

WEB 2.0 TECHNOLOGIES IN EDUCATION

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ABSTRACT

This paper will discuss how Web 2.0 technologies were used in one of the foundation units for the Bachelor Degree of Commerce at Curtin Business School. This research targets undergraduate students, lecturers, and tutors of the Business Information Systems (BIS) 100 at the School of Information Systems in Curtin University. The research sample size is 122 students for surveys, and ten students and seven instructors for interviews. Only 88 students responded to the post-survey.

Most universities have already planned, or are currently planning, to change from instructor-delivered teaching to student-facilitated learning with the help of Web 2.0. The main purpose of this paper is to investigate the impacts of Web 2.0 technologies on teaching and learning performance at Curtin University, Australia. This research will provide additional information about why Web 2.0 should be adopted in education and will provide several strategies to formulate the adoption of Web 2.0 successfully.

The Critical Realism paradigm, which consists of both positivism and interpretive, were applied in the study to explore and understand the relationship between the use of Web 2.0 and the teaching and learning performance. Qualitative and quantitative approaches were used to collect data from surveys and interviews. The results from the post-survey were compared with pre-survey results, to determine any changes in the levels of both awareness and knowledge since the pre-survey.

Significant findings show that the levels of awareness and knowledge of students using Web 2.0 were low at the beginning of the semester, with a slight increase in the levels of awareness and knowledge as the students were exposed to several Web 2.0 tools. In addition, it was noticed that males have more knowledge of Web 2.0 technologies than do females, and are more interested in technology than are females. It was also found that the percentage of students using Web 2.0 to organise group meetings, to communicate with other classmates, and to communicate with their tutors has increased by 6.62%, 7.7%, and 1.82% respectively. Further research should be carried out to tackle any disadvantages and challenges of adopting web 2.0 in teaching and learning in Australia and globally.

KEYWORDS

Web 2.0, E-Learning, awareness and knowledge, usability

1. INTRODUCTION

In most countries, the percentage of Internet usage has exponentially increased in the last ten years (eTForecasts n.d.). The Internet is an essential tool for users and businesses to finalise their work simultaneously. People use the Internet for various purposes, namely: research, education, marketing, information and entertainment. The Internet is rapidly evolving, as it provides many facilities to meet users' needs and requirements. The recent evolution of the Internet is Web 2.0, which is referred to as "network as a platform". It consists of Social Networking sites, video-sharing sites, web applications, wikis, blogs, and podcasts. Furthermore, this technology can support education in terms of participation, interaction, sharing of knowledge, social networking, critical reading, critical thinking and writing, collaboration, and expression of opinions.

Web 2.0 is the new revolution in education, since in general, the principles of Web 1.0 are the 3Rs: Reading, Receiving, and Researching; whereas the principles of Web 2.0 are the 3Cs: Contributing, Collaborating, and Creating. Some principles of Web 2.0 that Anderson (2007) and O'Reilly (2005) stated are: 'The Web as a platform', 'Individual production and User Generated Content', 'Harnessing the power of the crowd', 'Data on an epic scale', 'Architecture of Participation', 'Network effects', and 'Openness'.

Web 2.0 websites offer significantly more interactive functionality than does "Web 1.0". Web 2.0 technologies allow user participation by supporting anonymity, more collection of information, freedom of

expressing ideas, quick and easy communication, and study that can take place anywhere and at any time. With Web 2.0, teachers become facilitators and encourage students to reflect and write more critically.

Many universities around the world are adopting this technology in their education sector, including Curtin University, Australia which started to adopt this technology in their learning and teaching area to encourage their students to use ICT. For instance, the School of Information Systems at Curtin University has adopted the Web 2.0 tool "Google Doc" in one of their undergraduate classes to encourage their students to learn new technology which is widely available in the marketplace.

Many studies have proven that the Internet has become an essential for most people and Web 2.0 has become popular, especially in the education sector (Boulos, Maramba & Wheeler 2006; Li & Pitts 2009) However, some studies also showed that the level of awareness about Web 2.0 in some educational institutions falls somewhat short and some people are misled about the uses of Web 2.0. It was found that some students did not even know that the Web 2.0 tools can be used for personal purposes as well as for their education (Aharony 2008; Middleton & Lee 2007; Stepanyan, Payne & Mather 2007).

The primary objective of this research was to improve education, which includes both teaching and learning, with the help of technology, particularly Web 2.0 tools. The researcher sought to ascertain whether Web 2.0 has a significant, positive impact on teaching and learning; and examined whether education is improved by the teaching sector's adoption of Web 2.0 technology. The researcher also identified the changes that are required in order to improve teaching and learning by adopting Web 2.0 tools. The main research objective was to examine the positive and negative impacts of adopting Web 2.0 in teaching and learning.

2. BACKGROUND

Currently, the Internet has become indispensable to most people. A great number of daily activities are performed via the Internet such as shopping and even, group discussions amongst students. Technology should be incorporated into education (Scott 2009). There is a need for a shift from instructor-delivered teaching to student-facilitated learning (Hazari, North & Moreland 2009). Web 2.0 provides many applications that support e-learning.

E-learning adopts the constructive and collaborative learning approach, where teachers act as facilitators and students work in groups within and outside the class. With most collaborative technologies, students can share their ideas anonymously, freely, and at their own pace. It was found that some students and teachers lack skills and are reluctant to use new Web 2.0 technologies. Web 2.0 is the next stage in the evolution of the Internet, and is defined as an information system "...in which online users become participants rather than mere viewers" (Exforsys Inc 2009; Rosh, Jones & Wahl 2009).

Many Web 2.0 services provide discussion boards and public forums for participants to create dialogue and collaborate on particular matters, and this can be seen in examples such as WebCT and Blackboard (Simonoski & Dell 2006). In 2005, 95% of UK Higher Education Institutions had a virtual-learning environment which they used for education (Mistry 2009). It was found that some young people make use of Web 2.0 and other internet technologies effectively (Luckin et al. 2009). "The use of Web 2.0 technology is rapidly being integrated into undergraduate and graduate education" (Rosh, Jones & Wahl 2009, p. 274).

There are many different categories of Web 2.0, such as social networking, aggregation services, data 'mash-ups', tracking and filtering content, collaborating, replicate office-style software in the browser, and source ideas or work from the crowd (Anderson 2007). Web 2.0 has different pedagogical values as shown in Figure 1 The key driver of the development of Web 2.0 is the emergence of new Web-related technologies and standards. Chui, Miller, and Roberts (2009) suggested six ways of how to implement Web 2.0 successfully:

1. The Transformation to a bottom-up culture needs help from the top;
2. The best uses come from users – but they require help to scale;
3. What is in the workflow is what gets used;
4. Appeal to the participants' egos and needs – not just their wallets;
5. The right solution comes from the right participants;
6. Balance the top-down and self-management of risk.

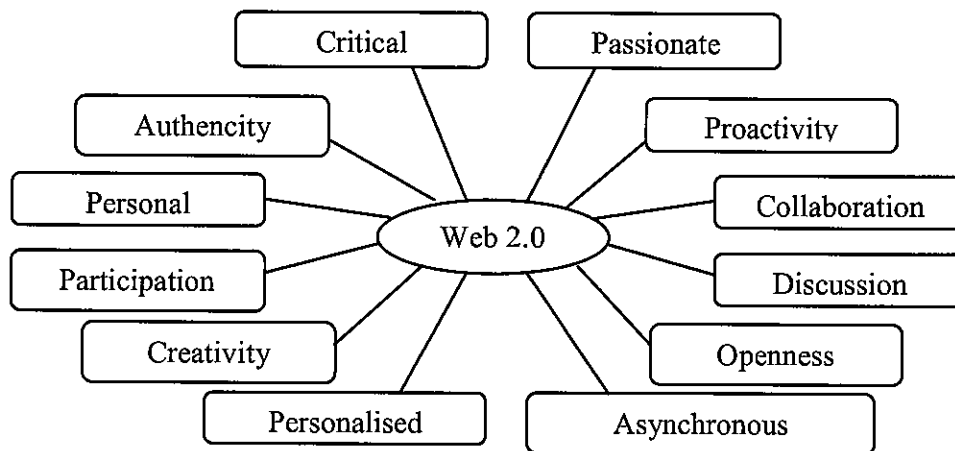


Figure 1. Pedagogical Values of Web 2.0

By using Web 2.0 in teaching and learning, students have the chance to create documents, videos, or podcasts online. A student can also act as a ‘Google Jockey’, who will search for any new terms or questions that emerge during a lecture, tutorial, or class discussion. In addition, Web 2.0 encourages more discussions amongst students in class on a particular topic. It encourages students to conduct more research, as students can gain access to broader sources of information other than textbooks. Teachers use the Internet to obtain updated information to prepare student notes so that students can acquire deeper understanding (Byrne 2009).

It is very important to implement Web 2.0 in education to formulate teaching and learning to be more interesting and interactive and to improve teaching performance. Students need guidance in using Web 2.0 technologies in their everyday lives and to help them keep safe on the Internet. Therefore, some parents are keen to be involved in their children’s education, particularly to be kept informed of their children’s learning progress at school, as many Web 2.0 applications can enable parents to do so. For instance, parents can use Wiki to participate in discussions about the school, and use blogs to check on curriculum content and their children’s progress. Students can use Web 2.0 technologies to complete their homework as well as to socialise with other people online (Freedman 2010).

3. RESEARCH METHODOLOGY

The primary research question for this research is as follows:

What are the barriers to, and challenges of, adopting Web 2.0 in teaching and learning at Curtin University?

It relates to the overall research goal, i.e. what the research is aiming to investigate. From the literature, it was found that Web 2.0 provides easy and quick communication and sharing of knowledge. However, there is lack of knowledge management as well as lack of common understandings.

The secondary research questions evolve from the primary research questions. They describe in detail what the research is aiming to achieve. Each secondary research objective will provide significant findings that will support the primary research objective.

The Secondary Research questions proposed are as follows:

1. *If Web 2.0 technologies have a positive impact on teaching and learning, how can Web 2.0 improve education and learning in future?*
2. *However, if Web 2.0 technologies have a negative impact on education, what changes need to be made in the Web 2.0 technology itself, or in the way Web 2.0 is used in education and learning?*
3. *In case of low awareness of the usability of Web 2.0 technologies, what are the strategies to diffuse and adopt this innovation?*

More research is required to determine whether Web 2.0 technologies still have a positive impact on teaching and learning and hence, how they will improve education learning in future. From the literature review, it was also found that Web 2.0 tools do not have translation facilities to support international

students. Hence, many misunderstandings occur. Sometimes, students do not have any interest in participating online due to many factors, one of which is laziness. They tend to be more isolated as well. With Web 2.0, it is difficult for teachers to assess students because of indirect contact. The level of plagiarism may increase. Some students can become distracted with Web 2.0; they tend to check their Facebook account, for example, and ignore their studies. Moreover, Web 2.0 applications may not be reliable because if there is a system downtime, students will not be able to study and this will delay their work.

Most students have little knowledge of Web 2.0 technologies. They are unaware that they are actually using Web 2.0 tools in their everyday activities for different purposes, even for their study. For instance, students at Curtin University use Blackboard, which is the university's Learning Management System, for their learning and some do not know that Blackboard is a Web 2.0 technology. The secondary research objectives will determine whether Web 2.0 technologies will have a negative impact on teaching and learning at university. If so, some recommendations will be provided for changes to be made to the Web 2.0 itself or the way Web 2.0 is being used in education. The secondary research questions will also help to identify strategies to promote Web 2.0 technologies, and to diffuse and adopt them. The findings of the secondary research questions will then support the primary research objective.

The target population for this research was the undergraduate students as well as instructors from the School of Information Systems at Curtin University, Australia, since the school has already adopted Web 2.0 technology in one of their undergraduate units. The sample size for this research was 122 undergraduate students for surveys, 10 out of the 100 students for interviews and seven instructors from the Business Information Systems 100 unit. When the researcher conducted the post-surveys, only 88 students responded because many students stopped attending classes as exams were approaching.

This research made use of the critical realism approach, which combines both quantitative and qualitative approaches, to collect and analyse data. In this research, surveys and interviews were used to collect data from BIS100 students and instructors. A pilot study was conducted during the summer school times. The purpose of the pilot study was to test the validity of the questions before conducting the pre-survey. Since the questions were valid, where students were not confused when filling in the survey, same questions were used for the pre-survey and hence, the researcher decided to add the data collected from the pilot study together with the data collected from the pre-survey.

All the results from the pilot study, surveys, and interviews were evaluated and represented in the form of graphical charts and tables. In regards to the quantitative methods, i.e. the pilot study, the pre-survey, and the post-survey, percentage was the only measurement used to measure, analyse, and compare the data. The purpose of the post-survey was to determine whether there have been some changes in the level of awareness as well as in the level of knowledge since the pre-survey, when Web 2.0 was still new to students. Hence, all the results from the post-survey were compared with the results from the pre-survey.

4. DISCUSSION

4.1 Findings from Pilot Study and Pre-Survey

According to the findings from the pilot study and pre-survey, it was found that the students' levels of awareness and knowledge of Web 2.0 were quite low. Most students are currently using Web 2.0 tools, such as Facebook, in their everyday lives without realising that these applications form part of Web 2.0. If the researcher asks a student to describe briefly what Web 2.0 is, s/he may not know the answer, but if the researcher gives the student an example of a Web2.0 tool such as Facebook, then s/he will have some idea of one aspect of Web 2.0. On the one hand, some students have heard about Web 2.0 without knowing what it is. There is another category of students who have heard about Web 2.0, who know what Web 2.0 is, and who are currently using some of its tools for everyday activities.

On the other hand, there are still a few students who do not know and have never heard of Web 2.0. These students are very traditional, non-technology people. They prefer to use paper, books, and so forth, rather than e-materials and/or online materials. They are mostly resistant to technology. It was also found that females use computers for study more than do males. Some students use computers for social networking. The tool that most students predominantly use most of the time is Facebook, whilst Blackboard is mostly used for study. The materials that students prefer to use in class are the printed lecture notes and notepads.

The data collected from the pilot study and the pre-survey answered the third secondary question, which is *'In case of low awareness of usability of Web 2.0 technologies, what are the strategies to diffuse and adopt this innovation?'*

4.2 Findings from Post-Survey

After analysing the data and comparing the results from the pilot study and pre-survey and the post-survey, it was found that the levels of awareness and knowledge of Web 2.0 Technology have slightly increased since the beginning of the semester. This means that after introducing Web 2.0 Technology in the Business Information Systems 100 classes, students started to familiarise themselves with Web 2.0. Obviously, it was expected that the level of awareness be 100% because Web 2.0 technologies had been introduced and used in the BIS100 classes during the whole semester.

However, only 53% of students have heard of Web 2.0 technologies. It can be deduced that either they have heard about this but are unfamiliar with Web 2.0, or they have not attended most classes and that is why they do not know what Web 2.0 is. Most students have been using certain Web 2.0 technologies but some of them are still unaware that these technologies are actually part of Web 2.0. The level of knowledge has increased by 14.64% for males and by 5.73% for females. This indicates that males know more about Web 2.0 technologies than females. Males are more interested in technology than are females. It was also noticed that a high percentage of females sometimes use Web 2.0 tools, after becoming familiar with the Web 2.0 tools in BIS100 classes and a very low percentage of females have never used Web 2.0 tools.

Moreover, it was found that the percentages of students using Facebook and Blackboard have been increased by 17.23% and 18.85% respectively. This may be due to new users hearing about Facebook in class and beginning to use and like it. Moreover, at the beginning of the semester, the new, first year students were unfamiliar with Blackboard and its applications. During the whole semester, the students were required to use Blackboard very often as they had to download lecture notes or even iLectures. In the BIS100 unit, students had to work on tutorials and submit them via Blackboard. The semester test was also carried out on Blackboard.

The percentage of students who prefer to refer to textbook rather than online documents in their study has decreased as, throughout the whole semester, students have started to use electronic materials for their tutorials, assignments, and semester test in the Business Information Systems 100 unit. The percentage of students using Web 2.0 to organise group meetings, to communicate with other classmates, and to communicate with their tutors has also increased. This shows that the levels of awareness and knowledge of Web 2.0 have definitely increased and students have begun to use Web 2.0 tools for study purposes. Teachers have been successful in teaching Web 2.0 technologies to students in the BIS100 unit. There has been a success in engaging students and motivating them to use Web 2.0 tools.

4.3 Findings from Interviews

In addition to the surveys, face-to-face and email interviews were conducted with students and email interviews with tutors. It was noticed that Web 2.0 tools bring many benefits to students' study. Web 2.0 technologies such as Google Docs are cheaper or free, and they are very convenient for students. They are easily accessed from any location and at any time. They also allow students to have access to a greater number of resources, and more importantly, to up-to-date news. Some students found Web 2.0 technologies easy to use and very flexible because they can be easily customised according to users' requirements, such as Blackboard, the Learning Management System at Curtin University. Web 2.0 tools facilitate easy networking. Web 2.0 tools help students to more easily collaborate and communicate. Moreover, students do not have to rush to complete, print and submit assignments to the tutor or lecturer. Students can also view the iLectures several times and at their own convenience.

Google Docs supports group assignments more efficiently and effectively because it provides sharing facilities. Some Web 2.0 tools also allow the sharing of ideas anonymously. So, more anonymous discussions should be provided in classes so that those students, who are reticent or lack the confidence to share their views with others, will be more willing to do so. By using anonymous discussions through Blackboard or Facebook for instance, a wealth of ideas may be gathered. It was noticed that students found Google Docs convenient, very easy to remember and efficient to use. There is no need to learn how to use Google Docs as

most of its functions are similar to those of Microsoft Word. Google Docs is very practical and user-friendly. It is very easy to navigate throughout Blackboard and material can be downloaded quickly.

However, Web 2.0 technologies can bring some disadvantages to education. Many errors arose with the drawing tools in Google Docs application as well as with Blackboard. For instance, some students saved their work and when they tried to submit their answers, a pop-up window appeared, saying that some questions had not been completed. Those students had to wait for a while for the system to respond correctly. Moreover, other students experienced major issues with Blackboard. Whilst they were typing their answers, the window froze and refreshed by itself, or errors in networking will affect students' studies, so students then lost either all or part of their answers. These problems led to student frustration. iLectures, which are the recordings of the traditional lectures, may reduce student motivation to attend classes. It is important to note that some Web 2.0 tools, such as Wikipedia, do not provide accurate, scholarly information as they can be accessed and modified easily by anyone. There are also some privacy issues with Web 2.0 technologies as their information can sometimes be publicly accessed or shared with certain people. The most important drawback that needs to be considered is that when using certain Web 2.0 tools in class, students can become distracted easily and quickly and hence, they will not follow the class properly.

In regards to teaching, adopting Web 2.0 technology will increase student engagement and it will make classes more interesting and interactive, which may lead to an increase in, creativity, usability, and participation. This technology may encourage better interaction amongst students, and between students and the tutor. Web 2.0 technology will obviously help decrease paperwork as iLecture notes are provided through Web 2.0. If students do not understand the terms used by the teacher during the class, they can immediately search for them online in order to better understand the teacher's material. Teachers can easily communicate with and teach external and offshore students. They can mark assignments at any time and from anywhere. This could make this task quicker and more efficient to accomplish.

However, the Internet is always a necessary part of any work with the Web 2.0 tools. If Web 2.0 tools are used in classes, students may find it difficult to focus and be distracted by other activities such as browsing, chatting or playing games online. The use of Web 2.0 technology in classes may discourage social interaction, although this depends on how the teacher uses the tools. Teachers could encourage students to network more effectively in the class with the help of particular Web 2.0 tools. There may also be resistance from the University because of the policy. Data can be lost unexpectedly. The system may crash at any time. Google Docs lacks the advanced features of Microsoft Office. Some Web 2.0 tools may be incompatible with different platforms.

According to tutors, during the first 45 minutes of tutorials, students should use computers, and this should be followed later by class discussions. Facebook can be used to share ideas with the tutor, or to ask him/her questions after class. It is important to note that there are currently no Web 2.0 tools available solely for teaching purposes. Those being used are mainly for administrative tasks. Moreover, it is recommended that Web 2.0 not be adopted early in the technology lifecycle.

The data collected from the interviews answered all three secondary questions, which are as follows:

If Web 2.0 technologies have a positive impact on teaching and learning, how are they currently improving education and will they continue to improve education in the future?

However, if Web 2.0 technologies have a negative impact on education, what changes need to be made to the Web 2.0 technology itself, or in the way Web 2.0 is used in education and learning?

In case of low awareness of the usability of Web 2.0 technologies, what are the strategies used to diffuse and adopt this innovation?

Finally, the overall analysis of results conducted within this research answered the primary question, which is *"What are the barriers and challenges by adopting Web 2.0 in teaching and learning at Curtin University?"*

5. CONCLUSION

Web 2.0, referred to as "Network as platform", is a revolution in education. It supports e-learning. One of the Web 2.0 applications, Google Docs, is already in use in one of the units at the School of Information Systems at Curtin University. Many studies have indicated that Web 2.0 is becoming an increasingly important aspect of the Internet, especially in the education sector. However, some studies also showed that in some educational institutions the level of awareness about Web 2.0 is low.

Because interest has been expressed in the application of Web 2.0 technology in education in some schools, it was deemed worthwhile to carry out further research on the subject. Overall, it was found that the levels of awareness and knowledge of Web 2.0 technology have slightly increased since the beginning of the semester. This indicates that after introducing Web 2.0 technology in the Business Information Systems 100 classes, students increased their knowledge of Web 2.0 and its applications. Most students have been using Web 2.0 but some of them are still unaware that those technologies form part of Web 2.0. It was also found that males know more about Web 2.0 technologies than do females, and they show more interest in technology than do their female counterparts.

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