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ROLE OF ICT IN DELHI UNIVERSITY PROCESSES

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ABSTRACT

This paper is an attempt to understand the role of Information Technology in the working and management of various aspects in Delhi University. This also helps us to get an overview of how the technology is being used in an academic organization in different fields and motivates us to explore the possibility of utilization of more technical advancements.

Keywords: National Knowledge Network, Delhi University, Delhi University Library Systems, Braille text, E-learning, E-waste

I. INTRODUCTION

The University of Delhi is known for its quality education and teaching. The University comprises of around 75 colleges and 40 departments widespread across North campus, South campus and off campus. Along with that it has administrative and examination blocks, libraries, health care centres, banks, hostels, staff quarters for teaching and non-teaching.The university has a laid fibre optic network connecting North and South campuses along with other colleges and departments. The networking facility is managed at both ends and helps in achieving various goals related with academics and research. The technology advancement along with strong academics has excelled the students to become talentedand skilled citizens later contributing to the society.

II. NATIONAL KNOWLEDGE NETWORK (NKN)

India is a country with rapidly increasing population and comprising of almost 60 % of it as the age group 25-30. Hence imparting education plays a great role in the foundation stone of future India. Currently there are around 500 Universities in India (including the central, state & other). According to a survey conducted in 2012-13, 86% of the population isable to enter graduation level but this percentage is cut down very sharply for the higher education. Due to the limited number of seats, only 12% of the total enrolled students are able to get admission in post-graduation. Not even this, only 1% is able to go into research.[1] To engage morepeople& to make a knowledge society, Indian Government started a project called NATIONAL KNOWLEDGE NETWORK (NKN), having their website designed and hosted by National Informatics Centre (NIC). NIC has a goal to implement the idea of connecting 1500 institutions over a period of 2-3 years. The purpose of National Knowledge Network in hand with NIC is to connect the knowledge community together from different fields like higher education, technology, agriculture, governance etc. The revolutionary step provides high bandwidth and low latency to connect knowledge and research institutes from different parts of the country.

It also supports distance education like video conferencing and MOOCs (Massive Open Online Course) to give a real life experience.

The whole idea is implemented at three levels

1. Super-core
2. Distribution core
3. Access core

The backbone of this network is connected with 7 meshed super-cores with a support of multiples of 10Gbps. To distribute it further, 26 core locations have been decided which are connected with super-cores. This is the main distribution layer that connects the entire country. 2.5/10Gbps links are used by the core locations to get connected with the super-cores. Finally the end-users like government firms, educational institutions & research labs are connected using 1Gbps link.

India is expected to have 500 million numbers of internet users by the end of 2017 that includes 314 million users connected by their mobiles only**.** [2]So NKN may work as a supportive platform to make an efficient virtual environment of learning.The on-going NKN project will make a web of knowledge that could be accessed by anybody, anywhere, any device, anytime. This will help in overcoming the problem of limited infrastructure. NKN will promote information sharing, technical advancements like e-learning may help students consult the online tutorials; access the e-journals, digital notes, engage themselves in online discussion/debate etc.Few universities have started the conceptof virtual classes with the help of ICT infrastructure & viewer can access this information through various open source software applications. The flexibility to conduct knowledge sharing via this medium on a good bandwidth open up avenues for better interaction and innovations in the near future as well.

Benefits:

- This high end network will help the researchers to work in a collaborative environment like GLORIAD, GARUDA etc.
- Access to resources like e-journals, scientific databases would get easier.
- Testing of various hardware & software may become more easy and accurate
- Geographical areas requiring high-performance computing can easily be implemented using NKN.

III. NETWORKING (HOW DIFFERENT COLLEGES ARE CONNECTED)

With high technical advancement and practical academic structure, a high bandwidth network is required in the University. Computer Centre maintained in North & South Campus helps in creating the ICT network across the city covering various colleges/departments. These centres act as a hub providing various network facilities to the on-campus & off-campus colleges/ departments/other DU branches. In North Campus 5 On-campus colleges are connected (via a direct link between computer centre & colleges) and 9 on-campus colleges are there in South Campus. All the remaining colleges are connected via optical fibre using the MPLS-VPN technology.

This technology makes feasible theVLAN to be established in such an efficient way with other colleges that it appears as if they are directly connected with the centre. Every college is offered a full bandwidth of 100Mbps. To handle this much of traffic, currently DU is having a 3G bandwidth in total which is segregated as 2G for North Campus & 1G for South Campus. Also the two centres are connected with each other through a dedicated link. Figure-1 shows the overall connectivity.

The entire networking related infrastructure is kept in North & South Campus computer centres. Earlier due to the restriction on infrastructure colleges/departments didn't use to prefer to host their websites by DU centre; they used to outsource the whole process. But now the scenario has changed completely. These days most of the college's website is hosted in DUCC. With the 'no-space restriction' of the uploaded data on the website, all the updates regarding the college are being updated on the site only. With almost 60 servers, 6 web-servers & 2 application servers, DUCC handles all the traffic even during the peak time. With the ICT network created DUCC provides services like

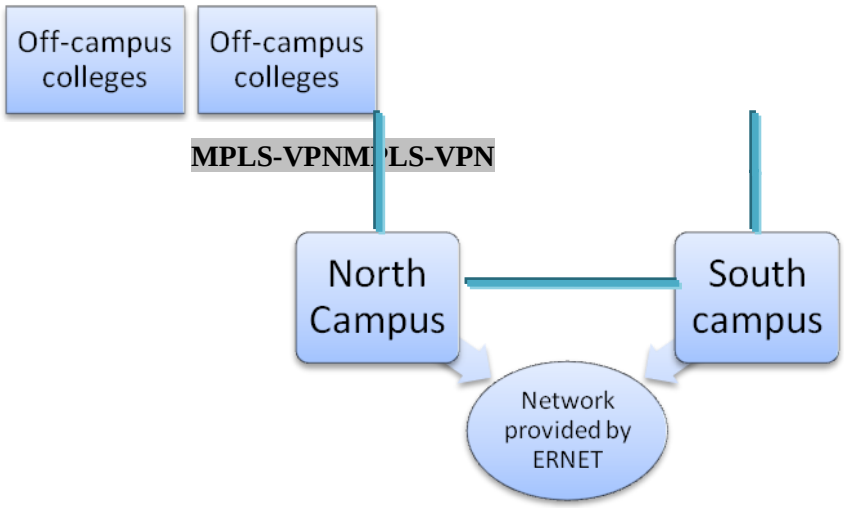

Figure-1: Block Diagram Showing the Overall Connectivity of Delhi University

- E-mail: - Mailing service is provided to all the DU officials, faculty members of colleges/ departments, PhD & to PG students.
- Anti-virus & spam protection: - For mailing and web services, anti-virus & spam protection is provided at server & gateway level
- Access to E-journals: - major e-journals are made available on the DU network with the help of central library, to help the researchers, faculty members & students.

With the help of NKN, every college & student is now accessing the worldwide available resources. Approximately 2lakh students & over 8000 faculty members are currently using this service in DU.

Up-comings-

- According to Dr. Gupta-Director, DUCC ,they are in the phase of upgrading the bandwidth from 1 G to 10 G and it is supposed to be achieved within a couple of months.
- Becoming the part of EDUROAM

EDUROAM is education roaming. This service offers a secure & worldwide roaming access of internet to the researchers & students. To use this service faculty/students can use their ID & password issued to them by their respective institutions. They need not to enter or use the credential of different university to access the internet. This service can only be accessed within the participating institutions only.

IV. APPOINTMENTS& ADMISSIONS

APPOINTMENTS: Recently Delhi University has started an online system for appointments. For this an in-house application (application form) is designed & developed by Institute of Informatics and communication, University of Delhi, South Campus. To fill the form user needs to register on the online portal by providing basic credentials. After registering a confirmation mail will be sent at the user's id. Clicking on the link provided at the mail will redirect the site to the login portal. After logging on the system multiple tabs are provided to fill the details viz. basic, educational & other required details. In case user is not able to fill the form in one go, there is an option to save & exit. After completing all the details, points are automatically awarded based on the University guidelines. For the verification of the awarded points, system prompts to upload the corresponding documents. After duly filling the details, user can submit the final form & proceed for the payment. The online payment gateway makes the payment procedure easy too (Delhi University is using SBI's payment gateway).

ADMISSIONS: - Students can use both online & offline forms to fill the admission application. This initiative simplifies a lot of trouble faced by college aspirants to get the forms & to submit it. Even for the admissions an in-house application is designed & developed by IIC, UDSC. Students need to register themselves & after the final submission, they can pay the fees online only. This facility is available for both under-graduate & post-graduate admissions. Gradual change in the received number of online application shows the comfort and interest of students for the online format. In 2011-12, 33% of the total number of applications was online & this number has increased to approx. 75% for 2015-16 depicting inclination towards online processes.

V. LIBRARY

5.1 Delhi University Library System

Role of ICT is very important as it helpsin Information Literacy & managing the library database in the best possible way. Delhi University is having its in-house designed front page of DULS (Delhi University Library System - crl.du.ac.in). With the advancement in ICT the process of searching/accessing the information from a global database has become much easy. Internet has changed the face of searching; now anybody can access the information about any article from their home only. Currently there are 37 libraries under DULS.

DULS is managing a huge database of information. It offers different services through which students/researchers can search their requirements locally as well as globally. Mr. Rajesh- Deputy Librarian, Central Library started a programme "Information Literacy Program (ILP)". His major concern is to make the user aware about the available information and how to use that information ethically. The programme is an initiative to provide academic information to the blind students. For the same, a complete in-house portal is developed to help them according to their needs.

5.2 Duls Services

The biggest ICT supported programme by DULS is online services. It provides a gateway to access & share the information.

- A-Z list of e-journals – DU has a repository of a number of e-journals. To access such a large database of journals efficiently, a project called Electronic Journal Listing Service (EJLS) has been started. User can search for the journal online by its title, publisher or subject. The searched result can be filtered till the article level in any of the journals. To access the searched article user needs to be on the DU network. Only authorized users are allowed to use this service as the authentication is done at IP level. The journals can be accessed anywhere on the DU network. All the colleges (on campus & off-campus) are using this service since they are the part of NKN.
- DELNET – Developing Library Network. It comprises of a network that joins different libraries present across different locations to share & access the information. DU is a part of this resource library. User can search for the books/articles in any of the libraries participating in this scheme. If the searched article is found in some other library then user can request for it & that library will surely deliver the requested resource.
- Digital Collection – An online repository is created of all the available e-books of different subjects.
- Open Access E-resources – It is very good initiative taken by DULS by providing the link of various e-resources worldwide. With the advancement in the use of ICT, DULS continuously search for freely available e-books/e-journals/thesis/ and other electronic gateway of information. After checking the validation & usefulness of the resources DULS provides a link under Open access E-resources category.
- Information Literacy Program Tutorial – This program helps the user in understanding various aspects of searching & accessing the information. The whole idea works on the principle of first identifying what user actually wants to search, then locating that particular resource, evaluate its effectiveness & finally use that resource ethically or in a proper manner. The program also helps in improving the search strategies.
- Free trial access – New databases are added on trial basis to check their effectiveness. Users can access the information using image viewer but they are not allowed to download the information. This type service helps the DULS in updating their resources.
- Chat – 'Ask your librarian' is a virtual referencing service started by DULS. Through this students can query various DULS official in some particular defined schedule. This service can be accessed by anybody who is connected on the DU network.
- OPAC - Online Public Access Catalogue (OPAC) is the online service offered by DULS to search different holdings present in the library.
- Print journals - Students/ researchers can access number of print journals & other publications available in Central Library through internet.

A special & first of its kind initiative is started by the Delhi University for the visually challenged students. An online portal (available at bl.du.ac.in) is made for them where a repository of scanned books (text to speech or Braille text) is uploaded. This portal can be accessed on the DU network only by the users using ID & password issued to them by the Central Library. For this Inclusive Print Access Project is used. To transcribe the text into speech, portable camera systems called Lex Air are installed. In spite of its failure to transcribe the imagesit is quite beneficial for easy and instant access of printed documents.

Other important software's of this project are Braille space &NonVisual Desktop Access (NVDA), widely used by equal opportunity cell which is a dedicated centre for Differently abled students. Braille space provides the

facility to record the assignments & convert them to written text. NonVisual Desktop Access (NVDA) helps the blind students to read the newspaper & to browse internet effectively.

Other University concerns like Ramps, transportation easiness, academic support etc are also managed by it and the grant is provided by the social empowering ministry.

VI. E-RESOURCES

6.1 E-Content

Institute of Lifelong Learning (ILLL) is a nodal agency that works for the creation, maintenance and uploading of e-content. Virtual learning environment (VLE) is a framework (vle.du.ac.in) in action since 2008 to support the teaching and learning community. The primary purpose of this platform is to help undergraduate students with different subject's related content by providing lessons prepared by various faculty members of Delhi University and duly revised with proficiency. It is also facilitated with interactive lessons to make the learning more comprehensive. The platform is running two programs

1) Delhi University Students – The content in this section is based on curriculum of Delhi University students

2) National Mission of Education (NMEICT: MHRD project) through which students studying in any of the UGC recognized University can access this material.

How the content is designed:

For the proficiency of e-content, faculty members from Delhi University are appointed as **fellows** on tenure basis for ILLL. The fellows along with some other members design the e-content for their specialized discipline in terms of modules known as lessons. For **Undergraduate Program Course** lessons are designed according to Delhi University's syllabus and for **NMEICT** project common papers are identified which are taught in different UGC recognized Universities. Every lesson consists of basic information, practice exercises (including true/false, short answers, long answers etc.) and summary. A few multimedia content including lecture series and short films is also available.

Four heads are designed for the undergraduate program: - 1) Commerce & Management Studies 2) Humanities & Social Sciences 3) Sciences 4) Mathematical Sciences. With the help of guidelines interactive non-copyrighted content is designed. Images, videos & online quizzes also add up in the lessons. To check plagiarism, fellows keep a check over the submitted content with the help of **Ternitin** software. In addition to this authors are advised to put some value added information that gives interesting knowledge beyond the curricula limits.

TECHNICAL ASPECTS

VLE portal is based on Open Source Software framework, **MOODLE**. For the database management **MySQL** is used. The complete lessons are further forwarded to System Analyst. It's his responsibility to check various IPR & copyrights issues. The admin also takes care of the images & videos quality before uploading. Once all the copyright issues have been addressed, lessons are uploaded in 3 formats wiz - 1) PDF (text only) 2) Interactive 3) Print (text + interactive).

Downloading of the content is freely available. Moreover students can give feedback after filling a form with valid credentials. ILLL centres at North campus and south campus works in correlation to achieve this goal.

Why to use it:

Currently over 100GB of online content is available on VLE portal in terms of e-lessons, quiz, lectures etc. It further comprises of 1399 lessons in all subjects, 50+ videos, approx. 60 e-lab content.

A team comprising of fellows, faculty members, animators, technical assistants and system analysts manage & maintain it for ILLL.

VII. EXAMINATIONS

The whole process regarding the examinations is now online. List of enrolled students with their subject details for the exams is now submitted online by every college. To maintain all the details regarding the result, DU is using third party software. Access of online portal is allowed to each college to fill the details of practical & Internal Assessment marks. Not only this, the portal helps thestudents to check their results online and submit the requests for their degree & mark sheets formulating into a single window access.

VIII. PAPER AND E-WASTE MANAGEMENT

Delhi University is continuously trying to reduce paper work. Apart from using technology enriched pedagogy, initiatives are taken to lesser the number of hard copies used in colleges, meetings etc. For example: In the ac/ec meetings earlier around 90,000 papers per meeting were supposed to be distributed among members for discussion. Considering the large amount of paper wasted, now laptops are assigned to the members as an eco friendly paperless approach. This also reduces the cost incurred in paper work in the University.

Apart from this, Delhi University has signed an MoU with Metal Scrap Trade Corporation Ltd. (MSTC) which is a Govt. owned PSU for the disposal of waste materials in the University.

Different departments of Delhi University first identify the items to be disposed off under separate heads like wooden Scrap, Iron scrap, electrical items, Library Books/Magazines, E waste and Hazardous Waste and Non-Working /Non repairable scientific equipment's. A list is prepared for the same with Reserve prices for different items based on their original cost depreciated over time. This list is then sent to the University. The University after verification of the items in list sends it to the MSTC which then takes steps to e-auction the materials. The identification of hazardous or radioactive material, if any, is done with the help of trained Radiological Safety Officer (RSO) who is deputed for this purpose by the University. The Internal Audit Office (IAO) of the University facilitates the bidding process for these waste materials. The main role of MSTC is to sell the old/obsolete products on behalf of Govt. Departments, PSU's, and Ministries etc. through e-auction. Vendors need to register themselves with proper documents to participate in e-auction. The vendor who proposes maximum bidding is identified as buyer. He visits the respective department and hence the site is cleared off. MSTC ensures the validity & responsibility of buyers in disposing off the e-waste. [3]

Delhi University Waste Management Process Flow Chart

IX. CONCLUSION

Day by day the technical advancements are taking place and so a pace is required not to be left behind. The study focussed on different levels of technical approaches on achieving a uniform goal of improving education taking into consideration the role of IT in Delhi University. The IT advancement further brings competition amongst peer institutes and motivates them to look up for better ICT enabled facilities. And hence the role of IT in different small and big fields is a direction towards creating a well enabled university. This environment supports the learners to enjoy the resources available at their locations and times. In the age of mobile technology and cloud computing sharing of knowledge with emerging trends in IT further plays an important role in the overall growth of a nation.

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REFERENCES

[1] "National Knowledge Network," [Online]. Available: http://nkn.in/.

[2] "Business Standard," [Online]. Available: http://www.business-standard.com/article/companies/india-to-have-500-mn-internet-users- .

[3] N. Tyagi, S. K. Baberwal and N. Passi, "E-Waste: Challenges and its Management," DU Journal of Undergraduate Research and Innovation, vol. 1, no. 3, pp. 108-114, 2015.

[4] "Undergraduate admissions," [Online]. Available: http://ug.du.ac.in/2015/index.php/site/login.

[5] "Central Library, Delhi University," [Online]. Available: http://crl.du.ac.in.

[6] "Virtual Learning Environment," [Online]. Available: http://vle.du.ac.in/.

[7] "Statistics on Indian Higher Education 2012-2013," [Online]. Available: http://www.dreducation.com/2013/08/data-statistics-india-student-college.html.