ICT AND WEB TECHNOLOGY BASED INNOVATIONS IN EDUCATION SECTOR

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ABSTRACT

ICT made real magic and drastic changes in all service sectors along with higher education and library practices and services. The academic environment is changing from formal education to distance and online learning mode because of ICT. Web technology and mobile technology has made great impact on education sector. The role of Open Access, institutional repositories, opens archives and e-publishing trends indicates the shift towards new way of communication on an increasing scale in the students and researchers. E-learning is more popular day by day. The students are more prone towards the use of technology. Users of Web 2.0 tools (Students 2.0) are self learner, self searcher, fast communicators, self publishers, self motivated. There is rapid growth of students using internet and web tools in India. Their expectations from the teachers, libraries, and administrative staff of academic institutes has changed and increased. In developed countries use of Web 2.0, cloud computing technology and its use in educational, library websites are normally used to provide best services with blogs, RSS, instant messaging, social networking services, wikis, and social tagging applications.
Use of web technology in education sector has some advantages and disadvantages too. In short education and library services are now based on digital resources, customized, user based, and web based and internet based information services .The present paper highlights innovation in education sector and libraries and impact of web 2.0 on students, teaching learning process, educational policies. Future 3.0 generation will be discussed in detail.

Keywords: **Use of ICT in education field, Web Technology, Web 2.0, Students 2.0, Education 2.0, impact of ICT on education, impact of ICT on Libraries, E-Learning, distance education.**

INTRODUCTION

In traditional teaching and learning process the student has to go educational Institutes, attend lectures and gain knowledge personally from the teachers. Face to face contact with teachers were matters to students in Gurukul system. But now with the extensive use of ICT, Web technology, E-Publishing, Open Access trend in Scholarly communication in higher education all over world has changed the education system from traditional to distance and e-learning. This is a type of teaching and learning that one can obtain with the help of online technology, instead of going to educational institutes. E-learning is benefited to those who are busy in other jobs and earning as well as house wives to improve their educational power.

E-learning consist of online learning, ICT support to education, virtual and digital teamwork, internet, CD-ROM, audio and videotape, use of satellite and television etc. The term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning.

E-learning incorporates all educational activities that are carried out by individuals or groups working online or offline, synchronously or asynchronously via networked or standalone computers and other electronic devices (Naidu 2006). Students are technology savvy and they are habitual with the internet, web applications, mobile technology, etc.

They are turning the pages of books, journals, notes digitally. To cope up with distance learning trend libraries are providing now web based library services. In developed countries use of Web 2.0, cloud computing technology and its use in educational, library websites are normally used to provide best services with blogs, RSS, instant messaging, social networking services, wikis, and social tagging applications.

Many universities and colleges are finding themselves facing new challenges to arm their students with the skills and knowledge required to leverage technology effectively along with how to equip them with an adequate education.

Current Technologies used in Education System

- **Internet and WWW**
  - **Asynchronous online learning**
  - **Web based applications accessible from anywhere**
  - **Email, Chat, Instant messaging for communication**
- **Mobile Technology**
  - **Personal handheld computers**
  - **Cell Phones**
  - **Laptops**
  - **Wireless devices – Wi-Fi, Bluetooth or 802.11**
- **Playstation/Xbox multimedia and application design**
- **Video Transmission**
  - **Conferencing**
  - **Internet based**
  - **Cell phone based**

Emerging Technologies

Internet 2.0 is 100 times faster than today's commodity internet. These technologies useful in cyber learning with videos, advanced video conferencing, library digital archive, use of remote laboratory instruments like microscopes, robotic vehicles, satellites like cloud computing servers, three dimensional images with virtual realities, teleimmersion and video streaming of multimedia content. Handheld computing is low cost solution used for students' assessment, Tablet PCs with handwriting and voice recognition.

Web Technology

The World Wide Web was developed in 1989 by Tim Berners Lee and by 1995 (Wiki and Muju-Munshi, 2005) web has expanded to global proportions. The website is composed of millions of websites and a website is a collection of web pages (HTML documents) that are linked together and stored on a server (host computer).

Web technology includes client server technology, web browsers, document mark-up language such as HTML, XML, RDG, TIE etc information worldwide. Web Technology related to interface between web servers and their clients. The information includes mark-up languages, programming interface and languages, standards for document identification and display

Web 2.0 Principles

Web 2.0 is more popular due to its building virtual applications, participative nature and collaborative utility, work for users and user based services, modular facility, sharing concepts for knowledge generated, communicative nature, remixing of media and presentable, freely available applications to any one, smart actions and low cost. The term Web 2.0/ social computing refers to the range of digital applications that enable interaction, collaboration and sharing between users.

APPLICATION OF WEB TECHNOLOGY IN HIGHER EDUCATION

According to Bonk, Kim and Zeng(2004) in today's context of higher education, the Web is a "tool for virtual teaming or collaboration, critical thinking, and enhanced student engagement." Technology allows learners to get their information wherever they want, what they want, when they want. Web 2.0 Education moves more towards "Personalized learning environments from Teacher-centred learning and faculty driven coursework. It creates more of a learner-centered learning environment. According to Ficek the Personalized Learning Enviornment has more advantage because of its key features like communication and collaboration, formal and informal learning, flexible roles and structures and electronic portfolios and organizers.

Tools Available

The different types of tools and technologies available for teaching learning are as below

Learning Management System

E.g. Moodle (Course management system) is a Course Management System (CMS), and also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). It is a free web application that educators can use to create effective online learning sites. These systems are used for create and deliver training/ education through structured delivery system.

Blackboard (Course Management System)

Enable to engage more students in exciting new ways, reaching them on their terms and devices and connecting more effectively, keeping students informed, involved, and collaborating together.

Mashups

Used to create and integrate information in very interesting and usable interface. E.g. http://mashmaker.intel.com/web,http://pipes.yahoo.com/pipes, http://code.google.com/gme

Files/Information Sharing

Tools used are drop.io, myfiles.bgsu.edu, furl.net, del.icio.us, Scribd (Document sharing tool) etc.

RSS

Allows users to find out, updates to contents of RSS enabled websites, blogs, podcasts without actually having to go and visit site, but information from site is collected within a 'feed' and 'piped' to users in a process known as syndication. s/w tools like aggregator and feed readers are used and installed on computer and then subscribe to feed.

Social Bookmarking

Social bookmarking refers to systems that allow users to store internet bookmarks and categorize them (with "tags") so that as well as being available for the user's own future use, they can be shared, for example with colleagues or with anyone interested in the field represented by the categories used. The field was created by the general-purpose Del.icio.us, which launched in 2003.

Wikis

A webpage or a set of web pages can easily be edited by anyone who is allowed to access. It is collaborative tool which helps in production of group work, hyper linking for linking pages. Library wiki as a service can enable social interaction among librarians and patrons, essentially moving the study group room online.

Publishers Wikis

Academic publishers have been slow to adopt wikis, most likely because the wiki model relies on open, editable and reusable content that is not easy to monetize. E.g.. Elsevier's Wiser Wiki was launched in early 2008 with content seeded from an existing (out of print) textbook (Textbook of Primary Care Medicine, Third Edition, by John Noble). Only qualified doctors are allowed to edit or create pages. After about a year of operation, the site had received a total of 600,000 page views, with some 200 valid content pages available

Tagging and Social Book Marking

(Jashua Scacter) A tag is Keyword that is added to digital object (Website, picture, video) to describe it. Social book markings saves links to web pages, being web based bookmarks are available from anywhere not just on your own computer, your favourite web pages are organized with tags, it shares web pages with others and creates network of likeminded persons/groups. It is supports lectures with additional information, creating learning communities, sharing information or resources in organized form, exploratory learning, tag clouds (mind maps to create visual representation) e.g. del.icio.us and furl.net

Podcasting

Podcasts are usually included within the Web 2.0 galaxy as another example of user generated content. Within academic publishing, podcasts are becoming an increasingly common adjunct to online journals and are reported to be very popular.

Instant Messaging

IM is a form of real-time direct text-based chatting communication in push mode between two or more people using personal computers or other devices, along with shared clients. The user's text is conveyed over a network, such as the Internet. More advanced instant messaging software clients also allow enhanced modes of communication, such as live voice or video calling and inclusion of links to media. e.g Skype. This resource is useful for libraries to establish communication with professionals and other counter parts.

Discussion forum / Internet forum

Is an online discussion site where professionals, readers can hold conversations in the form of posted messages. They differ from chat rooms in that messages are at least temporarily archived. Also, depending on the access level of a user or the forum set-up, a posted message might need to be approved by a moderator before it becomes visible. e.g. mlosc googlegroup, linked in groups, etc

Flicker (Photos)

Is a image database and an experimental information architecture algorithm to enable users to search images not by metadata, but by the data itself. Users search for images by sketching images also. It uses to share, comment, add notes to photos and images you want to use in classroom / environment.

Video Sharing

You Tube is a video sharing website where users can upload, view and share video clips. Google Video is another tool. Tokbox is used for video chat and video message amongst the study group.

Social Networking

Face book is a social utility that connects people with friends and others who work, study and live around them. Linked In is a professional social network gives you the keys to controlling your online identity and connects you to your trusted contacts and helps you exchange knowledge, ideas, and opportunities with a broader network of professionals / users. My space, Twitteer, ning, myspace also shares you with others. For classroom announcements, creating classroom community and learning both inside and outside classroom these tools are used. Classroom 2.0 is social networking site for collaborative technologies in education.

Google Docs (Collaborative suite)

Enables to create, edit and upload, import existing documents, spreadsheets and presentations, or create new ones from scratch quickly. One can access, store online and edit the document from anywhere if have web-browser. One can also invite people to the documents and make changes together. Can conduct use and user surveys online with this and collect feedbacks. It allows one to use the internet cloud as a new sort of desktop.

Prezi (Presentation software)

Is a cloud-based (SaaS) presentation software and storytelling tool for exploring and sharing ideas upon a virtual canvas.

Slideshare (Presentation sharing)

It enables to upload slides to share with other rate and comment on the slideshows of others.

A public link for presentation materials for faculty &student sharing content. Evaluating and critiquing presentations, arguments discovering information from outside sources. E.g.slideshare.com

Image Sharing

Picasa (Photo organizer):

Blogs

Jorn Barger 1997 a simple web page consist of information or links called posts. Allows to user to add comments. Posting and communicating process is blogging (Exchange of views)

Edublog (Educational Blogging)

Allows easily to create and manage student, teacher and library blogs, quickly customize designs and include videos, photos & podcasts - it's safe, easy and secure. It might include blogs written by or for teachers, librarians blogs maintained for the purpose of classroom instruction, or blogs written about educational policy. The collection of these blogs is called the edublogosphere. The use of blogs has become popular in educational institutions including public schools and colleges. Blogs can be important tools for sharing useful information and tips among co-workers, readers, dispersing information to students, or keeping in contact with parents. Librarians can create, monitor and edit blogs to ensure that the postings are appropriate and pertain to the reader category.

Zotero (Collect and manage research)

Is a powerful, easy-to-use research tool that helps you gather, organize, and analyze sources and then share the results of your research.

Calendaring

Uses for office hours, information sharing, easiness of collaborative work, planning. e.g. Google calendar, Microsoft Exchange

Collaborative Authoring

In e-learning and online environment for peer review work, group projects/documents, track changes, collaborative note taking following tools are used Google Doc, Wikipedia, pbwiki, wikispaces, stu.dicio.us, etc.

E-Portfolio

Creates a digital online repository for your publications and materials to show your teachers, students, colleagues. E.g. Elgg.com, digication.com, epsilon.com, etc

Other tools are Websites/Blogs/Micro blogs, Open source content and applications, Communication tools like email, mobiles, etc, social games/virtual worlds e.g.secondlife.com, Mapping, Content Management Systems like Zhoomla, Drupal, and many more

IMPACT OF WEB TECHNOLOGY OVER LIBRARY AND INFORMATION CENTRES

Web impact is prominent over the information society; it made revolutionary changes made developed new concepts in LIS.

Library 2.0 (Web 2.0 + Lib 2.0)

Lib 2.0 is application of web 2.0, interactive, collaborative and multimedia web based technology used for providing web based library services and collections. Lib 2.0 has following 4 essential factors:

- **It is user centered**
- **Provide multimedia experience**

- It is socially rich (IM and Wikis)
- It is communally innovative and changes constantly

Lib 2.0 brings library closer to user by delivering library services using blogs, RSS, my Space, My Face book, social book marking, Tagging etc

Librarian 2.0 (Web 2.0 + Lib 2.0 + professionals applications)

Librarian 2.0 is also called as Guru of information (Second life librarian).Librarian 2.0 along with traditional, technological skills needs to adapt different additional skills to manage web based library services

- Web technology awareness and applications
- Understand users at deep level
- Understand power of Web 2.0
- Adapt web tolls and apply for services
- Use services available through Google, book search, world cat

User / Scholar 2.0 (Web 2.0 + Lib 2.0 + Librarian 2.0 + Users applications) are

- Self learner and searcher
- Fast communicator
- Self publishers
- Self motivated to get the information required , analyze, predict, use and apply, publish and share with others
- Rapid growth of users on internet and web due to availability of e-resources, search engines, subject portals, meta search engines, online resources and use of email, twit, face book and blogging etc.

World 2.0 (Use of web 2.0 for the different practical applications in various area)

Web is used in all the activities and hence it may be indicated that world 2.0 is better term. In LIC's Internet was used as a best tool for gathering information in libraries and providing services. The information gathered using OPAC's, gateways, portals, subject portals, online databases, search engines, subject directories and other information resources it is possible to provide services along with:

- WWW
- Online discussions
- Resources in different disciplines like Science, Technology and Medicine
- Email facility
- News groups and discussion groups, subject groups
- Bulletin Board
- Databases
- Primary, secondary and tertiary information resources
- Library catalogues (OPAC's)
- E-journals and E-books
- Reference sources

Useful Web Tools For Libraries

There are more than hundred web tools available in web technology but for library and information centres following good tools are very useful for providing library services to users.

Virtual Library Tour

Library web sites could provide this facility virtual library guide to the physical facilities including collections, services and infrastructure available in the library. The combination of library maps and floor plans, library departments and photographic views are used for the tour. Virtual library tours are also using new technologies such as QuickTime movies etc and are beginning to replace image maps on main campus web sites.

Ask A Librarian

Internet-based question and answer service. The librarian who possess specialized subject knowledge and skill in conducting precision searches.FAQ prepared for standard queries and placed over the site

Real Time Services

A digital reference service that libraries are attempting to provide more and more live reference. The librarian can perform Internet searches and push websites onto the user's browser, and can receive immediate feedback from the users as to whether their question have been answered to satisfaction.

Web Based User Education

Google group based current awareness services
Discussion groups for discussing new issues
Library wikis access on readers demand

Library Things

Networking site for readers with additional functionality for libraries, offering catalogues, new books and other service

Publishers Wikis

Academic publishers have been slow to adopt wikis, most likely because the wiki model relies on open, editable and reusable content that is not easy to monetize. E.g.. Elsevier's Wiser Wiki was launched in early 2008 with content seeded from an existing (out of print) textbook (Textbook of Primary Care Medicine, Third Edition, by John Noble).

Only qualified doctors are allowed to edit or create pages. After about a year of operation, the site had received a total of 600,000 page views, with some 200 valid content pages available and other tools mentioned earlier.

Web Based Library Services

There are different kinds of web based reference resources and services for accessing information from libraries such as OPAC, Gateways, Portals, Subject Portals, Electronic Journals, Online Databases, Subject Directories and Search Engines. These resources overlap considerably in the type of information they cover, and sometimes it is difficult to distinguish between some of them. A library should have a good collection of these resources like selected Web links, subscription resources, and library materials in well-organized pages for serving better services to their users. Many libraries and organizations are providing digital reference service through collaborative services. Existing library consortia are adding digital reference to current shared services, and networks of libraries.

Some regional library consortia are offering member libraries the opportunity to share reference questions with each other using the Internet and other technologies.

Best Practices

To mange services using web tools one has to follow the best practices like:

- **Develop library website with social networking sites like Facebook, twitter, RSS feeds, etc which can give access to library resources**
- **Separate library blog for interaction and proving other web based services to readers**
- **Ask librarian site to response to active reference service**
- **24 hour online services utility**
- **Information and Web 2.0 tools literacy amongst staff and students**
- **Provision for e-book readers like kindle available to users**
- **Library software's need to support web 2.0 tools and techniques for supporting library activities**
- **Webinars practices in LIS**

BENEFITS OF WEB 2.0 TECHNOLOGIES

In online teaching, distance learning and online classroom teaching use of web 2.0 technologies are increasing in fact because of emerging new technology this type of teaching came into existence. According to Odum, Laddie(2010)These technologies are providing a constructivist user/student-friendly atmosphere and promotes and creates new opportunities for collaborative learning, creates a connection to today's students' real world, allows students to do authentic assessment and motivates learners. The web 2.0 applications like google applications for Education tools used for students collaboration and can also be used by an instructor to share documents with a colleague/students, possibly allowing them to co-author research in a much simple and efficient manner than ever before. It enables students to broaden their scope, horizons and collaborate with other students and staff from different parts of the world irrespective of language barrier, institutional walls, diverse culture, and traditions. Administration also benefits from use of such tools as they are cost saving, affordable, scalable also saves potentials. It stimulates new modes of inquiry, allows students to engage with new literacy and express themselves in different media, and encourages a proficiency in publication of contents which creates sense of ownership, audience engagement, peer assessment and informal learning. It fosters interaction, collaborative problem solving, and prompt feedback mechanism.

IMPACT OF LEARNING 2.0

In Formal education use of web technology applications are not that much deployed as compared to informal, distance education and training all over the world.

But according to Redecker, Christine, et.al (2009) these tools/applications are used in formal education for opening up society for communication, advertising, making institutional process more transparent and information exchange, to reach wider community virtually, to opening up wider channels for gaining knowledge and enhancing skills in research.

For exchange of knowledge and material, to facilitate community building, to provide teachers and learners a social environment and platform to develop collaborative research environment and results. To increase academic excellence it is been used.

It is observed that in developed and developing countries still institutes have challenges and barriers to implement these technology. Many developing countries don't have access to ICT and basic digital skills, lack of competency and expertise in web technology towards teachers, They need separate training program like information and technology literacy programs, Teachers needs to flexible system to implement their innovative ideas and technology based teaching methods, technology is changing so fast till one technology teachers and students gets used to it new technology comes and the uncertainty about these applications in teachers, Copyrights, safety and privacy concerns are always there. Educators needs to make sure of their learners identity and should work in protected environment. Need of some standard rules and regulations for teachers and students, institutes are coming up. Institutions need to re-evaluate their role with the changing scenario. They should give support, guide to their stakeholders and conduct awareness training workshops to encourage use of new technologies to teachers; they must revise their assessment strategies, and create synergies. They should make dialogue between researchers, practitioners and decision makers in order to monitor and investigate ongoing developments.

FUTURE OF EDUCATION 2.0

The following figure on http://www.iprofindia.com/index.html gives overview of present and how future will be.

In the report of Higher Education in web 2.0 world Hakikur Rahman, chairman of the SchoolNet Foundation of Bangladesh, gave his prediction about education in 2020, "Learners will be able to learn when they want, what they want, and how they want. Educators will equip themselves to be able to compete in the world of a supply-and-demand chain of knowledge. Learning will not be limited by age or sex; it will not be discriminated by regions or religions; it will not be narrowed down due to culture or history.

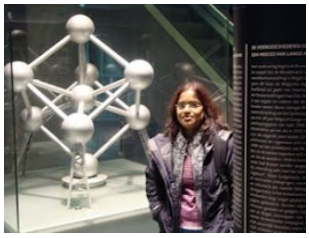
Learning will be like a homogenous fluid to elevate the knowledge content of each and every living human being on the planet."

Cathy Cavanaugh, an associate professor of educational technology at the University of Florida, Gainesville, predicted, "Higher education will be much more personalized, with fewer educational experiences and credentials packaged in courses and degrees, and take place in a wide range of physical and virtual learning environments, signaling a return to forms of learning in performance contexts in apprenticeship models. Universities will join with workplaces and other organizations to assess learner entry levels and broker the experiences they need to reach a desired level of expertise. Universities will be assessment, counseling, library, and quality management centers that connect learners with digital and human instructors, many of whom work as consultants/contractors (almost troubadours)."

CONCLUSION

In the developing countries where application of web technology is initiated in formal education as well as informal education as per discussed above there is need that educational institutes should make themselves abreast with current developments and expectations of their students by means of survey and interaction and discussing with other similar organizations. They should promote and ensure access to appropriate technology for all students, training to teachers to sharpen their technical skills. They should encourage and provide atmosphere, conduct information literacy, web awareness programs to students and staff to enable them to identify, search, locate, retrieve and, especially, critically evaluate information from the range of appropriate sources – web-based and other – and organise and use it effectively, attributed as necessary, in an appropriate medium. It is observed that all education ministry are now have separate budget for introducing new technology in education and on its awareness programs, for infrastructure, hardware/software. Tablet PC is good example in India. Government is providing tablet PC- Akash in very cheap rates to students. In schools also computer education has made mandatory. This is very good beginning and in 2020 the education industry will be better and interactive and technology based.

BIODATA and CONTACT ADDRESSE of the AUTHOR



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