%) of them state they need thorough training to an extent of 100% in DBMS and access to information databases, 116(26.0%) of them to an extent of 75%, 85(19.1%) of them rate to an extent of 50% and a small segment of 24(5.4%) of them rate as poor.

96 A majority of 70.0% of the LIS professionals express their need for training in IPR issues and trends, to an extent of 100%, 63(14.1%) of them to an extent of 75%, 41(9.2%) to an extent of 50%, 21(4.7%) to an extent of 25% and only 9(2.0%) of them do not training in this regard.

5.3.8. Constraints in attending training programs

97 A majority of 235(52.7%) of them opine that they lag behind in attending training opportunities, due to lack of encouragement, 92(20.6%) of them opine it is due to financial constraints, 89(20.0%) of them state it is due to family problems. A small group of 13(2.9%) of them project ill health as a reason, 10(2.2) of them due to disinterestedness and 7(1.6%) of them never responded on this.

98 It was found that out of 446 LIS professionals only 200(44.84%) of them had the membership status in professional associations and 246 (55.16%) of them never had any membership in any of the local, regional or national professional associations like INDEST, AKELPA, KALA, ILA, IATLIS, MyLISA etc.
5.4 Testing of Hypotheses

**H1: IT infrastructure facilities in most of the engineering college libraries are poor for rendering advanced ICT based library services.**

The data analyses presented in part – I tables 4.2.4 to 4.2.9 clearly indicates that the engineering college libraries of Karnataka State are not fully automated to render ICT based library services on modern lines. Hence, the above hypothesis H1 has been accepted as per the data analysis.

**H2: ICT Knowledge and skills of majority of the LIS professionals working in the engineering college libraries of Karnataka are inadequate to effectively render the ICT based information services.**

The data analyses presented in part – II tables 4.3.3.1 to 4.3.3.4 clearly indicate that the LIS professionals working in the engineering college libraries of Karnataka State do not possess adequate ICT skills and competencies to be competent enough to render ICT based library services on modern lines. Hence, the above hypothesis H2 has been accepted.

Seena and Pillai (2014) in their study identified the extent of different types of ICT skills of LIS professionals working in Kerala University library and find that LIS professionals lack skills to render ICT based library services. Hence suggest LIS professionals to be motivated for attending in-house training programs, workshops, conferences, seminars and public lectures.

**H3: LIS professionals need more exposure and training in ICT applications to render ICT based information services.**

The data analyses presented in part – II tables 4.3.3.5 to 4.3.3.9 and 4.3.3.12 clearly indicate that the LIS professionals working in the engineering college libraries of Karnataka State need ICT based training to an greater extent to be competent enough to render ICT based library services on modern lines. Hence, the above hypothesis H3 has been accepted.

Thompson Susan M (2008) in her study reveals the basic competencies needed by the LIS professionals and states that technology is one thing that no one can escape
from. Every library is different and more of hands on training is required for Librarians to understand computer hardware and troubleshoot technical problems, as others depend on them for such help.

**H4 : LIS professionals working in the engineering college libraries of Karnataka face constraints in acquiring ICT skills due to various reasons.**

The data analyses presented in part – II tables 4.3.4.1 clearly indicates that the LIS professionals working in the engineering college libraries of Karnataka State, though willing to enhance their ICT knowledge and skills, by attending trainings, face constraints / difficulties for various reasons. Hence, the above hypothesis H4 has been accepted.

**5.5. Recommendations**

Based on the findings of the analysis of the study reported in chapter V (Part-I and Part- II) and perceptions of the LIS professionals, following recommendations have been made to enhance the ICT skills and core competencies of the LIS professionals working in engineering colleges of Karnataka for rendering effective and value added information services.

1. The study reveals that 27.8% engineering college libraries did not possess library committee. Formation of library committee comprising of heads of departments is a requisite condition. The committee with the appropriate terms of reference, mainly oversees the functioning of the library, framing policies and objectives, allocation of budget, negotiation of e-resources and suggestions for up-dating the IT based infrastructure facilities. The user community from time to time can be asked to give feedback on the knowledge, skills and performance of LIS professionals. On this, the library committee and the management can take suitable steps to improve the efficiency and the capability of LIS professionals to effectively discharge the duties and responsibilities. Therefore, it is recommended that, library committee should be made mandatory in all the academic college libraries, to update and maintain the standards of the information services.
2. Majority of the government college libraries and to some extent private and aided college libraries also face inadequate library budget/funds, for extending ICT based information services and facilities. Therefore the Library Committee along with the institutional support should emphasis on required allocation of sufficient funds to libraries and to upgrade the IT infrastructure facilities and also to utilize the skills of LIS professionals.

3. Though some of the LIS professionals possess considerably good and moderate in ICT skills, there is scope for development of innovative ICT skills, so as to enable them to learn, practice and implement the same in their respective engineering college libraries to render/introduce latest ICT based library services.

4. Not every LIS professional of engineering college libraries are good/excellent and confident in ICT core areas of information services. Hence, they need ICT based regular trainings on core areas of information services, awareness towards the advance technologies in the similar field and also should undergo soft skill and interpersonal skill training programs.

5. It is found that majority of the LIS professionals are eager to undergo various ICT based training programs. At the same time, it is found that, they face constraints in attending training programs due to various reasons like, financial, discouragement, non-recognition, etc. Hence the institutions should motivate and encourage LIS professionals interests by organizing, or deputing and sponsoring them for training programs and workshops, conferences and seminars, either on job/ off job. Institutions can further implement a policy to reward the LIS professionals for their contribution or for bringing in changes in their respective college libraries after attending the training programs successfully.

6. It is evident that a large number of LIS professionals have expressed that workshops/seminars/trainings/conferences have helped them in acquiring up-to-date knowledge and skills. Hence it is recommended that the staff has to be encouraged by deputing/sponsoring them to attend such academic programs on a regular basis, irrespective of their designations.
7. The findings of the study has revealed that most of the Chief Librarians are ICT skilled than the others as they are generally deputed by the institutions for most of trainings/workshops to improve their skills. Hence the Assistant Librarians and the Library Assistants should also be given importance to attend such trainings/workshops to update themselves.

8. Librarians have to attend academic programs so that they can improve their teaching skills. This will help in imparting instructions and train the library users in availing the information services by using ICT tools and Web technologies.

9. The LIS professionals who have undergone ICT based advanced trainings and implemented the same in their libraries for the benefit of the students and faculty in their respective colleges, must be recognized by the management/administration and confer with suitable awards and honours. The Professional associations may also work on these lines to recognize and motivate LIS professionals.

10. LIS professionals, particularly the library assistants have to encouraged to continue their education either through distance/regular mode so that they can improve their academic credentials which will boost their self confidence and morale.

5.6. Further Scope of Research

The researcher has made an attempt to examine the ICT skills of LIS professionals in engineering colleges of Karnataka state. But, during the course of the study, it is understood that there are many areas which warrant serious research interest in this important branch of engineering college library management. This specialized area of research basically involves several components of engineering college library management. Yet, there are many areas of future research focused on:

1. Studies on available IT infrastructure and ICT skills / core competencies of the LIS professionals academic /research institutions and other areas can be undertaken.
2. Studies on assessing the LIS professional’s ICT knowledge, skills, and competencies (hard and soft skills) focusing on handling purchases of e-books procedures, overall library managerial skills/abilities, knowledge of IPR issues and solutions can be undertaken.

5.7 Conclusion

ICT has encompassed every aspect of information processing and retrieval in libraries. More so in case of research, technical and engineering college libraries. The need for the application of ICT is felt in the engineering colleges which are offering research programmes leading to the award of doctoral degrees. This modern trend is fast encompassing as the users of the libraries, of late, have become familiar with the use of technology for availing various library services and on account of this trend, there is also demand for ICT based services in libraries. Quality performance and assessment now-a-days expect the engineering colleges to be up-to-date in the application of ICT for various functions as well as services.

The present trend of availing technology for extending information services and the ICT based infrastructure in libraries affect the professional librarians to be knowledgeable and skillful in the application of ICT for information processing, storage and retrieval. Several professional organizations and associations have been conducting with due importance, the training and academic programs on modern applications of ICT for the engineering college library functions and services. The importance of being up-to-date at international level as far as the quality performance and customer satisfaction is identified. Hence noticing the trend and need, AICTE has taken measures to develop ICT based infrastructure in engineering colleges and encourage programs so as to improve the technological know-how and skills of professional library staff.

As the application of technology to the library services is encouraging every aspect of library functions and services to a larger extent, the LIS schools should also revise their syllabus so as to cover the present need based trend of ICT applications. Teaching and training programs are becoming more and more technology oriented and practice oriented. The main aim here is to make the students adequately skillful
and knowledgeable in handling the ICT based services in libraries, especially in technical and research libraries in the country.

Though ICT training for all the academic library staff will require a considerable investment over and above current training provision. This need for large-scale investment in skill development of the library professionals has been recognized everywhere. As librarians are the most important agents for the advancement of the society, any investment made to train them should be treated as human capital.

All India Council of Technical education has planned to elevate the quality of engineering education at the international level and there by suggest engineering colleges to go for accreditation and quality management systems. Hence, It is prerequisite condition that LIS professionals have to be aware of the recent trends in information services. Further, the professionals need to be trained on modern lines so as to enable then to install and extend ICT based information services. On account of this trend, it is found essential that the engineering colleges have to have the library advisory committee to oversee the functioning of library and to improve upon the services on continual basis to meet the needs of the students, faculty and other users. The library committee helps in judicious allocation of budgets, acquisition of need based information sources, development of infrastructure facility and deputation of staff for acquiring knowledge and skills. The committee will also recommend for improvements from time to time based on the feedback analysis report. It is also to be highlighted that librarians are treated on par with teachers who are working in engineering college, they are treated as teaching staff, and therefore it’s essential that on one hand they have to be knowledgeable and skillful in handling IT information facilities for extending information services. On the other hand they have to impart knowledge and train their users (students and faculties) in using ICT facilities and accessing various online information services. In this direction, the librarians of engineering colleges have to play two major roles. One in knowing the information sources and the other in establishing rapport with student and faculties. Here librarian can bridge the gulf with the thorough knowledge of ICTs.