Web 2.0-based Communication and Knowledge Sharing Model in Higher Education Institutes (Case Study: Universiti Teknologi Malaysia)

Faisal A. Saeed[1]
alsamet.faisal@gmail.com

Noorminshah A.Iahad[2]
minshah@utm.my

Nadhmi A. Gazem[3]
nizak3000@gmail.com

Author(s) Contact Details:
[1, 2, 3] *Universiti Teknologi Malaysia, Skudai, Johor, Malaysia*

Abstract— Web 2.0 has become very widely to develop many web-based systems. Web 2.0 tools have changed the nature of web-based applications especially those are used for communication purposes. The Forums, Wikis, Blogs, Social Networking, Video Sharing and other Web 2.0 tools are used to communicate web users with each other in effective way for many purposes. In Universiti Technologi Malaysia (UTM), the communication process between postgraduate students and School of Graduate Studies (SPS) is done by Face-to-Face, phone, fax, Email and post. There are many communication problems encountered by the postgraduate students before and after they registered as students. This project was conducted to propose a Student-University Communication Media model using the Web 2.0 and use it to develop a prototype of Web 2.0-based Student-University Communication Media Portal. The Object Oriented Approach was used to develop the prototype of Web 2.0-based Student-University Communication Media Portal. Eventually, the prototype was implemented and tested. However, the organizational strategy of implementing the prototype by SPS was formulated. The User Acceptance Testing was conducted by thirty users with more than 95% of them satisfied with the developed portal and confirmed that it is easy to use, functional and useful.

Keywords – web 2.0; communication model; communication module; knowledge sharing; higher education

1. INTRODUCTION

Universiti Teknologi Malaysia (UTM) is the largest engineering-based university, located at the southern of Peninsular Malaysia. It is well-known for being the pioneer of engineering and technological knowledge and expertise. UTM has more than 10 research alliances, and 28 centers of excellence, in addition to academic faculties. There are more than 16,036 full-time undergraduate students at UTM and more than 5,000 enrolled on distance learning programmes as part-time students. In addition, there are 6432 postgraduate students, 1762 of them are international students in various fields of specialization. Since the 1990s, the number of International students has increased, especially in postgraduate programs [1].

UTM serves students by providing many web-based systems. In addition to the UTM website, there are various other online application systems such as E-learning system and online registration system which are Web 1.0-based systems.

Web 1.0 is the first generation of the World Wide Web (WWW). The Web 1.0 sites are static, which contain information that might be useful, but there is no reason for a visitor to return to the site later. An example might be a personal Web page that gives information about the site's owner, but never changes. Also, Web 1.0 sites are not interactive, which means that the visitors can only visit these sites; they cannot impact or contribute to the sites. And Web 1.0 applications are proprietary, which means that under the Web 1.0 philosophy, companies develop software applications that users can download, but they are unable to see how the application works or change it [2].

In the current UTM website and its online systems, the student interactions and contributions are very minimal. Furthermore, online communication between students and the university is not provided, except for the use of Student E-mails. This paper is aimed to propose a Student - University Communication Media Model using Web 2.0.

Web 2.0 [3] is proposed because it facilitates interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web. Examples of Web 2.0 are web-based communities, hosted services, web applications, social-networking sites, video-sharing sites, wikis, blogs, forum, and other tools. A Web 2.0 site allows users to interact with each other, or to change website content in contrast to non-interactive websites where users are limited to the passive viewing of information that is provided to them.

Many models have been developed for integration Web 2.0 technologies in higher education [4][5][6][7] [8] in order to reduce the cost of learning, provide easier and faster access to information, and share accumulated experiences by using Blogs, Wikis , Flicker, and YouTube. However, few studies [9][10] [11] focus on the using of Web 2.0 as communication tools between students and universities management staff as customer service and consultation tools. This paper will develop communication model and evaluate the developed model.

2. MATERIAL AND METHODS

The literature review has been done to know the current work performed in this area and to get knowledge of the useful Web 2.0 technology tools that have been used for the communication purposes.

After that, collecting related data that helps to enrich and guide the researcher to conduct this research has been done, using the interview and questionnaires, this data have been analyzed well. Finally, the findings of the whole work have been achieved, which used to propose a Web 2.0 Communication Media Model.

3. CURRENT COMMUNICATION MEDIA SYSTEM ANALYSIS

Although UTM has many online web-based systems, the current student-university communication media are e-mail, phone, post, and fax. There is no web-based communication system in place. The students need to use these media in order to enquire about admission requirements, online application status, UTM rules and services, and to solve any academic or non academic issue. For example, the process of admission can be done at the university, by posting the documents, or by using the online application system. The School of Graduate Studies (SPS) is the responsible unit in UTM for the communication with postgraduate students. Every semester, hundreds of postgraduate students apply to study in UTM using the online application system, but many students are rejected due to many reasons, one of which is the miscommunication between SPS and students, especially the international students. The SPS staff use the phone, fax, post, and electronic mail to contact students in case of further requirements, missing documents, incomplete application, or other problems. But, because of the huge number of prospective students and their problems, it is too difficult to solve all of their problems. Moreover, some prospective students still send the admission documents by email to their friends who study in UTM in order to get admissions.

Also, the UTM and SPS websites provide information in the form of text and downloadable forms, which are misunderstood by many students who need more explanation or want to enquire and discuss about this information online. The use of the current communication media has many drawbacks; for example, the use of phone is expensive, misunderstood in some cases, and not sufficient in case of filling forms. The huge number of E-mails could not be managed and answered well, and might be sent to the wrong destination. The post is considered very slow and expensive compared to the online communication. The fax also is rarely used as a communication media. However, the researcher concluded that most students and SPS staff are not satisfied with the current communication media with regard to the cost, time, and efficiency, based on the conducted surveys and interviews. Therefore, there is a need to have web-based communication media in order to overcome the students' communication problems, before and after students' registrations. The Web 2.0 technology tools are proposed to be used in this Student-University Communication Media Portal.

4. RESULTS AND DISCUSSIONS

This section provides the analysis on feedback from respondents regarding to the current communication media, when and where students face communication problems, the satisfaction of postgraduate students with using the current system, and the need for web-based communication system. The researcher distributed the questionnaire that consists of four sections to approximately three hundreds of students. The total number of respondents was 151 students. The analysis on feedback from these respondents was sufficient for researcher to understand the problems of the current communication system, and the need for developing a model of Web2.0-based Student-University Communication Media

A. Respondent Background

The respondents included Master and PhD students. Most of respondents were international students distributed among different faculties in UTM. The percentage of 53% were Master students, whereas (46%) were PhD students. Also, the percentage of (88%) of respondents were international students, and only (12%) were local students.

B. Identifying the Communication Problems with university

The percentage of 62% of students got the information they need from SPS website, and 56% of them consider it as clear and organized website, but 55% of students answered that there is no online communication with SPS staff in place, and 51% mentioned that there is no good search engine to find the information in SPS website.

Although 60% of prospective students got the information they need from the SPS website, but 75% of them needed help to understand it. Also, 84% of prospective students needed communication with SPS staff, and 71% of them contacted SPS by using the current communication media (E-mail, phone, and others), whereas 74% of prospective students contacted non-SPS staff (such as their friends in UTM) to solve their problems, which is due to the lack of communication with SPS.

The current students were asked whether they still use the traditional communication media and need to inquire about information online. From the respondents' answers, the current students still use the Email, phone and post as communication media and they need online communication with SPS.

The students were asked about the way by which they applied to UTM. Only 20% of students applied through the online application system, 20% of students used the post, 5% of students used the E-mail during applying to UTM, 46% of students contacted their UTM-friends, 15% of them applied manually to SPS officers, and 10% of students used other ways for applying such as external agencies.

C. The Need for Online Communication Media

Most students strongly agreed that a new portal is needed to provide online communication with university staff and a way to inquire about information in SPS website. They agreed that the portal should notify students about any new updates, the portal should have a good search engine, the portal should guide students to use all UTM services, and the portal should act as communication media.

The prospective students need to communicate with SPS to inquire about the status of their applications, especially when the applications are incomplete. Also, the portal should provide the current students with needed information online such as the academic resources by using online communication media. The students strongly agreed to use Web 2.0 tools for communicating with SPS staff and finding the needed information. The students were asked about the most important information they need to communicate with SPS about. The percentage of 58% of respondents communicate with university for purposes of enquiring about status of their online application and university rules, when 51% of respondents enquire about UTM services, and 43% of respondents communicate with SPS during applying to study in UTM.

D. The Needed Web 2.0 Tools

In this section, the students were asked about specific Web 2.0 tools to be used in the Student-University Communication Media Model. The objective of this section is to know the suitable Web 2.0 tools that are familiar to students, and effective for communication.

The first question was asked to know the Web 2.0 tools that are used by students. Most students, 60% of them, used the online chat, and 56% of students used the forum and social networking. The percentage of 50% of students used the blogs, 26% of students used the wikis, 16% of them chose the RSS, and 38% of them used the other tools such as YouTube.

The second question were asked to know which tools students prefer to communicate with university staff in order to inquire about SPS rules and procedures. The result shows that most of respondents prefer to use Messaging account (58%), Forum (42%), and Chat (39%).

In the third question, the students were asked about the tools they prefer to use to inquire about status of their online application during the admission. Most students prefer to use UTM Messaging Account (65%), Forum (39%), and Chat (34%).

Another question was asked to know which Web 2.0 tools students prefer for displaying the SPS website information. The Forum is preferred by 46% of students, whereas the blogs, video sharing, and wikis are preferred by 22%, 33%, and 19% of students respectively.

The students were also asked about the tools they prefer to use for sharing knowledge with each other. Most students (48%) prefer the Social Networking, 40% of them prefer the Forum, and 38% of students prefer to use Messaging Account for knowledge sharing.

Finally, the students were asked whether they prefer to get SPS website updates by using the RSS or not. Most of students (60%) prefer it, only 7% of them are reluctant to use RSS, and 33% of students do not know about RSS.

4.2 Proposed Web 2.0-based Student-University Communication Media Model

As shown in Figure 1, the communication media model consists of three important layers. The interface layer, by which the user can browse and login into the system. The user could be the university staff or the student. The second layer is the application layer, in which the student and university staff communicate using several Web 2.0 tools according to nine communication modules. These modules specify the most important purposes of communication between students and university staff. The last layer is the database layer, in which the information is stored. The details of using appropriate Web 2.0 Communication Tools with each Communication Module are described in Table 1.
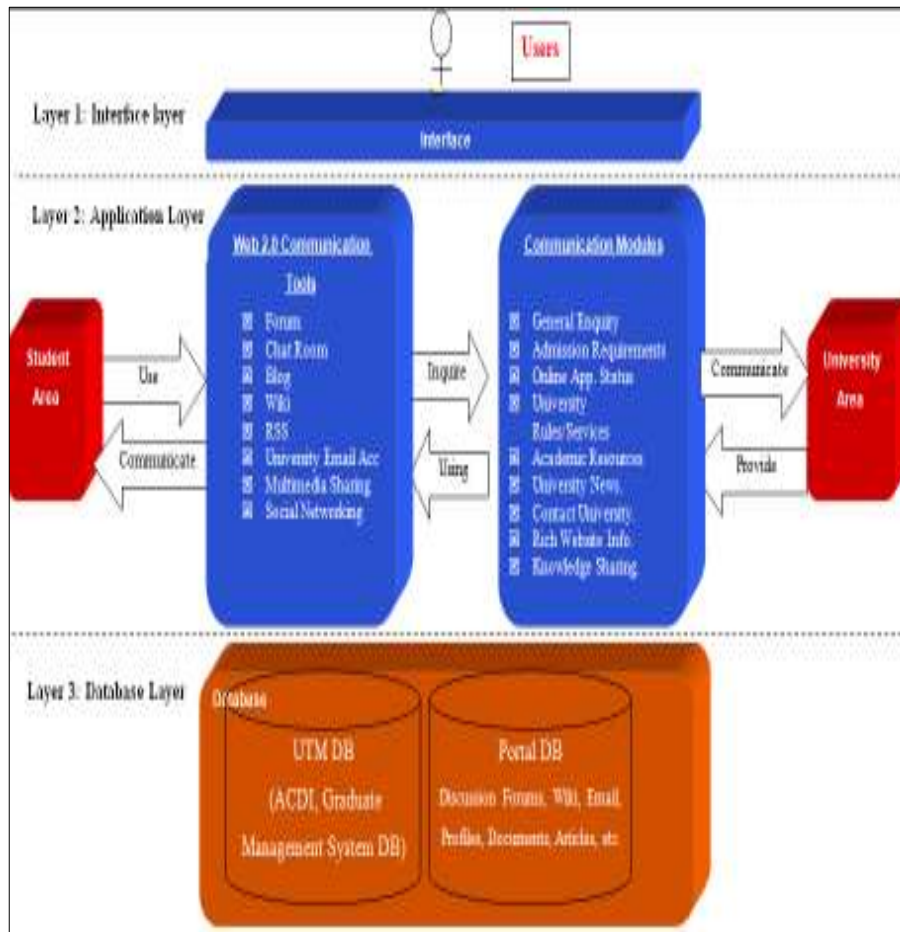
FIGURE 1: Web 2.0-based Student-University Communication Media Model

TABLE 1: Web 2.0 tools for Communication Modules

Communication Module	Web 2.0 Communication Tools
General Enquiry	UTM Messaging Account, Forum, Chat
Contact University	UTM Messaging Account, Forum, Chat
Admission Requirements	Forum, Blog, Wiki
Online Application Status	UTM Messaging Account, Chat
University Rules/Services	Forum, Blog, Wiki
Academic Resources	Forum, Blogs, Video Sharing, Wiki
University News	RSS, Social Networking
Enrich Website Information	Forum, Blogs, Video Sharing, Wiki
Knowledge Sharing	All tools

5. PROTOTYPE TESTING

Based on the proposed model, the Student-University Communication Media Portal was developed and tested in order to evaluate easiness, functionality , usefulness and user satisfaction of the proposed model.

During the testing, thirty users were given set of questionnaires for their feedback of the portal. Before that, the researcher briefly explained to the users the analysis findings that determine the communication problems between students and university, and the weaknesses of the current communication media used by the university. Then the researcher presented all the functions of the portal, and had asked the targeted users to use it. The users included PhD and Master Students and top

management staff of the university such as the Postgraduate school deputy dean, Deputy Registrar, and Assistant Registrar as shown in Table 2.

TABLE 2: Lists of the UAT Respondents' Background

User Type	Position/Program	Number of Users
SPS Management Staff	SPS Deputy Dean (Science & Technology)	1
	SPS Deputy Registrar	1
	SPS Assistant Registrar (Academic & Record)	1
	SPS Assistant Registrar (Intake)	2
	SPS Assistant Executer	1
Postgraduate Students	PhD Students	10
	Master Students	14
Total		30

The Portal has been evaluated based on four factors, which are ease of use, functionality, usefulness, and user satisfaction. Both types of users, SPS staff and postgraduate students in UTM, are included in this evaluation.

A. Ease of Use

Four questions were asked in order to determine the respondent users' feedback about Student-University Communication Media Portal ease of use. The portal interface, menus, navigation are the parameters of the evaluation. As shown in the tables. All the respondents from SPS Staff and Postgraduate Students confirmed that the portal is easy to use. The percentage of 54% of SPS staff and 64% of students strongly agreed that the portal is easy to useas shown in Tables 3 and 4.

TABLE 3: SPS Staff Evaluation of Portal Ease of Use

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
The Communication Media Portal is user-friendly?	0	0	33	67
The communication modules menus are a well-organized and arranged?	0	0	67	33
It is easy to navigate Communication Media Portal?	0	0	50	50
The Communication Media Portal easy to use?	0	0	33	67
Total Average	0	0	46	54

TABLE 4: Postgraduate Students Evaluation of Portal Ease of Use

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
The Communication Media Portal is user-friendly?	0	0	17	83
The communication modules menus are a well-organized and arranged?	0	0	50	50
It is easy to navigate Communication Media Portal?	0	0	50	50
The Communication Media Portal easy to use?	0	0	29	71
Total Average	0	0	36	64

B. Functionality

Two questions were asked to evaluate the functionality of the Student-University Communication Media Portal. The entire respondents of SPS Staff and 98% of Postgraduate Students confirmed that the portal successfully provides online communication media between students and SPS by using efficient communication tools like Chat, Forum and other Web 2.0 tools Tables 5 and 6 show in detail the evaluation of portal functionality.

TABLE 5: SPS Staff Evaluation of Portal Functionality

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I think this portal successfully provides online communication media with Students.	0	0	33	67
I think the portal uses efficient web-based communication tools like chat, forum, and others.	0	0	50	50
Total Average	0	0	41	59

TABLE 6: Postgraduate Students Evaluation of Portal Functionality

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I think this portal successfully provides online communication media with SPS Staff.	0	0	29	71
I think the portal uses efficient web-based communication tools like chat and forum	0	4	54	42
Total Average	0	2	41	57

C. Usefulness

Three questions were asked to evaluate the usefulness of the Student-University Communication Media Portal. The entire respondents of SPS Staff and 88% of Postgraduate Students confirmed that the portal is sufficient to solve the student-SPS communication problems online, more useful than the current-used communication media like phone or e-mail, and the portal will encourage SPS Staff to help Postgraduate Students. Tables 7 and 8 show in detail the evaluation of portal usefulness.

TABLE 7: Evaluation of Portal Usefulness for SPS Staff

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I think this portal is sufficient to solve the communication problems with Postgraduate Students.	0	0	50	50
I think this portal is more useful to SPS than the current communication media like email and phone.	0	0	67	33
I think the portal will encourage SPS Staff to help students and solve their problem online?	0	0	67	33
Total Average	0	0	61	39

TABLE 8: Evaluation of Portal Usefulness for Postgraduate Students

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I think this portal is sufficient to solve the communication problems with SPS.	0	16	42	42
I think this portal is more useful to Students than the current communication media like email and phone.	0	8	42	50
I think the portal will encourage SPS Staff to help students and solve their problem online?	0	13	41	46
Total Average	0	12	42	46

D. User Satisfaction

Two questions were asked to evaluate the user satisfaction for the Student-University Communication Media Portal. The entire respondents of SPS Staff and 96% of Postgraduate Students are satisfied with this portal, and would like to communicate with each other by using the Communication Media Portal. The percentage of 92% of postgraduate students respondents ensured that the communication modules, provided by the portal, satisfy all their needs and expectations regarding the communication with SPS. Tables 9 and 10 show in detail the user satisfaction.

TABLE 9: SPS Staff Satisfaction

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I am satisfied with this Communication Media Portal.	0	0	67	33
I would like to communicate with students by using the Communication Media Portal.	0	0	67	33
Total Average	0	0	67	33

TABLE 10: Postgraduate Students Satisfaction

Question	Strongly Disagree	Disagree	Agree	Strongly Agree
I think the communication modules satisfy all my needs and expectations regarding to communication with SPS.	0	8	63	29
I am satisfied with this Communication Media Portal.	0	4	46	50
I would like to communicate with SPS by using the Communication Media Portal.	0	4	38	58
Total Average	0	5	49	46

Finally, the user comments are gathered and the improvement have been made to the prototype portal such as adding poll, more detail information about the SPS staff in charge for each communication module. The other comments recommended this Student-University Communication Media Portal to be implemented in SPS as fast as possible. Moreover, the most Web 2.0 Communication Tools that SPS staff and postgraduate students like to use are shown in the Figures 2 and 3
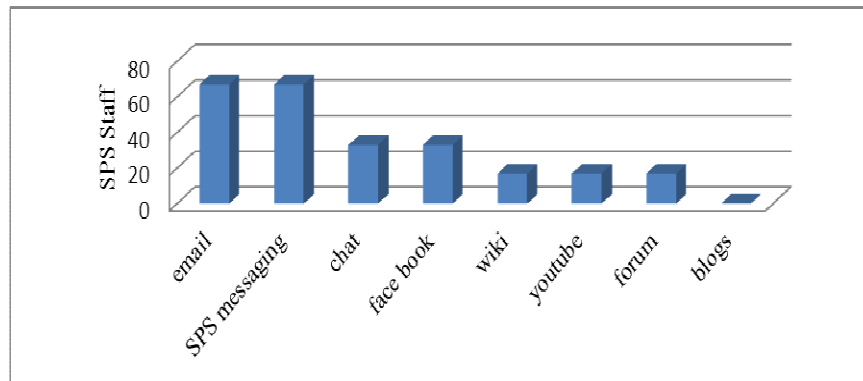
FIGURE 2: The Most Desired Web 2.0 Communication Tools by SPS Staff
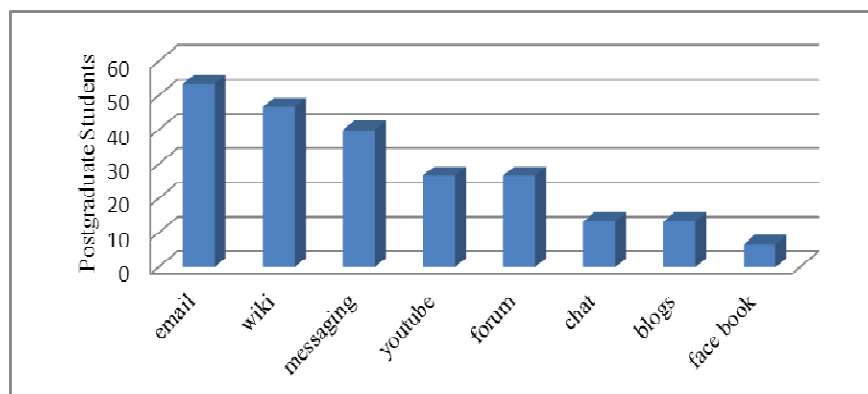
FIGURE 3: The Most Desired Web 2.0 Communication Tools – Postgraduate Students

6. CONCLUSION

By the clear understanding of the communication problems and the appropriate requirements needed by students and university staff, the student-university communication media model has been proposed. This model can be used in order to enhance and improve the communication between students and university. It will avoid the communication problems which are faced by students and staff. This model will help students to contact universities faster, easier, cheaper, and effectively. Also, it will reduce the time and cost of answering and making phone calls, especially the overseas calls. Also, this model can be implemented and used for any medium-sized organization customer service. It provides a communication media between the organization and its customers using the Web 2.0 tools. The model has been implemented by developing student-university communication media portal which has been evaluated by thirty users, both students and university staff. As the result of this evacuation, more than 95% of users are satisfied with the developed portal and confirmed that it is easy to use, functional and useful. In addition, more students prefer to use emails and wikis whereas more university staff prefer to use emails and chat tools for communication purposes. The future work can be done on applied the model on small and medium-sized organization to improve the communication between organizations and its customers.

REFERENCES
[1]   University Technology Malaysia Website, www.utm.my. Accessed on March 2010
[2]   Wikipedia. (2010). "Web 2.0." from: http://en.wikipedia.org/wiki/Web_2.0. Accessed on March 2010
[3]   O'Reilly, T. 2005a. What is Web 2.0: Design Patterns and Business Models for the next generation of software. O'Reilly website, 30th September 2005. O'Reilly Media Inc.Available online at:
      http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html (accessed March 2010)
[4]   Grosseck, G. (2009). To Use or Not to Use Web 2.0 in Higher Education? Paper presented at the Procedia Social and Behavioral Sciences, World Conference on Educational Science 2009.
[5]   Zhi-Jun Tan; , "The Construction of Web 2.0-based Learning Community" Knowledge Acquisition and Modeling Workshop, 2008. KAM Workshop 2008. IEEE International Symposium on , vol., no., pp.1018-1021, 21-22 Dec. 2008
[6]   Dan Liu; Shi-xia Ma; Qing-yun Ru; Zu-hua Guo; , "Design and realization of network education supporting system based on web 2.0," Computer Science and Information Technology, 2009. ICCSIT 2009. 2nd IEEE International Conference on , vol., no., pp.374-377, 8-11 Aug. 2009
[7]   Lengel, L. (2009) "Computer-Mediated Communication." 21st Century Communication:. SAGE Publications. Avaliable at: http://www.sageereference. com/communication/Article_n60.html. Accessed on Feb 2010
[8]   Plessis, C. d. (2004). "Web-based communication: the need for more valuable online information
      " Communicatio: South African Journal for Communication Theory and Research. Available at :
      http://www.informaworld.com/10.1080/02500160408537989. Access on 2010.
[9]   Nadhmi Abduljalil Gazem Al_Qubati (2009). Knowledge Sharing Portal For International Postgraduate Students in UTM, Universiti Technologi Malaysia: Master Thesis
[10] Nadhmi A. Gazim, Wardah Zainal Abidin , Faisal A.Saeed. Model of Knowledge sharing portal for International Postgraduate Student , The Third International Graduate Conference on Engineering, Science and Humanity IGCESH 2010, Malaysia
[11] Faisal A. Saeed, Noorminshah A. Iahad, Nadhmi A. Gazim. Model of Student-University Communication Media Using Web 2.0. The Third International Graduate Conference on Engineering, Science and Humanity IGCESH 2010, Malaysia