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Are We Ready for Web 2.0? Evidence from a Caribbean University

Kemuel Gaffar[1], Lenandlar Singh[1] and Troy Thomas[2]

[1]*Department of Computer Science, University of Guyana*; [2]*Department of Mathematics, Physics and Statistics, University of Guyana*

Web 2.0 technologies have gained increased popularity over the last decade. They have transformed user engagement on the World Wide Web and have made inroads in Education. However, adoption of these technologies in Higher Education in developing countries is hindered by the absence of facilitating conditions such as administrative support, equipment, skills and infrastructure. This study explores the readiness of lecturers at a Caribbean University for the adoption of Web 2.0 in the education process through a survey instrument which includes constructs from the decomposed theory of planned behavior. The study also investigates the limiting factors to achieving maximum benefits from Web 2.0 adoption in the learning process through experimental employment of a Facebook group in the teaching of a computer science course followed by a survey. Lecturers at the University are found to be ready, however, the extent of Web 2.0 adoption does not mirror this readiness signaling the need to address the facilitating conditions. The students' responses to the survey items indicate the existence of limiting factors such as internet connection speed, familiarity with moderators and frequency of feedback. These should be deliberately addressed in any effort to adopt Web 2.0 in education in a developing country setting.

Keywords: web 2.0 research, educational technology, social networking software, higher education, developing countries

Introduction

The interaction model of the World Wide Web (WWW) was dramatically transformed with the emergence of the Web 2.0 interaction paradigm. Web 2.0 technologies afford more socially connected experience by enabling active engagement with others, to create and contribute content in magnitudes greater than previously possible with Web 1.0 which involves static one-way content consumption (Anderson, 2007). Whereas with Web 1.0, users are passive consumers of content and ideas created by others, Web 2.0 users are active developers of ideas and they can question and critique concepts and ideas in ways that were not possible before Web 2.0. Collis and Moonen (2008) refer to these technologies as second-generation web-based services that emphasise online collaboration and sharing.

Social networking websites form a major part of the Web 2.0 family and there is rapid uptake around the world with staggering numbers of new users appearing daily. For example, Facebook reports that the network currently has more than 500 million users (Facebook Press Room, 2010) while Twitter has 100 million accounts. The adoption of social networks is credited to the ease with

which end users can become members, communicate, socialize, share information and keep abreast of current affairs. Business and other organizations also use social networks. Social networking tools are now mass-deployed and used to promote massive marketing operations.

In Education, Web 2.0 leads to discourses on pedagogy and Pedagogy 2.0 (Lee & McLoughlin, 2010) and Higher Education 2.0 (Barnatt, 2008), which highlights the level of interest attracted in the last decade. Educators are now engaged with Web 2.0, with significant interest in the use of social networks in formal education (Lockyer & Patterson, 2008). This is partially driven by the proliferation in use of Web 2.0 technologies by students and the digital natives (Pence, 2007). The main thesis of educators seem to be centered around the idea that the interactive nature of Web 2.0 makes them suitable tools for teaching and learning. However, this needs verification and as such educators have gone on to engage in Web 2.0 research.

Web 2.0 presents opportunities to shift from teacher-centered to learner-centered approaches by allowing maximum collaboration and participation. This is realistic because Web 2.0 makes it possible to individualize learning (Collins, 2009) while providing means for group work and interaction (Singh & Gaffar, 2011). Particularly, Web 2.0 is likely to support teaching and learning in environments with learners from diverse cultural and social orientations, varying academic backgrounds and different learning preferences. However, they may also present challenges for administrators, educators and students if not engaged carefully (Siemens & Weller, 2011).

The adoption of Web 2.0 in Education in developing countries is specifically challenged by several context variables. With a focus on Mzuzu University in Malawi, Nyirongo et al. 2009 find that lack of equipment, knowledge and skills, involvement in decision making by faculty member, infrastructure, technical, pedagogical and administrative support are barriers to technology adoption in Education. These findings are also supported by Kistow (2009) who focused on Trinidad and Tobago, Sife, et al. (2007) who focused on Tanzania. While a binding generalization based on these studies alone is difficult to justify, it is clear that developing countries tend to face similar challenges to adoption of technology in Higher Education.

The current study is undertaken in a Caribbean university with similar challenges to those identified above. The study is aimed at both determining whether the lecturers are ready for adoption of Web 2.0 technologies and providing guidelines for effective adoption of such technologies in Higher Education. It is expected that the findings can stand as indicators of what to expect in developing countries, but the specificity of these indications weakens as the distance between the contexts widens.

The next section outlines important outcomes from the research literature on Web 2.0 in Education. This is followed by a description of the research methodology, analysis of the data and a discussion of the findings of the current research. The paper concludes with suggestions for the way forward.

Literature review

Berners-Lee (1989) argues that the use of Web 2.0 encompasses accessibility, technological devices and usability and that derivation of maximum benefit necessitates high speed Internet access. However, broadband is now becoming more widespread and affordable. In addition, devices to support Web 2.0 technology are becoming increasingly affordable and they allow users to connect to the Internet from anywhere, enabling pervasive computing. Further, the popularity of mobile devices and other wireless technologies among the new generation of web users promises to propel further the already rapid adoption of Web 2.0 and social networking technologies. Berners Lee (1989) also suggests that "ease of use" must be considered. With Web 1.0 and older technologies, contribution on the Web was limited to experts in the field of HTML and web development technologies. However, Web 2.0 has a low barrier to entry which appeals to diverse end users and it facilitates participation by the typical user among whom are educators and students.

Research on Web 2.0 in Education is still in the embryonic stage, but many parallels are already drawn to support the affordances of Web 2.0. For instance, the works of constructivist theorists such as Vygotsky (1978) has been used to promote Web 2.0 in Education (Levy & Hadar, 2008). Others suggest that learning is as social process which occurs through interaction and information sharing (Lave & Wenger; 1991). Further, there is great pedagogical value to knowledge about how students respond to Web 2.0 technology for both teachers and students (Augustsson, 2010, p. 204). Barnatt (2008) and Collis and Moonen (2008) place emphasis on how the use of Web 2.0 impacts Higher Education and other authors have sought to extend the idea of Higher Education using a Web 2.0 perspective. For instance, Barnatt (2008) defines the term Higher Education 2.0 (HE 2.0) from the standpoint of the impact of Web 2.0 on the way Higher Education is delivered and managed.

However, the challenge to adopters is to identify the setting in which Web 2.0 can be effectively incorporated into their teaching and learning activities. To understand these contextual situations, research and empirical evidence are critical as they will help to further understand the real benefits of Web 2.0 (Meyer, 2010a).

Meyer (2010b) explored the effects of using Web 2.0 among doctoral students using wikis, blogs and online discussions to write research papers. The findings suggest that students were familiar with the Web 2.0 technologies and viewed them as useful for sharing thoughts, and ideas essential for learning. Students found the environment "safer" for expressing ideas compared to the traditional face-to-face setting. However, some students were uncomfortable with using these tools. A similar study, with a cross-discipline group of 47 undergraduate students was conducted by Swapna (2009). Students were exposed to blogs, podcasts and document sharing and the results indicate that Web 2.0 was not well understood by the students. Despite viewing the technologies as useful in supporting teaching and

learning, some students suggested that Social Networking Software (SNS) should be limited to social interaction and should not be used in educational contexts. Similar outcomes were observed by Levy and Hadar (2008).

Some authors have developed technology-oriented models for integrating Web 2.0 in Education. Tzeng et al. (2009) present an educative model supported with Web 2.0 technology comprising website users, content, virtual community and tools. They examine the application potentials of Web 2.0 when integrated in teaching frameworks and report as benefits (i) liberal information sharing, (ii) deep technological penetration, and (iii) closer links to ordinary life and industrial productivity. Tzeng et al. (2009) predict that Web 2.0 technologies will become the mainstream talk in business, politics, and military communities, in social fields, and most importantly in education. They suggest that proper use of these technologies will improve the quality of teaching and learning systems, and will provide ubiquitous and pervasive learning experiences. However, they identify several challenges facing educators moving towards e-learning platforms using Web 2.0. Two highlighted issues are (i) premature hardware development and (ii) lack of basic computer knowledge. They further argue that Web 2.0 technologies prove to be challenging for juvenile and senior groups of students.

Other authors have attempted to use Web 2.0 to widen course coverage and provide students with a wider range of tools to learn, and to extend face-to-face sessions. Barnatt (2008) for instance, reports on an experiment with Web 2.0 tools in two undergraduate modules in a UK business school. The modules were managed in an online learning environment called "Nexus" for a group of 900 undergraduate students and discussion forums and podcasts were used. Podcasts were very popular among students and the interactions in the online forums led to excellent debate, which ultimately resulted in improved overall performances in the final examinations. However, the author argues that implementing Web 2.0 in higher education settings presents similar social and cultural challenges to those affecting almost every sector of society; to leverage the most value from the generic tools and new practices and expectations of the Web 2.0 age (Barnatt, 2008, p. 49).

From an administrative perspective, Siemens and Weller (2011) raise a number of questions and policy issues for education leadership, in their quest to adopt and support SNS. They point to the fact that most of the SNS available today are owned and operated by external and private organizations and that issues will arise as a result. Of particular concern is the issue of privacy of students' data, control and freedom of students' use of SNS, and of the endorsement of particular technologies and whether this will conflict with internal policies (Siemens & Weller, 2011).

Finally, according to Collis and Moonen (2008), Web 2.0 tools and processes have empowered users and have led to innovation in higher education institutions. Further, the adoption of Web 2.0 technologies requires a change in the mindset of educators and administrators. They also indicate that inconsistencies in perceived quality of Web 2.0 tools and processes are barriers to their implementation. Organizations can stimulate this mindset change if participatory pedagogies and

the effective use of technology for collaboration, co-designing, contributing, and learning from others, are specified as quality criteria for internal and external learning assurance processes (Collis & Moonen, 2008, p. 104).

This paper examines students' and lecturers' perceptions of these technologies with particular emphasis on how they view Web 2.0 tools as a support system for teaching and learning. Two core questions are explored: (i) Are educators prepared to engage with Web 2.0 technologies to support teaching and learning? and (ii) What are limiting factors to maximizing the benefits of Web 2.0 adoption in the teaching/learning process?

Methodology

A case study approach was taken in this exploratory study. To answer the research questions, information was obtained from both lecturers and students of the University. The students' data were used primarily to answer the question about the limiting factors while the lecturers' data answered the question about readiness. The readiness of lecturers for Web 2.0 adoption was explored through a campus-wide survey of the teaching staff. To obtain information about the students, an experiment with formal integration of Web 2.0 technology (specifically a Facebook Group) in the classroom was conducted with a group of undergraduate computer science students at the campus. This experiment provided evidence of implementation issues and the impact of Web 2.0 on the learning process.

The survey of the academic staff spanned a two-week period and a free online tool (www.kwiksurveys.com) was used. The participants included all 247 lecturers at the University. They were notified by email. Participation was voluntary and of the participants 21.5% responded with 15% incomplete responses.

The core items used to measure readiness were selected from an instrument in a study done by Ajjan and Hartshorne (2008). Ajjan and Hartshorne's (2008) questionnaire was developed from the Taylor and Todd's (1995) decomposed theory of planned behavior. The decomposed theory of planned behavior is itself a decomposition of some aspects of Ajzen's (1991) theory of planned behavior into lower level constructs. The two theories agree, but the decomposed theory allows for more specificity and better understanding (Taylor & Todd 1995). Ajjan and Hartshorne (2008) adapt the items by Taylor and Todd (1995) to focus on Web 2.0 adoption in higher education. Each of the items included is scored on a 5-point rating scale and Ajjan and Hartshorne (2008) report a reliability coefficient between 0.67 and 0.98. These reliabilities exceed the acceptable minimum (0.6) for exploratory research (Hair et al., 2006, p. 102). The items included in the current study (see Appendix I for the items) are relevant to the constructs which are related to the educators' reflections on their practice and give insights into their readiness. These constructs are Behavioural Intention, Perceived Usefulness, Ease of Use, Compatibility, Self Efficacy, Actual Usage and Attitude.

In this study, the constructs were analysed separately due to sample size considerations. This incurred a loss of information on the interrelations among

the constructs. For each construct, the internal consistency was reported along with the minimum, maximum and midpoint values and the scale mean and 95% confidence interval for the scale mean were analysed.

For the students, a closed Facebook Group was created for the undergraduate course Computer Networking (CSI 213). Sixteen students registered for the course and each of them was invited by email and provided with guidelines for participation. Fifteen of these students joined the group. A group of 15 presented difficulties with regard to the testing of statistical hypotheses because of the small size, hence, the decision was taken to focus on exploring the data obtained from the case under consideration.

Each student, guided by the course instructor, selected a topic from the course outline and was given the 13-week semester to develop that topic into an online tutorial on the Facebook Group. An evaluation of the students' contribution was done at the end of each week using the metrics: number of posts, number of comments and number of questions asked and answered. The course instructor (the main researcher), one co-researcher and another technical support member supported the group. Facebook Groups as a specific Web 2.0 technology was used for experimentation because the students were already active Facebook users and because such groups provide for threaded discussion forums, which are suitable for tutorial development.

At the end of the semester, the students were surveyed using a free online survey tool. This survey focused on the students' Internet access usage trends, social networks use in general, perception of the Facebook Group for supporting tutorial development and the effect it had on their learning and overall performance. A combination of closed and open-ended questions was included in the survey. Eleven students (5 males and 6 females) of the 16 completed the post-tutorial online survey. Most of the respondents (73%) were aged 15 to 19 while the remaining 27% were in their early 20s.

Analysis

Lecturers' survey

The response rate of the Lecturers' survey was low – approximately 20% of the 247 individuals. Males accounted for 48% of the respondents while 52% were females. Ninety-seven percent of respondents were Assistant Lecturers, Lecturer 1 and Lecturer 2. No Senior Lecturer or Reader responded, while 2% of the respondents were Professors. Forty percent of the respondents lectured for five or fewer years and 83% for 10 or fewer years. Thirty six percent of all respondents were between age of 20 and 30 years, 23% between 31 and 40 years and 42% above 40 years old.

Approximately 88% of the respondents had access to the Internet either at work or at home. Table 1 shows the nature of internet activities for the lecturers, the percentage of the respondents who engage in the various activities and the percentage of the group engaged in each activity that do so on a daily basis.

Table 1. Nature of Internet activities

Activity	% Engaged	% Engaged Daily
Emails	100	85
Browsing	94	80
Research	96	66.7
Chatting	85	33.3
Socializing	74	45

It appears that lecturers generally use the internet for communicating by email and that they have a strong daily presence in this activity. Browsing, research activities and chatting are also very popular activities with general socializing being popular. Interestingly, chatting and socializing appear to be different activities to the lecturers as evidenced by the difference in percentages engaged. The last two activities, chatting and socializing are not done on a daily basis by the majority of those engaged in these activities. That such large percentages of lecturers are engaged in these internet activities suggests that a transition to their integration in the education process is feasible. Based on their responses, approximately 83% of them use the Internet to support their teaching and approximately 77% of them do so at least once per week. The nature of the support activities are not described here, however, there is in this some indication of the adoption of Internet technologies (not necessarily Web 2.0) in the classroom.

Figure 1 displays the responses to the question about their use of specific Web 2.0 technologies. The inclusion of all the possible Web 2.0 technologies in the survey was clearly impractical, signaling the need for a selection. The technologies indicated in the figure were selected from a host of other possibilities based on insight into their likelihood of use at the university under consideration. The researchers believed that the included technologies provide adequate indication of the potential for Web 2.0 adoption at the University while inclusion of less known technologies would not provide a substantial amount of new information but would add to the effort of completing the survey.

Based on the results in Figure 1, the most popular technologies used are Facebook, Instant Messaging, Skype and YouTube respectively. The least popular technologies are MySpace, Tagged, Flickr, and Twitter.
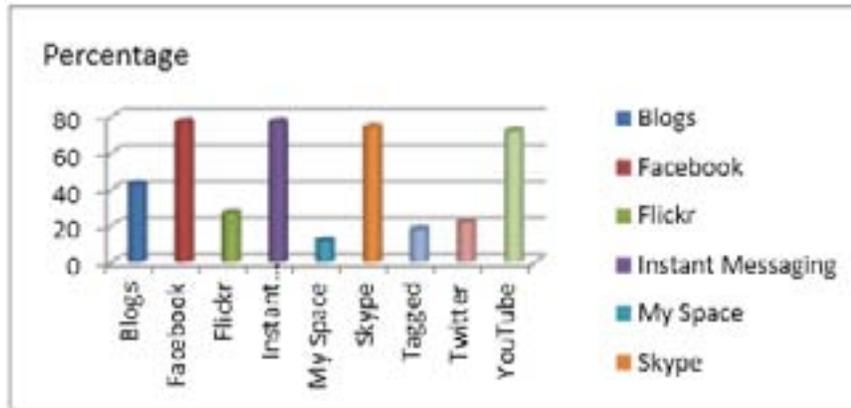
Figure 1. Use of specific Web 2.0 technologies

As indicated earlier, lecturers do use Web 2.0 technologies in their teaching. Table 2 shows the commonly used Web 2.0 technologies in support of teaching and the ways in which the technologies are used by the lecturers in support of their classroom work. In the final column are the total numbers of respondents who use the various Web 2.0 technologies in their teaching.

Table 2. Commonly Used Web 2.0 Technologies

Web2.0 Tools/ Activities	Lectures	Tutorials	Discussions	Share Materials	Announcements	Feedback	Total Respondents
Facebook	0%	4%	29%	21%	25%	21%	24
Twitter	0%	0%	0%	50%	50%	0%	2
YouTube	37%	16%	11%	37%	0%	0%	19
Blogs	13%	13%	25%	13%	25%	13%	8
Wikis	14%	14%	14%	29%	14%	14%	7
Instant Messaging	0%	4%	26%	15%	41%	15%	27
Skype	8%	8%	58%	8%	8%	8%	12
Flickr	0%	25%	0%	75%	0%	0%	4

The total number of respondents who use the various Web 2.0 technologies is not large. Instant Messaging, Facebook, and YouTube are respectively the most popular technologies incorporated in teaching, however, Skype seems to be potentially useful, but Twitter, Blogs, Wikis and Flickr are unpopular for teaching.

For the most popular technologies in Table 2, the tendency is to use them for discussions and announcements. This is particularly so for Facebook and Instant Messaging. These two technologies engage the desired recipients directly in a text form and do not require that they be online at the time the messages are posted or sent. This guarantee of receipt and ease of contacting multiple recipients are

perhaps the primary reasons for which Facebook and Instant Messaging are used to make announcements and to engage in discussions. On the other hand, YouTube's niche seems to be for sharing materials and to aid lectures. This is perhaps due to the availability of video based tutorials and demonstrations. More than half of the respondents who use Skype in their teaching use it for discussions. Perhaps the ease of making conference calls is the driver for this.

Readiness of lecturers for Web 2.0 adoption

Between 41 and 45 respondents completed all the items about readiness for Web 2.0 use. The internal consistency (Cronbach's alpha) for each of the constructs under consideration exceeds the acceptable limits of 0.60 to 0.70 (Hari, et. al., 2006, p 102) except for 'Ease of Use'. This justifies the treatment of each construct, except Ease of Use, as a summated scale. In Table 3, the internal consistency, minimum, maximum and mid-point values for each scale is presented along with the number of respondents, scale standard deviation and mean and a 95% confidence interval for the scale. In general, scale means that are closer to the minimum value indicate stronger disagreement, while means that are closer to the maximum value indicate stronger agreement and means that are closer to the mid-point indicate a tendency to be neutral.

Behavioural Intention refers to the intention of the user to adopt the technologies in the classroom in the coming semester. The mean score of this scale is 12.49. This value falls between agree and strongly agree on the Likert Scale. The 95% confidence interval for this scale mean ranges from 11.664 to 13.316 and excluded the midpoint 9. Hence, the scale mean is significantly higher than 9, indicating that the lecturers agree that they plan to use web 2.0 technologies. The confidence interval for the scale falls somewhere between agree and strongly agree. This suggests that in general the level of agreement is a bit higher than just agree but not quite strongly agree. The lectures can, therefore, be expected to use Web 2.0 technology in their delivery of courses at the university.

Table 3. Summary Statistics of the Constructs

Construct	Cronbach α (Reliability)	Min	Max	Mid-Point	N	SD	Mean	95% CI Lower	95%CI Upper
Behavioural Intention	0.924	3	15	9	41	2.618	12.49	11.664	13.316
Perceived Usefulness	0.913	5	25	15	45	3.537	18.64	17.578	19.702
Ease of Use	0.500	2	10	6	44	1.567	7.32	6.844	7.796
Compatibility	0.934	3	15	9	41	2.592	11.07	10.252	11.888
Self Efficacy	0.900	3	15	9	44	2.799	11.45	10.599	12.301
Actual Usage	0.838	2	10	6	44	1.807	7.61	7.061	8.159
Attitude	0.845	2	10	6	45	1.766	7.8	7.27	8.33

For Perceived Usefulness, Ease of Use and Compatibility, the scale mean falls between the neutral and the agree values. In each case, the confidence interval excludes both the neutral and the agree values, indicating that the scale mean is, in each case different from neutral and agree. As a result, the scale means are all between the neutral and the agree option. This suggests that the level of agreement is somewhat higher than neutral but not quite at the level of agree.

Perceived Usefulness is defined as the degree to which the individual believes that a technology (Web 2.0) would improve his/her job performance (Davis, 1989). In this context, the Perceived Usefulness speaks to the belief that Web 2.0 will enhance students' performance, evaluation, and learning. According to Rogers (2003), ease of use is a function of the degree to which an innovation is easily understood and used or requires minimum effort to use (Davis, 1989). Rogers (2003) also indicates that Compatibility is the degree to which the technology fits with the current experiences of the user and potential values if adopted. The lecturers, therefore, tentatively agreed that Web 2.0 is likely to improve job performance and is easy to use, hence, they may use it. It is also compatible with their experiences, thus, they are likely to adopt it in their classrooms.

The scales for Self Efficacy, Actual Usage and Attitude, show a similar pattern in mean distribution but this pattern is different from the two foregoing groups. In each of the three cases, the scale mean falls a bit below the agree level, however, the 95% confidence intervals each contain the average agree value for the respective scales. Therefore, there is a tendency to agree on the scales for these three concepts and this agreement is stronger than for the level of agreement for Perceived Usefulness, Ease of Use and Compatibility, but not as strong as for Behavioural Intention. Self Efficacy relates to the personal comfort level in using a technology; Actual usage speaks to the confidence users have in their ability to explain the value of Web 2.0 to others; Attitude is a descriptive construct about the overall perception of lecturers towards adopting Web 2.0. The results obtained therefore indicate that the lecturers (1) are fairly comfortable with using Web 2.0, (2) can explain the value of Web 2.0 to colleagues, and (3) believe that Web 2.0 is useful and beneficial in their teaching.

Students' tutorial development

Usage of the Facebook Group varied among participants but generally participation levels were low, with an average of approximately 35 posts per week (3 posts per student per week). Female students tended to interact more with number of posts for males averaging 7.3 and females 13.2. For the assessment which accounted for 7% of the entire course grade, the average was 76% with females obtaining an average of 98% and males an average of 62%. It is not clear from this whether participation is affected by performance or if disposition to perform influenced participation.

Students' post-tutorial survey

Approximately 91% of the students claim to own a computer with 73% of these connected to the Internet at home and 50% accessing the Internet from school. However, 78% of the respondents indicated that they used dial-up connections. Approximately75% of the students claimed to spend at least two hours per day on the Internet with 73% of this category spending as much as four hours online daily. All of the respondents used the Internet for socializing, emailing and chatting while 91% of the respondents used it for reading and research.

Among the social networking sites used by students were Facebook (100%), Hi5 (58%), Twitter (25%) and MySpace (17%). Approximately 64% claimed that they accessed their Facebook accounts at least twice per day. Reported uses of Facebook included: (i) keeping in touch with family and friends, (ii) getting support from peers, (iii) information seeking, (iv) keeping abreast with local and international news and events, and (v) meeting new people.

The students reported a diverse set of opinions on the use of the Facebook Group. Some students indicated that it helped them to (i) understand lesson concepts better, (ii) provided useful responses to their questions and (iii) encouraged and motivated them to learn. However, other students reported uncertainty about their contribution to the group, indicating that they were not confident enough to develop their tutorials, or ask and answer questions. Approximately 36% of the students indicated that their participation in the online discussions may have been affected by the presence of two other moderators (support staff) and by the "open" nature of the group. The students felt that the "other moderators" may not be knowledgeable enough about the content or context of their individual tutorial discussions. This suspicion may be due to unfamiliarity with the other moderators.

Further, the students reported that finding time for the Facebook Group discussions was difficult. They also suggested that their participation was affected because of limited research on their topics, ultimately affecting the confidence of their posts/comments and confidence to interact with other students' tutorials. Some students (10%) indicated that they were not motivated to use the forum.

In general, students believed that the online tutorial facilitated by the Facebook Group was much better than the traditional face-to-face tutorials as it allowed participation from students who do not like oral participation in the classroom. Others viewed it as better because it allowed them to do research before posting or commenting and because it increased the interactivity of the questions and responses. The students believed that the Facebook Group made learning outside of the classroom a reality and that it was convenient because the instructor and students were already Facebook users and were familiar with the tool. "Facebook online tutorials helped me to better appreciate the Internet for research", and "the tutorials were helpful when preparing for exams".

The students also indicated that the Facebook Group allowed them to socialize with peers and that the tool was ideal because it allowed the course instructor to control and monitor the discussions. However, some students

reported that the Facebook notifications and chat could be distracting while reading or interacting with the discussions. Others viewed Facebook as causing them to "spend too much time online" or as being "addictive". Some students did not particularly appreciate delayed-feedback asynchronous discussions.

Discussion

Lecturers

Facebook, YouTube, Skype and Instant Messaging are among the most widely used Web 2.0 technologies by staff to enhance the teaching/learning process. These are used mainly for information sharing, announcements and discussions with students while YouTube is used for lectures and sharing information. These technologies are also used in more limited ways for providing feedback, for tutorials and for lectures. Twitter, blogs, wikis and Flickr are not very popular technologies in this regard, but they are also unpopular in general (apart from the learning process). The lecturers appear to take advantage of the tools they are familiar with and tools that are easy to use to reach out to students – supporting the evidence from Vidal et al (2011).

In general, the lecturers have positive attitudes towards Web 2.0 technologies. They reported moderate to strong agreement on their plans to integrate Web 2.0 in their classrooms in the following semesters. However, all the other constructs received lower average ratings in such a way that two additional groups of constructs emerge. The first group which received an average rating of agree, consists of Self Efficacy, Actual Usage and Attitude. The second group which received an average rating between neutral and agree consists of Perceived Usefulness, Ease of Use and Compatibility. Davis (1989) suggests that Perceived Usefulness is an important factor since it is an indicator of Behavioral Intention. However, Perceived Usefulness is in the lowest rated group while Actual Usage is a fraction of a notch above it, and intention to use is in the highest rated group by itself. It is likely that inexperience (or low competence) with Web 2.0 limited the evidence of the positive effects of Web 2.0 in teaching and learning, and may have influenced feelings of uncertainty about their usefulness. This is consistent with the argument of Flores (2009) (as cited in Vidal et al., 2011) who indicates that the problem with uncertainty could be as a result of the perceptions about the use of social networks and lead to misconceptions and uncertainty about specific applications, such as in Education.

Uncertainty about using Web 2.0 technologies is also likely to correlate with lecturers' comfort level in using these technologies (Ajjan & Hartshorne, 2008). The mean scores for Ease of Use and Compatibility suggest a degree of neutrality (not quite agree). Also, Ajjan & Hartshorne (2008) suggest that Self Efficacy is a strong predictor of intention to use but noted that facilitating conditions are also likely to predict lecturers' adoption of Web 2.0. It is unexpected that intention to use would receive higher ratings than some of the other important constructs. Perhaps the prevailing conditions consisting of traditional expectations, resistance to change and lack of examples are a hindrance to full adoption or the responses

to intention to use may be subject to social desirability bias. Further investigation is warranted and it should account for the influence of the context. Ultimately, the lecturers seem to be inclined to adopting Web 2.0 in education but adoption may be retarded by the factors outlined.

Students' experience

The time spent online by students did not correlate with their participation levels on the Facebook Group. Low levels of interaction were noted and this may have had multiple influences. The students indicated that the "distraction" of other Facebook activities is likely to affect their use of Facebook Groups for formal learning activities (De Villiers, 2010). Students are likely to continue using Facebook for traditional Facebook activities and therefore any attempt to formalize Facebook group for educational tasks will have to be carefully thought out and implemented. O'Rawe (2010) reiterated a common belief that Facebook is not perceived by students as an educational tool but rather simply a means of communicating and connecting with people. However, the opportunity exists for "innovative" modes of interaction among students and lecturers but this requires a review of the traditional modes of interaction, assessment and discourse and the will to embrace change.

Web 2.0 technologies require more than dial-up level bandwidth. It is likely that students' use of dial-up connections may have discouraged participation in the online discussion forum. Low bandwidth is likely to affect more sophisticated social networks and this could be a constant hindrance to adoption. However, Facebook Group is a mainly textual environment and therefore bandwidth may not prohibit interaction.

Higher participation levels by females than males are also observed. However, no indicator suggests that gender is an emerging contributing factor. Limited interaction on the forum may be a result of the value of the activity assessment (7%). Further, appropriate assessment methods for social interaction among students using Web 2.0 should be further explored as existing quantitative metrics (number of posts, number of questions, etc.) may be limited and perhaps miss important qualitative aspects of students' discourse.

Attitude and perception are important indicators of acceptance and subsequent use of any technology. A high level of enthusiasm and positive attitude towards using Facebook is reported, along with a number of benefits from engaging with the Facebook Group. The students claim that the online forum allowed them to better understand lesson concepts, and provided a reliable means of asking and answering questions. Familiarity and high frequency of use of Facebook may have influenced the way they internalize the value of Facebook Group as part of their learning toolkit. However, concerns are highlighted about the asynchronous nature of responses of the Facebook Group discussions. The students indicated a desire for more frequent updates when questions are asked or comments shared. This is a critical issue to address, as delayed responses to students comments and questions may affect the levels of motivation, and may result in lower levels of interaction and

high attrition. On the other hand, students indicate that the asynchronous tutorials are more effective than synchronous tutorials since it allows time for responses and questions to be formulated, researched and presented.

Could the use of Web 2.0 tools such as Facebook Groups affect overall performances of students in examinations? Evidence from our study does not point in that general direction, although the students claim that the online tutorials helped them to prepare for the final examination. The correlation between the Facebook participation levels by gender and the final grades obtained may be spurious. Further experimental research which controls for prior ability/prior performance may help to clarify this relationship.

Finally, issues of group management and moderation are also documented by the students. The preference for a less moderated environment is expressed. This directly contradicts evidence from De Villiers (2010) who indicates that the students feel that the lecturer should monitor content strictly, using standards and quality assurance to test contributions for relevance and value in supporting learning (p. 184). Given the students' dissatisfaction with the presence of a second and a third moderator, the call for less moderation may be confounded with the feelings aroused by moderators with whom they are unfamiliar. The students claim that support moderators who lack contextual or content-area knowledge, may mislead them. However, in this case, both the second and third moderators were qualified in the subject matter. This raises the issue of trust which should be further explored. Instructors should closely monitor discussions by students as contributions that are poor of quality will not result in successful learning outcomes. However, this must be done with care so that participation is not discouraged.

Conclusion and recommendations

The literature highlights the potential and opportunities of Web 2.0 for Education. However, to fulfill these potentials and effectively grasp the opportunities available, it is important that the processes and tools used are applied within the right contexts and are supported by appropriate facilitating systems. Institutions moving towards the new learning paradigm of Web 2.0 must appreciate the need for change and embrace the new pedagogical benefits of Web 2.0. Technology is not the panacea for correcting problems in education but must be viewed as a tool for effecting change in the way institutions teach and students learn.

To fully understand the implications of Web 2.0 and its potential for education, and particularly in higher education, institutions must address implementation issues and challenges that currently appear as barriers to adoption. Further, it is important to examine how educators and students perceive these technologies and their usefulness in enhancing instruction, learning, communication (Vidal et al., 2011). The lecturers at the University are generally ready for Web 2.0 adoption in education. However, adoption may be encouraged by a holistic approach in which the University actively promotes and facilitates adoption. Training of staff to use Web 2.0 in the classroom is an

important consideration for higher education institutions. Training may hasten the adoption while at the same time institutions must also provide carefully thought out technical and pedagogical support. Incentives to recognize and reward innovative teaching and learning strategies may complement training. Further, higher education institutions could establish and adopt policies on use of social networks. However, in the absence of this, individuals can still continue to show the way and present themselves as examples to the wider University community.

To combat the limiting factors to effective implementation in the education process, attempts to adopt Web 2.0 technologies in the formal classroom, should (1) ensure that the students are familiar with the moderators if external moderators are involved, (2) provide regular and frequent feedback to students and (3) facilitate high speed access to computers and the Internet during scheduled hours on campus. The first point deals with the issues of confidence, trust and comfort in interfacing with the external moderators, while the second deals with the students' desire to obtain information quickly. The third point focuses on issues with bandwidth and the allotment of time for focusing on the work at hand. This latter point assumes that bandwidth on campus is better and that facilities are available and further that the course is a hybrid of face-to-face and online modes.

Further research should investigate the difficulties encountered by educators and students and address issues of trust in technology. Students are more likely to continue adopting Web 2.0 and social networks. However, it is not clear whether teachers and lecturers will trend accordingly. In addition, research should also address the rejection of technology by lecturers simply because students are adopting these technologies (Handley, 2007) and explore practical approaches required to break the apparent barriers to reciprocal adoption.

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Appendix I

Table 4. Description of the constructs in the lecturers' survey

Construct	Items
Behavioural Intention	I plan to use Web 2.0 technologies in my classroom I intend to use Web 2.0 technologies within the next semester I will add Web 2.0 technologies to my class next semester
Perceived Usefulness	I feel that using Web 2.0 will help my students learn more about the subject I feel that using Web 2.0 will improve students' satisfaction with the course I feel that using Web 2.0 will improve students' grades I feel that using Web 2.0 will improve students' evaluation To help my students better learn the material, I will incorporate Web 2.0 technologies in the classroom
Ease of Use	I feel that using Web 2.0 will be easy I feel that using Web 2.0 will be easy to incorporate in my classroom environment
Compatibility	Using Web 2.0 technologies are compatible with the way I teach Using Web 2.0 technologies fit well with the way I teach
Self Efficacy	I would feel comfortable using Web 2.0 technologies I could easily use Web 2.0 technologies on my own I know enough to use Web 2.0 technologies
Actual Usage	I believe that I could communicate to others the consequences of using Web 2.0 in the classroom I would have no difficulty explaining why Web 2.0 technologies may or may not be beneficial
Attitude	Web 2.0 is useful in my teaching The advantage of using Web 2.0 outweighs the disadvantages of not using it Using Web 2.0 is a good idea

Constructs and items taken from Ajjan & Hartshorne (2008).