Chapter-7

Summary, Findings and Conclusion
7.1 Summary

The purpose of this study is to develop an e-learning prototype, based on open access software JOOMLA, after examining and understanding various current e-learning systems for online delivery of education. With the advent of online instruction, it had become reasonably clear that modifications to traditional instructional design methods to suit the unique conditions of online environment were needed.

The present study is undertaken with the intent to design and develop an architectural and instructional delivery system to expand the possibilities of improving professional caliber and quality of education in Library and Information Science. Furthermore, the research study also investigated the knowledge and expertise in e-learning of Library and Information Science faculty members from the select universities across India. Moreover, the study has a purpose to investigate the effectiveness of softwares and e-learning delivery systems of select universities, their services and operations for delivering online instruction.

For the purpose of investigating the knowledge and views of Library and Information Science faculty members regarding the same, stratified sampling wad done and the investigator selected oldest and top ranking twenty universities across India having adequate infrastructure to support e-learning system and substantial faculty, which are offering education in this field of knowledge.

The investigator also selected eight other universities for investigation which provide e-learning in Library and Information Science and Management fields in India. After a thorough review of the related literature, a set of two well designed questionnaires are administered among the faculty members, online instructors and students under study. The survey results in 77.7%, 81.25% and
87.5% response respectively from faculty members, proficient staff members and students. In addition to collection of data, the investigator consulted various printed and electronic resources such as annual reports; pamphlets; brochures; newsletters; websites; etc. to cross-check the validity and authenticity of data provided by the respondents.

The collected data is analyzed and coded in MS-Excel package. Subsequently, the Chi-Square statistical test is used to prove the significant difference in the data. Besides above, graphs; charts; diagrams and Cross tabulation are used as per the need to measure the relationship between variables. Based on the data obtained from the users of libraries under study, following major findings are deduced.

7.2 Findings

The data is obtained through survey method by distributing a set of two well designed questionnaires among the Library and Information Science faculty members and instructors and students of the surveyed universities. On the basis of analysis of collected data with respect to "Design and Development of E-Learning Solutions in Library and Information Science", some of the major findings to enhance the efficiency and effectiveness of delivering online instruction and their operations and services are summed up as follows:

1. As higher education attempts to improve the products it provides, continued care and attention are needed in the area of instructional competence. As institutions continue to grow their online course offerings, an increasing number of faculty members will be called to teach online; many for the very first time. Failing to adequately support faculty could result in undesirable outcomes; low student satisfaction with online experiences linked to retention/attrition issues. The investigator has found that majority of the faculty members have ample knowledge about computers, internet and e-learning (Table-2 and Table-3). However, none of them ascribed that they have excellent knowledge about e-learning. There is a point of concern about the average knowledge of most of the faculty members which needs to be improved
over time so as to understand all pros and cons of the e-learning system and to effectively deliver as per the student’s expectations.

2. The teaching faculty is ready to accept and implement technology for the ease of delivering and adopt new and modern ways to cope with the shift and makeover of education system in India. It has been extremely important to incorporate and implement e-learning systems in Library and Information Science education in India (Table-7). Due to the changing trends in methods of teaching and ways of delivering, nearly all of the faculty members from the select universities in India are of the opinion that it is extremely important to implement e-learning systems in Library and Information Science education in India. On the other hand, various faculty members have got sufficient exposure in the field of Information Technology and are ready to accept challenges in IT environment. It is because of this reason the same amount of enthusiasm has been found among the faculty members to deliver education and instructions online.

3. E-learning has only been included as a holdup, not as an alternative or substitutes to traditional learning and is not considered as essential for the success of organization in India (Table-25). Since the success of the organization is measured in terms of the number of students, courses offered, page hits, infrastructure, quality and depth of the teaching and the total results as research output, but none of the institutes in India is entirely delivering online education, e-learning is still at the periphery and none of the organizations is completely dependent on e-learning for its success.

4. There is slow and poor internet connectivity and inadequate infrastructure facilities in various universities in India which leads to many problems in applying e-learning resources in their departments (Table-38 and Table-40). This could be mainly due to the lack of proper financial assistance which plays a major role in building up the infrastructure and adding resources to the learning instructional system,
E-learning resources largely includes asynchronous, web-based instructional content in the form of html tutorials, online databases, institutional repositories, interactive video, flash animations, screen captured presentations, and the like. The use of these resources depends mostly on the internet accessibility and the digital equipments available in the organization.

5. The study shows that the private universities are far ahead in implementing the innovative technologies efficiently with maximum user satisfaction than the government universities and institutions in India (Table-49). The private and open universities have a tough competition to survive and are adapting latest technologies in teaching and learning in order to expand the scope of the subject education.

6. Application of e-learning causes to weaken the student-teacher relationship. The interpersonal relationship between students and teacher is an important element contributing to the learning process of students (Table-36). In e-learning, we can find only mentorship which is a one-on-one learning relationship between a student and an expert in a specific topic or discipline for the purpose of supporting learning and development. Students and mentors can suitably and more frequently communicate with each other through words, pictures, and other information regardless of location or schedules. But the relationship weakens because of the low teacher discourse, the practical sense of feelings and expressions during face-to-face instruction and dealing with the problems and differences of the individual students.

7. E-learning is not fulfilling all of the learning needs of students. It is because the practical aspect of teaching and learning (hands on practice) is lacking in online mode of instruction and the lack of face-to-face interaction could be one of the problems. The material is complex enough to understand and learn which in turn affects the students who are not quick to understand and are week in structural setup of content (Table-37). Besides the above stated complexities, various problems
associated with e-learning is the design by technologists which is often very complex and requires strong input from pedagogues in terms of content and learning process flow. The second main thing is that the learning is not build on the prior knowledge of learner and it can be the waste of time. The third thing is that an LCMS platform needs to be robust and stable at all times and any weaknesses in it can cause trouble and poor motivation among learners. Last but not the least; poor learner support can result in poor attendance to the programs as they are left to their own devices which can result in lack of interest.

8. Motivation is a determining factor to keep students associated continuously with online learning throughout the course. Motivation of students in online courses is a challenging task. It is difficult to keep students motivated throughout the course because of the varying requirements of students, the type of students and their study habits that vary from student to student. It is found that there must be a timeline to check the progress of students and opportunities to redo an assignment must be devised in order to keep students motivated throughout the course (Table-16 and Table-41). However, providing immediate responses and instant feedback also can engage students to a fair extent and reduces the chances of anonymity feelings that can result in student’s withdrawal from the course.

9. Application of e-learning system would not replace or substitute the traditional classroom teaching and learning. Since, e-learning is nowadays considered as the alternative to the traditional classroom learning because of the benefits which it promises to offer, but e-learning cannot replace traditional classroom learning in the near future (Table-18 and Table-35). The reason behind this is that majority of the people are not well aware about the e-learning technology. Most of the students fail to purchase high cost digital equipments and in the developing countries, it is like a dream for poor to possess any such tools. Also, there is a lack of expertise and internet connectivity in the
developing countries which is a great setback to e-learning. The social interaction, practical learning skills development, interactive classroom settings, encouragement, exchange of ideas without communication barriers are missing in e-learning and can only be achieved in traditional learning.

10. Open source softwares are considered more efficient for design and development of an e-learning system (Table-8). The whole infrastructure is dependent on the type of softwares handling the system. Due to the availability of source code, organizations can architect and scheme the software as per their requirements with some modifications and make it more efficient, which cannot be achieved in proprietary or commercial softwares. This depicts the mounting influence of open source softwares and their rising impact in growing e-learning market.

11. Social networking is seen as a guided didactic communication for the development of autonomy among students (Table-31). The communication must all be present during the course on a personalized form (for the students to feel motivated). Communication between the teacher and students plays a pivotal role for effective knowledge transfer. The modes of communication depend on the capability of the system to handle such means and vary from system to system, depending on the efficiency of handling multi-dimensional approaches of communication. It is found that in a modern web milieu, social networking is an essential component in disguise in virtual learning environment.

12. Multiple-choice tests are the best strategies for the assessment of students on online courses. Drafting multiple-choice tests and assigning projects are the easiest ways of conducting tests in an online instruction (Table-33). They are the best ways to formative, summative, evaluative and educative assessments from providing diagnostic feedback to students and instructors; description of students' level attainment, curricular feedback to building students (and faculty) insight and
understandings about their own learning and teaching. It is considered as the most effective way of assessment as it is readily scorable by a variety of electronic means and offers some striking features as an assessment format. However, it is found that multiple-choice tests encourage poor attitude towards learning and to overcome that problem, multiple choice tests are often accompanied by short answer type assessments and thus the incorrect influence of multiple-choice tests is minimized in this way.

13. Internet is considered most reliable enough to provide 24x7 learning without any debate than the other offline synchronous formats, whereby the learning and teaching is done by providing CD-ROMs, bulletins and e-mails etc (Table-17). Students have access to multimedia learning resources including case studies, revision materials, assessments, and peer discussions - all through the internet. It is mostly because of the fact that on internet, students as well as teachers can access millions of resources within no time and can save the time in searching for the printed documents lying in the libraries, wherever possible.

14. Most of the organizations and institutions prefer to develop a portal or a website using software which is easy-to-use and contracted to a vendor because of the lack of technical staff and expertise in handling of the software. At times, if an organization or a particular department or faculty of the institution is having enough software technical expertise, then they prefer to have an in-house developed e-learning system which can be designed, upgraded and even modified as per their needs and requirements from time to time.

15. Students are not satisfied with the content delivery speed of learning (Table-34). Today, when change is faster than ever, a key advantage of e-learning is that it has faster delivery times than traditional classroom based instruction. Rapid prototyping or rapid e-learning using various authoring tools is one approach to the development of learning content
that has experienced exponential growth. However, due to the lack of proper infrastructure for learning content delivery and real-time video-conferencing system, learners feel discontented with the system. This time lag in developing and delivering of learning has resulted in poor learner's response and satisfaction and thus in turn affected their performance.

16. Joomla is the most preferred content management system followed by MOODLE and ILIAS. It is because of the fact that although Moodle is open source software but requires an IT specialist to handle it but Joomla is a kind of software which is easy-to-learn and handle (Table-49). Choosing any Content Management or Learning Management software is not always easy and requires lot of expertise. Main criteria for choosing any authoring tool depends on some of the attributes like accessibility, compatibility, maintainability and usability. There is no need to hire any IT specialist and there have been many discussions and complaints about the Moodle interface. For any problems with Moodle, there isn't any helpdesk and one has to look for solutions on forums which are the only support option while as Joomla has a guaranteed helpdesk for support which makes Joomla the preferred one over other authoring tools.

17. Website based systems have been a powerful impression to develop anything online, be it a learning or any commercial work and are considered the most versatile solution for delivering online learning followed by web portals (Table-9). The reason is quite apparent because of the fact that portals are of recent origin and the staff members are well versed with the designing and use of websites throughout these years. A sudden shift is not possible but the use of web-portals is gradually increasing because of the secure, easy-to-design and easy-to-use features. None of the university is using e-mail or dial-up based e-learning systems but emails are being used as an integrated part of the portal or website-based systems.
18. Providing detailed syllabus, user friendly menus, better communication tools, threaded discussions and interactive activities are some of the main features in all the delivering systems, which ensures motivation among students and success of the overall learning instruction (Table-21). However, social networking features are absent in most of the e-learning systems and there is a complete disagreement in displaying the status reports of student’s progress in a forum or message boards.

19. None of the e-learning delivering systems from the select universities allow students to easily communicate with other students and does not involve students in reviewing the work of other students online (Table-47).

7.3 Tenability of Hypotheses

The tenability of hypotheses is verified in the light of above discussed findings and by using Chi-Square statistical test.

1. There is adequate infrastructure and expertise available in all the universities under study for providing e-learning.

Sufficient infrastructure in an e-learning system and professional development of staff members plays an important role in practicing learning and teaching process in electronic environment. It is clear from the findings (Table-38 and Table-40) that lack of adequate infrastructure is considered as one of the major obstacles by 53.58% of the students and only by 34.61% of proficient staff members. It is followed by lack of expertise by 25.60% of students and by 51.92% of faculty members.

The Hypothesis is therefore Rejected

2. There is no significant difference in the opinions of e-learning proficient staff and students with regard to weakening of student-faculty relationship in e-learning environment.

The interpersonal relationship between students and teacher is an important element contributing to the learning process of students. In e-learning, one can find only mentorship which is a one-on-one learning relationship between a student and an expert in a specific topic or discipline for the purpose of
supporting learning and development. Students and mentors can suitably and more frequently communicate with each other through words, pictures, and other information regardless of location or schedules. From Table-36, it is evident that 77.51% of students believe that e-learning would weaken the student-teacher relationship. However, 63.46% of proficient staff members disagree with the statement.

On applying the Chi-Square test, it is found that the calculated Chi-Square value (13.6) is quite large than the Chi-Square tabulated value (5.991) with 2 degrees of freedom at 5% level of significance. The Chi-Square test, therefore, reveals that there is a significant difference in the opinions of e-learning proficient staff and students with regard to weakening of student-faculty relationship in e-learning environment.

**Hence, Null Hypothesis standsRejected**

3. There is no significant difference among faculty members with regard to the apprehension due to adoption of e-learning for delivering education.

The impact of information in all spheres of society coupled with the utilization of IT development for access and utilization of information are dramatically changing the face of the library and information institutions. Table-7 depicts that (100%) of the faculty members responded that it is extremely important to implement e-learning system in Library and Information Science education in India. All these figures depict that there is no apprehension or hesitance among teaching faculty to accept and implement technology for the ease of delivering and adopt new and modern ways to cope with the shift and makeover of education system in India.

**Hence, Null Hypothesis standsRejected**

4. Private universities are far ahead in delivering online instructions efficiently with innovative technologies than the government universities and institutions in India.

The study shows that the open and private universities are far ahead in delivering online instructions efficiently with maximum user satisfaction than the government universities and institutions in India. Table-49 clearly depicts
from the evaluation of the web portals of the select government and private universities that the private and open universities have a tough competition to survive and are adapting innovative technologies in teaching and learning in order to expand the scope of the subject education. However, most of the essential components of e-learning systems such as web 2.0 items, overview of the courses, additional references, standards compliance, open source LCMS etc. are missing in the government universities.

The Hypothesis is therefore Accepted

5. Students are more satisfied with the content delivery speed of e-learning mode of teaching than the proficient staff members.

Rapid prototyping or rapid e-learning using various authoring tools is one approach to the development of learning content that has experienced exponential growth. Today, when change is faster than ever, a key advantage of e-learning is that it has faster delivery times than traditional classroom based instruction. The data from Table-34 depicts that 69.23% of the proficient staff members are satisfied with the delivering speed of their online instruction. However, 30.77% of the proficient staff members and 79.43% of students seem to be dissatisfied because of the lack of proper infrastructure for learning content delivery and real-time video-conferencing system.

On applying the Chi-Square test, it is found that the calculated Chi-Square value (57) is higher than the Chi-Square tabulated value (3.841) with 1 degree of freedom at 5% level of significance. The Chi-Square test, therefore, reveals that there is a significant difference among proficient staff and students with regard to the content delivery speed in online delivery of education.

The Hypothesis is therefore Rejected

7.4 Conclusion

Technology has and will perhaps continue to have a dramatic impact on academic and educational setup of the world. It is considered as the main force today for changing the scenario of world education in general and India in particular. In order to satisfy the growing needs and requirements, e-learning is the best solution and alternative to traditional teaching and learning.
The purpose of adopting e-learning system should be to increase return on investments, reduce travel costs, assist workforce planning and to deliver content without having to sacrifice quality. By creating online classes and making them readily available to learners, customized learning systems will increase the overall institutional and organizational productivity. Presently, a large number of universities and educational institutions are in a state of adopting and implementing integrated e-learning systems in their educational setup for improving and extending their reach on education. But for doing so, they need to improve from current position of e-learning institutes to fully operational and self sufficient systems to handle this mode of learning effectively and efficiently. Therefore, the implications of studies for technological changes and improvements in academic institutes, especially Library and Information Science are of good value to authorities for implementing effective and successful e-learning system.

The present study reveals the position and perspectives of faculty members, e-learning proficient staff members as well as students of the select universities and the areas where there are more chances of improvement. Its findings may suggest new dimensions and directions in providing efficient and effective access to online resources through modern and standard learning methods. The report of these findings could also be used as a roadmap for implementing successful integrated online learning system to meet the expectations of modern and techno-oriented learners. E-learning environments are expected now, more than ever, to deploy and manage learning content that can be easily searched and retrieved during an auto-learning phase as well as to be reused for different educational purposes. With e-learning environment learners are allowed to easily locate and access the content of their preference. This study demonstrates that institutions are, in fact, taking steps to provide services to assist faculty with entering the realm on teaching online. The findings may guide the performance improvement process as well as provide a template for organizations to move forward with identifying key pieces to prepare faculty to deliver the program.
It is hoped that the present doctoral thesis on “Design and Development of E-Learning Solutions in Library and Information Science” will gather interest to help e-learning analysts both at State as well as at National level for implementing successful integrated e-learning system. The findings resulted from this thesis are based on the data provided by the faculty members, e-learning proficient staff and students of the select universities in India. Notably, the findings and suggestions of this study perhaps represent the national consensus needing attention and support to solve the issues that are associated with the implementation of successful e-learning system in the academic institutions of India, especially LIS schools. But, this study should not be deemed as the only viable way out to solve all the problems related to online learning in India. However, it will serve as a guide for the LIS faculty members and information analysts to select the most appropriate design for the development of an efficient e-learning system that will serve to the needs of a Library and Information Science professionals and learners in a better and effective way.

7.5 Suggestions

On the basis of findings of the study undertaken, the following suggestions are listed for the surveyed universities in particular and for other institutions in general in order to successfully implement e-learning system.

1. Library and Information Science faculty members must improve their practical knowledge and competence in e-learning and use of internet and computers, so that they may find it convenient to shift over a new system of teaching and learning which is going to implement in majority of the Indian universities sooner than expected. They must exert their potential to find new and improved techniques other than traditional ones to be incorporated in online mode of learning which will result in getting the fair value of providing learning than cost.

2. E-learning is not considered as an alternative or substitute to traditional learning and is not considered as essential for the success of organization in India. In fact, blended learning, a combination of both
traditional and online learning, is considered as the best solution to
tackle with modern day technological improvements in educational
setup. However, Library and Information Science faculty members
should try to get the best of both methods of teaching and learning and
should help students to get acquainted with the latest technology so that
they may not find any difficulty in completely shifting over to an online
mode of teaching and learning.

3. E-learning largely depends on the digital equipments and internet
connectivity. Any inadequacy in proper infrastructure and poor internet
connectivity can result in the failure of the system. Building up of proper
infrastructure should be the top most priority.

4. The social interaction, practical learning skills development, interactive
classroom settings, encouragement, exchange of ideas without
communication barriers must be incorporated in an e-learning delivery
system.

5. The four main components of e-learning are the system quality,
information quality, the service quality and the user satisfaction. All
these components should be taken care of because deficiency in any of
the components will result in the lack of interest among students.

6. A continuous and uninterrupted financial and technical support should
be provided to organizations and institutions for the successful
implementation of an e-learning system with well set modern
educational policies.

7. The whole infrastructure of e-learning is dependent on the type of
softwares handling the system. While choosing the software, it is
suggested to select the software which is not complex and difficult to
handle. It must have provisions to add, delete, modify or alter any
module that is not required or needs to be incorporated in it. The human
computer interface should be user-friendly and easy to handle.
8. Proper technical and learner support with instant feedback and effective communication should be provided in order to keep students motivated throughout the course.

9. Online discussions and webinars and continuous assessments should be conducted and encouraged so that the students will find space apart from their daily routine work which keeps students interested and active.

10. The time lag in rapid developing and delivering learning has resulted in poor learner's response and satisfaction and thus in turn affected their performance. There should be speedy prototyping or rapid e-learning using various authoring tools which is one approach to the development of learning content that has experienced exponential growth.

11. Detailed syllabus, user friendly menus, better communication tools, threaded discussions and interactive activities, forums and message boards should be incorporated in all e-learning delivering systems.

12. Students should be allowed to communicate with each other in the context of learning using group messaging or e-mails within the system over which administrators shall have full authority and control.

13. Students should also be allowed to communicate with teachers and faculty members easily as and when required.

14. Apart from delivering lectures and providing learning, students should be allowed to download audio/video and textual content and other learning resources. This feature needs to be incorporated in all the surveyed universities.

15. New recruitments should be done keeping in view the proficiency in handling the computer and web based e-learning systems.

7.6 Scope for further research

The instructional design methodology for the e-learning development involves five main phases which are analysis, design, development, implementation and evaluation. During the course of this research study, the investigator felt that following future work can be carried out in various other fields of knowledge.
1. Research is needed on the diverse technologies, especially the use of blogs, Wikis, shared documents, social bookmarking, RSS feeds, digital story-telling tools, search tools and expert locators. In particular, the tools that will be most successful and most readily used in creating and in finding knowledge within the organization.

2. Development of the e-learning content involves the use of multimedia packages and web based technologies. So, there is a need for the identification of multimedia and web based packages for the development of e-learning content in order to have a single platform for various subjects of knowledge. The learning objects will be developed accordingly based on the design of the e-learning content.

3. In order to store e-learning contents in a repository so as to facilitate sharing and reusing of the learning contents, design and development of e-learning content repository is essential. This will involve the understanding of XML and its technologies for easy storing and retrieval of documents.

4. Similar studies can be carried out for IITs and IIMs which are well reputed institutes in India.

5. A comparative and evaluative study is also suggested for the universities providing e-learning in India for other fields of knowledge, especially for the government institutions which are a step behind the private institutions in delivering online learning.

6. Similar studies can also be carried out for other large number of universities and LIS schools providing Library and Information Science education in India so as to facilitate, extend and improve the quality of LIS education.