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Developing a web-based e-learning model for Library and Information Science Candidates in India

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ABSTRACT

This study aimed at developing an e-learning platform for UGC-NET/JRF (University Grants Commission-National Eligibility Test/Junior Research Fellowship) candidates in the field of Library and Information Science (LIS). At the initial stage, the content was developed according to the syllabus of UGC and, a jury of experts validated it. The Moodle Learning Management System (LMS) was used to integrate and deliver the e-content, and the portal was hosted on a separate website (<http://lislearning.co.in/>) to ensure remote access. The study also addressed the need for e-learning in LIS and points out the scope and directions for future research.

Keywords: Moodle, e-learning, Learning management System, Library and Information Science, University Grants Commission, National Eligibility Test, Junior Research Fellowship.

1. INTRODUCTION

Education should be provided to all, guaranteeing all aspects with good quality. It should also certainly provide good prospects for all (UNESCO, 2015). The quality of education relies on the skills and knowledge of the teachers. Hence, the recruitment process of teachers should be perfect, by hiring skilled and knowledgeable teachers and, training or professional development opportunities should be offered on a regular basis. However, if the present trend continues, there will be a global shortage of teachers in more than 30 countries, which means there will not be sufficient teachers to fulfil the educational needs of all the children by 2030 (UNESCO Institute of Statistics, 2015). One way to deal with this global shortage of teachers is to develop instructional designs that utilize technology thus reducing the exclusive dependence on teachers without compromising the quality of education. Another distinct dimension is the need for lifelong learning in an era of rapid technological changes: There can be teachers for school age and college age individuals but it is not possible to provide lifelong teachers. Moreover, people who are seeking lifelong education are increasing day- by- day (Horrigan, 2016). In order to meet the needs of these lifelong learners, formal classroom education is not sufficient. As a result, educational institutions have to adopt new and innovative ways to cater to their needs. This calls for e-learning which, has the goal of learning from anywhere and anytime (Barjis, 2003). E-learning is known as electronic learning where the learning process is done using the internet to provide materials to the students (Hartley, 2001).

E-learning infrastructure is required for delivering learning materials over the web and this is done by using Learning Management Systems (LMS), which is also known as Virtual learning environments (VLE). LMS helps the educators in delivering their courses, supporting collaboration, assessing learners' performance, recording learners' data, and generating reports that will help in maximizing the effectiveness of the learning organization (Yasar & Adiguzel, 2010). In traditional classroom teaching, the teacher has several ways to identify whether the students are understanding instructions or not, for example, the teacher can ask questions and conduct a formal assessment to find out the progress of the students. In the same way, if e-learning is effective, it should have interactive elements which allow students to participate and post queries and also helps the educators in assessing their progress. The three vital components of VLE are administrator subsystem, e-tutor subsystem, and e-student subsystem. Effective e-content relies on the skills and knowledge of an domain expert combined with the skills of an instructional designer to ensure high-quality, interactive content is delivered (Lihitkar, 2013). The main aim of this study is focused on developing an e-learning platform for Library and Information Science (LIS) candidates in India based on the syllabus framed by the Indian University Grants Commission (UGC).

2. UNIVERSITY GRANTS COMMISSION (UGC)

The UGC of India is a statutory body, which was set up in 1956 by the Government of India, under the Ministry of Human Resource and Development (MHRD) for the coordination, assurance, and support of the education offered by the universities in India. UGC has its headquarters in the capital city, Delhi and has six nodal centres in Pune, Hyderabad, Kolkata, Bhopal, Guwahati, and Bangalore to screen the standard of advanced education in all locales of the nation (University Grants Commission New Delhi, 2017).

3. NATIONAL ELIGIBILITY TEST (NET) & JUNIOR RESEARCH FELLOWSHIP (JRF)

The NET is a kind of competitive examination for Indian nationals. It is conducted to and to determine the eligibility for Assistant Professor and lectureship in the universities and colleges and also for the award of Junior Research Fellowship (JRF) to support the pursuit of Ph.Ds. The NET is conducted twice a year (June and December) by the Central Board of Secondary Education (CBSE), for and, on behalf of, University Grants Commission [UGC] of India (CBSE, 2018).

4. NEED FOR E-LEARNING IN LIS

There has been a significant change in the field of Library and Information Science since the invention of Information and Communication Technology (ICT). As a result, the roles of libraries and librarians have also changed from the mere custodian of books to information scientist or knowledge managers. Now, institutions providing library science education have to produce efficient knowledge managers and information scientists who have too many diverse roles that meet the user needs. This has necessitated LIS schools to transform their traditional classroom teaching to ICT based teaching and learning. Ramdas Lihitkar Anilkumar Naidu, & S. Lihitkar (2013) have identified the following needs for incorporating ICT in LIS education:

- ☐ To enhance the quality of LIS students
- ☐ To cater to the needs of the market in the digital environment
- ☐ To implement e-publishing, which is widely accepted by the user community

□ To renovate conventional LIS education in India

5. BACKGROUND STUDIES

A plethora of studies related to e-learning and its usage, in general, are available. The studies related to e-learning in Library and Information Science in the Indian context were reviewed in the present study. Lihitkar (2013) designed a VLE for LIS students and highlighted that teachers should be first equipped with the methods of e-learning in order to deliver the contents effectively. Face-to-face interaction is termed as the major disadvantage in VLE, because it cannot replace traditional learning, but can compliment it effectively (Lihitkar, 2013). The LIS education in India is slowly making progress in accordance with global technological changes, but it requires good and adequate ICT infrastructure to gain momentum in this direction (Kumbhar, 2009). The LIS curriculum in India should maintain a balance between traditional and Information Technology (IT) components. Further, LIS departments need to incorporate global standards of LIS education by including e-learning, which is a difficult task in a developing country like India, but it is not impossible (Ramdas Lihitkar et al., 2013). The possibilities of e-learning initiatives in India are very slim as they lack the trained and qualified staff to handle the platform. But the mindset of the students is the main barrier to creating flexible learning platforms. The majority of the students are not familiar with the latest technologies though most of them spend hours surfing and chatting. Those same students are reluctant about taking online courses for education and skill development (Tripathi & Jeevan, 2010).

Most of the related literature is theoretical: they are just explaining the benefits of e-learning in the field of LIS. Only one study created a VLE model for LIS students, and there was no literature focusing on the competitive exams aspects of LIS. Hence, this study was initiated to develop an e-learning platform to meet the needs of UGC-NET/JRF candidates of LIS.

6. CHALLENGES OF ONLINE PROGRAMS IN INDIA

India is the seventh largest country in the world in terms of its geographical area with more than one billion population. It has 23 languages, 1652 dialects and a wide array of religions (UNICEF, 2013). With such a vast size, spread, and heterogeneity, it is difficult to cater to the educational needs of a nation without building a cost-effective and comprehensive e-learning system for the mass learners (Mann, 2015). In rural India, the majority of parents cannot afford to send their children to school, as they need their labour to support their family financially. In order to make education accessible to everyone, some educational institutions in India have started online programs where individuals can learn new skills and knowledge; However, these online programs cover only a small portion of the urban students, and they also lack the basic educational needs of the rural background (Sharma, 2005). Moreover, nearly 80% of the educational budgets in India are spent on staffing, and their return on investment (ROI) is poor, as one-fourth of the staff are not reporting to class regularly, which worsens the situation further (World Bank, 2015). Gurukul online, a leading e-learning organization in India, stated that access to technology and ICT infrastructure is very low in India, which poses a challenge to implement an e-learning system. This scenario is improving gradually, as accessibility to the internet through smartphones and computers has become affordable due to the competitiveness of the service providers (Mann, 2015). India has to tackle a wide range of obstacles in order to implement an e-learning system for its large mass of the population. An effective strategy and framework are essential to implement e-learning for mass learners,

and, if it is implemented, it should definitely provide education to those sections of the population, which, at present, are beyond reach.

7. METHODOLOGY

The study aimed at developing an e-learning platform for UGC-NET/JRF candidates of LIS using Moodle LMS software. The development of the e-learning platform comprised of four steps:

- ❑ Creating the content according to the syllabus of UGC
- ❑ Validating the content using subject experts
- ❑ Hosting the content through a website
- ❑ Integration of the website using LMS software to create an e-learning environment

Content Creation: The UGC- NET syllabus consists of ten units and the contents of these units are already available in both print and digital form. It was modified and presented in simple and lucid language by highlighting the concepts in the form of points instead of running texts in a paragraph in order to make it understandable even to slow learners.

Expert Validation: The modified content was sent to a panel of five subject experts in the field of LIS in order to receive validation, i.e. whether it is pedagogically valid to deliver it to the students. After receiving consent from the experts, the contents were finalized and were then ready to use.

Content Hosting: A space on the web is essential to deliver the contents online. Hence, a new domain (<http://lislearning.co.in/>) was purchased for the same purpose.

Integration: LMS is required to ensure an e-learning atmosphere over the web. Hence, Moodle LMS software was downloaded and installed in the localhost, which serves as a front end and Hypertext Preprocessor (PHP) as the back end. A MySQL database acts as a storage system for the data (student enrolment, tracking progress, etc.). Finally, the contents are integrated into Moodle and hosted through the domain <http://lislearning.co.in/>, which is accessible from anywhere on the World Wide Web (WWW).

8. WHY MOODLE?

Moodle is an open source learning management system that is designed to facilitate administrators and learners with a strong single integrated system that allows personalized learning (Moodle, 2018). It is easy to add content in Moodle because of its modular framework. It can engage learners and also support a range of pedagogical style of teaching (Romero, Ventura, & García, 2008). Moodle has been termed as an effective LMS for teaching and learning (Perkins & Pfaffman, 2006) that incorporates extensive features like enhancing student inquiry and analytical skills (Regueras, Verdú, Verdú, & De Castro, 2011), personalized learning (Woltering, Herrler, Spitzer, & Spreckelsen, 2009), and encouraging collaboration (McLuckie, Naulty, Luchoomun, & Wahl, 2009). It is supported by the massive online learning community due to its extensive customization and, moreover, its open source (Henk, 2010). Further, it is one of the most popular and commonly used LMS for creating flexible online courses by facilitating personalized learning experience (Rice, W, 2006).

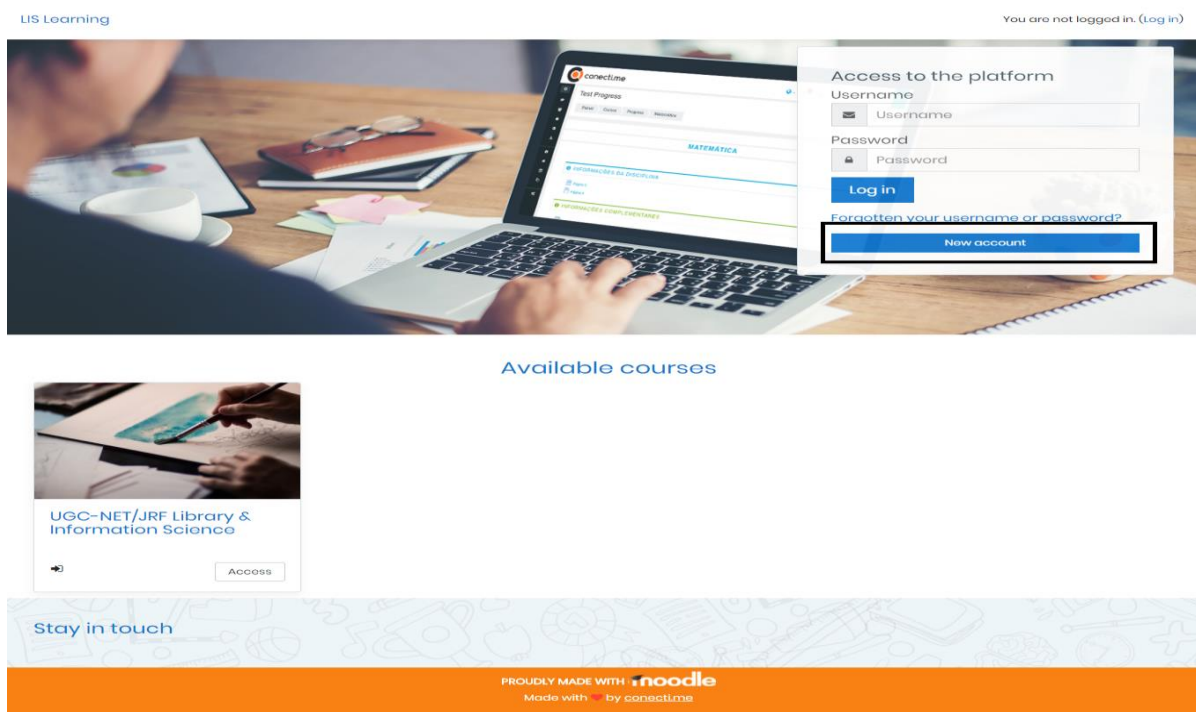
The previous studies related to the usage of Moodle as an LMS have provided a gateway for educators in selecting the appropriate LMS for their project. As an open source software, Moodle has been effectively utilized by various educational institutions to provide the web-based teaching-learning environment. Based on the literature and the popularity of the LMS, the researchers chose Moodle as the best VLE platform to develop the e-learning course related to LIS.

The target audience of this course is the candidates in the field of LIS, who wants to qualify UGC-NET/JRF examination for their career prospects. The created e-content was validated by a panel of subject experts and was hosted in a separate domain using Moodle LMS. The course was entitled “UGC-NET/JRF in Library & Information Science,” and consisted of ten units as per the syllabus of UGC. The topics of the contents in each unit were provided by means of separate modules and objective type review questions were presented at the end of each module. This helps the learners to assess their knowledge after completing a module and they can also attempt the review questions as many times as they like without any restrictions. Similarly, at the end of each unit, a set of review questions were provided to evaluate their knowledge in the unit. The same structure was followed in all the ten units. The uniqueness of this course is that learners cannot skip a single module and move to the next one as they have a checklist that is used to note their progress after each module. It's also not possible to complete without opening the module. This ensures that learners do not skip any module while completing the course and reminders are sent to their mail so they can continue from where they left off, and also to remind them about the checklist they have not completed.

9. E-LEARNING PLATFORM FOR LIS

The content created was validated by a panel of subject experts, was integrated with Moodle LMS, and, finally, was hosted through a separate domain (<http://lislearning.co.in/>). This e-learning platform was specifically designed to provide for the needs of UGC-NET/SET candidates of LIS. The home page (Figure 1) of the portal has provisions for new users or learners to create an account, which will help them enroll into the course using their student/learner identity.

Figure 1: Homepage of the e-learning platform (<http://lislearning.co.in/>)



The learner's details page (Figure 2) requests that they create their username and password, which would be used as the credentials for logging into the portal. The details include demographic information like name, age, gender, educational qualification, institution, and so on. Some of the details are mandatory, while some are optional, and those can be completed at the discretion of the learner. The login will direct the learner to their dashboard (Figure 3), which has the provision of enrolling in the course (UGC-NET/JRF Library & Information Science). Self-enrollment was initiated by the administrator, which means the learners have enrolled automatically without depending on approval from the administrator. The course (UGC-NET/JRF Library & Information Science) is segmented into the following five components.

1. Course Induction
2. Discussion Forum
3. Course Units (1 - 10)
4. Wrap Up
5. Certificate of Acknowledgement

Figure 2: Registration page for new learners

LIS Learning

New account ▼ Collapse all

▼ **Choose your username and password**

Username !

The password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 non-alphanumeric character(s) such as *, -, or #

Password !

▼ **More details**

Email address !

Email (again) !

First name !

Surname !

City/town

Country

▼ **General Details**

Area

Name of the Institution !

Type Of Institution !

Age !

Basic Degree !

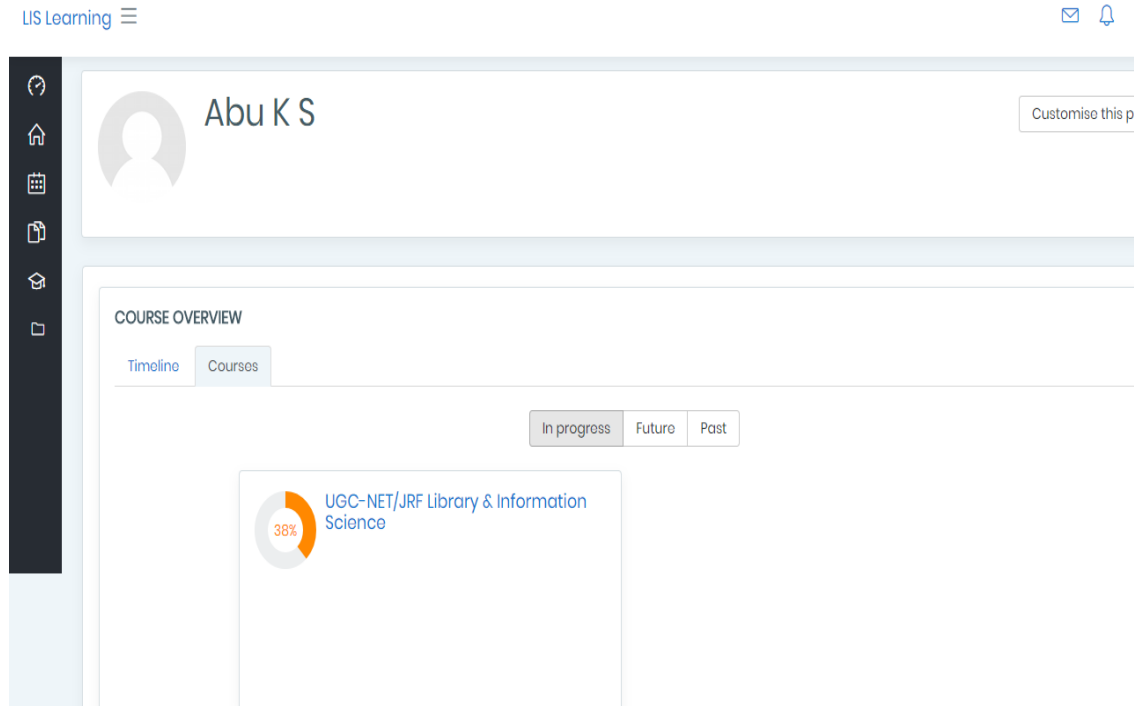
Qualification !

Status !

Gender !

There are required fields in this form marked !.

Figure 3: Student's personal dashboard page

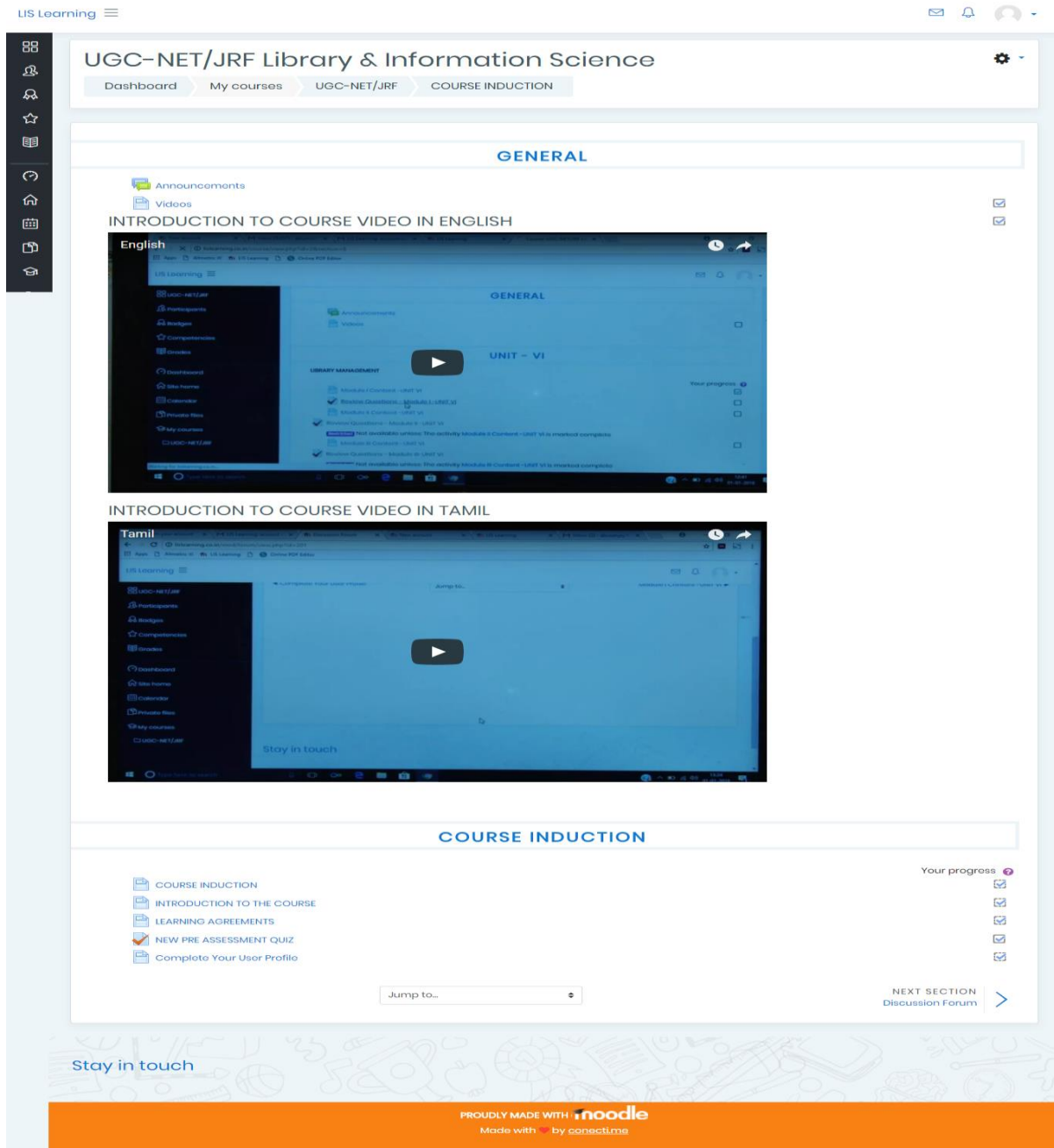


9.1. Course Induction

This segment welcomes the learners to the course by providing information regarding how to use the portal, the structure of the content, ethics to be followed in the discussion forum, and so on. Course induction, in turn, is divided into the following entities.

- ❓ **Course Videos:** Video tutorials in both English and Tamil (a language in India) are given to make the learners acquainted with the course. These videos clearly explain how to register, login, access the content, and how to get a certificate. The videos were hosted using YouTube and the links were provided in this section.
- ❓ **Introduction to the course:** The introduction gives an overview of the course, the structure of content delivered, details regarding review questions, and so on.
- ❓ **Learning Agreement:** This section briefs the learners about the rules and regulations to be followed during the progress of the course and criteria for course completion.
- ❓ **Pre-Assessment Quiz:** A set of multiple choice questions related to the UGC-NET exam containing ten units were prepared and posted in this section. This helps to identify the existing knowledge of the learners in the subject before enrolling in the course. The learners are only able to take the quiz one time. Once they submit it, they cannot revise or edit their responses learners are permitted only once to answer the quiz and after submitting their attempt, they cannot revise or edit.
- ❓ **Complete Your User Profile:** This allows the learners to add their photos, update their preference for notifications from the administrator, and edit their existing profile.

Figure 4: Learners' view of the course induction page



9.2. Discussion Forum

This space allows learners to share and exchange their ideas with their fellow participants and post their queries related to the course. The administrator uses the platform to interact with the learners. The administrator also has the authority to bar or remove posting with irrelevant information from the forum.


Figure 5: Discussion forum for learners

The screenshot shows a web interface for a discussion forum. At the top left, there is a logo for 'LIS Learning' with a hamburger menu icon. To the right, there are icons for email, notifications, and a user profile. Below this is a navigation breadcrumb: 'Dashboard > My courses > UGC-NET/JRF > Discussion Forum > Discussion Forum'. A search bar is located to the right of the breadcrumb. The main heading is 'UGC-NET/JRF Library & Information Science'. Below the heading, there is a sub-heading 'Discussion Forum' and a settings gear icon. A button labeled 'Add a new topic' is visible. The main content area features a post by 'LIS News' from 'Library Admin' dated 'Sunday, 14 January 2018, 12:41 AM'. The post text reads: 'Hello Friends, I am happy to interact and welcome you all to this discussion forum! This forum is initiated mainly for discussing, sharing and exchanging views, opinions, ideas and news/events related to library and information science. I hope that this forum will provide a fruitful experience in interacting with professionals/colleagues and also in enriching your knowledge. Kindly make use of the same Thank you'. At the bottom right of the post, there are links for 'Permalink | Edit' and 'Discuss this topic (0 replies so far)'. At the bottom of the page, there is a link to 'Complete Your User Profile', a 'Jump to...' dropdown menu, and a link to 'Module I Content - UNIT II'.

9.3. Course Units

As stated before, the contents were prepared according to the syllabus of UGC (<http://www.ugcnetexam.co.in/ugc-net-library-information-science-syllabus.html>), which was validated by experts before hosting online. Each unit was segmented into different modules based on the objectives and contents. The topics were delivered using these modules with each module containing a set of review questions, which will help the learners to assess their progress. They can also attempt the review questions as many times as they like. All ten units follow a similar structure. The details regarding the content of the units are presented below:

Figure 6: Structure of Content in Unit II

UNIT - II	
LIBRARY LAWS, LEGISLATION EDUCATION AND PROFESSION	
Module I Content - UNIT II	Your progress  <input checked="" type="checkbox"/>
Review Questions - Module I - UNIT II	<input checked="" type="checkbox"/>
Module II Content - UNIT II	<input checked="" type="checkbox"/>
Review Questions - Module II - UNIT II	<input checked="" type="checkbox"/>
Module III Content - UNIT II	<input checked="" type="checkbox"/>
Review Questions - Module III - UNIT II	<input checked="" type="checkbox"/>
Module IV Content - UNIT II	<input checked="" type="checkbox"/>
Review Questions - Module IV - UNIT II	<input type="checkbox"/>
Module V Content - UNIT II	<input type="checkbox"/>
Review Questions - Module V - UNIT II	
Restricted Not available unless: The activity Module V Content - UNIT II is marked complete	
Module VI Content - UNIT II	<input checked="" type="checkbox"/>
Review Questions - Module VI - UNIT II	<input type="checkbox"/>
Module VII Content - UNIT II	<input checked="" type="checkbox"/>
Review Questions - Module VII - UNIT II	<input type="checkbox"/>
PREVIOUS SECTION Discussion Forum	Jump to: <input type="text"/>
	NEXT SECTION Unit - VI

Unit I: Basic Concepts of Information

This unit gives an introduction to Information, its utilization as a resource and commodity, the transfer cycle of information (creation to the dissemination of information), communication channels and barriers, and finally, briefs about the various Intellectual Property Rights (IPR).

Unit II: Library Legislation

The second unit deals with library legislation in India (laws enacted by parliaments and assemblies relating to the founding and operation of libraries), the five laws of Library Science stated by Dr.S.R.Ranganathan (Father of Library Science in India), Library Associations and Organizations in India and across the globe, concepts of resource sharing, and library networking.

Unit III: Information Sources

This unit highlights the various sources of information (primary, secondary, tertiary non-documentary, reference, biographical, and bibliographical sources). It also deals with indexing and abstracting sources, databases, and other e-resources (e-books and e-journals).

Unit IV: Information Services

This unit discusses the different services offered by the library: Reference, referral, bibliographic, indexing, abstracting, current awareness, selective dissemination of information (SDI), translation reprographic, and other online services.

Unit V: Knowledge Organization

This unit explains the universe of knowledge, modes of formation of subjects, classification (Dewey Decimal Classification, Colon Classification) and cataloguing systems (Classified Catalogue Code and Anglo-American Rules for Cataloguing Rules), Indexing systems (Pre coordinate and post-coordinate systems), vocabulary control (Thesaurus, List of subject headings), and knowledge management.

Unit VI: Library Management

Unit six deals with management aspects in the library: Personal, Resource, and Financial management. It provides an overview of the different school of thoughts, various sections in the library, collection development policies, budgeting, Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), and Total Quality Management (TQM).

Unit VII: Information Technology

The seventh unit provides an insight into the basic components of Information and Communication Technology (ICT). It provides brief information about computer hardware, software, storage, input and output devices, switching systems, protocols, network topologies, and open system interconnections (OSI).

Unit VIII: Library Automation

This unit discusses the areas of implementing the application of ICT in the libraries. It explains about the online public access catalogue (OPAC), library Networks and consortia (Information and Library Network (INFLIBNET)), Developing Library Network (DELNET), Online Computer Library Centre (OCLC), and information systems at the national and the international level.

Unit IX: Research Methodology

This unit gives an insight into the research practices carried out in social science with reference to the Library and Information Science (LIS) discipline. It briefs about the components of research, its types, hypothesis, methods of data collections, report writing, and, finally, the applications of qualitative and quantitative research methods in the field of LIS.

Unit X: Types of Libraries

The last unit presents an overview of the various types of libraries in terms of its users (National, Public, Academic, and Special libraries) and also based on technology (Electronic, Digital, Virtual, and Hybrid libraries). It further explains the role of UGC in the advancement of libraries and, the importance of user studies and user education (CBSENETONLINE.IN, 2018).

9.4. Wrap Up

This is the concluding section of the course which consists of the following entities.

- ❑ **Concentration Questionnaire:** A set of questions aimed at assessing the learners' ability to concentrate is posted in this section. The questionnaire will help the administrator ascertain whether the learners are to maintain their concentration throughout the course or if they are distracted while completing it
- ❑ **Post-Survey Questionnaire:** This survey is conducted to obtain overall feedback about the e-learning platform from the learners.
- ❑ **Post-Assessment Quiz:** Similar to the pre-assessment quiz, the same set of questions (order of questions are changed) were asked in order to assess the learners' progress after completing the course. Only one attempt is permitted.
- ❑ **Answer Keys:** Answer keys to both pre-assessment and post-assessment were posted in this section.

- ❓ **Acknowledgements:** The sources used to prepare the learning materials were acknowledged in this section.
- ❓ **Additional Study Materials:** Other e-learning platforms and websites related to LIS were provided in this section.
- ❓ **Contact Details:** Finally, contact details of the administrator are provided for the learners to send their queries.

Figure 7: Wrap up page of the course

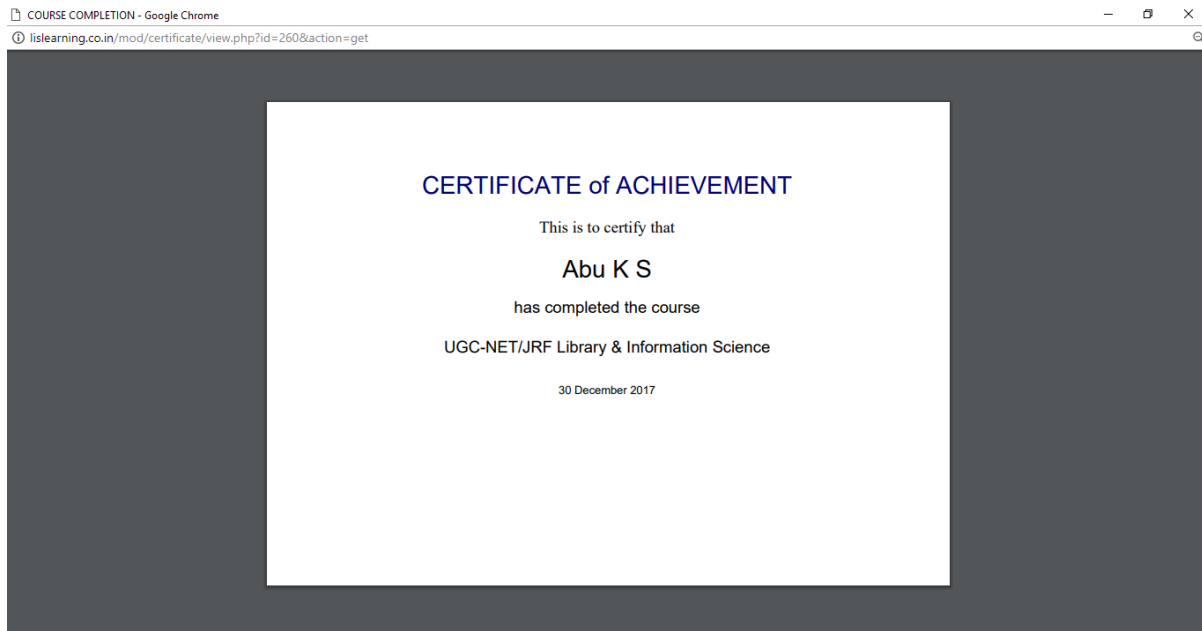
The screenshot displays the 'WRAP UP' section of a course. At the top, the title 'WRAP UP' is centered in blue. Below it, a list of activities is shown, each with an icon and a completion status. The activities are: 'CONCENTRATION QUESTIONNAIRE' (checked), 'POST SURVEY QUESTIONNAIRE' (checked), 'NEW POST ASSESSMENT QUIZ' (checked), 'NEW PRE ASSESEMENT QUIZ - ANSWER' (unchecked), 'NEW POST ASSESEMENT QUIZ - ANSWER' (unchecked), 'ACKNOWLEDGEMENT' (checked), 'ADDITIONAL STUDY MATERIALS' (checked), and 'CONTACT DETAILS' (checked). To the right of the list, the text 'Your progress' is followed by a question mark icon. At the bottom, there are navigation options: 'PREVIOUS SECTION Unit - X' on the left, a 'Jump to...' dropdown menu in the center, and 'NEXT SECTION Certificate of Acknowledgement' on the right.

Activity	Completion Status
CONCENTRATION QUESTIONNAIRE	✓
POST SURVEY QUESTIONNAIRE	✓
NEW POST ASSESSMENT QUIZ	✓
NEW PRE ASSESEMENT QUIZ - ANSWER	☐
NEW POST ASSESEMENT QUIZ - ANSWER	☐
ACKNOWLEDGEMENT	✓
ADDITIONAL STUDY MATERIALS	✓
CONTACT DETAILS	✓

9.5. Certificate of Achievement

After completing the course successfully, the learner will receive a certificate of achievement. In order to receive the certificate, the learner should complete all five segments of the course and each module successfully. The learner's progress is tracked at each stage and if he/she skips a module, the system will remind them that something is incomplete. Hence, only after his/her progress is 100% will the course be completed successfully.

Figure 8: Certificate of Achievement for the learners



10. CONCLUSION

The study aimed at developing an e-learning platform for catering to needs of UGC-NET/JRF candidates of LIS. A comprehensive online learning environment was created using Moodle LMS and was hosted using a separate domain (<http://lislearning.co.in/>). The effectiveness of this platform is not assessed in this study as it only focused on developing the platform. This study will bring a significant change to the teaching-learning process by placing the initiative in the hands of the learners rather than the educators. In addition, this study provides a plethora of research opportunities such as evaluating the effectiveness of the e-learning platform from the learners' point of view, which is vital to the success of this platform. Further, the e-learning systems produce a large volume of information that will help in analysing the learners' behaviour (Mostow & Beck, 2006). They can store information about student activities like interaction, progress in the course, test, assignment, reading, writing (Mostow et al., 2005), and also the personal information (user profile) about the learners (Dringus & Ellis, 2005). These large amounts of educational data can be mined effectively to identify different patterns and clusters, which will add substantial value to the existing knowledge. Hence, this study is a stepping-stone for initiating an e-learning environment for LIS candidates and based on the outcome, it will be modified and further research will be carried out accordingly. Additionally, the effectiveness of the e-content may be studied by comparing pre-test and post-test surveys. The collected demographic information may provide other avenues for future research, such as gender difference in performance, pre-test and post-test surveys, which may help to show to whom the e-content is more effective and also what kind of remedial measures to be taken. Similarly, different studies may be explored based on locality, age group, type of institutions, basic qualifications, and so on. The Gain Score (the difference between post-test and pre-test scores) may also be used to measure the performance of the learners enrolled in the course.

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