A Study on the Usage of Web 2.0 Applications by Basic Medical Science Students, in the Light of e-Learning Implementation

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Master of Science degree in Information and Library Studies

Submitted By

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Contents

Abstract

Web 2.0 represents the changing face of people's activities on the Web, from a mere place to access information towards a much "cool" place to create / write / share / collaborate / network with their intellectual involvement. Web 2.0 is changing all aspects of academic life including practice and training of medicine. When American University of Antigua integrates to the e-learning Systems, there was a need to study the present student population before implementing the facilities, about their usage of Web 2.0 applications for learning and research purposes. This dissertation is based on a survey for analyzing the awareness of the students about Web 2.0 applications and their expectations during integration of e-learning technologies. Major finding are wikis, instant messaging, media sharing, social networking and VoIP show high usage by major group of students, where very less usage of podcasts, social book marking, blogs, feeds is found. More students mainly want wikis, forums to be integrated to in e-learning system along with media/file sharing, streaming, chat rooms, blogs and book marking.

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(J. K. VIJAYAKUMAR)

List of Diagrams

Chapter 1: Introduction

Importance to the learning-centered approach; which is more active and subjective, as compared to the traditional teaching-centered approach; which is more passive and objective, has been established already. Students' collaborative and active involvement in the creation of learning and the materials is getting worldwide attention, especially after the wide usage of e-learning platforms and the introduction of Web 2.0 and Web 3.0.

Typically an *e-learning platform*, also called as Learning Management System (LMS), Course Management System (CMS) or Virtual Learning Environment (VLE), allows instructors to manage their courses and exchange information with students through the tools for communication like discussion board, email, virtual chat and for course delivery like syllabus, course materials, assessments (Chang, 2008). Integration of Web 2.0 applications, which are being used for social networking collaborations, in e-learning systems can significantly support the transformation from a teacher or institution focused instructional approach to a learner centered education (Coyle, 2007).

1.1 Overview of Web 2.0

Web 2.0 is attaining the status of the most powerful trend on the web, which is growing day by day. Web 2.0 is commonly used for identifying the trend of new kind of tools and activities happening, as a second phase of Web technology developments. It also represents the changing face of people's activities on the Web, from a mere place to access the information to a much "cool" place to create / write / share / collaborate / network with their intellectual involvement. Web 2.0 really began during a conference brainstorming session between O'Reilly and MediaLive International. Dale Dougherty, web pioneer and O'Reilly VP, noted that far from having "crashed", the web was more important than ever, with exciting new applications and sites popping up with surprising regularity. The people agreed to call it Web 2.0, spicing it up and making it sound all important in the first Web 2.0 conference and thus was born Web 2.0 (O'Reilly, 2005).

It is interesting to follow the developments of this new technology after 2005. Soares (2009)says that, irrespective of the objectives, the media have immediately adopted "2.0" as an adjective for each and everything that appeared since then with a glimpse of innovation in it. "Everything became 2.0". He agrees that, despite of criticism regarding the use of the term, the

web, indeed, changed. This is true that the whole world is in a 2.0 mode in communication, entertainment, education, business, medicine, research and in all spheres of life. People not only see or watch content on the web, they contribute and participate. Every day we are bombarded with more publicity about collaborative environments, news feeds, blogs, wikis, podcasting, webcasting, folksonomies, social bookmarking, social citations, collaborative filtering, recommender systems, media sharing, massive multiplayer online games, virtual worlds, and mash-ups (Warr, 2008).

Bughin and Manyika, (2007) make it clear that, business companies are also using Web 2.0 technologies and developed a new way of bringing technology into businesses. They found this new approach is easier to implement and more flexible than traditional top-down approaches for doing business and marketing as well.

Now, we are looking forward to the development of Web 3.0 based on semantic and meaningful web technologies. The next generation of the Web—the so-called Semantic Web—is now on the horizon, which will again enable new types of collaborative research to emerge (Hall et al., 2009). According to Giustini (2007) the two most exciting features of Web

3.0 applications will be the better organisation of documents and a deeper use of the knowledge base in medicine (or any discipline).

1.1.1 Main types of Web 2.0 technologies

Sandars and Schroter (2007) provide clear descriptions for these technologies as follows;

Blogs: These are personal websites that allow rapid updating by the author. Examples include Blogger (www.blogger.com) and Typepad (www.typepad.com). Content can be easily created and shared by making the blog accessible to others.

Wikis: These are similar to blogs but allow the text on the website to be edited by others, with the creation of a common document that can be shared between individuals. Examples include Wikipedia (www.wikipedia.org) and PB wiki (www.pbwiki.com).

Podcasting: A digital recording, or podcast, is produced and then played on digital media player. The digital recording is commonly in the

form of an audio MP3 (MPEG-1 Audio Layer 3) file but it may also include other formats, including video. The downloaded digital media files can be played on a range of devices. These include a personal computer (PC) or laptop which has a media player, such as iTunes or Windows Media Player, installed. They can also be played on a wide range of portable devices which support the file format, including iPods, MP3 players of many different brands, an increasing number of mobile phones, and Portable Digital Assistants (PDAs).

Instant messaging: This allows real time (synchronous) communication between two individuals (one to one) or between several individuals (one to many). Examples of commonly used text based services include MSN messenger (www.msn.com) and Yahoo! Messenger (www.yahoo.com)

Social bookmarking: An individual's favourite websites, including blogs, can be ''book marked'' and stored on a website. Examples include del.icio.us (http://del.icio.us/) and digg (www.digg.com). These bookmarks can be shared with others.

Media sharing: Visual media can be uploaded and stored on a website, such as Flickr (www.flickr.com) for photographs and You Tube (www.youtube.com) for videos. These media can then be shared with others.

Social networking sites: Several of the above approaches can be combined in these sites to make them extremely versatile. Examples include My Space (www.myspace.com), Facebook (www.facebook.com) and Orkut (www.orkut.com).

1.1.2 Evidences of Web 2.0 in e-learning

> "Web 2.0 is an emerging catch phrase and the applications associated with it shocked the traditional e-learning world".
>
> (Ebner et al., 2007)

Ruiz, Mintzer and Leipzig, (2006) say that innovations in e-learning technologies can revolutionize the medical education, allowing adaptive and collaborative learning. The integration of e-learning into medical education can catalyze and transform the role of the teacher as the distributors of

content, but will become more involved as facilitators of learning and assessors of competency.

In another survey done on chairs of promotion and tenure committees at 123 U.S. medical schools it is found that the chairs rated several e-learning activities and outcomes as important for promotion and as a meaningful contribution to scholarship (Ruiz et al., 2009).

According to Ehlers (2009), e-learning 2.0 simply means using social software and learning services, which can be combined according to individual needs. It refers to a number of developments, trends and points of view, which require change from teaching to learning and connects with five characteristics:

(1) Learning takes places always and everywhere.

(2) Learners take on the role of organizers.

(3) Learning is a lifelong process.

(4) Learning takes place in communities of learning.

(5) Learning is informal and non-formal.

It is interesting to watch how Web 2.0 applications are changing educational technologies through several instances. Social networking is about human communication, and reflects the degree to which we use technology to meet deep-seated emotional needs. People will continue to develop, discard, mutate, and tinker with the tools that enable these processes to unfold in a way that best reveals their inner essence to the outside world. Technology designers who understand the nature of networked communication: its limitations, ambiguities, and advantages, might succeed where others have failed. Ultimately users will go on a journey together with their friends. After all, “to be human is to be social” (Sharp, 2006).

Joint Information Systems Committee (JISC) is an independent advisory body in the United Kingdom that works to further the higher education by providing strategic guidance, advice and opportunities to use ICT to support learning, teaching, research and administration. Its initiative, Secure Personal Institutional and Inter-Institutional Repository Environment (SPIRE) Project was meant to study the implementation and use of ‘informal repositories during 2005-2007. But with the wide popularity and diversity gained by Web2.0, the focus was changed to Web 2.0 (White, 2007).

University of Michigan did a latest study about the usage of their websites (Chapman and Varnum, 2007) and it shows a high time use of Web 2.0 applications of their students. The top five activities as ranked by average response (in descending order) were email, social networking, IM, reading/using wikis, reading blogs.

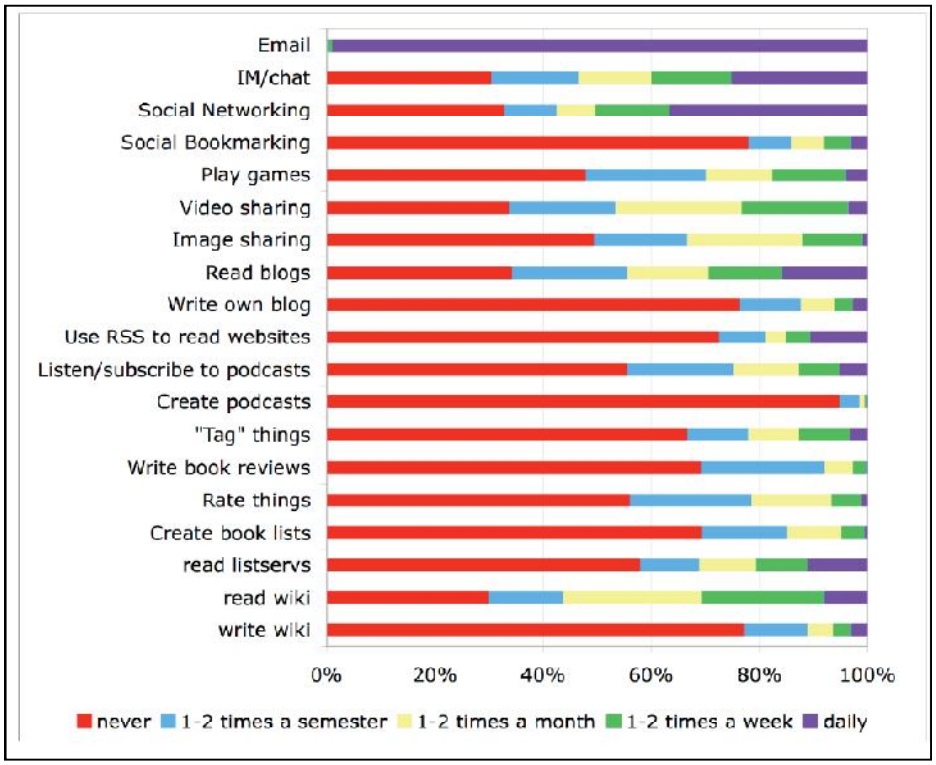

Figure 1.1: Usage of Web 2.0 tools at University of Michigan. (Chapman and Varnum, 2007) [Available at http://www.lib.umich.edu/files/services/usability/WebSurvey_Fall2007.pdf]

Gras University of Technology Austria did a survey among their students and faculty to find out the usage of Web 2.0 and how it affects

University's learning environment (Safran et al., 2007). They found that most of Web 2.0 applications are scarcely used in courses and in self-organized learning activities. Only weblogs and wikis are frequently used Web 2.0 applications in learning processes.

Another study of first year students from University of Melbourne in 2006 (Kennedy et al., 2006, Kennedy et al., 2008) shows that 76% of them uses Internet for searching study related information and significant portion of them uses Web 2.0 applications.

It is very clear that Web 2.0 is changing all aspects of academic life including practice and training of Medicine. Academic Institutions, Hospitals, Libraries, Publishers, E-Learning Vendors, Search Engines, Media, literarily all walks of life are implementing Web 2.0 technologies to serve the need of "digital natives" and "digital immigrants". According to Giustini (2006), Web 2.0 ultimately provides the opportunities of using software to create optimal knowledge building opportunities for doctors. He also provides a list (see below) of websites started in the early stages of Web 2.0 in medical practices and teaching.

Web 2.0 examples in medicine

Application	Website	Purpose
Bloglines	www.bloglines.com	RSS reader
Citizendium	www.citizendium.org	Expert wiki
Connotea	www.connotea.org	Online reference organiser
Del.icio.us	http://del.icio.us	Website tagging
Flickr	www.flickr.com	Photo sharing
Ganfyd	www.ganfyd.org	Medical wiki
Google blogsearch	http://blogsearch.google.ca	Blog searches
Google health	www.google.com/coop/topics/Health	Create your own search tool
MedWorm	http://medworm.com	RSS aggregator
SlideShare	http://slideshare.net	Slide sharing
Wikipedia	http://en.wikipedia.org/wiki	All purpose wiki
YouTube	www.youtube.com	Video snippets

Figure 1.2: Web 2.0 examples in Medicine (Giustini, 2006)
[BMJ : Clinical research ed. 333, 7582: 1283-4]

White (2007) says that some of the most challenging outstanding issues in this area relate to administration, ownership, sustainability and assessment, which are cultural (institutional and personal) rather than technical. It also suggests that the focus of further research should be on guiding and facilitating change rather than looking for purely technological solutions.

1.2 Background of the Study

American University of Antigua (AUA) College of Medicine is a US Offshore Medical School established in the year 2004 at Antigua, West Indies. Its students and faculty population comprises mostly Americans and Canadians with multi ethnic and religious culture. AUA started implementing latest IT application from the starting of the University. The campus is on Wireless network and latest learning applications are necessary for a modern medical school. It's Library and Learning resources Center has around 60 computers, entirely dedicated for students and faculty, connected to resources and Internet. Most of the students are in the Category of "Digital natives" or "Y Generation", born between 1980 and 1994 (McCrindle, 2006). Their familiarity and ease of ICT use because they spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age" (Prensky, 2001).

1.3 Need for the Study

In 2008, the researcher along with a faculty member did a survey on Human Anatomy students on the use of recorded video lectures in the form of integrated multimedia files using Camtasia software. We found that 82.7 percent of students found it very useful to review for their exams and 97.8 percent of students suggested that this kind of streaming videos of class room lectures should be available for other coursers as well (Srikanteswara and Vijayakumar, 2008) .

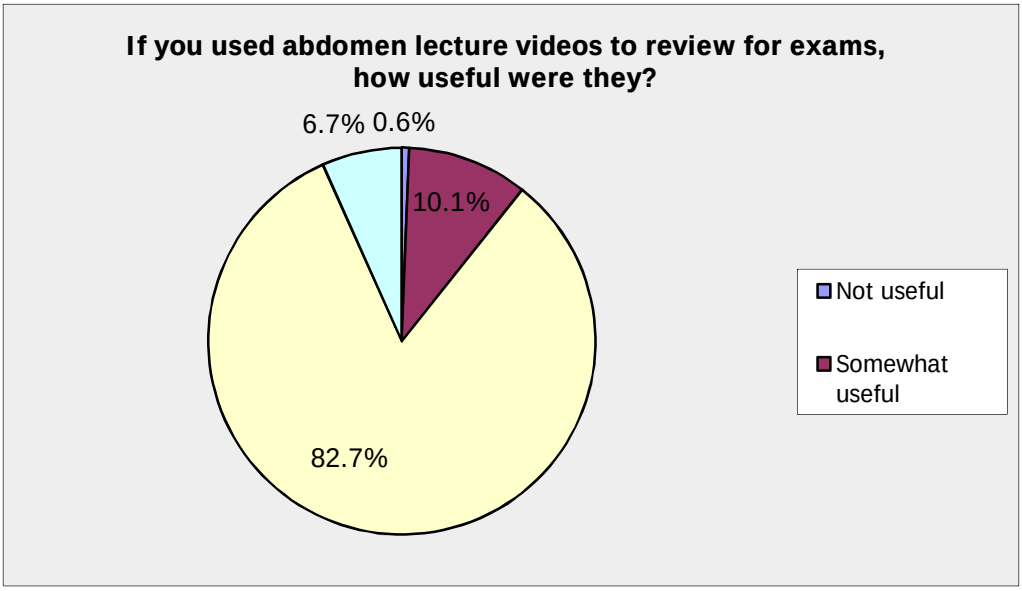

Figure 1.3: Usefulness of streaming videos at AUA (Srikanteswara and Vijayakumar, 2008)

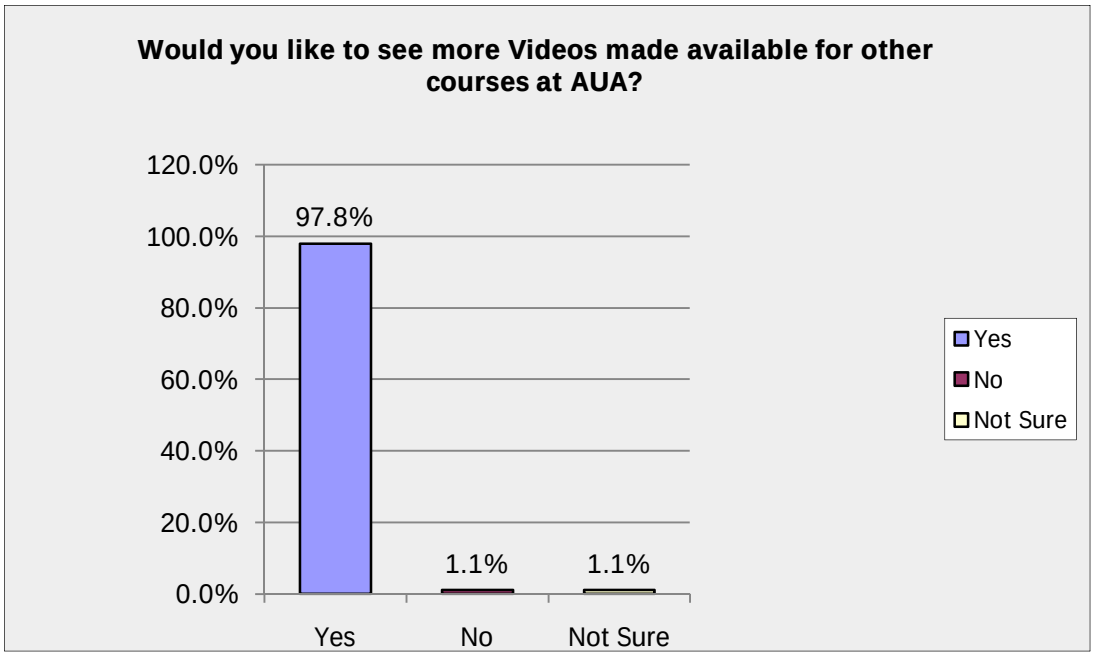

Figure 1.4: Expectation of streaming videos in AUA courses (Srikanteswara and Vijayakumar, 2008)

These preliminary findings encouraged the researcher to study about the students online behaviors especially in Web 2.0 environment and e-learning.

Researcher when working as the health sciences librarian at AUA had a chance to be part of e-learning implementation team and had several interesting discussions with students and faculty. He was also involved in comparing different e-learning platforms and undergone training in Blackboard, the selected platform for AUA. Through these studies and interactions with students and faculty, he found that most of the students are aware and using Web 2.0 application before or after coming to medical

education and they must be expecting these applications to be integrated to present e-learning system.

After finishing Basic Medical Science, students will go to various hospital locations in USA for continuing their next Semester and clinical rotations. Delivering the necessary learning materials and resources and interaction between faculty and students are becoming a challenge in terms of different locations. With this, AUA decided to improve its learning system with supplementing with e-learning facilities and other social networking applications. Being integrated to the e-learning Systems, Web 2.0 applications are also going to play a major role in any e-learning platforms. Therefore there is another need to study the present student population before implementing the facilities, about their usage of Web 2.0 applications for learning and research purposes.

1.4 Rationale of the Study

The future world of practice for the current medical student is rapidly evolving and the changes are already beginning to occur. The appropriate responses by medical educators are an increased awareness of the inevitable

trend and acceptance of the importance of self-organized and personalized learning. The role of a medical educator will change but, as always, it will be concerned with how to enhance learning by considering the potential of the new technology (Sandars and Haythornthwaite, 2007). Web 2.0 applications are also creating new challenges for medical professionalism, where the scope is not well-defined in undergraduate medical education (Chretien et al., 2009).

Before implementing these technologies, it is very important that each institution should study the awareness and usage of these technologies by their users. The clear idea of user needs and how do they want to utilize these services should be analyzed carefully. Administrators need to gather evidences about the degree of usage of these emerging technologies. Based on this one should aim to develop and implement appropriate technological - tools in e-learning, where each learner will have a personalized learning system that is linked to a vast range of learning resources, containing both codified and tacit knowledge, and that is also adaptive to both the learner but also the wider learning community within which each learner is an integral part (Sandars and Haythornthwaite, 2007). Attwell (2007) identifies the basic paradigm shift from learners engaging with institutional provision and

procedures to the institution engaging with the learner. He underlines the need for institutions to recognize the new cultures of learning and networking and change in institutional practice and procedures and in curriculum organization and pedagogic approach.

1.5 Aim and Objectives of the study

The main aim of this research is to identify the usage of Web 2.0 tools and expectation of its availability in an e-learning platform by medical students at American University of Antigua, College of Medicine.

1.5.1 Objectives

- Review the literature for evidences in usage of the various Web 2.0 applications medical education, learning, research and practice.
- Find out what Web 2.0 technologies are being used by medical student population for their learning and research purposes.
- Study the usage patterns of Web 2.0 tools by students.
- Identify students' expectations of these technologies in e-learning platforms and suggest integration of these technologies.

1.6 About the dissertation

This dissertation is organized into 5 chapters. The first chapter deals with a brief background and introduction to Web 2.0 tools; it also includes some evidences where Web 2.0 tools are used by students for their learning and research. Background and rationale of the study is given before describing the needs, aim and objectives of this study.

An extensive literature review is provided in Chapter 2, catagorised under 4 main themes; Web 2.0 in education, We 2.0 in medical education, Web 2.0 in medical practice and challenges reported by few researchers. Chapter 3 give an outline of the research methodology used and explanation on different steps followed in this study.

Chapter 4 provides the results of the study after analyzing the data, results are described textually and graphically. Researcher also tried to correlate the results with few previous studies. Last chapter tries to critically analyze the study and its results, finds how successful the research was, identifying the limitations and recommending for further research areas.

Chapter 2: Literature Review

As a key component of this research, it was necessary to review the relevant literature to identify the evidences in usage of the various Web 2.0 applications medical education, learning, research and practice. An extensive review will be helpful in preparing the survey tool to collect the data and complete this study. Literature review also helped the researcher in identifying key trends and in justifying and refining the work. Databases like Pub Med, Web of Science, Scopus and ERIC were consulted during the course of this research for extensive literature reviw. In this chapter, the researcher reports selected and recent evidences and cases published between 2000 and 2010, in journals, reports, theses and websites. By appropriately applying Web 2.0 techniques to medical learning, students, trainees, practitioners and even patients can benefit from the collective intelligence of a global audience" (McGee, 2008)

2.1 Web 2.0 in e-learning

The e-learning 2.0 is arrived. Craig (2007) notes that social networking experiences finding the structures of the LCMS are inflexible in

contrast with the user-centered approach of Web 2.0 services. He found this fundamental shift leads to innovative solutions, including broad institution-wide dialogues on the role of organizations in a Web 2.0 environment, innovative approaches to faculty training, a new emphasis on the role of faculty as learners in a rapidly changing environment, and rethinking the underlying architecture of the LCMS model. Rogers, et al (2007) find that Web 2.0 and E-Learning 2.0 reflect a break from the way things have been done, offering an alternative to the highly centralized industrial model of learning of the past era. Black Board, the widely accepted e-Learning system responded to this need by introducing Black Board Scholar (2009b). It is a social book marking service customized for education, as an exciting new way for students and instructors to find and tag educationally valuable resources on the Web.

According to Chang, (2008) past research has indicated that e-learning technology is not utilized to its full potential in education despite greater degree of access within higher education institutions. He finds faculty members from a Midwestern university desire the availability of many of the more innovative features, such as blogs, wikis, discussion forums like

domino, and other Web 2.0 tools in e-learning platforms such as Black Board.

Coyle (2007) through his study on students using the wiki function in Moodle course management software, find that wikis are an effective collaboration method and allowed students to work at their own pace and to easily see the work of other group members. In the view of increasing Social tagging tools in e-learning platforms, Bateman (2007) makes it very clear that Collaborative tagging can represent practical metadata in supplementing e-learning where sufficient metadata is lacking.

Sankey and Huijser (2009) suggest that the goals and ideals of Web 2.0/ Pedagogy 2.0 can be achieved, or at least stimulated, within an institutional Learning Management System environment, as long as the LMS environment is aligned with such ideals, where it is designed to provide a 'likely benefit' to both student and staff.

McLoughlin and Lee (2007) identify the demands of Pedagogy 2.0 in terms of interdependence between ideas, individuals, communities and information networks, supported by technology. According to them, the use

of the affordances of social software tools to enable connectivity, communication, participation and the development of dynamic communities of learning will create dynamic communities of learning.

Brigham University moved towards E-Learning 2.0 while simultaneously increasing interoperability by using elearning standards reflected in the widely-used reference model called SCORM - Sharable Content Object Reference Model (Rogers et al., 2007). Development of the "Infocampus project", a free and Open University social network featuring entertainment, culture and technology at the University of Alicante for all Spanish universities by "Plan Avanza" of the Ministry of Industry is an example of a country level initiative (Ortiz and Fraile, 2009).

Lee, Chan and McLoughlin (2006) report the success of a project where a group of second year volunteer students produced a series of short educational podcasts for the first year students. Through this project, the producers group got an opportunity to revisit previously learnt subject content and better understood the material. It also helped them to develop generic skills such as research and teamwork skills. Cain and Fox (2009) support it and say that the participatory culture is a key component of Web

2.0 and students can also given opportunity to create knowledge, which gives promise to educators.

Chang and Lee (2010) propose to develop an innovative science learning environment which integrates various modern technologies combines three major projects, Classroom 2.0, Mobile 2.0, and Testing 2.0. They are confident that the model proposed will be applicable in university courses, senior high schools as well as in teacher's education courses worldwide.

Eisen (2009) reports a project funded by Joint Information Systems Committee (JISC) in United Kingdom called "E-Reflect", which is a student assessment and feedback module, which can be integrated to LMS systems and found students seem 'happy' with e-feedback as part of a blended approach (Saunders et al., 2009). Findings of two survey projects funded by JISC, i.e, Learner experiences of e-learning (LEX) project and Learner experiences of e-learning (exploring subject differences) - LXP project- find that students are using new technologies to support all aspects of their learning processes like, communication with tutors and other students, keeping abreast of course administration, finding and managing learning

materials, processing data, and creating assignments/presentations (Conole et al., 2008).

Another survey from Northeastern US Universities finds that the knowledge of Web 2.0 skills is generally regarded as being very important and students who were educated on Web 2.0 skills increased both their knowledge and comfort level in course management system (Sendall et al., 2008).

A surevy on youngsters from four European countries; France, UK, Germany and Spain shows that they are Web 2.0 experts and share data on social media and community sites (Lusoli and Miltgen, 2009).

Alexander (2006) reviews these tools and finds their rich search possibilities can further enhance the pedagogy of current events and literature in various disciplines. He also argues that there are also possibilities for a campus information environment and thematizing these tools as objects for academic scrutiny.

From Singapore, Tan, et al (2009) highlights various phases of the rapid growth in e-learning from the initial genesis and achieving engaged and interactive learning in e-learning 2.0, and University 2.0 phase where learning becomes more participative and immersive with student life at Nanyang Technological University (NTU).

After surveying students from Year 12 English class in a semi-rural school in south of Auckland, Cleary (2008) indicates that there is a place for Web 2.0 technology and social software in English classrooms. She demands the need to keep up with the rapidly changing lives of digital native students.

REPLAY, a system developed at ETH Zurich, combines a standardized workflow of automatic production of classroom lectures, index and archive these objects while establishing an open and flexible distributive end. Then, beyond the conventional approach, it provides isochronous metadata, collaborative tagging and ontology-based search patterns, thus creating a knowledge pool of intelligent e-learning objects (Schulte, 2007). These kinds of systems can easily be developed and integrated to e-learning platforms.

In supporting e-learning 2.0, the main academic supportive system in any campuses, the libraries, are also geared up to welcome Web 2.0 technologies. Medical Library Association USA established a special task force for helping medical Librarians in learning implementing Web 2.0 application (MLA, 2007). This recent survey on medical librarians, shows that, majority of them use blogs, feeds etc for their professional and personal life.

Library 2.0 is the approach typified by Web 2.0 principles, which allows opportunities for libraries to better serve existing audiences and to reach out to potential beneficiaries where they happen to be, and in association with the task that they happen to be undertaking. This new approach makes it possible for searchers to be presented with choices to view online, borrow locally, request from afar, buy or sell as appropriate to their needs and circumstance (Curran et al., 2007).

Most of the Library System vendors are bringing out more personalized Web OPACs, Libraries are trying to reach out to its customers through blogs, RSS Feeds, and promoting social tagging. Publishers are also

implementing Web 2.0 technology to catch up with user needs, 2collab, Elsevier's bookmarking service (2009a) is an example.

Tao, et al.(2009) report the positive impact of a Mobile Reference Service program at Saint Louis University, School of Public Health, which has improved library support for research and scholarship in Public health courses.

Gavgani and Mohan (2008) encourage the libraries and librarians to initiate webliographic organization and control of Medicine 2.0 tools, by framing necessary policies, developing standards and procedures and encouraging specialization. There are several evidences of integration of Library 2.0 in supporting e-Learning 2.0, but they are not listed here since it is out of the scope of this study.

Prensky, (2010) warns those Educators who are denying or restricting their students' access to You Tube (video sharing platforms), are missing a major communications medium, which is filled with highly relevant educational information. He says, for any schools, it would be foolish to ignore the medium of video as a powerful learning tool for today's youth.

2.2 Web 2.0 in Medical Education

> "Web 2.0 technologies offer new opportunities in undergraduate and postgraduate medical education. There is an overall high awareness of a range of new Web 2.0 technologies by both medical students and qualified medical practitioners and high interest in its use for medical education". (Sandars and Schroter, 2007)

In *Medical Teacher*, Ellaway and Masters (2008)and Masters and Ellaway (2008) published "*AMEE guide e-learning in Medical education*" in two parts covering a wide range of topics and detailed outlines of technical, social and content issues. They give prominent importance to Web 2.0 tools, both in content and technology parts of learning management systems (LMS) and Course Management Systems (CMS). They predict that social learning networks, mobile learning via podcasts, Web 3.0 based semantic content will have immediate call for integration to present e-learning systems.

According to Irby (2008) medical students expect to learn and work in Web-based instructional environments and cover the content at their own

pace and explore content in greater depth. They need mobile devices, virtual worlds, and social networks are ubiquitous among today's students. They also expect lecture casting, wireless access, technology-enabled classrooms, audience response systems, electronic portfolios, file sharing, blogs, and social networking, which are becoming common in universities. Electronic course evaluations and online course management systems (e-learning platforms) provide learners with more flexible access to a wide range of instructional resources. He finds some schools have developed virtual learning environments that allow students to raise and respond to questions and engage in discussions of the content in virtual and real time.

In a review article, Hanson, et al (2008) conclude that proficiency is required in this new environment for health educators in incorporating Web 2.0 applications into health education, which will provide greater reach in health communication and marketing through additional channels. Sandars (2006) says that blogs and wikis are an emerging area in medical education and can provide a learning resource that can be read by learners, they can be written by learners as a portfolio, and they can be used as a collaborative learning space.

Sandars and Schroter (2007) did a survey among medical students and practitioners in UK, and report that the group is highly familiar, but low use of Web 2.0 technologies. The group stated that lack of training is the reason for the low use, which clearly shows the educators role in implementing these technologies to the present learning system. Through recent study done after 3 years, Sandars, et al. (2010) find over 90 percent medical students highly using instant messaging and social networking sites and suggest that social software should be integrated into existing curricula and Virtual Learning Environments. These two studies are clear indicators of increased usage of Web 2.0 tools by medical students in UK.

Based on a survey of 1369 students using online courses at the University of Oxford by White (2007) notes that there is high use of instant messaging (82%) and social networking (60%) and 58% read blogs, 38% wrote their own blogs, 19% used Flickr, 57% used You Tube and 19% used del.icio.us.in

In another study from 25 UK Universities, Ward, Moule and Lockye (2010) find only a relatively small number of responders were using Web 2.0 technologies such as podcasting (32%), blogs (44%), wikis (28%) and

virtual worlds (16%). They conclude that Web 2.0 technologies will be potential in the education of healthcare professionals, but these developments need to be further to keep the balances.

Thurzo, et al (2010) report the current trends in on-line behavior of dental students on the Web 2.0 technologies and confirmed an increasing number of resources with rising frequencies of e-learning materials.

According to Cain, Scott and Akers, (2009) there is high social media usage among pharmacy students and many do not fully comprehend the issues that arise from being overly transparent in online settings. Attitudes toward accountability for information supplied via social networking emphasize the need for e-professionalism training of incoming pharmacy students.

Day and Wells, (2009) find that health informatics students value the online discussions, which add value to their learning. This happens because of the ability to use their social presence in a format familiar to them and the process of collaborative knowledge creation.

Konstantinidis, Bamidis and Kaldoudi (2009c) propose a collaborative learning environment combined with a computer based audience response system and an approach facilitating Web 2.0 (online) in Problems Based Learning style. Students are given chances to answer teachers' questions, and these feedbacks are taken care to prepare course materials.

Boulos, Hetherington and Wheeler (2007) justify that the 3-D virtual worlds have great potential in medical and health education, but remarked that many of the associated educational and library-related possibilities still need to be fully identified, explored in various settings/scenarios.

A recent survey on "The virtual mobility pilot project" developed for Croatian medical students and teachers shows that the majority of students are satisfied with the online electives, mostly because they had more contact with tutors and peers, better possibilities of self-assessment, more flexible learning, better access to learning materials, faster and easier information retrieval, and better quality of communication with tutors and peers (Taradi et al., 2008).

Another sample size survey among US medical and nursing educators administers was conducted by Lemley and Burnham (2009) and found that Web 2.0 tools are slowly being introduced into the curricula of medical and nursing schools for a variety of uses. As per the findings, the most common Web 2.0 tools used in the curricula of both fields include blogs, wikis, video-casts, and podcasts, and another major group of medical and nursing schools plan to implement Web 2.0 tools in their curricula during the upcoming year.

To complement integrative curriculum, Division of Clinical and Functional Anatomy at University of Ottawa has implemented podcasting of Anatomy lecturers in French and English. After surveying students, Patasi, et al (2009)report that 92% of them found podcasts 'very helpful for self-paced learning', 89% of them deemed the podcasts as an excellent resource for studying anatomy, and 79% embraced the use of the podcasts in examination preparation.

Ganguli (2006) reports the wide spreading use of podcasts in US and Canadian medical schools and foresees personal digital assistants, iPods, and

mobile phones coming together into a single device to deliver coursework in medical education.

Kaldoudi, et al (2008) identify an inherent alignment between the notion of active learning and Web 2.0 technologies. To emphasize on social skills (such as collaboration, interaction and peer activity) they propose more use of wiki and blog kind of Web 2.0 technologies to create online distributed problem-based learning sessions in medicine.

The European Union (EU) have funded mEducator Best Practice network (BPN), a project focused on Multi-type Content Repurposing and Sharing in Medical Education. This project aiming at the implementation and critical evaluation of existing standards and reference models to enable specialised state-of-the-art medical educational content to be discovered, retrieved, shared and re-used for e-learning (Konstantinidis et al., 2009a).

The first Medical Semantic Wiki in Greek Language and its use in medical education are illustrated by Bratsas, et al (2009), which introduces a very specific technology that combines social software and the semantic web, together with their possible role in medical education.

In an attempt to develop professionalism among first year medical students, Varga-Atkins, Dangerfield and Brigden (2010) report their experience, where an online wiki provided to 32 students in problem-based learning (PBL). They find that wikis acted as a shared knowledge base for hard-to-find resources on professionalism. They find students use a sense of professionalism when they consider posting a resource.

Haigh (2010b) evaluated 2598 references, a sample of 10%, from a health related Wikipedia. She finds 1473 (56%) of the references cited come from clearly identifiable reputable sources and proposes that Wikipedia is appropriate for use by nursing students, for health related entries.

Burke and Snyder (2008) support effective integration of YouTube videos into college health education courses, provided the instructor must evaluate each video for its acceptability for use in the instructional environments.

Through survey on faculty an students from Texas Womens University, Oomen-Early and Burke (2007) find both instructors and

students were satisfied with blogging and found it to be an effective teaching and learning strategy. They also find that blogging can enhance peer interaction, allow for synthesis of course content, and help sustain student engagement in the online health education classroom.

Konstantinidis, et al., (2009b) describe an integrated system combines the availability of an open source, web based EHR subsystem, with a Web 2.0 facilitated e-learning component for supporting the smoking cessation network initiatives. This is developed for supporting continuing medical education and promoting public awareness in the Greek public hospitals.

A study by Hughes, et al (2009) shows Google and Wikipedia used by 80% and 70% of junior physicians , much more extensive than previously thought among them. This widespread use is explained, despite junior physicians' clear concerns with the credibility of the information found, through differences in ease of use, structure and breadth of information compared with traditional content sites such as PubMed.

Wood (2010) finds increase in participation, motivation and engagement of nurses and others in an acute care multi-site teaching

hospital, where Web 2.0 technologies introduced to enhance learning for nurses and others.

Myhill, Shoebridge and Snook (2009) say that the virtual research environments based on Web 2.0 technology is not only viable but a certainty, and more desirable features will be available once Web 3.0 tools are integrated.

In bio-informatics, Zhang, Cheung and Townsend (2009) propose a Web 2.0-based Scientific Social Community (SSC) model for computer-to-computer data exchange as users add value through data creation, sharing and integration. They believe that this model can foster collaboration and harness collective intelligence to create and discover new knowledge, which will also has a potential role as an e-learning platform in education

Through a literature review, Chu, et al (2010) establish that educators in all specialties of medicine are increasingly studying Web 2.0 technologies to maximize postgraduate medical education of house staff. They also propose that Web 2.0 technologies hold great promise to innovate anesthesia education and clinical practice.

Haigh (2010a) claims that Nurse lecturers are becoming more aware of the opportunities that Web 2.0 offers and are slowly moving into the world of cyber-teaching, but suggest nurse educators to protect themselves and their students from legal pitfalls such as unintended copyright breech. Ducut and Fontelo (2008) advice medical educators and learning institutions to equip for the future, where health student and professional will be in mobile computing in world, by adopting Web 2.0 tools with the appropriate technology and allow their students to achieve their maximum potential.

2.3 Web 2.0 in Medical Practice

> "One third (35%) of American adult internet users have a profile on an online social network site, four times as many as four years ago, but still much lower than the 65% of online American teens who use social networks". (Lenhart, 2009)

Hughes, Joshi and Wareham (2008) find emerging body of research literature in Medicine 2.0 or Health 2.0. They also find the terms *Medicine 2.0* and *Health 2.0* to be very similar and related and associated to five major

themes: (1) the participants involved; (2) the impact on different collaborations and practice; (3) the ability to provide personalized health care; (4) the use in medical education; (5) its associated methods and tools.

Tools like blogs and wikis are really all about taking the technical skill out of information sharing processes; allowing experts and others to focus on the information itself that make this information sharing as uniquely powerful as it is easy (Kirkpatrick, 2005). Podcasts, wikis, blogs etc are hot topics for medical practitioners, which helps them in sharing or accessing medical information. These Web 2.0 applications, particularly wikis, blogs and podcasts, have been increasingly adopted by many online health-related professional and educational services. Because of their ease of use and rapidity of deployment, they offer the opportunity for powerful information sharing and ease of collaboration (Boulos et al., 2006). Web 2.0 is not a fad, but changing the way patients and physicians interact (Giustini, 2006). The medical community needs to be aware of Web 2.0 technologies and their increasing role in providing health information “any time, any place (McLean et al., 2007).

Tilstone (2007) describes the popularity of social collaboration tools are not only used by youngsters, but also by scientists and health care professionals.

A wiki based Casepedia provides a Web 2.0 platform that will allow medical professionals to publish, comment on, and classify authentic cases (Patel et al., 2008).

Frame, I., et al. (2009) describes Web 2.0 social networking tools will be useful for documenting ideas and the collaboration process in e-Science and e-Research. Shneiderman (2008) predicts that Science 2.0 will be part of a great tradition and will affect research funding, educational practices, and evaluation of research outcomes. He reports that scientific journal editorial boards and conference program committees are already shifting their attention to new topics and opening their doors to new collaborative scientific research methods.

As a valuable technical development for online medical search applications in MEDLINE, a highly interactive Web-based search application, PubMed Interact, exploring recent trends in Web technologies

like DOM tree manipulation and Ajax is being developed (Muin et al., 2006, Muin and Fontelo, 2006).

Rethlefsen and Segovis, (2009) report that social networking websites such as Facebook, Sermo, and LinkedIn have changed the way many physicians, fellows, residents, and medical students communicate. They also report patient social networks are also active, and they are used out of the desire to connect with others suffering from a particular disease or undergoing treatment for it.

P-health, a tailored immersive e-therapy platform based on intereality provides a hybrid augmented experience merging physical and virtual worlds. As compared with conventional telehealth applications such as emails, chat, and videoconferences, this kind of interaction between real and 3-D virtual worlds convey greater feelings of presence, facilitate the clinical communication process (Gorini et al., 2008).

There are several projects aiming at semantic integration in Web 2.0 applications. Science Collaboration Framework (SCF) is one among them, which is a reusable platform for advanced structured online collaboration in

biomedical research which supports structured 'Web 2.0' style community discourse amongst researchers. The first instance of the SCF framework is being used to create an open-access online community for stem cell research StemBook (http://www.stembook.org) (Das, et al., 2009).

(Giustini, 2007) points out that Web 2.0 already established in medical practice. He compares Web 3.0 to Web 2.0 as follows.

At a glance: Comparison of the features of web 2.0 and 3.0

Web 2.0	Web 3.0
"The document web"	"The data web"
Abundance of information	Control of information
Controversial	No less controversial
"The social web"	"The intelligent web"
The second decade, 2000-9	The third decade, 2010-20
Google as catalyst	Semantic web companies as catalyst
Wisdom of the crowds	Wisdom of the expert
Mashups, fragmentation integration, new tools	
Search, search, search	Why search, when you can find?
Google's Pagerank algorithm	Ontologies, semantic systems
Lawless, anarchic	Standards, protocols, rules
Print and digital	Digital above all else

Figure 3.1: Comparison of Web 2.0 and Web 3.0 (Giustini, 2007)

He is confident that a smarter web, ie, Web 3.0 is likely to have a big effect on medicine, especially in bioinformatics; it will become more common to process ever larger amounts of data.

Wright, et al (2009) believe that Web 2.0 as a tool for collaborating on clinical decision support content appears strong, particularly for collaborative content development within an organization. Their arguments are based on case studies of three efforts: the Clinfowiki, a world-accessible wiki for developing decision support content; Partners HealthCare eRooms, web-based tools for developing decision support within a single organization; and Epic Systems Corporation's Community Library, a repository for sharing decision support content for customers of a single clinical system vendor.

In an effort to address the potential to develop Web 2.0 services for young persons with a chronic disease, Timpka, et al (2008) describe design patterns allows representing the core design elements of content development in Web 2.0 systems.

A recent review on use of Internet for prevention of sexually transmitted infections by Rietmeijer and McFarlane (2009) reveals a growing interest towards adapting to the Web 2.0 environment by using

these sites to upload information in a variety of formats and participating in blogs and fora.

Valenzuela, et al (2007) found that the implementation of a Web-based teleconsulting service in Colombia appeared to be an innovative way to improve access to health care and information in the community and encouraged open and explicit discussion. They also believe that extending the service to underserved areas could improve access to health services and health information.

Varlamis and Apostolakis (2008) present a structure for interconnecting communities to bring together doctors, nurses and volunteers around patients and providing the tools for requesting and providing medical information, advices and psychological support. This is based on a community database with valuable information concerning user feedback, patient needs, treatment suggestions, patient profiles and medical record history, where these can be analyzed by various stake holders for quality.

In a case report, Scotch, Yip and Cheung (2008) describe the use of Web 2.0 technologies within a public health application that integrates animal, human, and temperature data to assess the risk of West Nile Virus (WNV) outbreaks. Even though authors suggest that these tools are not mature enough for large-scale public health data applications, the results of this study demonstrate the potential value of grid computing and Web 2.0 approaches in public health informatics

Randeree (2009) while exploring the technological impacts of Healthcare 2.0 found that the ability for patients to access their information, find newly released studies, digest and produce knowledge, as well as communicate and share with other patients will continue to drive new services. He believes that the social phenomenon of Web will empower patients and healthcare providers alike and will drive the education and understand of diseases and treatments.

Eysenbach, (2007) says the traditional intermediaries in information dissemination process are replaced by tools and peers as a social process of digital media, called as “apomediaries”, to guide to trust worthy information.

He agrees that Web 2.0 technology enables building credible websites through communities based upon personal and social needs.

In a report Sarasohn-Kahn (2008) concludes that the proliferation of social media enabled Health 2.0 sites will inevitably lead to consolidation and users through their collective wisdom will determine the value of these services. It also predicts the growth of social and mobile technologies focusing on specific diseases, built by patients, caregivers and providers.

Nordqvist, et al. (2009) provide evidence of positive attitudes from clinical pediatric practitioners towards a Web 2.0 portal tailored for young patients with type-1 diabetes and their parents. It encourages close collaboration with all user groups when implementing Web 2.0 systems for the care of young patients with chronic diseases, particularly type-1 diabetes.

Chou, et al., (2009) find that the new technologies, represented by social media, may be changing the health communication pattern throughout the United States. They also find that social networking sites attract the largest portion of Internet users and are likely to continue to grow in health

communication and e-Health interventions, but the growth of use of social media is more in younger age groups.

As collaborating researchers living in different countries, Gambadauro and Magos (2008) see many advantages of Google Docs like office 2.0 tools. Sagotsky, et al (2008)describe few Web 2.0 based data sharing initiatives in Life Sciences working to facilitate web-based collaborative biomedical research, education, and outreach. They identify that semantic web promises to offer help in connecting and integrating the ever-growing amount of biomedical data, and in combining them with cutting-edge analytical services.

2.4 Challenges

A survey among US medical schools reported incidents of students posting unprofessional online content, especially via Web 2.0 platforms. To solve this big challenge, there are no adequate policies having in place as well (Chretien et al., 2009). From UK, (Sandars et al., 2010) say that medical educators need to recognize the potential of social software in undergraduate medical education and students should maintain the

informality and privacy of these sites. They also noted that the integration of social software into current curricula and institutional Virtual Learning Environments (VLEs) will be the biggest challenge.

In a recent study, Kind, et al.(2010)find that almost all US medical schools have a Facebook presence, but most do not have policies addressing student online social networking behavior. They recommend that social media policies should be established in medical schools with the involvement of all stakeholders. They also demand for future researches to understand the extent to which students embrace such policies as helpful in guiding professional and responsible social media use.

For medical writers, Roberts (2009) warns that even though many blogs and tweets can be useful for sharing information about new studies and sources of information, they are just opinions. Medical writers need to track down the underlying sources and verify before using them. These technologies offer simple ways to drag or grab images and tables of data from a website or blog and drop them into new copy or a web page, but one should be aware of the danger of infringing the copyright of the original publisher.

Boulos and Wheelert (2007) stress that there is a need to raise awareness of Web 2.0 tools and the possibilities they offer, and an urgent need to conduct quality research to inform better use of these applications in health care services and education.

2.5 Conclusion

Social network sites are popular because humans are popular. These became a popular subject of study in academic circles, sociologists, psychologists, computer scientists and library scientists have all became fascinated with these technologies as the subjects of study and brought up body of research literature (Landis, 2010). Researcher tried to cover most of the related literature published in journals, reports, and websites as well as in theses.

As it can be seen from the literature review, there have been many studies conducted on Web 2.0 applications in e-learning, medical education and medical practice. The literature review also revealed that there are so many evidences of application of Web 2.0 tools in medical practice, health

care delivery and research areas as well. Some of the studies are highlighting the need to study the awareness and usage patterns of Web 2.0 applications by students, before they are implemented. The research presented here is an attempt to address the usage patterns of medical students in Web 2.0 applications and their expectations of them in e-learning platforms.

Chapter 3: Methodology

3.1 Survey method

Researcher selected the study to be quantitative and non-experimental, by choosing the basic medical science students as sample, for analyzing data statistically/graphically where generalizations could also be made. After analyzing various non-experimental methodologies, it is found that SURVEY through a questionnaire will be the most useful way to collect data to meet the objectives of this study. Self-administered surveys are those where no interviewer is present and the respondent completes the form, a questionnaire (Robbins, 2008).

According to Robbins (2008), questionnaires—or surveys, as they are sometimes called—are the tools researchers use to measure the variables of interest; they measure what we want to know. Questionnaires ask people to answer questions or reply to statements based on:

1. What people are—their characteristics such as age, gender, ethnicity
2. How people think—their beliefs and attitudes
3. How people act—their behaviors
4. What people know—their knowledge

3.2 Questionnaire

Questionnaires are good for using to find out how widespread something is (Rugg and Petre, 2006). After considering the nature of data to be collected and nature of sample group, researcher decided to use Questionnaire as the survey instrument. A detailed questionnaire is framed with a brief covering letter (See Annexure) with following kind of questions;

- closed and structured questions with pre-defined choices,
- semantic differential scale questions,
- 2 open and unstructured questions.

To encourage the students to talk about whatever is important to them, researcher included two open-ended questions. Researcher thought they are very important in surveys and will help to establish rapport, gather information and increase understanding of their knowledge level.

Questionnaire is framed by strictly following the relevant standards and with explanations of questions where ever necessary. Researcher tried to be specific, short and clear by avoiding too many open ended questions,

assumptions, jargons and irrelevant questions. Questionnaires in print-format were given to students and the responses were collected by hand.

The questions are framed by taking care of all ethical facts related to an academic research. Proper confidentiality and security are given to the data collected, and the identity of participants is protected. There are few studies carried out recently in the same topic and they are included in Literature Survey. Researcher tried not to repeat them as it is. However, there are similarities in few questions asked, but the fundamental aim of this survey is to analyze the basic medical science student's awareness and usage of Web 2.0 applications for their learning and research.

3.3 Sample Group

This study is carried out entirely at American University of Antigua at its campus of College of Medicine in Antigua, West Indies. Its students are the sample group. 162 responses are received in response to questionnaire distribution to a group of 200 randomly selected students. Necessary permissions have already been taken from the management to survey the students and to use the other facilities. The study was a self-supported one

and a financial funding is not solicited from any agencies. However, AUA was very kind enough for allowing the office and IT facilities for the study.

3.4 Ethical Issues

According Blaxter et al.(2006), consideration of possible or actual ethical issues is an essential part of any research project and researcher took sufficient care about this throughout the research project. Gaining the cooperation and consent from the Institution to survey the students and use the facilities, were taken care first. Other common ethical issues during data collection, analysis and writing stages like confidentiality, anonymity, legality, professionalism and participation were also taken care, and was included in the questionnaire as well. Researcher did not come across or practiced any unethical practices during the action of this research.

3.5 Data Analysis Methods

The data collected through the survey is analyzed and graphical representations are developed. Since it is a quantitative approach, Microsoft

Excel program is used to code data in spread sheets, generate graphs and diagrams (tables, line graph, pie chart, bar charts, histograms etc) to represent the data. The patterns displayed are supported with discussions and textual explanations. The qualitative data gathered from open-ended questions could not be coded and it is not possible at all times (Robbins, 2008). So those selected responses are listed separately, but they are considered and included in findings part.

Chapter 4: Data Analysis

As mentioned in the research methodology, a questionnaire was developed for this research based on quantitative non-experimental method. The basic medical science students at American University of Antigua, College of Medicine are the sample group. 162 responses are received in response to questionnaire distribution to a group of 200 randomly selected students. The results are analyzed and findings are highlighted at the end of this chapter.

4.1 Data Analysis and Discussion

4.1.1 Age distribution

Out of 162, 101 respondents (62%) are in the age group of 21-25, 52 (32%) are in the group of more than 26 years and 9 (6%) are in the group of 15-20 group. A major portion of the sample group belongs to Y Generation or Digital natives, born between 1980 and 1994 (McCrindle, 2006)

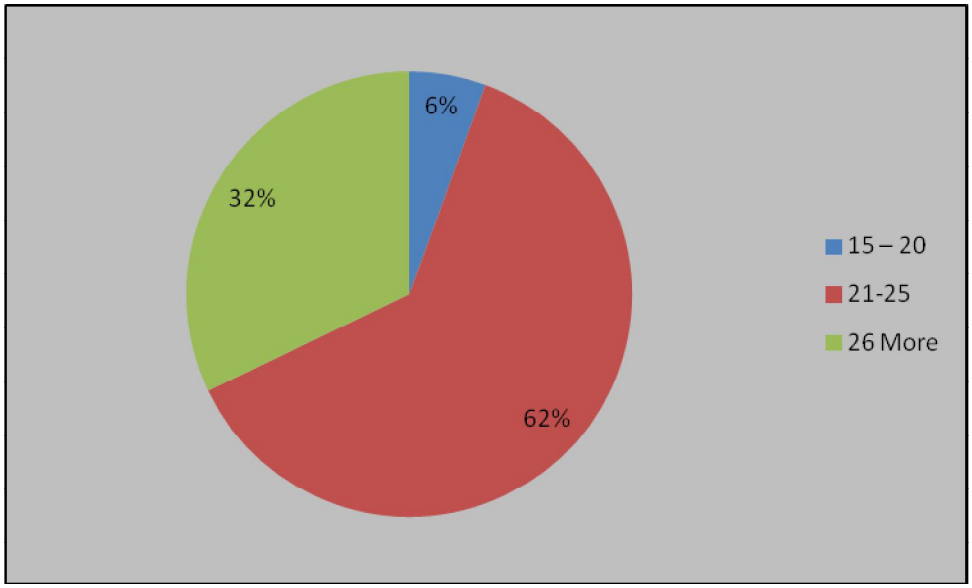

Figure 4.1: Age distribution of the sample group

4.1.2 Time share on Internet

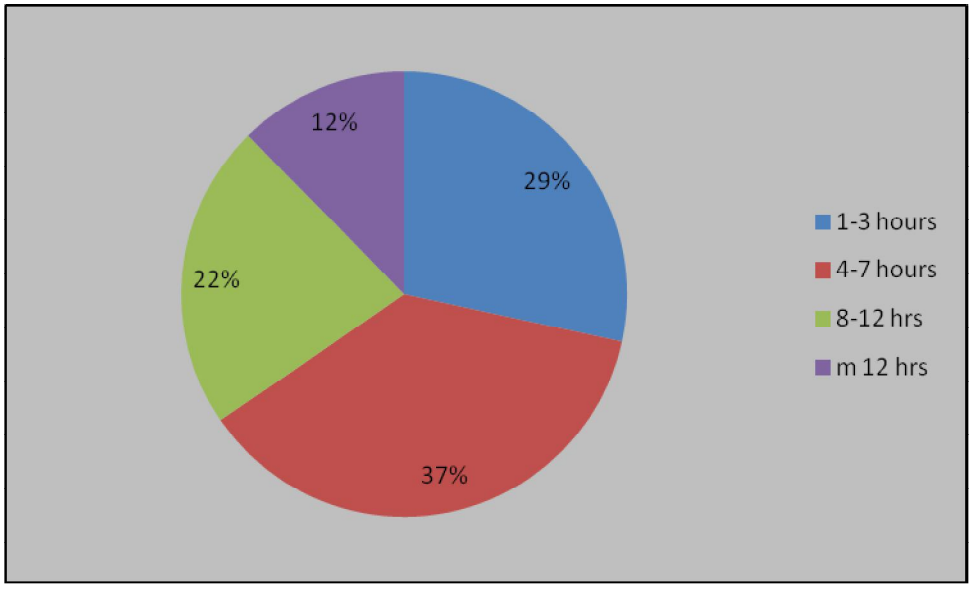

Figure 4.2: Time share on Internet by the sample group

On an average, 60 (37%) respondents spent 4-7 hours in a day on Internet, 46 (29%) spent 1-3 hours, 36 (22%) spent 8-12 hours and 20 (12%)

spent more than 12 hours. This shows high use of Internet by the students, where only 29% spent less than 3 hours online.

4.1.3 E-resources usage for their Medical education

Question: What kind of resources do you use from the Internet for your Medical education?

It is interesting to note that 107 (66%) respondents use blog and wikis; portals and websites are used by 95 (59%); 92 (57%) respondents chat with peers through Internet; medical school department websites are used by 81 (50%); news and feeds are used by 66 (42%); e-Journals are used by 63 (39%); e-books are used by 56 (35%); library databases and resources are used by 49 (30%) and 15 (9%) of them use other resources such as; e-mail, access medicine, you tube, educational videos, magic jack, search engines, black board etc. This shows relatively high use and activities of Web 2.0 applications by medical students as compared to traditional resources.

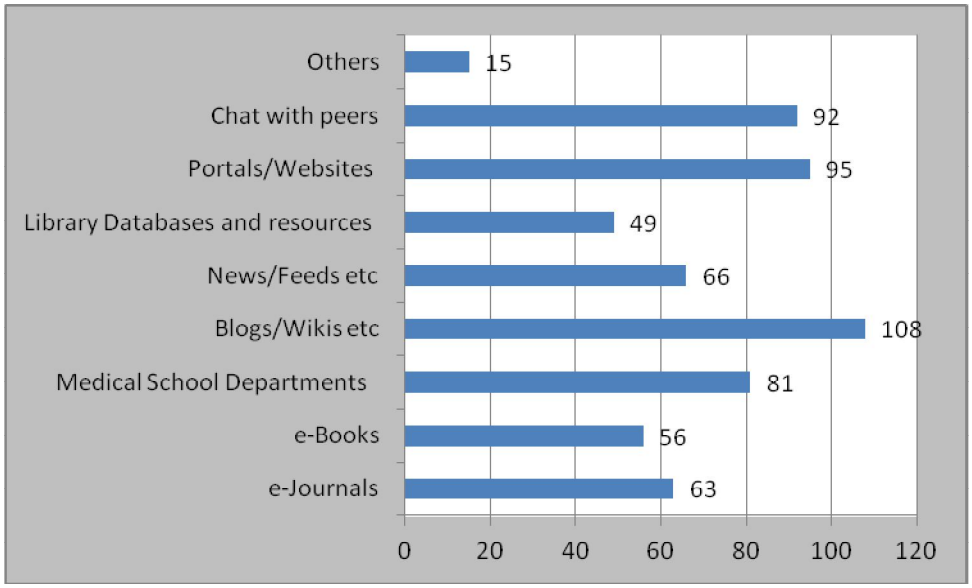

Figure 4.3: E-resources usage for their Medical education

4.1.4 Usage of Web 2.0 tools

Among Web 2.0 tools used by medical students, following description will show how extensive these technologies are being used by the students. The visualized graph in the following graph will show the usage patterns in Web 2.0 tools.

Wikis: 69 occasionally used, 85 extensively used, 2 are not aware about this and 6 did not respond to this question.

Blogs: 61occasionally used, 31 extensively used, 4 contribute, 50 never used, 12 not aware and 4 no response.

Media Sharing: 56 occasionally used, 83 extensively used, 1 contribute, 14 never used, 2 not aware and 6 no response.

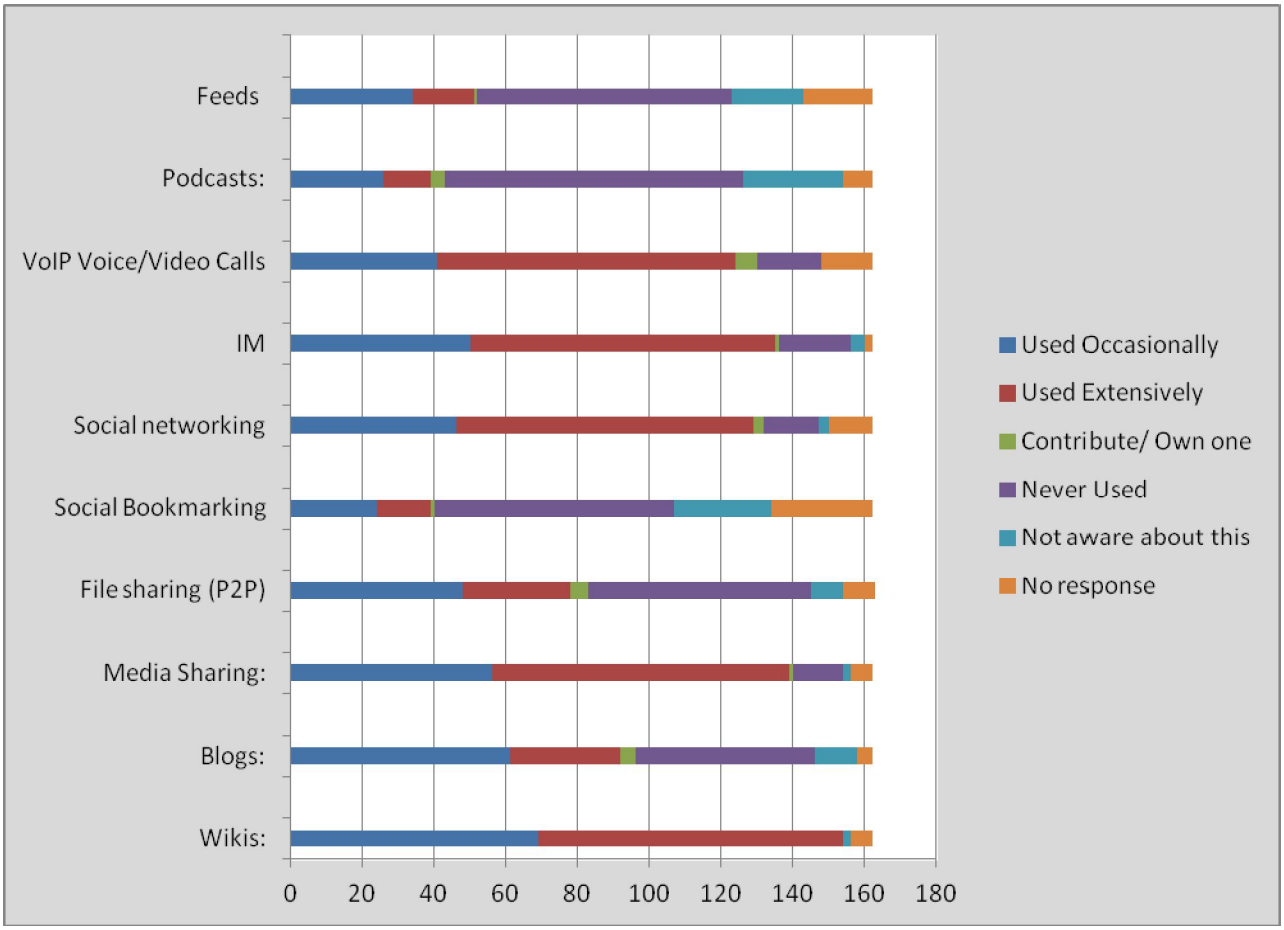

Figure 4.4: Usage of Web 2.0 tools for Medical education

File Sharing: 48 occasionally used, 30 extensively used, 5 contribute, 62 never used, 1 not aware and 9 no response.

Social Book Marking / Tagging:

24occasionally used, 15 extensively used, 1 contribute, 67 never used, 27 not aware and 28 no responses.

Social Networking sites:

46 occasionally used, 83 extensively used, 3 contribute, 15 never used, 3 not aware and 12 no response.

Instant Messaging: 50 occasionally used, 85 extensively used, 1 contribute, 20 never used, 4 not aware and 2 no response.

VoIP: 41 occasionally used, 83 extensively used, 6 contribute, 18 never used, 0 not aware and 14 no response.

Podcasts: 26 occasionally used, 13 extensively used, 4 contribute, 83 never used, 28 not aware and 8 no response.

Feeds: 34 occasionally used, 17 extensively used, 1 contribute, 71 never used, 20 not aware and 19 no response.

Wikis, instant messaging, media sharing, social networking and VoIP are extensively used by major part of students. When we add students group who occasionally use these 5 technologies, we can clearly say that these are the technologies showing a positive trend in student's usage. But, very less usage of podcasts, social book marking need to be analyzed more, since these two technologies have high usage in medical practice and collaborative research. Blogs, feeds and file sharing are also have low usage among the sample group.

This data is closely matching with some of the previous studies, where Sandars, et al. (2010) find over 90 percent medical students using instant messaging and social networking sites. But this data is contradicting findings from Ward, Moule and Lockye (2010) where they found podcasting used by 32%, blogs by 44%, wikis 28% and social networking by 16%. If we compare with different studies (White, 2007), (Kennedy et al., 2006) the findings have minor variations due to region, non-promotion from the campus faculty, unawareness among students and non-availability of such systems in their e-learning platforms.

4.1.5 Usage of a course management (e-learning) system

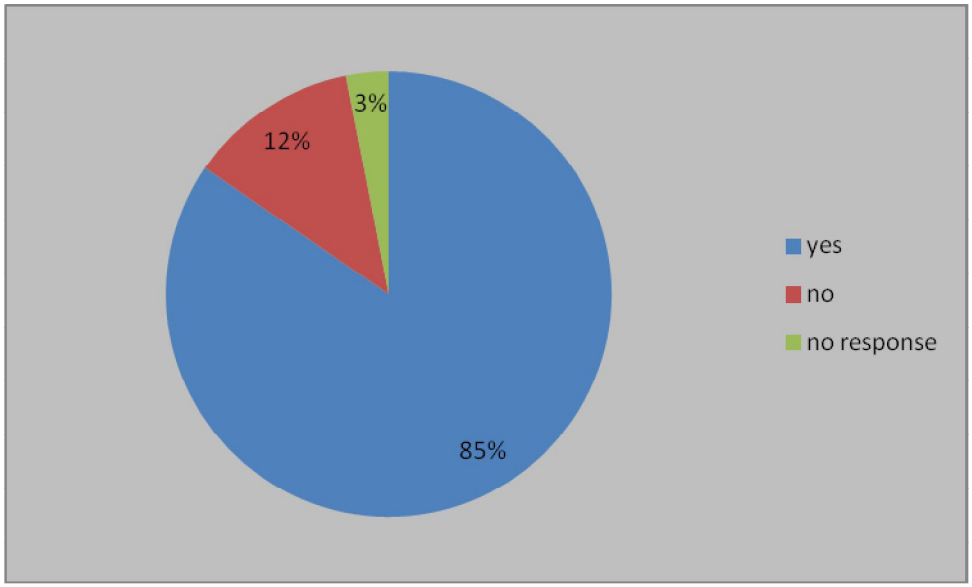

Figure 4.5: Usage of a course management (e-learning) system

Out of 162 respondents, 137 (85%) have used or using e-learning system for their medical education, 20 (12%) are not used and 5 (3%) did not respond to this question.

4.1.6 Availability of Web 2.0 features in course management systems

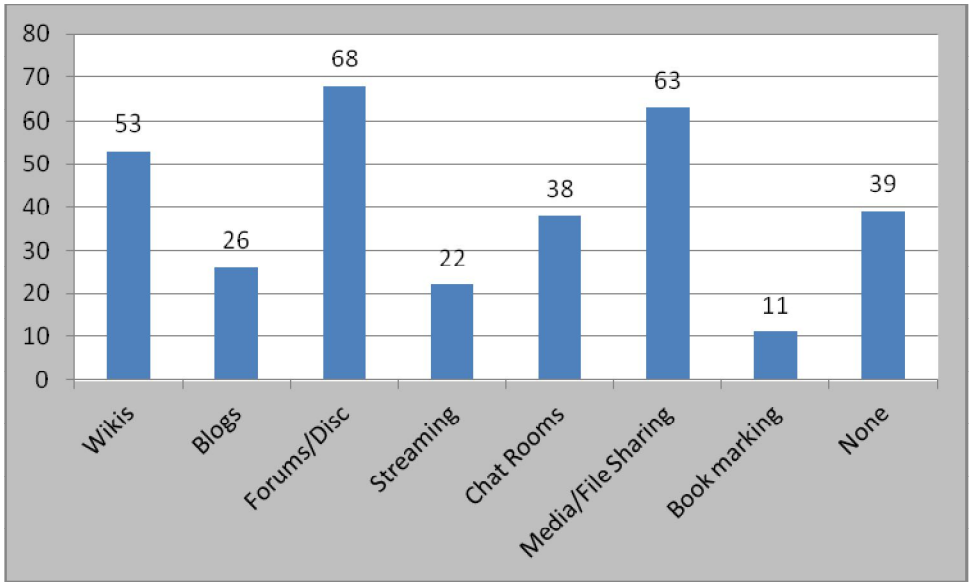

Figure 4.6: Availability of Web 2.0 tools/features in course management systems

68 (42%) respondents told that the course management system they used has forums and discussion feature in it. Other features are 53 (32%) wikis, 63(30%) media/file sharing, 38(23%) chat rooms, 26 (16%) blogs, 22 (14%) streaming, 11 (6%) book marking and 39 (24%) told they did not have any web.20 features in their course management system. Most the e-

learning products are integrating such Web 2.0 tools and support blended teaching.

4.1.7 Expectation of Web 2.0 feature(s) in an E-Learning System.

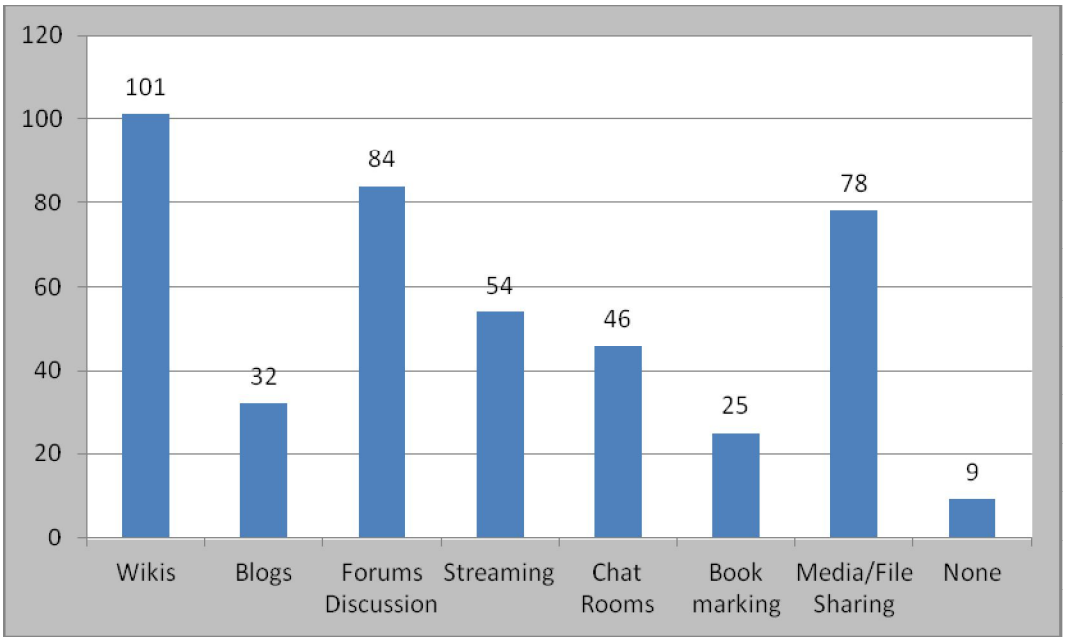

Figure 4. 7: Expectation of Web 2.0 feature(s) in an E-Learning System.

101 (62%) respondents expect wikis function in an e-learning system, 84 (52%) expect forum and discussion, 78 (48%) expect media/file sharing, 54 (33%) expect streaming, 46 (28%) expect chat rooms, 32 (20%) expect blogs, 25 (15%) expect book marking and 9 (5%) respondents do not expect any Web 2.0 features. It is interesting to note that wikis, forums and discussions and media file sharing are wanted by most of the students, and shows its popularity among them.

4.1.8 Reasons for Web 2.0 tools are useful in learning

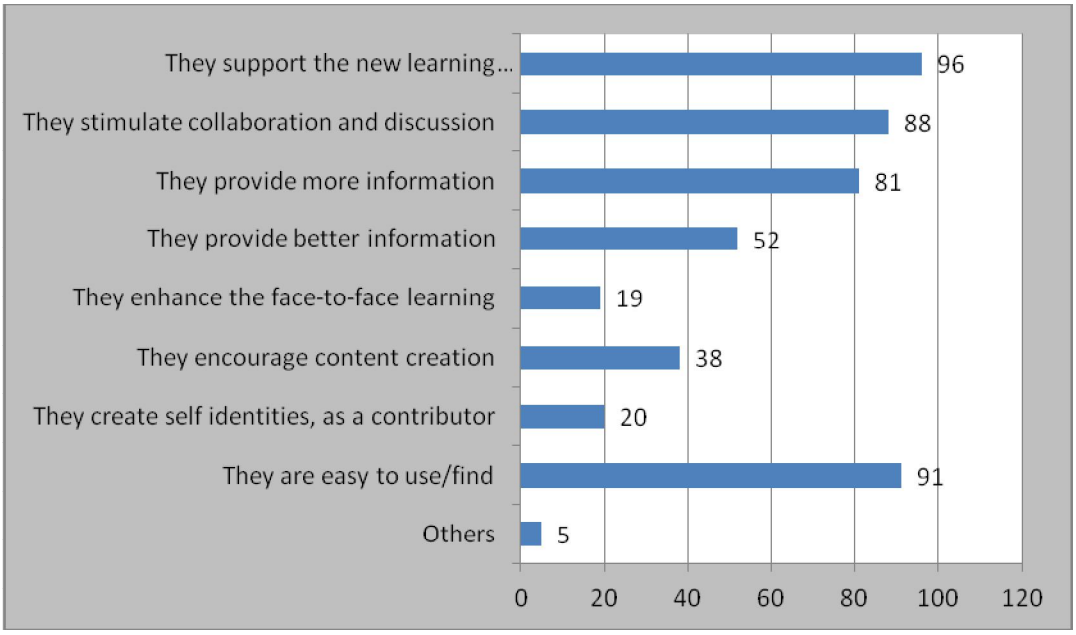

Figure 4.8: Reasons for Web 2.0 tools are useful in learning

96 (59%) respondents agree that Web 2.0 tools will support new learning, 91 (56%) believe that they are easy to use and find, 88 (54%) agree that they stimulate collaboration and discussion, 81 (50%) believe that they provide more information, 52 (32%) believe that they provide better information, 38 (23%) believe that they encourage content creation and only 20 (12%) believe that they enhance the face-to-face learning.

4.1.9 Evaluation of information from blog, wiki, podcasts etc

Question: Do you evaluate a blog, wiki, podcasts etc based on its authority, reliability, authenticity etc, before using the information for your course works, assignments, research projects etc?

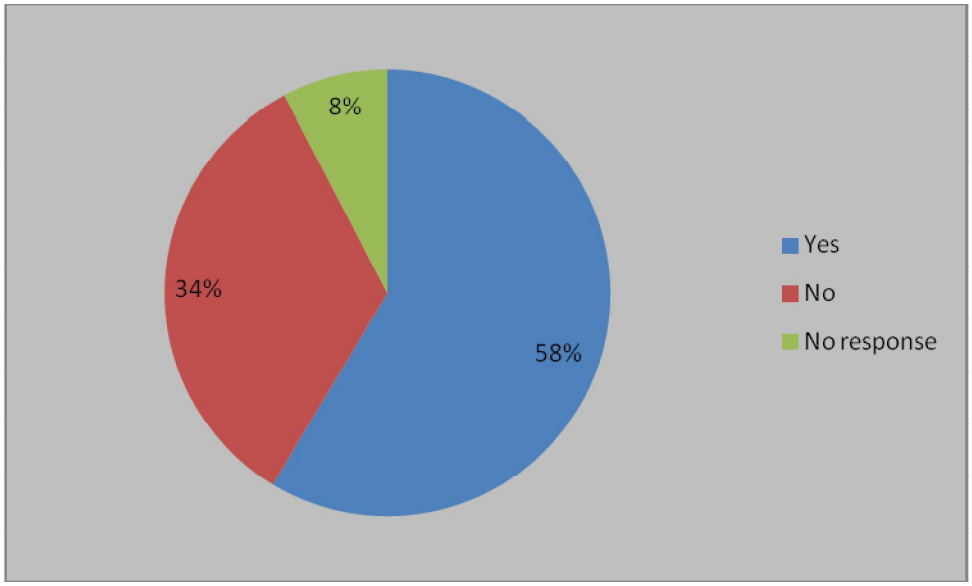

Figure 4.9: Evaluation of information from Blog, Wiki, Podcasts etc

92 (58%) respondents evaluate the information from wikis, blogs, podcasts etc before they use them for their course assignments and research works, 53 (34%) do not evaluate and 12 (8%) respondents did not answer this question. It should be a matter of concern for the educators to have clear guidelines and policies in evaluating the information from Web 2.0 resources (Haigh, 2010b, Burke and Snyder, 2008)

4.1.10 Reasons preventing from using the information from Web 2.0

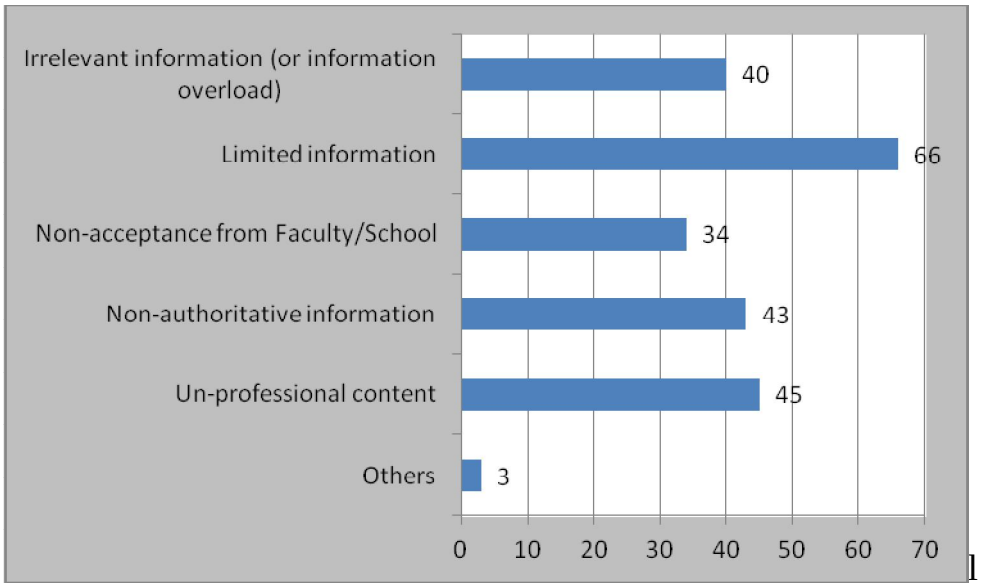

Figure 4.10: Reasons preventing from using the information from Web 2.0 tools

66 respondents (41%) found limited information as the reason preventing them using information from Web 2.0 tools, 45 (28%) found un-professional content, 43 (27%) found non-authoritative information, 40 (25%) found irrelevant information or information overload, and 34 (21%) found the non-acceptance from faculty or school are the reasons. 3 respondents found other reasons such as “youtube is blocked”, “internet not used much for study” etc. Posting of unprofessional online content, especially via Web 2.0 platforms is a matter of concern and there are no adequate policies having in place as well, even in U.S. Medical schools (Chretien et al., 2009).

4.1.11 Citing practice of the information from Web 2.0 tools

Question: When you use the information from a blog, wiki, podcasts etc for your course works, assignments, research projects, do you cite (provide reference) them properly?

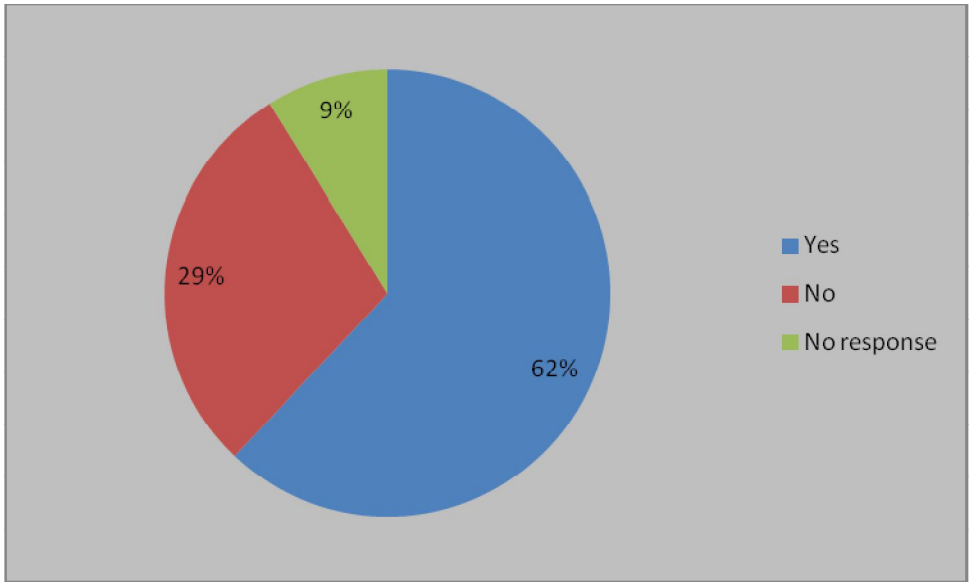

Figure 4. 11 : Citing practice of the information from Web 2.0 tools

98 (62%) respondents said that they cite the references of information taken from Web 2.0 platforms, but 46 (29%) of them do not cite and14 (9%) respondents did not respond to this question. A considerable minority is still do not practice citations or giving credit to the original author and this leads to plagiarism and unethical situations. Masters and Ellaway (2008)suggest plagiarism detection systems to be incorporated even in Web 2.0 environments.

4.1.12 Willingness to contribute share in Web 2.0 environments

Question: Are you willing to contribute/upload/share OR just to read/listen/download in Web 2.0 environments?

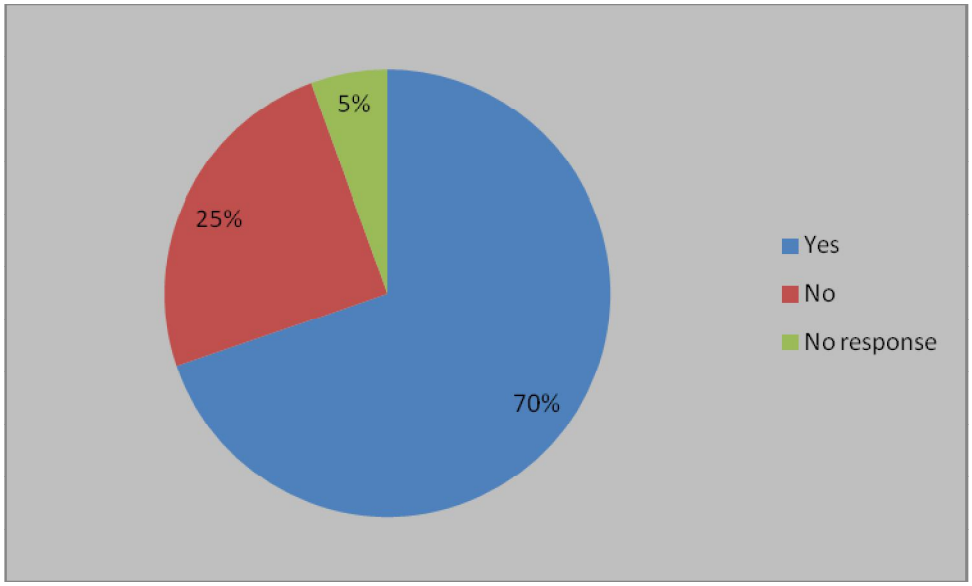

Figure 4.12: Willingness to contribute share in Web 2.0 environments

113 (70%) respondents are willing to contribute or share information in Web 2.0 environments, 40 (25%) would like to read or listen and 9 (5%) did not respond to this question. This willingness is a positive trend, especially, the emphasis on student authorship and debugging of sophisticated academic knowledge bases are the powerful features of Web 2.0 tools (Bratsas et al., 2009).

4.1.13 Awareness of Web 2.0 usage in medical practice and CMEs

Question: Do you know that Web 2.0 tools are used by physicians and hospitals in medical research and CME?

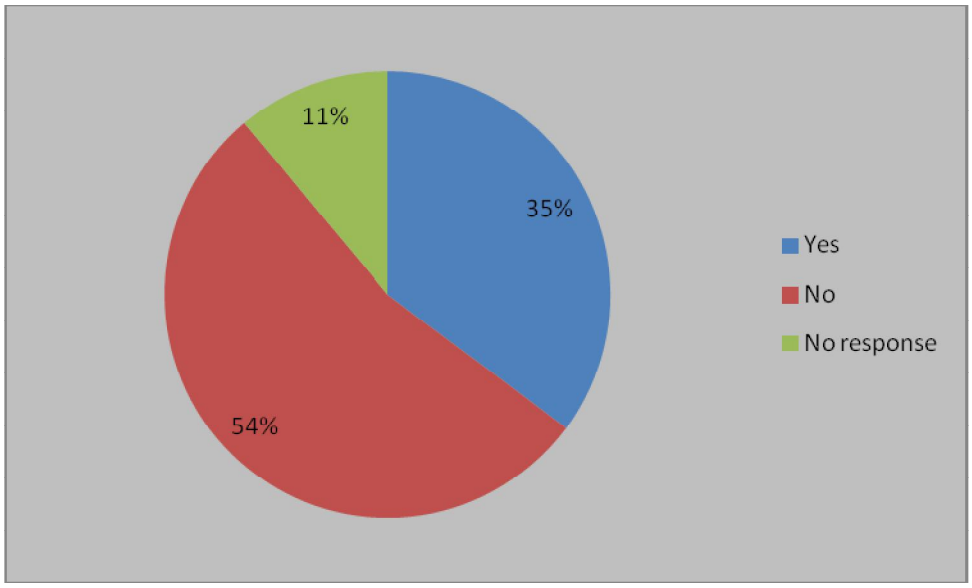

Figure 4.13: Awareness of Web 2.0 usage in medical practice and CMEs

It is interesting to note that 87 (54%) respondents are NOT aware about Web 2.0 usage in medical practice, research and continuing medical education programs, where only 57 (35%) knows about it and 18 (11%) did not respond to this question. The wide use of these emerging technologies in continuing medical education/professional development, patient education (Boulos and Wheelert, 2007) and on all areas of medical practice (Hughes et al., 2008) is already known, and basic medical science students should be aware about it.

4.1.14 Open Ended Questions

To encourage the students to talk about whatever is important to them, researcher included two open-ended questions. Researcher thought they are very important in surveys and will help to establish rapport, gather information and increase understanding of their knowledge level. Below given responses are clear indicatives of students' passion to use Web 2.0 tools in their learning process.

When comparing with traditional resources (faculty notes, text books, journals etc), what are your over all opinion about the information available in Web 2.0 platforms?

Most of the responses are very common, general, specific and short answers. As compared to traditional resources, generally they found that the information from Web 2.0 platforms are easy to access, easy to search, convenient, informative, useful, faster, great, helpful, important, good, effective, awesome, concise, direct, efficient and so on. There are some responses, which are little more in detail, some have little critic views, which are given below.

1. They are helpful (for) additional clarification.
2. It's much easier to access and understand. There are more than one resource (to consult)
3. Can be useful but one must be skeptical when using the information
4. It can enhance overall education
5. Can be useful, but should be used wisely.
6. More information that is readily available and easy to access.
7. Very good information avenue and instantaneous.
8. It is great (to use) at home.
9. Traditional methods although reliable are unorganized. Web 2.0 makes information more organized and easily accessible.
10. They provide a broad base of information. So there are more resources, easy to use more accessible.
11. Wikipaedia has information in the form of a summary. For further information, it also gives links and reference.
12. Save time and accelerate learning of the resources is well organized.
13. Useful, but need more access to full text journals with currently useful information.
14. Would be useful if available especially the videos/streaming.

15. These are more helpful and make life easier if I can't understand the topic.
16. It is easier to access all you need in a computer and internet.
17. Faculty notes and scholarly information remain best source.
18. They are easier to use than book.
19. It is easier to get to and almost as reliable
20. More animated, greater access. Easier to carry one laptop than textbooks.
21. Pretty accurate perhaps more readily available.
22. Although the information needs to be used with caution due to lack of editing and peer reviewing in some cases, the information is helpful and easily accessible. Web 2.0 platforms provide access to almost limitless information on infinite topics.
23. It is good to have but hard materials (books, notes etc,) can never be replaced
24. Web 2.0 can find information faster and quicker but books are more detailed
25. More extensive can be overwhelming to sit through, but they are not extensive.
26. Easier, faster retrieval of information. I have no problems.

27. Textbooks usually go into more depth depending on the reliability of the textbook.
28. Quicker access, but not necessarily more reliable.
29. Easy to access, reinforce knowledge good resource to study from.
30. Helpful, but used as a supplemental source.
31. Not very well informed about 2.0. I stick with books , faculty power points etc.
32. A good reference to go over ideas and concepts
33. It is a great way to incorporate knowledge into technology
34. Textbooks are great for reviewing subject matter as a whole but are hard to navigate for quick and short references. Here Web 2.0 is helpful. They are easier to use due to their search capabilities
35. Adds value to learning, seeing, hearing and writing; Web 2.0 all helpful for information.
36. Useful but not as specific as traditional resources.
37. Books are better.
38. They should be available all the time.
39. Useful when information is unavailable.
40. Web 2.0 is more useful and readily available. Better for these days.

41. Much better, really reliable and they are available anywhere and anytime. Additionally it provides a wide variety of mechanisms with different techniques of learning.
42. It is more appearance than just opening a book full of words.
81. YouTube makes up for information that isn't provided by our faculty.
82. Information can more easily be accessible and often times more illustrative and interactive.
83. Just found out what it is.
84. I find the Web 2.0 platform as a quick way to review and look up topics but original resources provide more in-depth information.
85. The more, the better.
86. At times it is not effective use of own time. Because they are tend to be helping information overload or not from a reliable source. On the other hand it can contribute to a greater variety of information as well as different layouts of information which can great to all types of learners.

Main concerns of the critical views are about the reliability of information, the need of evaluation etc. Some students clearly say that text books and faculty notes are more relevant and will not be replaced by

technologies. Most of the opinions tend to be saying that these resources can be a good supplementary resource, if evaluated and wisely used.

What are your comments about effective use of Web 2.0 tools in medical education OR practice?

Effective uses of Web 2.0 tools in medical education and practice are commented differently by different respondents. There are again very common, general, specific and short answers given by many of them. These comments include; it is very fast; fun; good but need change; useful; convenient; easy access; good; recommend; need more; effective etc. The comments worth mentioning or critical are provided below, after eliminating duplicates from previous answers.

1. They should be provided or Okayed by the medical school. So it will be understood by students the information is accurate.
2. I think it can be a good supplement resource.
3. It should be encouraged for the practice of medicine.
4. Provide recorded lectures, medical cases.
5. It should be implemented more.

6. Effective in turns of being able to pull reliable and accurate information, but may be a problem when technology is not available.
7. I think it should be encouraged. It is more practical for current times.
8. If used effectively it would have a tremendous impact on how we learn to keep track of medicine
9. It is very useful and informative. All information under one roof.
10. It should be used as an adjacent to classroom and hands on learning.
11. All the medical professionals should get the internet facility to use Web 2.0 tools to upgrade their knowledge.
12. I need to learn more about what platform is capable of providing.
13. Helpful, but students don't know how to use it capably.
14. There should be a mandatory tutorial during orientation about this.
15. It is very helpful but teachers need to add more to their notes/ppt in order to be useful. Anyone can put up pictures from books but notes need to go along with them.
16. It will make communication faster, easier and will lead to better care and understanding of the patient.
17. They help in study, so stop blocking them.
18. Stop blocking these websites.

19. I like them to use, but I think it is dependant on extrinsic factors. So it shouldn't be used to take important exams.
20. They are great , they provide more exposure to material and allow the user different approaches to materials
21. I think if used effectively (noting sources, checking citations etc), Web 2.0 tools are a great help in a field such as medicine which is constantly being updated and expanded.
22. It is good as a supplementary material only.
23. AUA should take part in it and a better system is needed.
24. Extremely useful, if utilized correctly.
25. If used properly and effectively, I think it can enhance medical education/practice.
26. I will continue to use throughout my career.
27. It is a good way to discuss different ideas within the school /network and will help make information more readily available.
28. Good for information access when no other hard copy resources are available.
29. I hope we will be able to expand blackboard. So lectures can be streamed from outside school.
30. It enhances the study and practice of modern medicine.

31. I feel that they can be great if used from appropriate sources, However at times that is extremely difficult to access.
32. May be useful for some and annoying for others. Textbooks are still the most reliable resources.
33. I am sure there are advantages to Web 2.0 but I am not in a position to comment.
34. A useful tool that informs the physician of new drugs , treatment or new information regarding a medical condition.
35. Can be upgraded but no problems.
36. They are great supplementary information as a secondary resource, still hard text as a primary resource.
37. They are somewhat comparable, but not as ground breaking materials compared to large /more professional journals etc.
38. As long as information is reliable they are good.
39. Don’t think everything you need is available online.
40. I think it would be very beneficial if used properly.
41. Very helpful. It provides a variety of views on various topics that may be ambiguous to some individuals.
42. They should be allowed (but blocked by AUA).

43. It is a good idea that will allow incorporating different types of learning but the traditional methods (textbooks) should never be totally eliminated.
44. Web 2.0 is the future.

Again main concerns are about the reliability of information, the need of evaluation etc. Some students say that medical school and faculty should clearly accept the practice of using the information from Web 2.0 tools. Blocking of such tools, like You Tube, are opposed by students and asking for more open approach from the administrators. There are opinions pointing out to the necessity of implementing these technologies to e-learning platforms, such as blackboard. They demand steaming videos of faculty lectures and podcasts kind of blended approach. Still they feel that text books and faculty notes are important and will not be replaced by technologies, but can be a good supplementary resource, if evaluated and wisely used.

4.2 Findings

From the literature review, it has seen that there are many evidences of Web 2.0 applications in e-learning, medical education and medical

practice. It is also found that students are using wikis, instant messaging, podcasting, social networking, and blogs for their medical education. Now let us discuss the major findings of this study as listed below;

1. 65 percent of the students spend between 1 to 7 hours on internet and 35 percent spend more than 7 hours a day, for learning purposes, which shows high use of Internet by basic medical science students.

2. A relatively high use and activities of Web 2.0 applications as compared to traditional resources, is found through this study. For medical education purposes through Internet, blogs and wikis are used more. Other resources in descending order of usage are portals and websites, chat with peers, medical school department websites, news and feeds, e-Journals, e-books, library databases and resources.

3. Among Web 2.0 applications, wikis, instant messaging, media sharing, social networking and VoIP show high usage by major group of students. Even though a positive trend is visible here, very less usage of podcasts, social book marking is also found. This trend is against to high usage of

podcasts and collaborative bookmarking practices, especially in medical practice. Low usage of blogs, feeds and file sharing is also found.

4. It is found that 85 percent of students have used or using e-learning system for their medical education.

5. Forums and discussion was highly noticed by students in their e-learning systems, followed by wikis, media/file sharing, chat rooms, blogs, streaming and book marking. 24 percent students did not have Web 2.0 applications in their course management systems.

6. Among most wanted features, 62 percent students expect wikis function to be integrated in a technologically advanced e-learning system and 52 percent expect forum and discussion. Other expectations in descending order are media/file sharing, streaming, chat rooms, blogs and book marking.

7. More students believe Web 2.0 tools will support new learning, easy to use and find, stimulate collaboration and discussion, provide more information, and provide better information. Few students also believe that these tools encourage content creation and enhance the face-to-face learning.

8. The information from wikis, blogs, and podcasts etc are evaluated only by 58 percent students, before they use them for their course assignments and research works.

9. "Limited information" on Web 2.0 tools preventing a good number of students from using these resources, along with other reasons (in descending order), such as; un-professional content, non-authoritative information, irrelevant information or information overload, non-acceptance from faculty or school.

10. Major group of students, 62 percent, provide proper citations to the information taken from Web 2.0 platforms. Knowingly or unknowingly a considerable minority is still do not practice citations or giving credit to the original author(s).

11. Another positive trend is found in 70 percent respondents show their willingness to contribute in content creation or share information in Web 2.0 environments. Others just like to read or listen or did not respond, do not want to be part of authoring collaborative environments.

12. When we look at a broader perspective of Medicine 2.0, it is interesting to note that 54 percent basic medical science students are NOT aware about Web 2.0 usage in medical practice, research and CMEs. Only 35 percent knows about the wide usage and 11 percent did not respond to this question.

13. Students believe that text books and faculty notes/presentations are more important, but Web 20 tools can be a good supplement, when they are used wisely.

14. Students want medical school and faculty to clearly accept the practice of using the information from Web 2.0 tools.

15. Students feel there is a need of more open approach from the administrators and are against to blocking of Web 2.0 tools, like You Tube, Facebook etc.

16. There are opinions pointing out to the necessity of implementing these technologies to e-learning platforms, such as blackboard at American University of Antigua. Steaming videos of faculty lectures and podcasts kind of blended approach are the main demands.

Chapter 5: Conclusion

5.1 Achievement of this study

Overall, the process of reviewing literature, constructing questionnaire, analysis the data and write this dissertation in an organized way, was challenging and interesting for the researcher. This whole exercise helped the researcher in understanding the methodology, studying the population and style of analyzing and research writing, which will be an advantage in the professional career and research.

The initial understanding of the researcher about student's awareness and usage of Web 2.0 applications was the main force prompted for further studying their expectations in the long run, especially in an integrated e-learning system. So the main aim of this research was to identify the usage of Web 2.0 tools and expectation of its availability in an e-learning platform by basic medical science students at American University of Antigua, College of Medicine. Aims and objectives of this research are met successfully and results are analyzed for suggesting necessary recommendations.

First objective of the study, reviewing the literature for evidences in usage of the various Web 2.0 applications, especially in medical education, learning, research and practice, has been met and this is included in Chapter 2 of this dissertation. Through the survey, researcher could meet other objectives of understanding usage, usage patterns and expectations of Web 2.0 technologies for learning and research purposes, and the results are provided in Chapter 4. Based on these, researcher put forward some recommendations, and suggestions for further studies after identifying the limitations of this study.

5.2 Recommendations

The literature review and the study revealed several needs and expectations by the medical students and by medical practitioners, even by community as a whole, in the age of Web 2.0 technological advancements. These tools attract the largest portion of Internet users, the youngsters and growing especially in medical fields. E-learning platforms are inflexible in a larger way to accommodate the possibilities of building credible resources through communities, and contrast with the user-centered approach of Web 2.0 services (Craig, 2007). At this point, researcher put forward the

following recommendations to educators, faculty and students, especially in medical field.

Innovative solutions at institutional level in a Web 2.0 environment are the need of the hour. It includes rethinking the underlying architecture of the present e-learning models. Students should be provided with the facilities in a format more familiar to them and used by most of them. Educators and faculty need to understand that these activities will add value to their teaching and learning process. Faculty also should be trained with a new emphasis as learners in a rapidly changing environment. Virtual Learning Environments supportive curricula, social media policies, e-professionalism for students, feedbacks systems and related possibilities still need to be fully identified and explored in various settings/scenarios at campus level. Teaching and learning institutions should be equipped for the future with the appropriate technology and allow their students to achieve their maximum potential. The immediate calls are for integrating wikis, instant messaging, audio/video streaming, social collaborations, podcasts and Web 3.0 based semantic content to present e-learning systems.

While implementing Web 20 or Web 3.0 features, the aim should be to develop and implement tools in e-learning platforms and each learner should have a personalized learning system linked to a vast range of learning resources, social media and collaboration, where each learner and his/her contribution is an integral part (Sandars and Haythornthwaite, 2007, Vijayakumar, 2008).

5.3 Limitations and Suggestions for further research

This study was focusing only on basic medical science students at American University of Antigua. This study can be extended to other disciplines and to faculty members.

There was no comparison made between different e-learning platforms in terms of availability of Web 2.0 features, which can be done at case basis before implementing the system.

Focus of this study was on medical education and practice, where a detailed study can be done for other disciplines as well.

The study did not focus on information seeking behavior, rather on usage patterns. Information seeking behavior on Web 2.0 environments can also be done while developing the search interfaces and content platforms in an e-learning platform.

Researches in Web 2.0 applications in learning are tend to be very descriptive failing to identify and discuss the pedagogical theories and models that support and enhance the exploitation of Web 2.0 tools in (e)-learning environments, (Sigala, 2007), which needs attention and further research.

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Annexure: Questionnaire

A SUREVY ON AWARENESS AND USAGE OF WEB 2.0 APPLICATIONS BY BASIC MEDICAL SCIENCE STUDENTS

This survey is to find out medical students' awareness and usage of Web 2.0 tools during their education. It also aims to identify their expectations about these tools in a course management system (e-learning platform). *Web 2.0 tools generally refer to the web based new social collaboration tools emerged in last few years (Wikis, Blogs, Feeds, Social Networking, Podcasts, Instant Messaging, VoIP, media/file sharing etc)*.

The following questions are designed to find out both your personal and professional usage of these tools. All measures are taken to safe-guard the confidentiality of the participants of this survey. *Your response is not mandatory*, but will greatly help the researcher in analyzing the trends and framing the suggestions.

Thank you for your time….. Dr. J. K. Vijayakumar

1. Your age group? [ ] Less than 15 years [ ] 15 – 20 [ ] 21 – 25 [ ] More than 25 years

2. On average, how many hours in a day do you spend on the Internet?

[ ] 1-3 hours [ ] 4-7 hours [ ] 8-12 hours [ ] More than 12 hours

3. What kind of resources do you use from the Internet for your *Medical education*? (***Check all that apply***)

[ ] e-Journals [ ] e-Books [ ] Medical School Departments
[ ] Blogs/Wikis etc [ ] News/Feeds etc [ ] Library Databases and resources
[ ] Portals/Websites [ ] Chat with peers [ ] Others (please specify)

4. Please select the most appropriate, in terms of your usage of following Web 2.0 tools (***Tick all that apply***);

Web 2.0 tools	Used Occasionally	Used Extensively	Contribute/ Own one	Never Used	Not aware about this	No response
Wikis: *(eg: Wikipedia, medical Wikis etc)*						
Blogs: *(eg: Blogs of Faculty, Physicians etc)*						
Media Sharing: (eg: You Tube, Flickr)						
File sharing (P2P) *(eg: LimeWire, BitTorrent etc)*						
Social Bookmarking/ Tagging: *(eg. Delicio.us, CiteULike etc)*						
Social networking Sites: *(eg: Facebook, Myspace etc)*						

Instant Messaging: *(eg: GTalk, MSN, YMessenge etc)*						
VoIP Voice/Video Calls *(eg: Skype, GTalk, YMessenger etc)*						
Podcasts: *(eg: Podcasts from NEJM, Lancet etc)*						
Feeds (mainly news): (eg: RSS Feeds from JAMA etc)						

5. Have you ever used a Course management system (E-Learning System), as a part of your courses?
   Eg: Black Board/WebCT/Angel, Moodle, Sakai etc).

   [ ] Yes [ ] No [ ] No response

6. Have those systems provide any of the following Web 2.0 application? (***Check all that apply***)

   [ ] Wikis [ ] Blogs [ ] Forums/Discussions
   [ ] Streaming [ ] Chat Rooms [ ] Media/File Sharing
   [ ] Book Marking Tagging [ ] None

7. What Web 2.0 feature(s) do you expect (OR do you think more useful) in an E-Learning System, during your Medical Science education? (***Check all that apply***)

   [ ] Wikis [ ] Blogs [ ] Forums/Discussions
   [ ] Streaming [ ] Book Marking/ Tagging [ ] Chat Rooms
   [ ] Media/File Sharing [ ] None [ ] Others (specify)

8. What motivates you to think that Web 2.0 tools are useful in learning? (***Check all that apply***)

   [ ] They stimulate collaboration and discussion
   [ ] They support the new learning environment (anytime, anywhere)
   [ ] They encourage content creation
   [ ] They create self identities, as a contributor
   [ ] They enhance the face-to-face learning
   [ ] They are easy to use/find
   [ ] They provide better information
   [ ] They provide more information
   [ ] Other (please specify)

9. Do you evaluate a Blog, Wiki, Podcasts etc based on its *Authority, Reliability, Authenticity etc,* before using the information for your course works, assignments, research projects etc?

   [ ] Yes [ ] No [ ] No response

10. In any instance, did any of the following reasons prevent you from using the information from Web 2.0 tools? (***Check all that apply***)

    [ ] Non-authoritative information
    [ ] Un-professional content
    [ ] Limited information
    [ ] Non-acceptance from Faculty/School does
    [ ] Irrelevant information (or information overload)
    [ ] Other (please specify)

11. When you use the information from a Blog, Wiki, Podcasts etc for your course works, assignments, research projects, do you cite (*provide reference*) them properly?

    [ ] Yes [ ] No [ ] No response

12. Are you willing to contribute/upload/share OR just to read/listen/download in Web 2.0 environments?

    [ ] Yes [ ] No [ ] No response

13. Do you know that Web 2.0 tools are used by physicians and hospitals in medical research and CME programs?

    [ ] Yes [ ] No [ ] No response

14. When comparing with traditional resources (faculty notes, text books, journals etc), what are your over all opinion about the information available in Web 2.0 platforms?

15. What are your comments about effective use of Web 2.0 tools in medical education OR practice?