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Web 2.0 Applications in Enterprises and Education

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ABSTRACT

Web 2.0 technology and concepts are being used increasingly by organisations to enhance knowledge, efficiency, engagement and reputation. Understanding the concepts of Web 2.0, its characteristics, and how the technology and concepts can be adopted, is essential to successfully reap the potential benefits. In fact, there is a debate about using the Web 2.0 idiom to refer to the concept behind it; however, this term is widely used in literature as well as in industry. In this paper, the definition of Web 2.0 technology, its characteristics and the attributes, will be presented. In addition, the adoption of such technology is further explored through the presentation of two separate case examples of Web 2.0 being used: to enhance an enterprise; and to enhance university teaching. The similarities between these implementations are identified and discussed, including how the findings point to generic principles of adoption.

Keyword: Web 2.0, Applications in Enterprises, Applications in Education

1. Introduction

Web 2.0 tools like blogs, wikis and social networking site are famous in public. Blogosphere, Wikipedia and Facebook are some successful example of public web 2.0 applications. Over the past years, Web 2.0 tools have started to attract number of discipline including business and education. Web 2.0 is adopted in these two areas in different ways to improve the work performance. Web 2.0 allows people to collaborate, communicate, work together and share knowledge which will help enhancing work productivity. However, the adoption of such phenomena is an issue that might be related to this technology characteristic as well as culture change .This paper is organized as follows. The next section will review the definition of Web 2.0 technology, its characteristics and the attributes that define Web 2.0 technology. In section three, several Web 2.0 applications will be reviewed to clarify the concept of

Web 2.0. Also some of the potential use of these applications in enterprises and education are presented. The fourth section will present a case example of Web 2.0 application in enterprises followed by another case example in education in the fifth section. These two sections show how Web 2.0 could be adopted and what some of its critical issues are. Lastly; a discussion and conclusion will concludes this paper.

2. Web 2.0

2.1 Definition of Web 2.0

The term Web 2.0 emerged in 2004 to refer to a new internet technology. Dale Dougherty coined the Web 2.0 term during a team discussion about future Web conferences (O'Reilly, 2005). Although the Web 2.0 term has been used greatly by practitioners from the industry and academia, there are some criticisms about this term. Some researchers like (Tapiador, Fumero, Salvachua, & Aguirre, 2006; Valdes & Smith, 2005) stated that Web 2.0 is not clear, and it is difficult to predict the actual meaning behind it. The second criticism about this term is that it is misleading, because it refers to the next generation of the World Wide Web at a time when there is debate about what Web 2.0 is (Wigand, 2007).

On the other hand, there is agreement on the concept and role of this technology, regardless of its idiom. Many agree that there is a shift in how people interact with the web as there are new generations of services or applications available on the web. These types of applications are designed to provide internet users with space to publish and share information. Thus, the Web 2.0 phenomena could be defined as a new generation of online applications on the web that permit people to collaborate and share information online (Tapiador et al., 2006; Wigand, 2007). Unlike traditional static web pages, Web 2.0 is more dynamic, allowing users to contribute to the web content and support web-based communities of users.

2.2 Web 2.0 characteristics

There are several characteristics or attributes that define Web 2.0 technology and distinguish it from the traditional web (Valdes & Smith, 2005). First of all, Web 2.0 is user centred, as users are allowed to create, organize and categorise the web content (Levy, 2009; Valdes & Smith, 2005). Besides that, users are actively involved in user-generated metadata (Valdes & Smith, 2005). User-generated metadata are data that describe user content; tags and bookmarks are examples of the meta-data that allow users to create on the web. Secondly, openness is another Web 2.0 attribute, which means that there are no licenses on the content (Tapiador et al., 2006; Valdes &

Smith, 2005). For example, content intensive sites like Wikipedia apply open-source-content on its content. The third Web 2.0 characteristic is the lightweight, which refers to the simplicity of the user interface, system functionality and type of development technology (Gilchrist, 2007; Valdes & Smith, 2005). Lastly, the content in Web 2.0 is distributed, shareable and editable (Hinchcliffe, 2006; Valdes & Smith, 2005).

Meanwhile, according to Cormode & Krishnamurthy (2008), unlike previous World Wide Web, most Web 2.0 applications are ‘more forcefully making the user a first class object in their systems’, and therefore making interaction easier for the user. Some of the important site features that mark out a Web2.0 site include the following:

- Users as first class entities in the system, with prominent profile pages, including information such as age, gender, location, testimonials, or comments about the user by other users.
- The ability to form connections between users, via links to other users who are ‘friends’, membership in ‘groups’ of various kinds, and subscriptions or RSS feeds of updates from other users
- The ability to post content in many forms: photos, videos, blogs, comments and ratings on other users’ content, tagging of own or others’ content, and some ability to control privacy and sharing.
- Other more technical features, including a public API to allow third-party enhancements and mash-ups, and embedding of various rich content types (e.g. Flash videos), and communication with other users through internal email or IM systems.

The Figure 1 below represents the differences between Web 1.0, which is the traditional web, and Web 2.0. The basic idea is that Web 2.0 is a web based community of users who are allowed to participate in the development of the web content. In other words, the users’ actions with the web have been improved on from read only to publish, subscribe and collaborate (Tapiador et al., 2006).

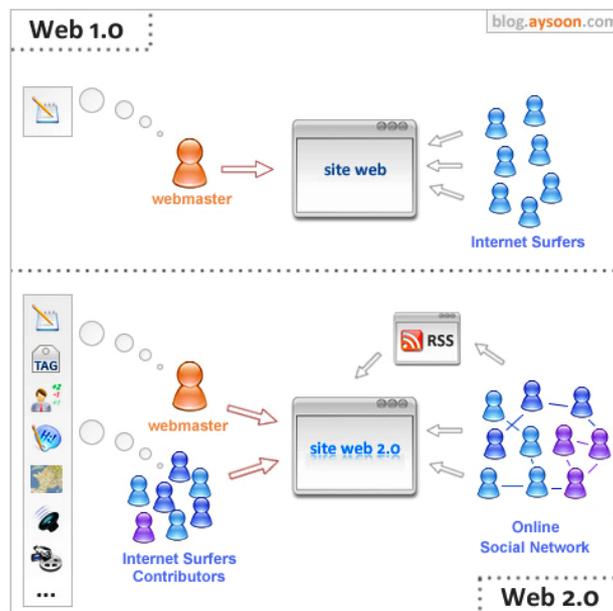


FIGURE 1. The Difference between Web 2.0 and the Traditional Web. sizlopedia: Saad Hamid (2007)

3. Web 2.0 Applications

Currently, several web-based applications or services demonstrate the Web 2.0 characteristics that are available. This type of online applications includes web blogs, wikis, content syndication, content tagging and bookmarking, and social sites. These applications allow anyone to be involved in the interaction with the web and its content. Users are permitted to publish, filter, edit, search, subscribe, collaborate and communicate online (Tapiador et al., 2006; Tredinnick, 2006). Accordingly, with high internet accessibility and the available mobile devices, many users are attracted to using Web 2.0 applications. A review of these applications is provided below.

Web blog:

Web log, or blog as it is entitled for short, is one of the oldest Web 2.0 applications. It started to be used in the mid 1990s as a way of publishing content on the web. That is, blogs can be defined as web-based diaries used as a personal diary, publication medium and general information tool. Many individuals and organisations are attracted to using blogs because of the great simplicity and lower cost of web publishing. In addition, the participatory form of published blogs allows other users to comment and exchange ideas, which they find motivating (Tredinnick, 2006).

Wiki:

In the web context, wiki refers to a structure website that provides content for

users. This type of website allows users to add, remove and edit the website content and layout in a simple manner; consequently, the users' participation adds value to the content, which is essential in this type of Web 2.0 applications. The more users involved in the collaborative authoring, the richer the content is. The most well known wiki in the world is Wikipedia, which allows anyone to contribute by adding or editing entries in its online encyclopaedia which contains 1.5 million articles (Gilchrist, 2007). This free approach to contribution might seem to guarantee mass content; however, Wikipedia has demonstrated how its content is credible and stable (Tredinnick, 2006) .

Tagging and social bookmarking:

Tags are keywords defined by users to describe the content of websites so that they can be used to classify and organise the users' preferred websites or digital content like videos or pictures. After these tags are defined, users can bookmark websites or other web content to these tags. Tags are created online on a website like del.icio.us, and then users bookmark the content on this website instead of on the web browser, as with the previous way of bookmarking. This feature allows the tag and bookmark creator as well as other users to share the bookmarks and access them online from anywhere around the world. For this reason, it has been called social bookmarking as many users share these bookmarks (Millen, Feinberg, & Kerr, 2006).

Social networking:

The internet is strong evidence that shows how this technology has been used for building communities over the internet (Toni, 2006). Social networking facilitates meeting people, finding like-minded people, finding experts in a particular field, and connecting people with each other via social websites. This type of Web 2.0 applications could be used for acquaintances over the web, such as the Myspace website, or it could be used for business oriented sites such as the LinkedIn website (Levy, 2009).

Content syndication:

Content syndication refers to the distribution of content from several and different types of websites (e.g. blogs, news websites) to an aggregation website by using a syndication protocol like Really Simple Syndication (RSS) (Levy, 2009). The classic way to check particular website content is the users' actual visit to that site. If many website users need to access the website every day to check for updates, this could take a long time and users may not find new updates. Alternatively,

users can be linked to the ‘favourites’ websites by signing to some of their feeds which relate to the needed contents. After that, any update in the original websites will be sent to a particular website called an aggregator, such as Google read (Tredinnick, 2006).

Having all these, the overall Web 2.0 technologies can be grouped into five major clusters: social networking, social media, web applications, aggregators, and mash-ups. Each cluster as visualized in Figure 2, groups together similar types of Web 2.0 sites and services:

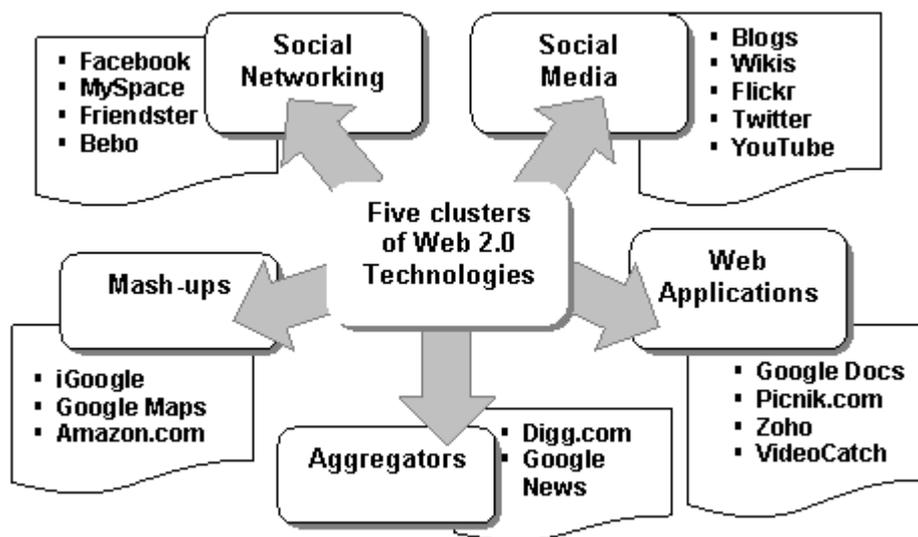


FIGURE 2: Five Categories of Web 2.0 Tools and Example of Services (Adapted from Zakaria, Watson & Edwards, 2009)

There are a variety of Web 2.0 applications which are perceived to benefit organisation and learning in certain ways. The following Table 1 introduces some commonly used Web 2.0 applications in terms of its features and capabilities and what are the potential applications that can be beneficial for enterprises and educational activities. The similar kind of discussions on this can also be found in Cook (2008) and Dawson (2009) and Franklin & van Harmelen (2007), Mason and Rennie (2008) and Richardson (2009) for education.

TABLE 1: Example of Web 2.0 Applications and its Potential for Enterprises and Educational Applications

Web 2.0 Tools / Services	Potential Applications for Enterprises	Potential Applications for Education
Blogs (Social Media)	<ul style="list-style-type: none"> ▪ CEO channel of communication with all employees ▪ Expertise sharing ▪ Marketing tools for new product or services ▪ Internal communication 	<ul style="list-style-type: none"> ▪ Establish networking, knowledge sharing and course readings ▪ Assignment submission and review ▪ Dialogue for group work
Wikis (Social Media)	<ul style="list-style-type: none"> ▪ Managing enterprise projects ▪ Collaborative writing enterprise's reports ▪ Build the enterprise information and knowledge ▪ Collaboration platform with external parties 	<ul style="list-style-type: none"> ▪ Collective project development ▪ Group authoring ▪ Track a group project ▪ Tracking progress
Social Networking	<ul style="list-style-type: none"> ▪ Leadership development ▪ Enhancing the social relations between employees ▪ Find experts in the enterprise ▪ Knowing weak ties on a personal level 	<ul style="list-style-type: none"> ▪ Showcase students online portfolio ▪ Establish network among teachers and students Develop learning network from other institutions
Tagging and Social Bookmarking (Social Media)	<ul style="list-style-type: none"> ▪ Categories enterprise information and knowledge ▪ Sharing expertise and expertise resources 	<ul style="list-style-type: none"> ▪ File sharing ▪ Bookmark sharing ▪ Peer reviewing / commenting ▪ Vocabulary and work

		enhancement
Podcast (Social Media)	<ul style="list-style-type: none"> ▪ Business marketing tool ▪ advertising organisations' events ▪ Can be used to communicate employee's ideas and tips 	<ul style="list-style-type: none"> ▪ Publishing platform ▪ Mobile classroom ▪ Media archive ▪ Class preview ▪ Study guides
RSS and syndication (Aggregators)	<ul style="list-style-type: none"> ▪ Obtain the corporate news. ▪ Keep track of projects and events update. ▪ Be connected with the CEO posts. ▪ Link with experts' tips 	<ul style="list-style-type: none"> ▪ Obtain updates and news ▪ Monitor student progress ▪ Announcements ▪ Retrieve subscribed information

The following section will provide some examples of how Web 2.0 applications are being used in Organisation and learning institutions. Real case studies of Web 2.0 use will be represented including the motivation of adopting such technology as well as the benefits gained.

4. The Implementation of Web 2.0 in Enterprises

4.1 Web 2.0 in Enterprises

As Web 2.0 technologies are very well known in public, they are increasingly being used in organisations. Ross Dawson (2009) has categorized the key potential benefits for organisations implementing Web 2.0 as enhanced: Productivity and efficiency; Knowledge; Reputation; and Staff engagement. These are simplified in Figure 3 below:

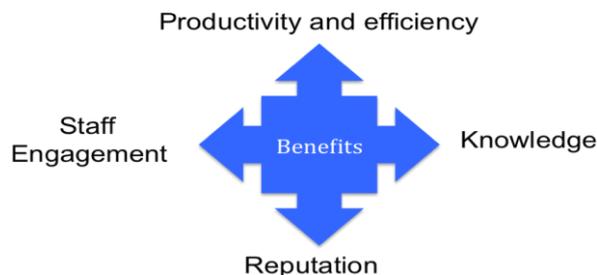


FIGURE 3. Organisational Benefits from Web 2.0

First, productivity & efficiency, Web 2.0 tools can enhance work productivity as it helps workers to work collaboratively. Projects and team works in particular across-location can be managed effectively via Web 2.0 tool like wikis and blogs. Moreover, staff engagement can be obtained from Web 2.0 tools because of the social nature of such tool and employees can be involved in a discussion and be play role in organization's decision. The knowledge benefit that is provided by Web 2.0 is crucial. Web 2.0 tools can be very usefully media to facilitate not only explicit knowledge but also tacit knowledge and collective intelligent. Thus, the organization knowledge (one of the most important organizational asset) can be maintained, improved and accessed over time. The last benefit is enhancing organizations reputation in the market particularly when firms use Web 2.0 to be connected with their customers. Therefore, organizations are interested in adopting Web 2.0 technology.

Professor McAfee was the first to coin the Enterprise 2.0 term, which refers to the adoption and the use of Web 2.0 technology within organisations (Brynjolfsson & McAfee, 2007). The technology is used in organisations for different purposes. Firstly, collaboration is an important aspect of Enterprise 2.0 in which a group of employees work together to write and edit content on the corporate intranet (Bughin, 2008; McAfee, 2006; Tredinnick, 2006). Secondly, some Enterprise 2.0 tools can be used as a communication platform between employees, such as instant messaging applications (Cook, 2008). Furthermore, connection use is an essential aspect in Enterprise 2.0, particularly in large organisations to socially connect employees who do not know each other and who may work together in the future (DiMicco, Millen, Geyer, Dugan, Brownholtz, & Muller, 2008). Finally, Enterprise 2.0 applications may be used by employers for Information and Knowledge management (Creese, 2007; Levy, 2009; McAfee, 2006; Tredinnick, 2006).

4.2 Walt Disney Company using Web 2.0

Overview of the company:

There are some examples of organisations that implement Web 2.0 technologies, and one of them is Walt Disney. It is one of the largest entertainment companies in the world. It is a large international organisation that encompasses Disney Studios, United State ABC television network and other film and music studios (Creese, 2007).

What motivates them to use Web 2.0:

The tremendous size and divisional nature of the corporate environment makes the communication within the organisation and with its partners into a big issue. At the

beginning of 2004 the situation was poor. The Disney staff and management were suffering from email overload, their outward facing sites were static and some divisions were losing business to competitors, particularly the ABC network's news service to CNN and NBC. However, these issues are the drivers for Web 2.0 implementation in Walt Disney. Web 2.0 tools use has been targeted to improve the relationship between the company and its customers with regards to the corporate information issues (Creese, 2007).

How they apply Web 2.0:

From the middle of 2004, the decision to introduce Web 2.0 technology in the organisation has been made by the top management. For the information and communication problems, internal and external blogs and wikis were developed. The external blogs and wikis are used to maintain the communication and information channel between the company and its partners, whereas the internal blogs are used to coordinate the company divisions' shared functions like distribution and shift logs. After that, in attempting to solve the information and communication problems, the organisation started to think about extending the use of Web 2.0 to reach their customers. Therefore, the ABC television and movies.com sites started using RSS feed and content aggregation functionality to make more dynamic web news and update services for the employees and the customers. Also, the external customer blog was used as an advertising tool via its interface (Creese, 2007).

What kind of tools do they use:

1. Wikis: used for information and knowledge management
2. Blogs: used for communication with the organisation partner and customer; also it is used as an advertising tool
3. RSS: it is used for news and up-to-date distribution, which fixed the email overload problem

What benefits did they gain:

There are valuable benefits reported from Walt Disney's use of Web 2.0. First, Web 2.0 technologies enabled a better customer feedback loop; secondly, improved public image and perception about the company; third, they found that Web 2.0 opened up new business opportunities. Moreover, using such tools facilitated the constant changes needing to occur. Finally, it has been found that RSS and other blog functionalities cut down the communication costs (Creese, 2007).

4.3 Issues

Disney gained a range of benefits via Web 2.0 usage in the organisation, from information, to product news, and the use of gossip to capture the interest of a number of different target groups and demographics. However, Disney also reported some difficulties and one of the most critical issues is getting many staff to take up and use Web 2.0 technology, which could affect the benefits of introducing this technology (Creese, 2007). According to Davis (1989) the level of user acceptance in using IT systems plays an important role in the success of these systems, therefore studying the factors that affect the acceptance of Web 2.0 in organisations is an important research gap.

5. The Implementation of Web 2.0 in Learning Institutions

5.1 Web 2.0 in Learning Institutions

The number of institutions using other Web 2.0 applications keeps growing and this trend is expected to continue as the new generation of learners are beginning to adopt this new approach as part of their living and learning activity. The motivation to adopt these tools is because several Web 2.0 applications have benefited education and learning institutions in several ways. In some means, Web 2.0 applications provide different options or alternatives in addition to normal traditional practice.

Plenty of web-based services used today demonstrate the application of the Web 2.0 technology which some of them have already being used to a certain extent in education. For example, learning activities such as knowledge creation, meaning making and collaborative authoring for example, have been strongly facilitated by applications like wikis (e.g. Wikipedia) and blogs. Similarly, knowledge discovery and sharing have also been facilitated by this wave of applications such as wikis, blogs, blogs search engines (e.g. Technocrati), social bookmarking managers such as (del.icio.us), RSS aggregators such as Feedster and folksonomies tagging like Flickr. These Web 2.0 applications foster participation as they are user-centred in many ways (Alexander, 2006; Andersen, 2007; McGee & Diaz, 2007; Nikolov, 2007; O'Reilly, 2005). According to Downes, most social software derived from Web 2.0 have adopted a bottom-up approach providing a platform to encourage active participation and collaboration among users (Stephen Downes, 2005). While applications like blog and wiki can promote critical, analogical and analytical thinking (Richardson, 2009). From this, it is apparent that Web 2.0 can offer a variety of learning activities with powerful implications on the way learning is being delivered.

5.2 Examples of using Web 2.0 technology in education

This section will explore the examples of how Web 2.0 tools are being implemented in real classroom scenario. The discussion will be based on Sendall, Ceccucci & Peslak (2008). Sendall et al. explains the implementation of Web 2.0 tools at two US universities with a total involvement of 29 students (21 from first university taking business course and 8 from second university taking information system course).

How they apply web 2.0:

At the first university, the students incorporated Web 2.0 tools: wikis, blogs, instant messaging, RSS, widgets, gadgets, YouTube and SecondLife in the course. During the implementation, teachers were playing an active role to coach students on how to use the Web 2.0 tools and scaffolding the process of understanding the use of the application. One strategy observed is to give students assignment on certain tools in class and to finish it outside classroom or on their own.

What kind of tools they used:

According to them, the following Web 2.0 tools are used to mediate various types of learning activities:

Blog – Students were asked to response on assigned chapters and classroom discussions at the end of the week.

Wiki – Wiki is used mainly for preparing students for assessments by creating questions and answers which later will be used for their exams. Students are individually assessed for their contribution thus the use of real names are required. The second university made use of existing Blackboard as the platform for Wiki to create a collection of the midterm and final exams due to the lack of textbook's lack of robust test bank.

Second Life – This tool is used as a case study to understand the new business opportunities provided by virtual worlds.

Social Networking sites (SNS) – SNS particularly Facebook was used to learn about online communities and social network marketing. Teacher also discussed how companies are making money on SNS and explained to student how to set their personal privacy settings.

RSS, widgets, gadgets – Students created their own personal page in iGoogle using gadgets, widgets and RSS feeds. Teacher found that this is a quick exercise to teach the students about several other Web 2.0 technologies.

Instant Messaging – Teacher held one online class using IM to have let the students experienced a synchronous text-based discussion. Students were asked to prepare for this the same way they prepare for conventional classes. The

implementation of this technique was then discussed in the next class meeting and finding ways to improve this approach.

E-Collaboration – Teacher attempted to set up a Groove session to demonstrate how to use e-collaboration tools on the Web as working sectors and IT students are already accustomed to working in groups. This approach however was restricted to free 30 day trial and was abandoned by the teacher.

5.3 Issues

By referring to the description by Sendall et al. (2008), the incorporation of Web 2.0 into curriculum by the first university was much clearer in comparison to the second. According to the author, many of these activities in the first university were impromptu and many were planned. Students responded to the incorporation of Web 2.0 into learning if they do not perceive it as ‘busy’ or extra work. This approach also helped student to have competitive edge over other counterparts during job applications as business sector currently seeks candidate who familiar with Web 2.0 tools and technologies. While at the second university, the use of Web 2.0 tools reflects similar approach made by the first university but how the tools have been embedded into curriculum has not been stated visibly. The study indicates significant increase in knowledge and comfort level for all Web 2.0 tools after being taught using this learning instruction. Blogs, wikis and social networking are found to be useful both in classroom and in the workplace. This study also reveals insignificant result variance between gender thus suggesting that Web 2.0 instruction and education may be more or less gender neutral.

6. Discussions

From the above discussions, the benefits and opportunities for the application of Web 2.0 in business and education are many. However there are other challenges that hinder the overall incorporation in both organisations. One issue is related to moderate the interaction within the organisations. Because most of Web 2.0 tools are collaborative, they offer potential involvement not only within organisations, but also other people or sources beyond the institutions. For example, the ability for people to leave comments in blogs or alter wiki contents can be a very powerful communication, discussion and learning tool.

Organisations have become more willing to implement Web 2.0 technology as they realized its potential benefits to enhance knowledge management process. Some

academics value Enterprise 2.0 benefits and at the same time highlight some challenges that might affect its use. The social nature of such technology could facilitate the employees engagement in knowledge work, however if they don't involved and adopt Web 2.0 to share their knowledge and experience, then Enterprise 2.0 initiatives will not be success (McAfee 2006 ; Creese, 2007). Therefore, some research like (Bradley, 2007; Hester & Scott, 2008; Wilensky & Redmiles, 2008) which aim to investigate users (employees) adoption of Enterprise 2.0 have been conducted and resulted in elicitation the factors that might hinder employees to adopt such technology. For example Hester & Scott (2008) review the adoption theories as well as Web 2.0 tools and develop a conceptual model for Wiki diffusion. They come up with some possible wiki adoption factors includes relative advantage, complexity, critical mass, organizational culture and organizational compatibility (Need for Collaboration, Need for Management of Dynamic Knowledge). Web 2.0 is people to people technology and if they don't intent to adopt it, there is no benefit from introduce it in the organisations.

On the other hand, many higher education institutions are beginning to adopt Web 2.0 tools and services. The underlying adoption is getting clearer as there are calls for learning institutions to cope with current generation of learners (Anderson, 2007). Statistics have shown that their familiarity with Web 2.0 technologies and high level of involvement with social networking activities warrant learning providers to assume current generation of learners will have better potential if Web 2.0 technologies being integrated into their learning activity (Lunkin et al., 2008; McCrindle, 2006). Besides, the adoption also is designed to boost the employability of graduates in a rapidly changing society. Working sector is currently highlighting the need for the skills of 21st century namely communication skills, decision making, creativity, team work, problem solving and others. Web 2.0 tools that are rich in mutual social collaboration, constructive, and active discovery can create a learning environment that can foster these skills. No doubt the process of employing Web 2.0 tools may require learning institutions to overcome several hurdles beforehand, but the learning opportunities that these tools offer makes it worth all the efforts to create better learning practices for teachers and learners.

7. Conclusion

Organisations are implementing Web 2.0 to enhance their effectiveness, knowledge, engagement and reputation and this is true across the sector including business and education. It is clear from the exploration of the two case examples that Web 2.0 is

more than simply the adoption of technology but also that of organisational change. In both cases, people are at the centre of successfully reaping the benefits of implementing Web 2.0. For example, Walt Disney implemented web 2.0 to benefit its employees and customers but reported that user acceptance was a critical issue for uptake. Similarly, web 2.0 has been implemented in the educational sector to benefit student learning and engagement but the approach has been adhoc and led to variable results. In both cases there is strong evidence suggesting a significant need to scaffold users through the process of adoption. As organizations continue to grapple with the adoption of Web 2.0 technology it is clear that an increased focus on adoption strategy is required.

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