Enhancing Teaching & Learning with Web Tools

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Abstract: *Education affects human life deeply. In the educational process, technology is playing ever increasing role – -both in quality and in its reach or accessibility covering diverse sections of the society. Recent research has revealed how rich web applications in education can significantly enhance quality of teaching and learning. The currently most used web version is Web 2.0. Web 2.0 is an approach towards the use of Internet based technologies, which provides access to a range of layouts (platforms) and languages that belong to a social framework based on communities and networks. Web 2.0 can provide various benefits to learners ranging from different disciplines for Arts, Communication, Education, Mathematics, Engineering, and Sciences particularly to get digital form of latest information & knowledge in an efficient and effective manner. Web 2.0 can play a key role in the delivery of education by providing platform for effective student participation, educational networking, fast query response and collaborative learning. This paper addresses the challenge of engaging teachers & learners in opening up the learning environment through the use of Web 2.0 tools. This paper also suggests & analyzes potential uses of Web 2.0 tools in improving effective delivery of learning & in enhancing learning experiences.*

Keywords: *Web 2.0, online learning, e-learning, education technology, network education supporting system*

1. Introduction

For about last two decades, the World Wide Web (WWW) is being used to improve communication, share resources, increase collaboration, promote active learning, and deliver education in distance learning mode.

The WWW helps teachers in planning suitable online delivery structure, sharing goals of learning and activities for their course.

The Web 2.0 *(or Web 2)* is seen as a step-change in the structure of overall environment of internet and computer activities on the World Wide Web. This change in the Web is based on more involvement of users in different activities, particularly the social activities. So, new forms of web designs and Web 2.0 applications offer new possibilities for user involvement on the Internet.

In recent years, more and more universities and educational institutions offer online services such as for enrolling in their programs, or even provide completely virtual (online) learning environments in order to facilitate the lifelong learning and to make this compatible with other educational management activities. For example, a teacher may create activities totally based on web handouts, student's activities, projects, and lists of resources for reference, and put these on the Web. It enables students and other learners to access it from any where in the world, of course, connected through Internet. In general, for such a development, e-Learning media covering the common applications/services such as blogs, video sharing, social networking and podcasting, are used. These services in general are called Web 2.0 services.

2. Definitions of WEB 2.0 and its Advantages

In order to facilitate the discussion, to begin with, we consider some definitions of Web 2.0 by some pioneers in the field. The term Web 2.0 was officially coined in 2004 by *Dale Dougherty*. With Web 2.0, the websites/ web-applications using different multimedia components have become friendlier, more stylish, with many new useful features and with a high level of interactivity.

Web 2.0, as described by Tim O'Reilly, refers to web-oriented applications and services that use the internet as a platform, with its unique features [1]. About Web 2.0, Tim O'Reilly [3] says:

"Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences."

One of the most significant differences between Web 2.0 and the traditional World Wide Web (retroactively referred to as *Web 1.0) is greater collaboration among Internet users and other users, content providers, and enterprises* [4]**.** Web 2.0 is really just an extension of the original ideals of the Web that does not warrant a special moniker [5].

Web 2.0 is seen as a set of internet services and practices that gives a platform to individual users to participate and collaborate in various communities of knowledge building and knowledge sharing. The web 2.0 services are possible because of the ever-extending and easy reachability of the World Wide Web. Web 2.0 is the popular term for advanced Internet technology and applications including blogs, wikis, RSS, discussion forum, podcasting, e-Portfolio, and social bookmarking. Web technology is being used for a number of years and has become relatively mature now, although new features and capabilities are being added on a regular basis [5]. Web 2.0 works on the principle: *the service automatically gets better with more people using it.*

Web 2.0 technologies and services are, by their very nature, about interaction, some more specifically than others. Internet phone services such as Skype and instant messaging services such as AIM enable synchronous interactions; blogs and microblogs, wikis, and social networks, all offer ample asynchronous interaction opportunities. Google's highly anticipated Wave tool promises to take interaction to a whole new level [7]**.** For synchronous usage, a user could overlay the use of Skype to

collaboratively examine, review, and discuss a particular expression in a discussion, a formula in a spreadsheet cell, or the images included in a document describing a particular topic. An asynchronous approach could involve a user simply for making edits and then inviting the collaborator to visit and review automatically and to track changes as per convenience of the users. Major implications of Web 2.0 and its services for education and research in general, include the capabilities:

- That allow producing learning and researching contents, and not just consuming the content

- That allow for authentic assessment

- For cost efficient learning facilitator

- For fastening interaction

- For collaborative problem solving

- For providing prompt feedback

- For transparency and group participation instead of authority

- For facilitating learning services instead of just acting on the advice of subject matter expert

- For providing access to people

- For *learning to be* and for participation at different levels instead of just *learning about*

- For making learning more research and application oriented, instead of just passive learning

- For participation instead of just presentation

- For conversation among group instead for just publication

- For lifelong learning instead of formal time bound learning

- For providing a constructivist-friendly toolkit

3. Tools and Services of Web 2.0 for Education:

The new generation of Web 2.0 emphasizes the active participation of internet users and interaction among social communities, through *social network tools* or *social software* such as Blog, wiki, social book marking and social networking. These tools have the specialty of high interaction and group participation, and are convenient for organizing internet social communities and for interchanging messages. Now researchers/students of any discipline of learning are able to apply fast social network tools to establish their own *exploratory space* and also are able to share progress & achievements in respect of their studies with others rapidly. Using Web2.0 tools, learning contents can be published and can also easily be integrated with essential multimedia contents such as digital images, slide shows, films, videos etc. In this context, Web 2.0 offers many tools and services for different kind of web applications on Internet for educational purposes, as shown in figure 1 below.

Figure 1: Web 2.0 Services

Next, we briefly discuss some of the Web2.0 tools and services which are useful for education and research.

Wikis: A wiki is a system that allows one or more people to build up collectively a collection of knowledge in a set of interlinked web pages, using a process of creating and editing pages. Some of the wiki services are shown in figure 2. The most common wikis are http://wikipedia.org, http://www.wiki-site.com and http://www.zoho.com/wiki.
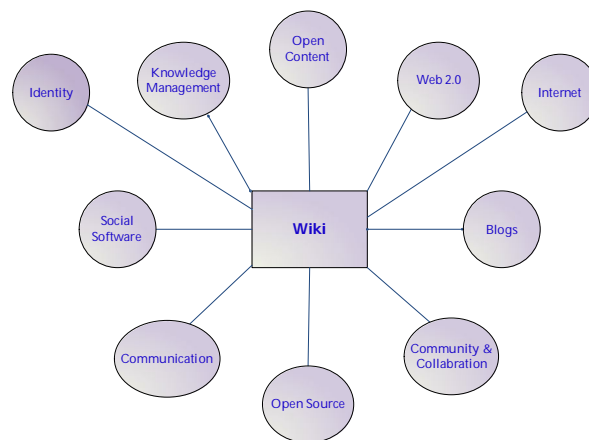

Figure 2: Wiki

Wikis are playing significant role in content creation, publishing, editing, revising, and collaborating for knowledge creations. Wikis are being used for maintaining and building a repository of content and material. Wikis can be used in education for:

- The creation of annotated reading lists by teachers/subject matter experts,
- Book marking, of class projects, which need to have the incremental addition of knowledge by a group, or production of collaboratively edited material, including material documenting group projects,
- Instructor/Teacher led writing activities, and
- Empowering learners through a more democratic, open philosophy of learning and sharing.

E-Portfolio: A digital portfolio, which is also known as an e-Portfolio, is basically one of the important learning & assessment tools. An e-Portfolio is a collection of thematic, electronic data assembled and managed by a user, typically on the Web. An e-Portfolio may include text, electronic files, images, multimedia, blogs and hyperlinks. Managing of e-Portfolios demonstrates the user's abilities for self-expression, and some time, self promotion. An e-Portfolio is online; it can be maintained dynamically over time. Some e-portfolio applications permit varying degrees of audience access, so that the same portfolio might be used for multiple purposes [10]. An e-Portfolio is seen as a type of learning record which provides actual evidence of achievement. By using e-portfolios, students can maintain a space where they can show their academic achievements to prospective employers. E-portfolios encourage personal reflection and often involve the exchange of ideas and feedback. Examples of two portfolios of students are shown in figure 3a and 3b below.
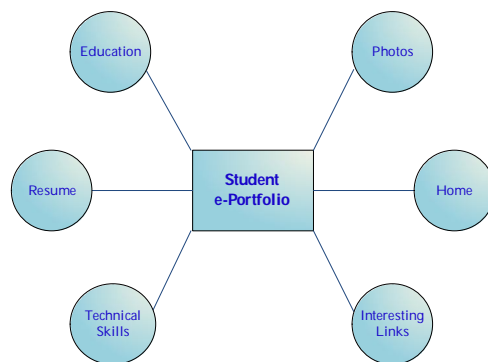
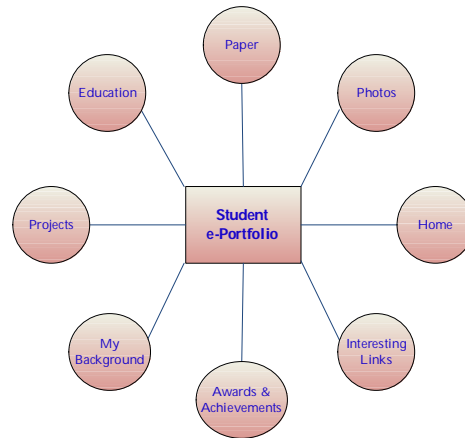**Figure 3a: Student E-Portfolio: Career Oriented**

Figure 3b: Student E-Portfolio: Academic Oriented

Discussion Forums: Online forums are the websites that allow discussions to take place over longer periods. It provides asynchronous communication platform to a large number of participants. Participants of a discussion forum can read and reflect on postings by seeking out further information before making a response. Discussions are moderated by experts/moderators before making it public. Postings may stay on the discussion board for as long as the moderator deems it fit. Contribution of every discussant is shown in separate threads. Each discussion may have a number of threads including an initial posting which starts the discussion, and replies to that posting which keep on building additional threads with time and participation. Users are facilitated to edit their own comments. Discussion forums can be used for discussion on specific topics/learning objectives, in different subject areas. It can be used as collaborative learning platform for learners sitting at distant places. For example, a learner may come up with a topic of discussion say 'Anna hazare's Anti-Corruption Movement ' using an online discussion forum. The interested people from all over the world may join that discussion and may add their own views, ideas & experiences, by writing over a long period of time. Some examples of discussion forums are http://www.forum.nokia.com/, http://www.in.com/discuss/ and http://forums.zapak.com/.

Blogs: Blog is a short form of Weblog. It is an extremely popular form of on-line diaries. It provides platform for easy publishing and sharing of e-content including photos online. In blogs, there are provisions to add comments posted by readers. Community blogs provide shared authoring. Recent technological developments allow easy updating with text, photographs or even video, direct from mobile phones. If a group of bloggers on the same subject area collaborate together, they can build up a collection of interrelated knowledge by incorporating posts and comments received from users. Such type of groups may be of learners in a subject area, encouraged and promoted by teachers etc. Teachers can quickly give feedback to students, and students to each other. A Blog may be used as an effective tool for educational delivery in distance learning mode, in view of the facts that it provides facilities for prolonged discussions outside the classroom and for asking of questions that may be answered by guest speakers/subject matter experts. Blogs can be used for discipline specific teaching and research in particular. For example, Experts in agriculture and farmers are free to share their experiences and views about tools and techniques for farming, and knowledge about fertilizers, crops, soil management, or even about their own experiments with others using Blogs post. They can even upload their videos and photos to support their arguments.

Really Simple Syndication (RSS): RSS provides a mechanism to track changes to multiple websites simultaneously, and to share contents with other websites. RSS feeds are the structures that organize electronic contents of any form which is being updated on a regular basis by its owners or others. Subscribing to RSS feeds saves the time of checking every single site that you access to find out if it has posted anything new relevant to the user. RSS is also used to publish frequently updated works such as Blog entries, news headlines, audio, and video in a standardized format. For example, you are a music teacher and after going through web you found 20 or 30 Blogs & web sites on the internet that are regularly publishing relevant and interesting information about music. You find this collection of information may be useful for your students. Finding time for visiting & collecting day by day data on a regular basis would be nearly impossible

handle. Posting the data from different sources is also a typical job. In such cases provides a solution. RSS feeds allow you to do this collection of work by using a type of software called an aggregator or feed collector. The aggregator checks the feeds you subscribe to, usually every hour, and it collects all the new content from those sites you have subscription with. Then, when you're ready, you open up your aggregator to read the individual stories, file them for later use, click through to the site itself, or delete them if they're not relevant. In other words, you check one website instead of 30 websites. So RSS makes the job easy too. Online web applications like Phone Feeds (http://www.phonefeeds.com/), My Yahoo! Mobile RSS (http://mobile.yahoo.com/) and Lite (Feeds http://www.litefeeds.com/) make it easy to reformat RSS feeds for use in mobile devices like a PDA, Blackberry or other Mobile Phones. User may get feeds over any type of internet connection. There is a service available called Feed Beep (http://feedbeep.com/) which sends SMS alerts to users phone when feeds are updated.

Podcast: The podcasting is a combination of audio and/or video content, with RSS, downloads, and playback programs. Vidcasts are video versions of podcasts. Podcasting provides facility to the listeners for conveniently keeping themselves up-to-date with recent audio or video content on topics relevant for them. Videocasts are very useful in the case of educational delivery in distance learning mode. For example, videocasts can be used to supply videos of experimental procedures in advance of lab sessions. Instructional videos and seminar records can be hosted on video sharing systems. Some example websites with podcast facilities are: http://www.podcastalley.com/ and http://www.cnn.com/services/podcasting/.

Podcasts can be used to provide introductory material before lectures or, more commonly, to record lectures and allow students to listen to the lectures again and again, if required and supply audio tutorial material to the learners. Podcast assist in distribution and sharing of educational media and resources. For example, in a lecture on some topic on agriculture, the learners could have access to a set of previous works via a photo/presentation sharing system. Podcasting provides facilities to comment on and criticize each

others work; even by people from outside of class or even from out side of institutions.

Digital Libraries: Web applications based on web 2.0 has created a new type of information storage and new means of communication to deliver digital contents worldwide. In education and research, thousands of digital collections will continue to be created to facilitate students and researchers around the world. Digital collections such as research articles, journals, technology reports, inventions, surveys, market analysis reports, equipments and collections etc., stored digitally in a variety of versions that constitute digital libraries [11].

Intelligent Search Engines: In the last few years, learning processes have benefited from the technological evolution of the web. The dispersion of the web has permitted the introduction of new educational processes, which are more flexible for accessing the resources for learning. Now a days, Internet has become the most useful and powerful source of information. In order to effectively deal with the huge amount of information on the web, advanced web search engines have been developed for the task of retrieving useful and relevant information in multimedia form for its users [12]. When you use a traditional Web search engine, the engine isn't able to really understand your search. It looks for Web pages that contain the keywords found in your search terms. The search engine can't tell if the Web page is actually relevant for your search. It can only tell that the keyword appears on the Web page. An advanced era of intelligence based-search engine could find not only the keywords in your search, but also interpret the context of your request. It would return relevant results and suggest other content related to your search terms. Experts believe that future web based search engines will provide users with richer and more relevant experiences [13].

Virtual worlds & Avatars: A *virtual world* is a mix of 2D/3D gaming technology, augmented reality, simulated environment powered with Internet technology where users interact through movable *avatars.* Users create *avatars* on the Web and allow them to reside in the virtual worlds. Learners can create their own *avatars* on the web & reside in these worlds. Virtual worlds can be seen as the beginning of new era of e-learning as they allow learners to do role-play, 2D/3D modeling, simulations, creativity and their

active involvements. There is a huge space for conducting research relating to the pedagogical benefits of teaching and learning in 3D virtual worlds [13]. Recently several web based 3D virtual worlds, such as *Second Life*, *IMVU* and *Active Worlds,* have gained attention of the students and teachers for education & learning worldwide.

4. Major Impacts of Web 2.0 tools on Learning

Web 2.0 based computing applications & environments are extremely versatile in promoting learning worldwide. The impact of technologies is quite attractive to learners in engaging them in distributing, collecting & sharing knowledge to each others. Now common people have the opportunity in expressing their views, innovative ideas in front of the world. These kinds of opportunities were not possible with traditional learning arrangements. *Social computing applications* based on Web 2.0 represent a flexible tool for collaborative learning, content creation & sharing. They provide a framework for collaboration in a way so that the focus from *individual problem solving* is shifting to the *collaborative way of problem setting*. From an educational point of view, functionality like collaborative editing (e.g. Wikipedia, wikiversity) can be seen as an effective tool of collaborative learning & knowledge sharing. There are exiting university courses where students, as part of their curriculum, participate, manage & contribute to *Wikipedia* articles.

Reusability of content by different websites: Web 2.0 provides the facility of retrieving content available on WWW from any website, not necessarily the particular website on which the content is available, but from some similar/relevant website. However, earlier, in web 1.0, one had to access the particular website containing the desired content. In other words, through web 2.0, writing some content on a topic on some website becomes dynamically available on other relevant websites also. Web 2.0 provides different kinds of web services, for example, RSS allows the users to manage, separate and migrate these user created contents to achieve reusability.

Personalization is an important characteristic that enforce learning. When social computing is incorporated into educational practices, the support for more personalized learning paths, pace and environments such as e-

Portfolios, personal learning plans, and learning diaries, has facilitated personalized learning to a large extent. Thus, with the help of web 2.0, the boundaries between formal and non-formal learning, classroom and distance learning, intra- and extra-institutional learning is indistinguishable

5. Conclusion

Web 2.0 is more than a set of useful and new technologies and services. Web 2.0 technologies offer an array of services to make a true online classroom a reality. Because of its very nature, web 2.0 services are having positive impact on teaching and learning. Web 2.0 offer benefits of collaboration, feedback, incorporation of different media such as text, voice and video in learning and teaching. These benefits can be directly aligned with the existing best practices in online education, and can make more authenticated and effective educational environment. Web 2.0 is suitable for educational and lifelong learning purposes in our knowledge society. As our modern societies are building to a large degree on digital world easily accessible through Internet, hence, the users from every part of the world in these environments can share & socialise. They can share their work, ideas, and knowledge. These active interactions of learners in educational practices fosters a creative and collaborative engagement of learners. However, the technology alone does not bring educational success. It only becomes valuable in education if both the learners and teachers can make out something useful with it and the teachers can play the role the real promoters in utilization of these tools in learning practices.

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