Face-Lift: Social Computing in Higher Education

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ABSTRACT

There is no doubt that the world of elearning is growing everyday and the stakeholders of Higher education are looking to empower education with technology. Social Computing represents one of these tools that can help those stakeholders to attain their goal. The purpose of this research paper is to understand the behavior of individuals when they are using these Social Computing tools then propose a model with which the universities can guarantee perfect implementation of Social Computing in their learning environments to leverage the students' learning and enhance the teaching styles as well. Eight factors have been highlighted to be considered when adopting the Social Computing tools in higher education to help in the adoption of such tools. Some examples of these factors are Reputation, Expected Relationships, and Privacy Concerns. By integrating these factors with the performance expectancy and the behavioural intention, a new model will be formulated to predict the reasons stakeholders should consider for the adoption of the Social Computing tools in higher education. This research depends mainly on interacting with stakeholders having different roles in Higher education to generate accurate findings that can help decision makers to realize the real benefits of adopting Social Computing in their institutions.

Keywords: Social Computing, Web 2.0 Technologies, Technology Adoption, Use Behaviour, Wiki, Blog, Tagging, Syndication, Podcasts, Vodcasts, Pedagogy, Virtual World..

1. INTRODUCTION

Communication is the exchange of thoughts, messages or information among participants. This communication has innumerable benefits to all participants involved in it. These benefits include growth of knowledge, having a competitive advantage and creating a network among the participants based on loyalty and trust. In the time of no computers, business was successful but was not efficient enough.

In the last two years, the term Web 2.0 has gained as much popularity as Internet itself. Web 2.0 is a term coined to explain the sharing of information at common platforms like blogs, wikis, social bookmarking, microblogging and social networking sites. All of

these technologies are based on the definition of Social Computing. Social Computing is about the intersection between social behaviour and computational systems (Cachia, 2008). The impact of Social Computing on any business is that it keeps the consumer or end user at the center of all communication and the organizations build products and services based on the preferences of the consumer. Social Computing can also lead to benefits like innovation from group thinking and efficiency in gaining knowledge from the correct source.

Business organizations, these days, are making experimental efforts to adapt to Social Computing for new dimensions of benefits from the employees and from the consumers. The concept of Social Computing will remain an emerging topic for a very long time and organizations can take more risks in identifying the best methods of implementing characteristics which will give them the highest competitive advantage.

On the other hand, concerns of privacy may hinder the deployment of such tools in private organizations. Other barriers include the infrastructure requirements in the enterprise and the requirement for integration with existing tools in the organization. Despite these constraints, this research aims to prove that the positives of implementing Social Computing in Higher Education institutions as one type of the important business organizations outweigh the barriers to its entry.

2. PROBLEM STATEMENT

The wave of Social Computing is so powerful that if organizations are not involved and adaptable to it, they will be left behind in competition and late entry will not allow organizations from reaping the maximum possible benefits. Organizations like Starbucks have a subscription on Twitter on which consumers alike are able to make suggestions in terms of flavors of coffee, alternative offerings, etc. Employees can also communicate with consumers and share information about the product and service offerings from Starbucks. In due process, Starbucks is reducing the cost of marketing, capturing feedback at real time and, eventually, increase productivity.

In general, Social Computing has to be adopted in organizations to stay ahead or, at least, stay with the competition. Organizations must also adapt and accept the fluid nature of Social Computing and make required changes to facilitate benefits. Therefore, the key variables identified are Social Computing and Organization adoption and adaption capacity.

The key problem statement of this research is to understand how effective can the Higher Education institutions use the Social Computing to enhance the teaching and learning processes from one side and leverage their relationships with stakeholders from the other side, which in due process, achieve higher business value.

Although some institutions are deploying Social Computing tools, they are not receiving the expected value from it. Reasons like loss of control in the usage of these tools or misunderstanding the real impacts of Social Computing on Education can be attributed to this. Business is about creating value. These days, this value is not in the data itself but in how this is being used by people in the organization and outside it. Without a way to navigate through, process, interpret and share data, business intelligence can be overwhelming.

3. PURPOSE/OBJECTIVE OF THE STUDY

The main objective of this research is to identify the effect Social Computing has on various aspects of the organization viz. what must the organization do to achieve success from Social Computing and how should the organization adapt itself to Social Software.

This research aims to develop a framework which will help organizations in realizing the potential benefit by the application of Social Computing tools. For instance, this framework will contain traits required in the organization structure which will enable flexibility for adapting to Social Computing. There are more dimensions that will covered in the framework in due time as a result of further literature review.

This study will also compare the relationships of individuals in a setting which involves Social Software with known relationship models and theories like the UTAUT model. Understanding these relationships will give us more insight into explaining the mindset of individuals in a network. This in turn will help us understand why such a mindset is created and how it can be harnessed to reap benefits from these networks of individuals.

Another problem that must be addresses is to understand the reasons why individuals use Social Computing tools, what information they are sharing, what tools they are using, etc. This explains the importance of implementing social software within organizations.

4. RESEARCH QUESTIONS

Three research questions are put forward in this research paper:
- **How effectively can the Social Computing tools be used in Higher Education?**
- **What are the Drivers of implementing Social Computing in Higher Education?**
- **What are the expected obstacles in the above implementation?**

Answering these questions will lead to developing an effective framework that can define how Social Computing can be effectively deployed in Higher education.

5. LITERATURE REVIEW

Social Computing has been studied by authors like McKay, Lauren, Gartner, Donna and Eisenfeld. Its applications have been introduced from different points of view where some white papers published are about Web 2.0 technologies, Enterprise 2.0 and Social networking. For example, Whitney Michael has studied Enterprise 2.0 (Whitney Michael, 2009), Whitney Michael is studying Web 2.0 (Whitney Michael, 2009) and Metz, Sharon have studied Social Networking (Sharon, 2008).

Parameswaran and Whinston (2007) suggest the very urgent need for research in the field of Social Computing. They suggest that research on Social Computing and its effect on organizations and on business are in its primary stage and require expansion in scope. More theories can be applied to explain this effect. This is required to understand the diverse nature of connections created in a social environment. Rigid frameworks may

no longer be the focus in Information systems as technologies like Web 2.0 require a more fluid and flexible framework to be successful in.

Ouchi (1980) turns to another direction to explain the requirement for instilling a particular behavior among employees which result in Clans. Clans align personal goals to organization goals easily but there is ambiguity in levels of performance among individuals. If we compare the clan to online communities which collaborate for a cause, this ambiguity leads to innovation from among the weak and not only the strongest.

Eastwood (2009) in his whitepaper about being ready in the world of Web 2.0 suggests that around 24% of employees in organizations have accounts on Social Networking sites to collaborate amongst themselves. The question is no longer about whether organizations should implement Social Softwares or not. The answer is already given as a YES. The question to be answered is to understand how much benefit organizations will have from implementing Social Computing tools.

Shannin, Gail and Hudith introduced how the social Networking websites and communication tools reshaped the relation between students and the world. They developed a survey (ECAR 2009) about the using of such tools in education which it reflected that about 90.3 % of respondents are using it, while 89.8% are using text messaging (Shannon, 2009).

Sarah Robbins-Bell defined the term 'Social media' and how can it be used in Higher education. Then she defined the Virtual worlds and its themes (like Avatars and world of Warcraft), and how can it work in Higher Education. And linked between the students in the non-formal social media and in the educational virtual worlds. Then she proved that there is no contradiction between formality in education and using social media in it (SBRobbins, 2009).

There are an innumerable number of theories of Information Systems which aim to understand the reasons behind the attitude and behavior of an individual in general terms. Examples include the Theory of Reasoned Action (Ajzen & Fishbein, 1980) which studies the relationship between attitudes and behavior. It suggests that Subjective Norm i.e. perceived expectation when combined with attitude forms a particular behavior. Another such theory is the Theory of Planned Behavior (Ajzen, 1985) which is an extension of the Theory of Reasoned Action. The Technology Acceptance Model (Davis et al, 1989). Venkatesh et al (2003) summarised a total of 8 such related models and came up with a unified framework which contains factors which are similar in these 8 models. The result is the Unified Theory of Acceptance and Use of Technology (UTAUT). This model identifies Performance expectancy, Effort expectancy, and social Influence and Facilitating conditions as major factors which influence a particular behavior. They have also added 4 moderating variables which will significantly influence behavior or, in this case, acceptance of technology.

Gunther et al (2009) make significant efforts in understanding the reasons why and how is microblogging used by individuals. They conducted an experiment with 4 focus groups to select those important factors that play a role in the adoption of microblogging. The factors they considered for their experiment were based on UTAUT as a foundation. The result of the experiment brought forward 8 important constructs which were very decisive in extending the UTAUT model to understand microblogging in the enterprise.

In this paper, it makes logical sense to use the same constructs or factors as identified by Gunther et al (2009) in an effort extend them towards the adoption of all forms of Social Computing. We wish to target higher education specifically but feel that this study can be extended to any enterprise in any industry. To accomplish this task, we will be creating a questionnaire containing questions which underline the 8 factors as mentioned in the next section. This questionnaire, as per the scope of this research paper, will be directed to stakeholders in Higher Education.

6. SOCIAL COMPUTING APPLICATIONS FOR LEARNING - LITERATURE REVIEW

Social Computing applications refer tool the set of tools for Blogging, Podcasting, Social Networking, Collaborative content, Social tagging, Multimedia sharing, and Social Gaming (SBRobbins, 2009). In general, the term 'Social Software' refers to any software application that supports the interaction between users. SC applications allow the users or learners to collaborate and communicate together in different ways. The following lines introduce for the SC applications that seem the most suitable for learning and indicate the potential of using it in Higher Education. Some of these tools look overlapping because of its integration or dependency on similar services, but introducing the will show how can they be used in different manners to enhance the students' learning.

6.1. SOCIAL COMPUTING TOOLS FOR LEARNING

6.1.1. BLOGS

The term "Blogs" or "Webblogs" was introduced for the first time in 1997 by Jorn Barger to refer to an online and public environment for writing and adding articles by an author or group of authors. These articles are known as 'Posts' and are displayed in a reversed chronological order (Ellison & Wu, 2008; Anderson, 2007).It depends on the author's desire, The blog can include text, images, audio, and video content. It also can include part for the reader comments, and search tool for searching its content. Over time, large number of people was blogging together and continued growing until developing its own new term 'Blogosphere' which refers to the whole blogging users (Anderson, 2007). The Blogosphere was doubling every 5-7 months between 2006 and 2009 with a rate of 100,000 blogs created daily (Pascu, 2008). The estimation of the number of Blogs over the internet reached 200 million blogs by 2007 (OECD, 2007). In Education, a recent survey was conducted by Open Source Software Watch (OSSW) in UK (2006) and found that half of the surveyed institutions reported using blogs. And some websites (like Edublogs.com) started offering Blogs for academic uses by the educators and students.

In education, blogs can be used as follow:

1. By teachers as dynamic learning environment, which facilitate broadcasting the course announcements, course calendar events, feedbacks to the students and helping the students to express their thoughts and understanding with the ability to interact and comment on it.
2. By students to build their e-portfolio online which may present their work and share thoughts in between each other.

3. Between group of students to express their knowledge and share ideas together.
4. Between different group of students and teachers to link though and exchange ideas.

Some Educational benefits can be reflected on the students' learning from using blogs in their learning. These benefits can be projected on the following areas:

5. Students feel free to express in blogs, which may serve in enhancing the critical, analytical, and creative thinking at the student side.
6. As user centered tool, Blogs enhance the participatory learning of the students and even highlight the authorial voices for every one of them.
7. Through the interaction and collaboration between the students when using blogs, they build stronger relationships between each other and experiment the meaning of persona. Blogs help in fostering and developing the civic and social skills.
8. Blogs can help enhancing the students' writing skills and using the language. Moreover, it makes them feel the meaning of authorship, mental freedom and responsibility.
9. Blogs promote the student learning through the enhancing the communication between the students which also increase the students' participation and motivate them more.

6.1.2. WIKIS

A Wiki is a website that enables the users to add, edit, remove, and change its content collaboratively. The Wiki content is usually a text, but it can contain images, audio and video as well (Owen et al., 2006; OECD, 2007) . unlike blogs, wikis have the advantage of history and rollback functions. The history function enables the users to develop different versions of the content, and the rollback function enables the users to restore the previous versions. The most known example of wikis is Wikipedia[i] which was created at 2001 and rapidly grew to have around 82,000 active contributors, editing more than 17,000,000 articles in more than 270 languages, and attracting 400 millions of unique visitors monthly by March 2011 (Wikipedia, 2011)[ii].

Wikis may integrate with the other websites through web links to audio, video, and other files (Warlick, 2006). The educational feature that serves the collaborative writing and is not available in wikis is the tracking of the number of the unique views. It can serve academically in assessing the students' contributions.

In Educational settings, wikis can serve in many subjects. It is ideal tool for collaborative writing and group work. Projects involving multimedia and reading lists can be implemented through wikis. study guides, text books, and subject specific knowledge repositories all can be created using wikis as well. Moreover, wikis can serve in building school or class websites for the need of engaging the broader interest audience and granting them the ability to contribute and comment directly on the website. The teaching staff can use wikis to scaffold collaborative projects as well (Bryant, 2006; Warlick, 2006; Bartolomé, 2008; Franklin & van Harmelen, 2007).

6.1.3. SOCIAL NETWORKING SERVICES

As defined by Cashia (2008), the Social Networking Services refer to the social spaces which are designed to facilitate communication, collaboration, and content sharing over a network of contacts. They enables users to share profiles and personal information, communicate by email, send instant messages, share announcements, blog together, and meet online with their friends or even other new people. Many successful examples of the social networking services are heavily used nowadays. Facebook[iii] , Linkedin[iv], Second life[v], and MySpace[vi] all are examples of these services.

In Europe, using the social networking sites represented the third most popular activity on the internet. By 2007, over 250 million of user profiles were created on the social networking websites (Pascu, 2008). Recent surveys in US reported that 59% of the online teens have created personal profiles on the social networking websites like Facebook and Myspace. The interesting thing in these reports was that the most discussed topics were education-releated and focused mainly on the collaboration around their school work (International, 2008).

The observation taken by Davies and Cobos (2008) about why people tend to use the social networking websites summarized the following reasons as an answer:

10. Explore their identity.
11. Engage in communities and self-expression.
12. Keep in touch with their friends.
13. Develop new rapport and meet new people.
14. Share content and exchange files.
15. Access information and informal learning.

Childnet International (2008) highlighted that the social networking websites are used heavily by the youth category for discovery and exploration, and commented on that by pointing out the potential of the social networking websites to encourage the users for self-directed learning. Moreover, Childnet highlighted the following uses as the potential for using the social networking services in education:

16. Fostering the group collaboration and help in achieving their projects work.
17. Enhancing literacy and the communication skills for the learners.
18. Help the students to develop their e-Portfolios where they can present their work and achievements, and promote their interests.
19. Facilitate the learning about copyrights and data protection.
20. Support the learning of the e-safety issues.
21. Facilitate forming the online communities about specific topic(S).

6.1.4. TAGGING, SOCIAL BOOKMARKING AND FOLKSONOMIES

Social Bookmarking services enable the users to record (bookmark) their favorite website(s) and define it with related title or word (tag) that expresses or summarize the content of that page (Franklin, 2007). del.icio.us[vii], Bibsonomy[viii] and furl[ix] are clear example of the social bookmarking service websites. The process of tagging the websites

with certain user-defined tags to organize them is called 'folksonomy' (Owen et al., 2006; Vuorikari, 2007). The words that the user defines as tags for certain content are attached to that content and are defined as the Folksonomic metadata of the content (Alexander, 2006; Vuorikari, 2007). As an example of how these metadata are used, the user can subscribe for certain tags on del.icio.us to receive a list of the URLs that were attached to these tags.

The user of these service usually has an inbox which contains his bookmarks and added that he/she can subscribe for another user's inbox to receive his bookmark list in his own inbox and update his list with more URLs of similar interet (Franklin & van Harmelen, 2007). Many other Social computing applications are using the concept of tagging to bookmark the user favorites of videos, music, blog posts, photos, podcasts and artifacts (Anderson, 2007). Flicker[x] is one of the most known photo tagging websites. CiteULike[xi], and Connotea[xii] are another examples for tagging but for academic purposes. Both of them help in organizing the research references with tagging them and also share them with other users. So, it makes it easier for researchers to manage and discover the scholarly references (Owen et al, 2006; Vuorikari, 2007).

In educational contexts, the potential of the social bookmarking services to support education can be summarized in the following points:

22. Educators and Learners can tag some websites as recommended educational resources, which may help them to bookmark and share the websites that focus on certain area or topic of the subject. Thus support their research and help each other (Vuorikari, 2007).
23. Instructors and Learners can build up collections of bookmarks and collaborate together with them to filter the digital content of certain subject or topic (Vuorikari, 2007; Franklin & van Harmelen, 2007; Porto, 2008; Alexander, 2006);
24. With the ragging service, the lierarian can develop pre-selected tag lists of resources to browser and use for their extend. These lists and collections can be used to build up tag clouds which facilitate browsing the digital content in many fields (Vuorikari, 2007).

6.1.5. SYNDICATION AND NOTIFICATION TECHNOLOGIES

Syndication refers to receiving the online updates of the content of a given website automatically, rather than going to that website and frequently checking it (Owen et al, 2006). The RSS (Really Simple Syndication) protocol allows the user to define a feed reader or aggregator, which help in centralize certain content from its website by pulling the frequent updates together in one folder and summarized by their content and gives the user advantage to click on summary to see its details (Franklin & van Harmelen, 2007; Owen et al, 2006). Syndication and notification through the RSS feed reader is not a particular Social Computing tool, but it facilitate the organization, inter-connection and coordination of the multiple online resources.

Educationally, Syndication can help the both of the learners and teachers by managing the extensive learning environment through defining feeds for the content updates. For example, an instructor may publish certain subject-related material and continue updating it from time to time. In this case, with the use of the feed readers, the

students could receive these updates automatically and the instructor receive notifications when they update their responses (Owen et al, 2006). The same scenario can be applied for the new blog posts, changes in the bookmarking system tags, changes in the shared media, and news updates.

6.1.6. PODCASTS AND VODCASTS

Similar to Syndicating website content but for audio, Podcasting refers to receiving the content updates conveniently of an audio content. Vodcasting is the same like Podcasting, but with the video content (Franklin & van Harmelen, 2007). Podcasting and Vodcasting are asynchronous modes of distributing the multimedia files. Not like the other social computing tools, Podcasting and Vodcasting are not much popular so far. Pascu (2008) reported that By 2008, only 2% of the internet users on Europe were using Podcasts; however, By 2007, Apple iTunes only was hosting 82,000 podcasts online.

The normal way of podcasting starts by the podcaster who makes the podcasts available online through an RSS feed, to which the users subscribe and use their aggregator program (called Podcatcher). So, when a new update of the audio file is uploaded, they will receive it automatically on their portable devices to listen to it at their convenience. Podcasting and Vodcasting are powerful tools for distributing the educational audio and video content. They are attractive to the students who feel, with podcasts and vodcasts, free to learn anytime anywhere and listen to the podcasts or vodcasts as many as they need. Even more, they do not to remove anything from their schedule as they can listen to the podcasts while commuting, exercising or doing household chores.

In the educational context, podcasts can be used as follow:

25. By the educators to support their students with additional learning materials and resources. It can augment teaching through providing the lecture recordings to the students (Harris & Park, 2007; Franklin & van Harmelen, 2007).
26. As an alternative way of presenting the course work. So, it can be used as an assignment for the students. They can listen and answer related questions or write certain report.
27. As a mean of presenting the institution or one of its units. For example, some podcasts can be published to introduce some of the institution services like the institution news, library updates or work hours (Harris & Park, 2007).
28. To keep engaging the other stakeholders of the institution with the recent updates and reach out the wider community. For example, it can be used to inform the researchers about certain service or for deploying certain survey.

Many universities reported using Podcasts in Education. Even more, a number of them announced making the content of some courses available for public through podcasts. For example, in 2009, Harvard university announced its second year of podcasting the computer science course E-1 "Understanding Computers and the Internet" on the internet, and it had many followers and appeared on the top 100 podcasts on Apple iTunesxiii. Barkley university announced that 30 of its faculty members agreed to clip on a microphone during their lecturing time to record the lectures and publish it on the internet as podcasts (http://itunes.berkeley.edu/). Through its early initiative "Duke Digital

Initiative", Duke university distributed 20 GB iPods on all its fir-year students to use as leaning tool. The planning was to deploy the educational technology. But one of the emerging technologies in their project was podcasting the classroom recordings and field recordings. University of Washington conducted an online survey for podcasting pilot, the survey results reflected that 70% of the students found that the podcasts supported their leaning at all and was very helpful in studying before exams and when preparing homework (Bell, 2007).

6.1.7. MEDIA-SHARING SERVICES

Media-sharing Sites store the users-contributed media files like photos, videos, presentations, documents, podcasts and vodcasts, and allow the users to search these files and display its content. YouTube [xiv]is an example for the media sharing sites which store movies, Flicker[xv] is an example for the photos websites, iTunes[xvi] is for podcasts and vodcasts, Slideshare[xvii] for presentations, Scribd[xviii] for documents, and DeviantArt[xix] for Art work (Franklin & van Harmelen, 2007).

Media-sharing sites makes it easier for the students to access many educational videos. YouTube has a lot of educational videos on it. Aspire Academy for Sports Excellence in Qatar is teaching its student-athletes sports sciences and some other academic subjects which needs a lot of video recordings. They post the recorded videos online on YouTube and the students watch them at their convenience to analyze them and write reports to their teachers/coaches (www.aspire.qa). Some other institutions developed special media-sharing sites for their students to make them using that technology and keep them safe of any inadequate offensive content. TeacherTube is an example of these sites, which contains more than 20000 educational videos on it (Downes, 2008).

Nicole Ellison[xx], a lecturer in one of the Higher Education institutions in US, has used Facebook as teaching tool and pointed out that Facebook made the subject more convenient and easily accessible for the students. She commented that Facebook provides more engaging learning environment and enhances the peer-to-peer social component (Redecker, 2009).

6.1.8. ONLINE OFFICE APPLICATIONS

The Online office applications are online software packages that makes the user able to open the desktop application files like Microsoft Office and Open office files. i.e. it is a replica of the desktop applications, and so that some users call "WebTop" or "WebOffice". Usually, it includes tools for Word processing, multimedia presentation, datasheets, etc (Redecker, 2009). The big advantage of these tools is that they allow online collaborative editing, which means many users can edit the same file at the same time. Google Docs[xxi] for Word processing, Presentations and Datasheets, Backpack[xxii] for accessing common information and coordinating shared schedules, and Stikkit[xxiii] for contacts, meetings, and emails, all are examples of the online office applications.

The online office applications can help group of users to collaboratively produce documents online with the advantages of keeping history of every work step, online discussions and annotation resources. In her blog, Vicky Davis[xxiv] introduced for her collaborative project which was conducted with the help of 40 educators who made 500 entries, authored and edited in an online presentation using Google Docs, and commented on the advantages of using the online presentation tool of Google Docs by mentioning that the collaborative editing helped the users to work together from home or at school with no need to cost for buying piece of Software, and with the advantage of group collaboration which includes chatting together while editing.

In the educational contexts the online office applications can facilitate the group work between learners as they could edit content and chat together. It can also support the educators by enabling them to publish their work for all students regardless of who have the required software runtime or not. It also facilitate commenting on certain content online and building the course content together. Moreover, It provides the potential of distance collaboration anytime across the globe.

6.1.9. VIRTUAL WORLDS AND IMMERSIVE ENVIRONMENTS

Virtual environments provide the users with 3D digital environment to which the users subscribe and start developing their 3D world by building, displaying and storing their virtual creations (OECD, 2007). In these environments, the user is represented by a graphical representation called Avatar. In the 3D digital environment, users can host events or real university courses (de Freitas, 2007). SecondLife[xxv], Entropia Universes[xxvi], Dotsoul Syberpark[xxxvii] and Active Worlds[xxviii] all are examples on the virtual environments on the Internet. Second Life succeeded to attract millions of "Active residents" and still in continuous rapid growth (Pascu, 2008). In March 2007, around 500 universities and research centers plus 2800 educators had presence with activities on Second Life (Calongne, 2007).

The New Media Consortium (NMC) conducted an early survey in 2007 about using Second Life in Education. The survey was taken by 209 educators who already use Second Life in their classes and they reported manifold uses of it in the educational purposes (NMC, 2008). 60% of the surveyed educators took a class in Second Life, 51% done activities include supervising the class projects on Second Life, 58% of the educators are planning to teach classes on Second Life, 50% were doing Class meetings, 46% were conducting research, 47% conducted their office hours virtually on Second Life, 34% provided student services and support activities through Second Life, 34% were mentoring the student research projects, 8% of the surveyed educators taught a real life class entirely on Second Life and 19% are planning to do so.

About the potential of Second Life, or the 3D virtual environments at all, to support the educators and learners, the survey questions included a part about that, and the respondents expressed that they see a high potential of deploying it in Higher Education (94% of them). 87% of the respondents see significant use of Second Life in simulation and scenario activities. 86% see it effective in the artistic expression, 78% see its high potential in the group work, collaboration and meetings, 74% in distance learning programs, 73% in team building, 68% in professional development, and 60% see its significance in teaching full courses.

6.1.10. WEB 2.0 TOOLS DESIGNED FOR LEARNING PURPOSES

There are some online web applications tailored especially for education and provide the capabilities of collaborating online, create online courses and add content to it, provide online assessment tools like test, surveys, and question pools, enable the learners to contribute in wikis and blog activities, and provide some announcement and calendar tools (Stemmer, 2007). One of these free software is Moodle e-Learning platform. It has significant implementations in Higher education with a database of users includes 49,952 registered sites serving 37 million users in 3.7 million online courses (as of October, 2010, Wikipedia). Another example is Elgg[xxix] which is an educational web service available as open source software which is known as "Learning Landscape" and provides blog management system, file repository, user profiles to discover people with the same interests, and the ability to import and export to the other known social networking sites (Calvani, 2007).

An example of providing online e-Learning environment supported by the virtual reality mode was started by new open source project that targets integrating Second Life and Moodle together in new educational platform called "Sloodle" [xxx]. It aims to develop sound pedagogical model for teaching in web-based 3D environment with all the features of the learning management systems, which is expected to make teaching easier and achieve higher rates of learning.

There are many other examples of the educational social computing applications which were started as initiatives from some universities and now available for free as open-source platforms. San Francisco based initiative Wikispaces[xxxi] is one them, which started since 2006 and provide thousands of wikis for free to serve in educational purposes (Geser, 2007). "Escribamos" is another example for the social computing software which is **designed** for education. It was developed by Calliope, a Belgian multilingual online writing center, and it works as collaborative writing environment and provides tool for creating e-Portfolios (Opdenacker, 2007). Additional example is "MASSIVE" which is peer review service for universities (Attwell, 2007). The learning activity management system "LAMS" is another example which was developed in UK to provide several Web 2.0 tools for collaboration between the students and educators (Aliyev, 2007).
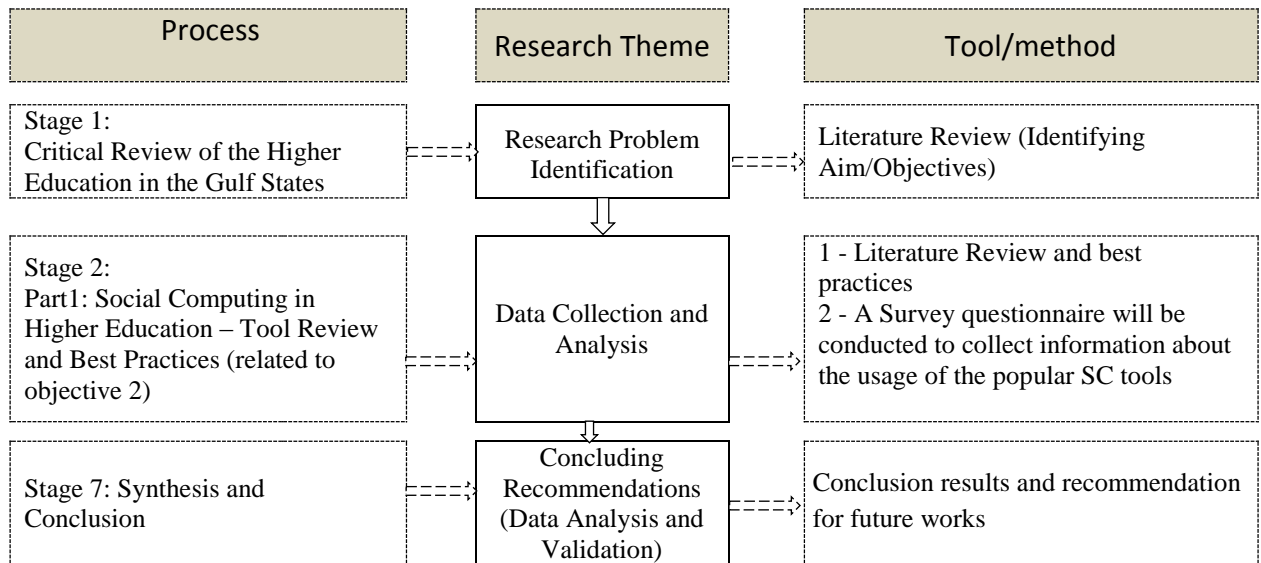
7. RESEARCH DESIGN – METHODS AND PROCEDURES

As defined by Collis and Hussey (2003), a research methodology is an orderly systematic approach taken towards the data collection and analysis. It can be defined as the overall strategy that the researcher applies to achieve the overall aim and objective of his research. It can be thought of as the tool that defines the path that the researcher takes to reach his research's destination.

This study aims to leverage the use of Social Computing tools in the Higher Education institutions in the Gulf States to enhance the teaching and learning experience in Higher Education institutions in the Gulf States. It goes through reviewing the available literature about the Higher Education issues in the Gulf States and the available best practices of

using the Social Computing in Higher Education all over the world, then propose a framework for deploying these Social Computing tools in an effective way to enhance the teaching styles and promote the student learning, and ends by developing a prototype for the online courses to ensure the right implementation of that deployment.

The research methodology that is used in this research is shown in the figure below. It has three stages, and during each stage, a variety of research methods are employed to achieve some of the defined research objectives. Further details will follow to justify the reason of why this methodology was chosen as suitable for this research.

Process	Research Theme	Tool/method
Stage 1: Critical Review of the Higher Education in the Gulf States	Research Problem Identification	Literature Review (Identifying Aim/Objectives)
Stage 2: Part1: Social Computing in Higher Education – Tool Review and Best Practices (related to objective 2)	Data Collection and Analysis	1 - Literature Review and best practices 2 - A Survey questionnaire will be conducted to collect information about the usage of the popular SC tools
Stage 7: Synthesis and Conclusion	Concluding Recommendations (Data Analysis and Validation)	Conclusion results and recommendation for future works

Some important factors will be taken into consideration in this research. These factors are:

i. **Reputation:** A lot of contradicting studies have been done on the factor of reputation or image (used synonymously). Kankanhalli, Tan & Wei (2005) state that reputation from knowledge contribution has no influence on contribution behavior. This can be extended to Social Computing. Donath (1999) mentions that exact opposite i.e. reputations are a significant predictor of individual knowledge contribution. The findings from Gunther et al (2009) state that **reputation is positively related to performance expectancy (to attain gains in job performance).** They also suggest that individuals make deliberate efforts to engage in social interactions in search of approval and reputation and hence the **positive relationship between reputation and intention.**

ii. **Expected Relationships:** It can be defined as the extent to which individuals **believe** that they can improve relationships with others using Social Computing. Social Computing on its own implies interactions and relationships among individuals. The obvious fact from Social Computing is that knowing the right person to be in touch with is very important. Another important angle is of Socialization which refers to the process of inheriting norms, customs and ideologies. Expected Relationships can also be termed as Socialization. Therefore, we can state that '**expected relationships' is positively related to behavioral intentions and also to performance expectancy.** Gunther et al (2009) also confirms this.

iii. **Communication Benefits:** Logic would suggest that this factor should be and will be the most important in determining the adoption level of Social Computing in the organization. Social Computing replaces 'coversations at the cooler', **email** and phone. Improving such communication via Social Computing may lead to less email, less phone calls, less IM and less meetings. Gunther et al (2009) correctly state that "this means less interruptions of the employee's work flow and more time for task performance" and that **Communication benefits are positively related to performance expectancy.**

iv. **Signal-to-Noise Ratio:** Schroeder (1999) defines signal-to-noise ratio as the amount of useful signals that can be transmitted through a medium as compared to the noise in the environment. A ratio which is better than 1:1 means that the signal is stronger than the noise. This signal, which is stronger than the noise, is a better means to keep individuals better informed. Individuals in organizations are coping with a lot of noise in terms of email, phone, IM, etc. Status updates from Social Computing Applications and requests to update information on an existing Wiki are just examples of more noise that the employees may have to encounter. With Social Computing Applications in place, instead of receiving 20 emails a day, employees may receive 200 tweets a day (Gonzalez and Mark, 2004). We can then rightfully suggest that the **Signal-to-Noise Ratio is negatively related to Performance Expectancy.** Gunther at al (2009) have had similar thoughts.

v. **Codification Effort:** Signal-to-Noise Ratio has a friend in the Codification Effort factor both of which would negatively impact the Social Computing adoption process. The rationale behind Social Computing is frequent updations. **This** would require efforts from the employees which who have to share this time with their daily tasks (Orlikowski, 1993). From another perspective, Social Computing Tools can actually be a better means of communication as compared to IM, email or phone calls. Considering the informality of communication with Social Computing, codification effort will be reduced to a certain extent. Employees, in general, would find the process of continuous updates tedious as it would affect their task performance. We can conclude that **Codification Effort is inversely related to Performance Expectancy.** Gunther et al (2009) concurs with this result.

vi. **Privacy Concerns:** For any layperson using Social Computing, security of communication would be the primary concern when sharing of private information is concerned. Facebook came under a lot of scrutiny when users realized that they could not delete accounts they did not wish others to view. They could deactivate accounts but they still stayed on the Facebook servers. Facebook eventually changed this policy but this privacy concern had created a lot of **concern** for its users. In the organizational context, employees privacy concerns would be about the level of control management would have over them with the implementation of Social Computing. In an environment where continuous learning takes place, ensuring the security of such content will be the standing pillars based on which knowledge owners will collaborate with each other. The experiment conducted by Gunther et al (2009) suggests that employees "associate negative utility with such self-disclosure" and that **Privacy Concerns have a negative effect on Intention to use i.e. Behavioral Intention.**

vii. **Collaborative Norms:** Social Influence is about the extent to which an individual believes that others feel that it is important for the individual to use the system. Social Influence and Social Norms, as mentioned by Venketash et al (2003), strongly influence knowledge sharing. This thought was not shared by Gunther et al (2009). They suggested that it is not Social Influence, but it is Collaborative Norms which have a positive impact both on knowledge contribution **and** knowledge seeking. This is because individuals perceive Collaborative Norms more informal as compared to Social Influence where individuals work in the fears of their superiors. Such informal communication can result in the desire to learn and the desire to conduct research and develop. Therefore, we can say that **Collaborative Norms is directly related to Behavioral Intentions.**

viii. **Facilitating Conditions:** This factor is perhaps one that individuals would not think of during the inception of the new application, but they would realize the impact on the usability aspects of the application. In the experiment conducted by Gunther et al (2009), they figured out that employees did not want to move to another application to update Twitter. The tool must be integrated tightly with the **existing** infrastructure. We can then conclude that **strong Facilitating Conditions are required for the right behavioral intention to use.** Factors like flexible budgets and the requirement of strong information assets are an integral part of the facilitating conditions.

8. DATA COLLECTION

The surveyed population of individuals in higher education was divided into 4 different samples. The questionnaire was generic and was applicable to each of the 4 samples. The description of each sample is given below:

1. **Students:** the sample includes randomly chosen undergraduate and postgraduate students from the University of Wollongong in Dubai and UAE University, Al Ain.
2. **Instructors:** the sample includes randomly chosen lecturers from the University of Wollongong in Dubai and UAE University, Al Ain.
3. **Management:** the sample includes randomly chosen staff from the administrative departments of University of Wollongong in Dubai and UAE University, Al Ain.
4. **Observers:** the sample includes individuals chosen irrespective of relationships and industries. Individuals include parents, friends, former colleagues, relatives, etc. who have the basic understanding of the popular Social Computing tools.

A total of 129 questionnaires were answered completely by participants across all the 4 samples. This includes 52 students, 10 instructors, 28 management staff and 39 observers.

9. DATA ANALYSIS

Every statement in the questionnaire had 5 options for the respondent to choose from. Each of these options was assigned a value shown as follows:

Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

Table1: Survey measures

The following table illustrates the results from the analysis of all the answered questionnaires that were received. The Factors are as per the defined hypothesis of this paper. Each factor was represented by a set of questions. For instance, questions 1, 2 and 3 represent the factor 'reputation'. The percentage of optimism defines the average of the extent to which individuals agree or disagree with a particular statement in the questionnaire. The mode identifies the response that was received the most number of times.

The most fascinating revelation from all of the results is that, by and large, they are consistent across all 4 samples.

	Factors	Students (52)		Instructors (10)		Management (28)		Observers (39)	
		Optimism	Mode	Optimism	Mode	Optimism	Mode	Optimism	Mode
1	reputation	89%	5	88%	5	86%	4	88%	5
2		86%	4	84%	4	83%	4	74%	4
3		76%	3	72%	3	90%	4	71%	4
4	expected relationships	84%	4	84%	5	83%	4	82%	4
5		88%	4	76%	4	79%	4	74%	4
6	signal to noise ratio	53%	2	68%	3	74%	2	49%	2
7		88%	4	92%	5	90%	4	94%	5
8	codification effort	72%	5	76%	5	74%	4	63%	3
9		88%	4	84%	4	84%	4	82%	4
10	privacy concerns	92%	5	88%	4	94%	5	87%	5
11		65%	3	60%	2	75%	3	52%	3
12		68%	4	84%	4	84%	4	63%	4
13	collaborative norms	83%	4	90%	4	80%	4	82%	4
14		79%	4	92%	5	76%	3	71%	3
15									
16	facilitating conditions	49%	4	64%	4	42%	4	52%	4
17		78%	4	92%	5	78%	4	78%	4

Table2: Survey analysis

	Factors	Chosen Dependency	Hypothesized Link	Result from Analysis	Compare with Hypothesis
1	reputation	performance expectancy	strong link	strong link	same as hypothesis
2					
3		behavioral intentions	strong link	strong link	same as hypothesis
4	expected relationships	performance expectancy	strong link	strong link	same as hypothesis
5		behavioral intentions	strong link	strong link	same as hypothesis
6	signal to noise ratio	performance expectancy	*weak link*	*strong link*	*against hypothesis*
7					
8	codification effort	performance expectancy	weak link	weak link	same as hypothesis
9					
10	privacy concerns	behavioral intentions	weak link	weak link	same as hypothesis
11					
12					
13	collaborative norms	behavioral intentions	strong link	strong link	same as hypothesis
14					
15					

16	**facilitating**	behavioral intentions	*strong link*	*weak link*	*against hypothesis*
17	**conditions**				

Table2: Analysis of the survey results – part2

Questions 1, 2 and 3 focus on Reputation. The above data is consistent across all samples to confirm the strong link of reputation with performance expectancy and with behavioral intentions. Actually, the numbers show that this factor has the strongest link among all the hypothesized relationships.

Results from Questions 4 and 5 about expected relationships are not as strong as Reputation but still confirm a strong relationship across all samples. An average mode of 4 across all samples in question 4 shows the mindset of all participants towards their behavior to deliberately create relationships for benefits.

Important revelations from Questions 6 and 7 had to reconsider the researcher mindset about Signal to Noise Ratio. The practical thought process from the experiences and literature review seemed flawed from the results that were received. Across all samples, participants honestly believed that the signal to noise ratio will easily be greater than 1:1 when Social Computing will be used in Education. The average responses ranged from neutral to disagreement from the participants.

Both Codification Effort and Privacy Concerns consistently show very strong agreement from most of the participants which confirms the weak links with performance expectancy and behavioral intentions. Both questions for Codification Effort have received modes of 4 or more. In the context of Privacy Concerns, mostly all participants are neutral about the idea that the cost of security is more than the benefits one receives from deploying Social Computing. This could be due to lack of actual implementation being done in large enterprises.

For the factor 'Collaborative Norms', questions 13 and 14 have received positive support from all samples. This is an approval for the strong linkage with behavioral intentions. Results from question 15 have been omitted based on the feedback from a few participants who were unable to understand the question, specifically, the meaning of the term 'knowledge base'.

It is hypothesized that strong facilitating conditions with respect to the infrastructure of the organization are required with a flexible budget for Social Computing to flourish. The participants agreed with the fact that a flexible budget is necessary in the implementation of Social Computing. With an average mode of 4, question 16 went strongly against our hypothesis. Participants feel that Social Computing applications will be used extensively irrespective of the IT infrastructure of the organization.
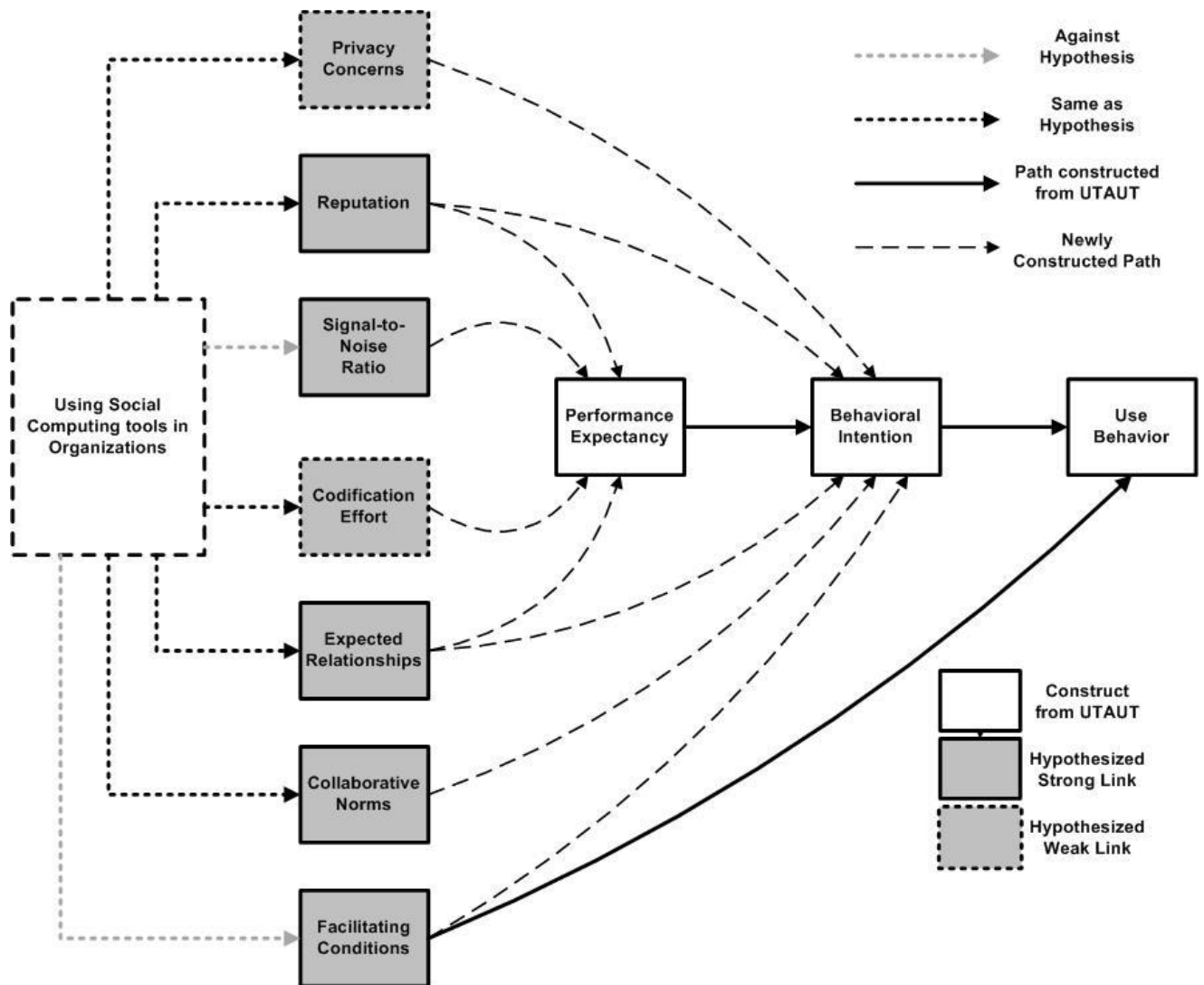
10.MODEL FORMULATION

Figure 1: an extension to the UTAUT Model

Based on the data analysis and the formulated results, the above model was formed. It highlights factors already existing in the UTAUT Model and the factors which have been hypothesized in this research. The links in the far left are results from the analysis of the data that we received.

CONCLUSIONS

Despite many of the challenges that confront the deployment of Social Computing in Higher Education, like privacy concerns, Infrastructure cost, and the needed codification effort, adopting Social Computing in Higher Education can be effectively deployed as the pros are more than the cons. Factors like Reputation, Expected Relationships, Communication Benefits, Signal-to-Noise Ratio, Codification Effort, Privacy Concerns, Collaborative Norms, and Facilitating Conditions have been investigated by deploying a research questionnaire for different stakeholders in Higher Education. The research findings helped to develop a generic model that highlights the relationship between each factor and the use behaviour of Social Computing tools. The

proposed model builds on the Unified Theory of Acceptance and Use of Technology (UTAUT), and extends the research done by Gunther et al (2009) to apply those 8 factors to all the forms of Social Computing.

11.ACKNOWLEDGEMENTS

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APPENDIX 1 - THE SURVEY QUESTIONAIRE

Issues	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
REPUTATION:					
The use of Social Computing tools will **INCREASE** if it leads to an **increase in reputation (image).**	5	4	3	2	1
An **INCREASE** in **reputation** leads to an **increase in power and influence.**	5	4	3	2	1
More **power and influence** forms the reason behind an **increase in productivity.**	5	4	3	2	1
EXPECTED RELATIONSHIPS:					
The use of Social Computing tools will **INCREASE** if it leads to an **increase in relationships among peers.**	5	4	3	2	1
An **INCREASE** in **relationships among peers** forms the reason behind an **increase in productivity.**	5	4	3	2	1
SIGNAL-TO-NOISE RATIO:					
The use of Social Computing tools will **DECREASE** the **amount of quality information exchanged** among its participants.	5	4	3	2	1
The use of Social Computing tools is an **EFFICIENT** method to **keep people informed** about what you are working on at the moment.	5	4	3	2	1
CODIFICATION EFFORT:					
The use of Social Computing tools will **INCREASE** the **time and effort** required from all individuals.	5	4	3	2	1
The **time and effort** required to continuously update information has to be **shared with existing responsibilities.**	5	4	3	2	1
PRIVACY CONCERNS:					
There must be **high levels of security in place** for creating a **positive mindset** towards using Social Computing tools.	5	4	3	2	1
The **cost of security** is **more than the benefits** one receives from deploying Social Computing tools.	5	4	3	2	1
Security policies can **never be strong enough** to combat misuse of Social Computing tools.	5	4	3	2	1
COLLABORATIVE NORMS:					
The **highly networked structure** of Social Computing Tools creates a new desire to learn from peers.	5	4	3	2	1
The structure of Social Computing Tools encourages individuals to **collaborate for Research.**	5	4	3	2	1
The use of Social Computing tools **to learn** must be **enabled and supported** by an **easy-to-use, intelligent Knowledge Base.**	5	4	3	2	1
FACILITATING CONDITIONS:					
The use of Social Computing tools **will flourish irrespective of the IT infrastructure of the organization**.	5	4	3	2	1
Budget for implementation of Social Computing tools should be **flexible** as it is a new technology but, **it is very effective.**	5	4	3	2	1

Footnotes:

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[i] http://wikipedia.org

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