AN INVESTIGATION INTO THE TEACHERS AND STUDENTS' PERCEPTIONS OF USING WEB 2.0 TECHNOLOGIES IN TEACHING AND LEARNING CONTEXT AT SULTAN QABOOS UNIVERSITY IN THE SULTANATE OF OMAN

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"Una investigación sobre el uso de las tecnologías Web2.0 para la enseñanza y el aprendizaje en el marco del Sultan Qaboos Universidad en de Sultanate Of Oman

This dissertation was written by Teeba Abdullah Alkindi, under the directions of Dr. Amaia Apraiz Larragan and Dr María José Bezanilla Albisua (Universidad de Deusto)

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Copyright Statement

Dedication

This dissertation is dedicated to my dear husband who encouraged me throughout my study. He spared his valuable time from his hectic schedule for inspiring and supporting me. I learned from him that the largest task can be accomplished if it is done one step at a time. He supported me each step of the way. To him I lovingly dedicate this dissertation.

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Definition of Key Terms

Compatibility: the degree to which an innovation is perceived as being consistent with the existing values, past experience, and needs of potential adopters (Rogers, 2003, p. 15).

Complexity: the degree to which an innovation is perceived as difficult to understand and use (Rogers, 2003, p. 16).

Diffusion: the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003, p. 5).

Digital Natives: those who were born from roughly 1980 to the turn of the millennium. "This generation grew up with computer and Web-based technologies and is believed to be more technologically savvy and perhaps more technologically dependent than any preceding generation" (Burhanna, Seeholzer, and Salem, 2009, p. 523).

Innovation: an idea practice or object that is perceived as new by the individual (Rogers, 2003, p. 12).

Perception of Web 2.0 Adoption*:* the feelings, attitudes, and impressions that students have regarding the use of Web 2.0 applications as learning tools.

Relative Advantage: the degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 2003, p. 15).

Result Demonstrability: it focuses on the tangibility of the results of using the innovation, including their observability and communicability (Moore and Benbasat, 1991, p. 203).

Trialability: the degree to which an innovation may be experimented before committing to use it (Rogers, 2003).

Visibility: Visibility originates from the concept of observability, which is one of the key attributes of innovation identified by Rogers (2003). It is defined as the degree to which the results of an innovation are visible to and communicable to others. According to Moore and Benbasat, 'it appears that the more a potential adopter can see an innovation, the more likely to adopt it' (1991, p. 203).

Voluntariness: The degree to which use of the innovation is perceived as being voluntary, or of free will (Moore and Benbasat, 1991, p. 195).

Web 2.0: The second generation of Web based services emphasizing online collaboration, creating, and sharing (Collis and Moonen, 2008).

Web 2.0 Adoption: The self-perceived use of Web 2.0 technologies to create and share information and collaborate with others for the learning tasks.

Web 2.0 Applications: technologies, tools, or systems: include social networking sites (i.e., Facebook and MySpace), wikis (i.e., Wikipedia), Flickr, bookmarking sites with collaborative tagging (i.e., Delicious) (Burke, 2009).

Abstract

This is a study of teachers and students at Sultan Qaboos university in the Sultanate of Oman. It looks at the perceptions of teachers and students regarding the use of Web 2.0 technologies in teaching and learning context at university level. The study follows semi-structured interviews and questionnaires as methods of collecting data regarding the experience of both teachers and students in using Web 2.0 technologies. A thematic analysis is implemented to analyse the qualitative data drawn from the main research questions. On the other hand, quantitative data were analysed by the use of Statistical Package for Social Sciences (SPSS). The data showed that the use of Web 2.0 has become a common feature in most of the colleges across the university with both teachers and students showing that they are positive about the potential of Web 2.0 technologies and applications in terms of enhancing teaching and learning experiences. The study revealed that a number of factors influenced both the adoption and implementation of Web 2.0 technologies. The study explores the impact of selected demographic variables including age and gender, among others, on the adoption and use of Web 2.0 technologies by teachers and students at university level. The study established the need to increase awareness of Web 2.0 technologies among students and teachers to optimise their use in teaching and learning context.

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Chapter 1: Introduction

1.1 Overview

We live in a world that is undergoing significant changes with the evolution of technology. Many people's everyday life now revolves around technology. The technological developments in the society have had a big impact in various sectors including the education sector. For instance, today, the introduction and use of new technologies such as Web 2.0 in teaching and learning has become a dominant feature in educational institutions across different sectors including Higher Education (HE). Several studies have indicated that there has been an intense and growing interest across all sectors of the educational industry in terms of adoption and use of Web 2.0 technologies (Dabbagh and Kitsantas, 2012; McLoughlin and Lee, 2010; Alexander, 2006). The use of Web 2.0 technologies is facilitating the transformation of learning through extending the students' control over the entire learning process (ibid.). The current study was conducted to explore the use of Web 2.0 technologies in higher education sector at Sultan Qaboos University in the Sultanate of Oman. The following section provides background and context of the study including the primary aim and objectives of the study. In addition, the chapter presents the problem statement, the study's aim, objectives, significance and organisation of chapters.

1.2 Background and Context of the Study

Technology is impacting on education. Collins and Halverson (2009) assert that, along with the evolution of internet development, teaching and learning in HE are experiencing a transformation. Utilising the internet as a platform, Web 2.0 has formed an interactive affinity between Web content producers and recipients and has transformed the process of unidirectional information retrieval into a network-driven interchange with online community users (Kearns and Frey, 2010; Armstrong and Franklin, 2008; Brown and Adler, 2008). New resources such as blogs, wikis, voice applications, social networking sites, and virtual communities have allowed people with common interests to meet, share ideas, and collaborate in innovative ways (Robelia and Hughes, 2009; Collis and Moonen, 2008, Greenhow, Robelia and Hughes, 2009). Web 2.0 is creating a participatory medium and a culture for user-contributed learning. Web 2.0 is seen as a prime facilitator of participatory learning and knowledge building and creation (Collisa and Moonen, 2008; McLoughlin and

Lee, 2007) because Web 2.0 is 'people centric', 'interactive', 'social', and 'adaptive' it can provide students with an arena in which to become collaborators in the generation of knowledge rather than passive recipients of knowledge (Alexander, 2006; Beldarrain, 2006; Brown and Adler, 2008; Dron and Anderson, 2009). This view was articulated earlier by Maloney (2007) and Dhar and Sundararajan (2007) when they said that the use of Web 2.0 technologies enables people to connect different pieces of information and create new information that could be shared with others.

A few years ago, Richardson (2009) noted that a large number of educators were beginning to experiment with Web 2.0 technologies; however, it must be observed that in his assertion there is no mention of specific context where the technologies were being utilised. It is possible that there are variations in the way these technologies are being utilised from one region or country to another with some countries having more people using the technologies than others. This makes it important for studies such as mine to be conducted, which seek to highlight how the technologies are being used in specific contexts, for instance, Sultan Qaboos University in the Sultanate of Oman.

It is true that Web 2.0 technologies are becoming part of many people's daily lives. Sandars and Schroter (2007) state that a wide range of Web 2.0 technologies have become very popular within the general population. One of the major reasons for this uptake has been that Web 2.0 technologies need little to technical experience. This allows users to effortlessly create their own content and actively share their opinions across a network of users. Although, this activity is of a social nature but its educational aspect is evident. It is worth noting, however, that the extent to which these tools are being utilised in the classrooms remains debatable. For instance, Ajjan and Hartshorne (2008) posited that 'while students are increasing their use of emerging technologies such as text messaging, wikis, social networks and other Web 2.0 applications, this is not the case for many faculties' (p. 71). Similarly, Richardson (2009, p. ix) asserts that: 'while fully 90% of our connected students use these social web technologies in their personal lives, only a small fraction of classrooms have begun to understand fully what these networked environments mean'. In the same vein, Maloney (2007) highlighted the need to explore teachers' use of Web 2.0 technologies to support teaching and learning in higher education. More technologies that are new continue to emerge and it is evident in literature that more research in

the use of these technologies is needed. Crook (2008) and Meyer (2010) have argued for more empirical research on the educational use of Web 2.0 technologies, its adoption and its impact on higher education.

There is a dearth of research on the use of new technologies including Web 2.0 applications in the Sultanate of Oman. For instance, prior to this study, there is no evidence of any empirical study undertaken at the university where this study was conducted to explore the use of these web 2.0 technologies and the perceptions held by both teachers and students on the effectiveness of the tools. This appears to support observations made by Brown (2012) who says "contextually rooted discussions of the potential of Web 2.0 in teaching are rare". More common are generalised analyses of the benefits of Web 2.0 for higher education sector. The integration of web 2.0 into teaching may be affected relatively more, however, by perceptions of its potential among teaching academics and academics charged with enhancing teaching practice. It is against this background that this study has been designed. The study seeks to explore the use of Web 2.0 technologies at Sultan Qaboos University in the Sultanate of Oman to develop an understanding of the extent to which these tools and applications have permeated the classroom walls and the impact they are having in the higher education sector. The nature of the problem under investigation is discussed in more detail in the following section.

1.3 Problem Statement

In the Sultanate of Oman, like what is happening elsewhere across the globe, there is a growing trend in the use of new technologies in the teaching and learning context. The Government, through the respective Ministries of Education and Higher Education, has shown its commitment to embrace the new technologies by providing policy and relevant infrastructure at different levels to promote the uptake and use of new technologies. This has been in response to the characteristics of new demographics that have been described by Prensky (2001) as 'digital natives' (p. 1). Although not all students can be said to be digital natives, it is true that today technology has become a dominant feature in many people's lives including the majority of the students. The students entering schools, colleges and universities have grown up with technology and, hence, the need to provide an environment that supports their learning. As observed by Madden and Fox (2006), today's students are using

Web 2.0 tools and other applications on a regular basis. Web 2.0 applications, which have been designed for social purposes, have shown that they have potential benefits in education. They provide several pedagogical benefits given their ability to: enable active participation of students; provide opportunities and conditions for student reflection and to foster a collaborative and active community of learners (Ferdig, 2007). As indicated earlier, there is lack of research around the use of new technologies in educational institutions in the Sultanate of Oman. For instance, to date, there is no empirical study that has been conducted to establish the use of Web 2.0 technologies in the university where this study was carried out. It is not known which technologies are being used and what do the users (both students and teachers) think about those technologies. Brown (2012) indicates that there is limited research on teachers' views regarding the use of Web 2.0 technologies. She further argues that the lack of representation of academics' views of Web 2.0 may link to perceptions of academics as resistant to the 'pedagogical change that requires the use of new technologies' (Collis & Moonen, 2008, p. 99). Collis and Moonen (ibid.) cite reasons given by Sanchez for this resistance including 'a lack of confidence' among academics and 'uncertainty in the light of change'. This resistance is also associated with academics driving institutional policies who may 'adopt pedagogies that actually structure, constrain and contain the somewhat anarchic and more radical potential of these technologies' (Ravenscroft, 2009, p. 2). They tend to opt for closed platform web 1.0 type technologies conducive to teacher-driven pedagogical approaches and not to pedagogies based on student contributions, and the networked and collective learning possibilities of web 2.0.

Not much is available in terms of research on students' perceptions of using Web 2.0, in particularly, to my knowledge; no similar studies were available in the Sultanate of Oman. This forms the basis for the conduct of this study. Establishing the perceptions of users is vitally important as argued by Brown (2012),'teachers' perceptions of Web 2.0's potential should be viewed as a potentially rich resource through which to better understand how Web 2.0 might respond to the rich and complex teaching contexts' (p. 51). Furthermore, the existing literature on the use of web 2.0 provides an essentialist view of how the potential of Web 2.0 should be harnessed in higher education, a view concerned more with notions of universal best practice than with practice oriented to specificities of context, and a view with little

regard for the needs of students and teachers working in context (Brown, 2012). This view by Brown (ibid.) presents the need to conduct research in context such as the current study. The need to generate information about the use of Web 2.0 technologies in the university constitutes one of the important drivers for this study. The aim and objectives of the study are listed below.

1.4 Aim of the Study

The premise of this study was that new technologies are being integrated into teaching and learning context at different levels. With this notion in mind, the current study sought to develop an understanding of the way in which Web 2.0 technologies were being used in a higher education institution paying particular attention to the perceptions of users including teachers and students.

1.5 Objectives of the Study

This study aims to:

- Identify the current familiarity and use of Web 2.0 technologies by teachers and students at Sultan Qaboos University in the Sultanate of Oman.
- Evaluate how Web 2.0 technologies were being viewed by teachers and students in teaching and learning contexts at university level.
- Identify factors influencing the use of Web 2.0 technologies in teaching and learning context by teachers and students at university level.

1.6 Research Questions

1. Which Web 2.0 technologies are the participating teachers using in their teaching activities in the University?
2. Which Web 2.0 technologies are the participating students using in their learning activities in the University?
3. What are the participating students' perceptions of the value of using Web 2.0 technologies in their learning activities?
4. What are the participating teachers' perceptions of the value of using Web 2.0 technologies in their teaching activities?

5. What are the barriers in the use of Web 2.0 technologies in teaching activities of the participating teachers in the University?

6. What are the barriers in the use of Web 2.0 technologies in students' learning activities in the University?

1.7 Significance of the Study

Web 2.0 technologies are one of the most significant mechanisms through which teaching and learning is being transformed in the contemporary society. These digital applications enable interaction, collaboration and sharing among users (Brown, 2012). The present study focuses on the use of these new technologies in teaching and learning at HE level, an area that has not yet been sufficiently addressed in the Sultanate of Oman. It is, therefore, hoped that the findings of this study would be useful to a number of stakeholders in the HE sector in the country and beyond. People who are likely to benefit from the study include policy makers, educational planners, teachers, students and researchers within and outside the country. Findings from the study are likely to be a significant addition to the existing body of knowledge on the use of new technologies in teaching and learning contexts. Findings from the study will enable the authorities or administrators in similar educational institutions to determine the best way to provide support in the integration of Web 2.0 tools and applications to meet the needs of both teachers and students.

1.8 Organisation of the Dissertation

The dissertation consists of 7 chapters as explained below.

Chapter 1: Introduction

In this chapter, the researcher explains the background and context of this study, the project aim, objectives, research questions and the significance of the study. the researcher also highlight where the researcher came from as a researcher, that is, her positionality, focusing on how the researcher chose her study area and her research topic.

Chapter 2: Education in the Sultanate of Oman

This chapter is basically an extension of the introductory chapter. It provides the reader with more contextual background information regarding the education system in Sultanate of Oman.

Chapter 3: Literature Review

This chapter introduces the theoretical framework and the body of knowledge of the study.

Chapter 4: Research Methodology, Procedures and Ethical Considerations

This chapter describes analyses and justifies the approaches used to address the research questions including the specific techniques used to generate the research data. Moreover, it includes information and a thorough discussion of the proceedings of the fieldwork, that is, the designing, piloting and use of the research instruments. An outline of the ethical principles underpinning the study is included in this chapter.

Chapter 5: Data Presentation and Analysis

Data generated from the participants from the university involved in the study is presented in a clear and concise manner to enable transparent interpretation and analysis.

Chapter 6: Discussion of Findings

Several themes that emerged from the study are discussed in this chapter. The discussions are developed with reference to research data and the available literature.

Chapter 7: Conclusion and Recommendations for further research

This chapter summarises some important conclusions drawn from the research findings, with discussion on their educational implications. Opportunities for future research are outlined in this chapter.

1.9 Positionality

In Social Sciences, it is understood that research is not value free. It is widely accepted that the researcher influences the research process in different ways; hence, positionality has become a popular and an ethical expectation in the conduct of re-

search. Since the study is part of Social Sciences, the researcher will discuss the definition of positionality and proceed to make her own positionality explicit.

Sikes (2004, p. 18) offers a simplified definition of positionality when she says positionality reveals your stance as a researcher, that is, where you are coming from 'in terms of [your] philosophical position and [your] fundamental assumptions concerning social reality, the nature of knowledge and human nature and agency'. Several factors including one's gender, class, political allegiance, historical and geographical location colour the nature of these assumptions. On a similar note, Wellington et al. (2005, p. 99) say that: '…the methodology and methods selected will be influenced by a variety of factors, including the personal predilections, interests and disciplinary background of the researcher…' Bearing this in mind, the researcher will explain briefly 'where I am coming from as a researcher' (Sikes, 2004). In the words of (Winter 2000, p. 129)" I believe that as a researcher in the social sciences, my own values 'are inevitably embedded within the research and play a significant role in shaping it.

CHAPTER 2:THE SULTANATE OF OMAN AND ITS EDUCATION SYSTEM

2.1. Introduction

This chapter presents an overview of the characteristics of the Sultanate of Oman and its education system. The first part focuses on the main features of the country including the geographical location, the social, cultural and economic status. The second part discusses the education system in the country. Emphasis will be placed on the Higher Education (HE) sector which is related to the focus of this study. All this information forms part of the contextual background of the study as it is intended to help the readers, especially those outside Oman, to know a little bit of information about the country in order to follow the discussion of the research topic in context.

2.2. About Sultanate Of Oman:

The Sultanate of Oman is located in the south-east corner of the Arabian Peninsula. The country's population was estimated at 3.2 million people. The official language is Arabic, however, English is used as the medium of instruction at higher education level and the most widely used foreign language in the country. As with other Gulf nations, oil is the backbone of the economy, providing a large portion of the country's GDP. However, compared to its neighbors (for example, Saudi Arabia, Qatar, Kuwait), Oman is a modest oil producer. The economy is also supported by tourism. Oman's attractions include mountains, deserts and cities with features including castles (forts) and palaces. The country follows the Islamic religion; however, there is freedom of religion in Sultanate of Oman which gives foreigners in the country the opportunity to pursue their religions freely. The leader of the country, the Sultan, has been instrumental in introducing economic reforms boosting expenditure on health, education and welfare. Since the study focuses on education, more information on the education system, in particular, Higher Education will be discussed in the following section.

2.3. The Education System in the Sultanate of Oman

This section discusses the main features of the education system in the Sultanate of Oman highlighting the structure and legislative framework. Given that this study focuses on the HE sector, this section focuses on the discussion of the higher education system including how new technologies are being integrated in teaching and learning within the sector.

2.3.1. Educational Legislation

Educational policies in the Sultanate of Oman are derived from the directives of His Majesty, The Sultan, and from decisions made by the government. The two Ministries namely Ministry of Education (MOE) and the Ministry of Higher Education (MOHE) are responsible for formulating the educational policies that are used to guide each Ministry's operations and planning. Within the Ministry, legislations governing education system is passed by various committees and boards such as: the Education Council which is chaired by the Minister and supported by the undersecretary and the Director Generals (Ministry of Education, 2014). The Ministry is also responsible for supervision, control and follow-up to ensure that educational policies are properly carried out according to plans.

2.3.2. Administration and Management of the Education System

The Ministry of Education and the Ministry of Higher Education are responsible for setting up, designing and executing the educational policies in the Sultanate of Oman.

The Ministry of Education is formed of three vertical levels: the central level, the local level represented by the regional directorates, and the school level. The school is considered as an independent administrative unit which comes under direct local supervision. The Ministry of Education carries out several central tasks such as educational policy planning, specifying educational objectives and drawing strategies, plans and projects through which objectives are achieved. Within the Ministry, the Directorate General of Curriculum has the responsibility for developing the national curricula that is taught in all public schools. Private schools have the option of either implementing the curricula developed by the Ministry or adopting curricula affiliated with international programmes.

The Ministry of Higher Education was established in 1994. It supervises post-secondary education in universities, institutes and colleges. It also supervises scholarships abroad. The Ministry of Manpower oversees post-secondary industrial technical colleges and vocational training institutes. While the Ministry of Social Affairs supervises kindergartens run by voluntary organisations, all private sector kindergarten providers are supervised by the Ministry of Education. Nurseries are under the responsibility of the Ministry of Social development.

2.3.3. Structure and Organisation of the Education System

There were two educational systems in operation .But currently there is one system only .The old system called the general education and the new system called basic education. The general education consists of three levels namely primary, preparatory or lower secondary, and upper secondary. In 1997, the Ministry began replacing the three levels General Education system (primary, preparatory and secondary) with the Basic Education system. This was part of the long-term social and economic development strategies designated 'Vision 2020'. The basic education system consists of two cycles followed by two years of post-basic education programme. The two systems are running concurrently until the three level systems is phased out. This reform aims to create a unified education system covering the first ten years of schooling (Ministry of Education website, 2014). The following section discusses the different levels according to the information available on the Ministry of Education (2014).

2.3.3.1. Preschool Education

Five different types of early childhood care and education services exist namely: nurseries, day care centres, home care centres, Madrasa or Qur'anic schools and kindergartens. Nurseries cater for children aged between 3 months and 3.5 years. Day care centres cater for children aged between 6 months and 3 years, with 3 year olds and above receiving kindergarten classes. Qur'anic schools provide services to children aged between 3 and 6. Kindergartens which cater for children in the age range 3.5 years and 5.5 years are the most formal preschool services.

2.3.3.2. Primary Education (Elementary)

Children aged between (6-8) are accepted in the 1st elementary class. After a duration of six years successful students proceed to the preparatory level. This Primary level aims at assisting children in developing healthy and integrative manners and acquiring basic skills and knowledge to enable them understand the social, environmental and economic relations within their community. It also prepares them for the continuation of their education in the next level. According to the new system, which runs in parallel with the old one, basic education lasts ten years and is organised into two cycles-the first cycle covering grades 1 to 4 and the second cycle consisting of grades 5 to 10. Basic education is provided free of charge.

2.3.3.3. Preparatory Education

Students who successfully complete their elementary education are admitted to this three-year level. This level forms the intermediate level between primary and secondary levels. This level aims at addressing the students' social and psychological needs relevant to their early adolescence. It also aims at enhancing the students' interests and abilities. It gives those appropriate skills and knowledge and assists them to progress to secondary education.
Upon completion of this level, students sit an examination which entitles them, if successful, to enter the first year of secondary education. Islamic Institutes are similar to preparatory schools and the students follow the same preparatory courses, the main focus is on Islamic studies and the Arabic language. Vocational training centres offer three year programmes to grade 9 gradu-

ates; upon successful completion of the training programme, trainees are awarded a certificate which specifies the specialisation and vocational level attained.

2.3.3.4. Secondary Education

Students who successfully complete their preparatory education are admitted to this three-year secondary level. This level aims at consolidating the students' spiritual, mental and social development and prepares them for higher education, employment and participative citizenship. General secondary education lasts three years. At the end of this level, students sit a national examination to obtain the general secondary certificate. Technical and artistic education is parallel to the secondary level and lasts three years. Only boys are accepted to technical schools. In addition, there are two commercial schools and one industrial school. According to the new system, the ten-year basic education programme is followed by two years of post-basic secondary education.

2.3.3.5. Higher Education

Higher Education programmes fall under the Ministry of Higher Education. There is one public university in Sultanate Of Oman established in 1986. These institutions of higher education admit students who would have passed their secondary education. The secondary school graduates who are not absorbed into higher education will have two options: a small minority will study at private institutions locally or abroad, depending on whether or not they and their families can afford it; alternatively, they can take an unskilled job at low pay. Otherwise, they will be unemployed and an added burden to society.

The institutional organisation of higher education is structured into two main levels. The policy-making level is represented by the Higher Education Council which is in charge of establishing policies and strategies of the education system as well as roles and responsibilities for individual organisations. Moreover, it is responsible for coordinating activities undertaken by sub-organisations. The second tier includes the ministries and institutions that are responsible for implementing the policies and strategies approved by the Higher Education Council. These include: the Ministry of Education, the Ministry of Higher Education, the Sultan Qaboos University, the Ministry of Manpower, and the Ministry of Health.

Higher Education plays an important role in the development of human resources. The table 2.1 below shows the public higher education institutions in Sultanate Of Oman including the type of qualification they offer while table 2.2 shows private higher education institutions.

Table 2.1: Public Higher Education Institutions in Oman

Institution	Awards	No of Students 2012/2013	Brief Overview
Sultan Qaboos University	Diploma, Bachelor, Master and PhD	24,901	The first student intake was in 1986. Currently, it has nine colleges: the Colleges of Science, Education, Engineering, Arts & Social Sciences, Economics & political science, Agriculture and Marine Sciences, Medicine and Health Sciences, Law, and Nursing.
Colleges of Applied Science	Bachelor	12,456	Formerly Colleges of Education. The government converted Colleges of Education into Colleges of Applied sciences. Six colleges are distributed in different regions of Oman. Programmes offered in these colleges are: Information Technology, Business Administration, Communication Studies, Engineering, and Design.
Technical Colleges	Diploma and bachelor	28,790	There are six Technical Colleges distributed in six different regions of Oman. These colleges offer a number of programmes such as Engineering, Business Studies, Information Technology, Applied Sciences, Pharmacology, Photography, and Fashion Design.
Institutes of Health	Diploma	5,950	There are twelve Health Institutes located in different regions of the country. These institutes offer a variety of courses including Nursing, Medical Laboratory Science, Diagnostic Radiography, Physiotherapy, and Dental Surgery Assistant.
College of Banking & Financial Studies	Diploma, Bachelor and Master	2182	This college was established in 1983 as an institute for banking and financial studies with the main objective to educate and train secondary school graduates for a period of up three years. Most of its graduates are employed in the banking and financial sector
college of Shari'a Sciences	Bachelor	3000	The institute comprises three specialisations: Jurisprudence and its Foundations, Foundations of Religion, and Islamic Studies

Source: Annual Report of the Ministry of Higher Education (2011), Oman.

As can be seen from the above table, public higher education institutions are supervised and governed by several organisations.

During the 1990s, Sultanate Of Oman witnessed the establishment of a few institutions of higher education managed by the private sector, a trend that has continued to grow up to the modern day. This was a response by the government to the increase in the demand for higher education by graduates from secondary schools. Table 2.2 shows some of the private colleges that have been established in the country.

Table 2.2: Private Colleges in Oman

College	Date of Establishment	Area	Programmes	Affiliation
College of Administrative Science (Majan College)	1995	Muscat	Business Administration, Accounting, Finance, Computing, Communications, Marketing, Travel & Tourism	Luton University, UK
Modern College of Business Science	1996	Muscat	Business Administration, Accounting, Computing, Banking, Economics, Management & Information System	Missouri Univ., St Louis, USA
Caledonian College of Engineering	1996	Muscat	Civil, Electronic and Mechanical Engineering, Engineering Management	Caledonian Univ., UK
The Fire Safety Engineering College	1997	Muscat	Courses in Fire Safety, Drilling and Safety	Central Lancashire University., UK
Muscat College of Management Science and Technology	1998	Muscat	Communications, Computing, Business Administration, Engineering	Perth College, UK
Sohar College of Applied Sciences	1998	Sohar	Engineering, Computing, Business Administration, Business Studies	Lincolnshire Univ., UK Humberside Univ., UK
National College of Science and Technology	1999	Muscat	Business Administration, Accounting, Computing, Information System Management, English Language	Westminster University., London, UK
Mazoon College of Management and Applied Science	1999	Muscat	Business Administration, Finance and Banking Management, Computing, English Language	Missouri Univ., St Louis, USA
Al-Zahra College for Girls	1999	Muscat	Business Administration, Finance and Banking Management, Computing, English Language	Amman National Univ., Jordan

Oman Medical College	2001	Muscat and Sohar	Doctor of Medicine, Bachelor of Science	West Virginia University- USA
Sur College	2001	Sur	Management and Marketing, Accounting, Finance and Banking, Business Information System, Information Technology, Hotel Management and Tourism	Melbourne University Private-Australia
College of Tourism and Hospitality	2001	Muscat	Tourism and Hospitality Management	University of Applied Management Science+ Institute of Tourism and Management-Austria
Waljat College of Applied Sciences	2001	Muscat	Computer Science & Engineering, Electronics and Communication Eng., Biotechnology Eng., Business Admin-Information Technology Management	Birla Institute of Technology – India
Middle East College	2002	Muscat	Software Technology, Hardware Technology & Networking, Internet Technology	Coventry University, UK.

***Source*: Ministry of Higher Education website (2014).**

Transnational commercial higher education in Sultanate Of Oman is provided through the private universities and colleges except a few institutions including the College of Banking and Financial Studies and the Oman Academy for Hospitality and Tourism, which are public institutions. The following section discusses the use of new technologies (including Web 2.0 technologies) in Higher Education

2.4. New Technologies (Web 2.0) in Higher Education

E-learning has been embraced in the Higher Education system in Sultanate Of Oman. However, it has a very short history having been adopted for the first time at the public university, Sultan Qaboos University (SQU) in 2002. Since 2002, SQU has continued to take a leading position in the use of new technologies including Web 2.0 in teaching and learning. Some statistics from SQU will be presented and discussed below to demonstrate the developments taking place in terms of technology use in higher education in the Sultanate of Oman. In 2012, the number of online courses provided by the university was 497 with 386 WebCT and

119 Moodle courses catering for 24609 users. The table 2.3 below shows the number of online courses and users across different departments.

Table 2.3: Numbers of Online Courses and Users at SQU in spring, 2012.

Collage	Number of Courses	Number of Online Courses	Number of users
Agriculture	25	6	144
Arts	52	19	1053
Commerce	20	6	231
Education	44	14	1,117
Engineering	63	24	760
Language Center	61	37	5495
Medicine	30	15	1571
Science	97	25	7860
Total	392	146	24,069

***Source*:** SQU Centre for Education Technology (Al-Suwaid, 2012).

Sultanate Of Oman launched the e-Oman initiative in 2006 to prepare its businesses and people to participate fully in the digital society. E-Oman was founded on His Majesty Sultan Qaboos bin Said's progressive vision to transform the Sultanate into a knowledge-based society and to build a knowledge-based economy. E-Oman aims at creating an effective government-community citizen infrastructure that provides better services to people. Leveraging ICT power for economic and social benefits is e-Oman's greatest goal. Integrating government departments to provide more efficient public services, increasing IT literacy, developing the economy through smart electronic services, creating local knowledge industries, and minimising the digital divide are some initiatives undertaken by e-Oman (Omani Information Technology Authority, 2013).

Use of new technologies is also being developed in schools. For instance, along with the e-government initiative, recently, the Ministry of Education in Sultanate of Oman (2013) implemented e-learning for the state schools in two contexts: a virtual classroom system and a self-learning system. The use of virtual classrooms is to provide lectures on the Internet in an

interactive learning environment consisting of teachers and learners, and coach trainees. The self-learning system is based on the design of electronic content. It allows the learner or trainee the possibility of direct research on educational materials and training courses from the existing manual system from any place, at any time (Ministry of Education, 2014). This means more students entering colleges and universities will be conversant with the use of new technologies in their learning. Although there is no nationwide e-education systems in place at present, many efforts to restructure the country's education system to be technology-based such as the "laptop for each teacher" project, have taken place. Currently, the Ministry of Education is strategically planning the nation's infrastructure of educational system.

This chapter provides an overview of information about Sultanate Of Oman, the country where the study was conducted to ensure readers can follow the issues discussed in the study in their context. The following chapter presents the literature review.

CHAPTER 3: LITERATURE REVIEW

3.1. Introduction

This chapter is a review of the literature related to the topic under study. An effort was made to consult recent books and journal articles that focus on the use of Information Communication Technologies (ICTs) in teaching and learning contexts in general, and Web 2.0 tools, in particular. Given the rate at which technologies are changing, the researcher made a concerted effort to consult recent studies on the topic under study to ensure that relevant contemporary issues and debates around the use of new technologies in education are addressed and used to provide clear guidance in the current study.

As argued by different authors, a literature review is helpful to contextualise the study, among other things. Wellington (2000) shows the importance of a literature review stating that a researcher's job is not just to mould their own brick but to slot it into the wall of existing understanding in the located field. This metaphor helps to that individual research should be located in the context of what has been done before. The review of literature included material which focuses on global, regional and national perspectives regarding the use of new technologies in teaching and learning in general with particular focus being placed on the use of Web 2.0 technologies within the higher education sector. The researcher used words like ICT in higher education, Web 2.0 in teaching and learning, and active learning. The literature sources were found using search engines, computerised databases, and library indexes, opportunistic searching, snowballing searching and using my personal networking such as sources suggested by supervisors and colleagues. For instance, electronic searches were conducted on Google Scholar and other journals such as British Journal of Educational Technology, The Internet and Higher Education and Active learning in higher education. Manually, the researcher traced reference lists of some articles. To focus on the aims and objectives of the study, the exclusion criteria during literature survey included the following:

- The study focused on use of ICT in higher education.
- The study focused on students and teachers' perceptions on the use of ICT in higher education context.
- The study focused on Web 2.0 technologies in higher education context.

Relevant papers were retrieved and identified from different types of publications including papers from empirical studies, editorial and reviews and grey literature. Several themes emerged and the following themes that are closely related to the topic under consideration were prioritised:

- Use of ICT in teaching and learning context.
- Web 2.0 technologies and their potential use in teaching and learning.
- Teachers' perceptions of using technologies in teaching and learning.
- Students' perceptions of using technologies in their learning.
- Factors affecting the use of technologies in teaching and learning context.
- Active learning and student engagement.

The following section discusses each of the topics highlighted above separately.

3.2. Use of ICT in Teaching and Learning Context

The premise of this study is that the world has changed so fundamentally in the last few decades and the roles of learning and education in day to day life is also changing forever. The advent of technology has impacted on people's lives in a significant way making it imperative to rethink the way we conduct our lives including teaching and learning practices in educational institutions. Today's students are different from the type of students we had, for instance three decades ago. This was observed at the beginning of the 21st Century by people like Prensky (2001) who observed that the advent of technology was impacting the nature of students in academic institutions citing that students:

- Are no longer the people our educational system was designed to teach.
- Have not just changed incrementally from those of the past…our students have changed radically.
- Represent the first generations to grow up with this new technology.
- Think and process information fundamentally differently from their predecessors.
- Are all "native speakers" of the digital language of computers, video games, and the internet (p. 1).

Surely, more than two decades after this apt observation by Prensky, today's students' lives are interwoven with technology. Computers, the internet, online resources, and instantaneous access are simply the way things are done. Students have grown up with technology and the need to use technology in teaching and learning context cannot be overemphasized. This view was well articulated by Bingimlas (2009, p. 235) who posits that, 'the use of ICT in the classroom is very important for providing opportunities for students to learn to operate in an information age'. In the same vein, Schunk (2009) contends that:

"It seems clear that technology has the potential to facilitate instruction in ways that formerly were unimaginable. For example, not long ago technological classroom applications were limited to movies, televisions, slide projectors, radios and the like. Today, students can experience simulations of environments and events that they never could in regular classes, receive instruction from and communicate with others at long distances, and interact with large knowledge bases and expert tutoring system" (p. 311).

Surely, new technologies are changing how educators think about learning and teaching processes. Use of ICT has got several benefits in teaching and learning processes. Jonassen et al. (1999) presented a dynamic perspective on the role of technology in learning. The maximum benefits of technology derive when it energises and facilitates thinking and knowledge construction. In this reconceptualisation, technology can serve the functions shown in the table 3.1 below.

Table 3.1: Functions of Technology

• Tool to support knowledge construction
• Information vehicle for exploring knowledge to support learning by constructing
• Context to support learning by doing
• Social medium to support learning by conversing
• Intellectual partner to support learning by reflecting

Source: Jonassen et al. (1999)

The need to embed new technologies in teaching and learning is emphasized by Trilling and Fadel (2009) when they argue that, 'in the 21st Century, everyone's level of information literacy and fluency will need to rise. Whether at work, in school, at home, or in the community, there will be increasing demands on our ability to:

- Access information efficiently and effectively.
- Evaluate information critically and competently.
- Use information accurately and creatively' (p. 65).

Arguably, education institutions play an important role in facilitating digital literacy and one effective way to achieve this is to integrate ICT in the classrooms as is currently the case at different levels including higher education. As early as the beginning of the 21st Century, Yelland (2001) argued that traditional educational environments do not seem to be suitable for preparing learners to function or be productive in the workplaces in an information society. She argued that organisations that do not incorporate the use of new technologies in teaching and learning cannot seriously claim to prepare their students for life in the 21st Century. Earlier studies acknowledged the impact of ICT in education with Coffman et al. (2007) citing that, 'education is shifting from directed to constructivist learning, largely aided by the expansion of technology in the classroom'. Similarly, Kok (2010) asserts that instruction and learning processes are gaining new dimensions due to the proliferation of ICTs. The study offers an opportunity to look at how some new technologies (Web

2.0) are being used in the teaching and learning context in higher education and will elicit the views of students and teachers participating in the use of the technologies. In the following section, the concept of Web 2.0 technologies is defined including a discussion of how these tools are being harnessed in higher education teaching and learning context.

3.2.1. E-Learning

E-learning is available in many forms; standalone courses are taken by a solo learner, the stand alone course allows the user to set their own pace without interaction with an instructor. Virtual classroom courses are structured like a classroom course with online meetings. e-learning techniques also include learning games and simulated activities that require exploration and lead to discoveries. Embedded e-learning is the existence of a separate computer program such as a diagnostic procedure or a help file. Mobile learning is learning through the use of mobile devices such as PDA's or mobile phones. Blended learning is the use of more than one of the described techniques (Horton, 2006).

Many lecturers feel that the class lecture is the most effective way to disseminate course content and this is not contested but the benefits of e-learning are many, one is that it allows a lecturer to provide additional content to the student thereby allowing a student to review a lesson as many times as they wish through a medium which is more interactive than traditional notes. Many students are sometimes reluctant to ask a question during a lecture if they do not understand a concept. The use of an e-learning application allows a student to re-visit a concept as many times as they wish in order to comprehend the lesson. An e-learning application that provides analysis of subject areas in which students are competent or require additional focus allows a lecturer to identify the areas of strength within a group and also the areas of weakness. Education is an iterative process and is also a process which requires confidence within a student (Horton, 2006; Keller, 1983).

E-learning allows flexibility in learning, in the commercial environment it saves time and money because students do not have to travel or spend excess time away from the work place. The self-paced style of e-learning allows students to take module based lessons, which allow students absorb a lesson before moving onto the next stage at the time they find convenient. A student controls the speed of e-learning and thus can move faster through lessons they are comfortable with and move slowly through more difficult lessons. The control given to a student regarding both the time and speed in which the lesson is taken can encourage motivation as the power and control is given to the student (Horton, 2006).

E-learning can lead to increased retention and a stronger understanding of a subject. By using the different technologies such as video, audio, quizzes, games and rewards for completion of exercises, it increases the user participation. The application allows a person to re-visit or replay lessons that he/she finds more difficult to comprehend.e-learning applications which produce statistical analysis allow lecturers to identify the weaknesses and

strengths of the students in their classroom and provide an enhanced teaching environment before graded assessments determine a permanent result (Oblinger, 2006).

Implementations of projects which require adjustment to established methods will encounter barriers. Barriers to effective e-learning include its adoption rate. A successful e-learning application might exist but getting a lecturer or university to encourage the use of such an application is often a stumbling block (Mallak, 2001).

A professor or lecturer whom already has a full timetable and has an established teaching method may be unable or unwilling to make the time to move content over to a new system. It is quite common for lecturers to present a lecture using slides, an e-learning application which allows conversion with relative ease would encourage migration. The infrastructure within a college may require additional resources to host additional networked applications and a college may not be in a position to allocate additional funding and human expertise necessary to maintain an e-learning application. Creating an application which matches the learning objectives of a lecturer and clearly aids a lecturer in delivering content will encourage the lecturer to use the e-learning application. Constant feedback from students on how well features are working and feedback on additional features which would be beneficial will help promote the effectiveness of e-learning systems (Mallak, 2001; Sinay, et al., 2004).

3.2.2. Learning Management Systems

The use of learning and course management systems has grown in higher education. Universities and colleges are using systems such as Web CT and Moodle. Jafari et al. (2006) carried out research to identify the advantages and shortcomings of current learning and course management systems. The advantages and disadvantages are divided into three areas; compatibility and interoperability, usability and smartness/dumbness.

The issue of compatibility and interoperability was important to administrators in Jafari et al. (2006) research, some administrators seen the use of open source as a potential option which would reduce costs and gain local control of systems. Some administrators interviewed also preferred the stability and support offered by commercial options. Integration with current systems is also another issue that administrators of current learning and course managements systems are concerned with. Transportability between existing systems is a necessity sought after by administrators of the system and was discovered to be a large problem in educational institutes (Jafari et al., 2006). Browser incompatibility was also a commonly reported problem; lecturers interviewed by Jafari et al. reported that they had to inform users which browser works best with the system they use. Students also had a number of log-in names and passwords to remember to access services such as e-mail, portfolios or grading records. The opinion concluded from this area of the research was that a student should have one access point to all areas of information such as course content, library, grades, e-mail. The student should not have to be concerned with technical issues or

be overwhelmed with multiple access points and passwords. According to Jafari et al. (2006) having access to grades and financial aid from the same interface would be a more perfect world for both instructors and students.

The second of the three areas was smartness/dumbness, it was identified that current systems only provide basic alert messages or notification of the most recent updates or modification in a course. Students and administrators expressed the desire for a system that uses artificial intelligence algorithms to compile profiles on their preferences and to tailor their learning environment to match who they are, what they like and the position in the system they paused their most recent session. The last of three key areas concluded by Jafari et al. (2006) is usability. Administrators were found to value transparency and ease of use very highly. Ease of use was found to be more important than a system which presents a large amount of rich tools to the student. It was found that some groups of lecturers would encourage the creation of new sets of tools whereas others would frown upon the creation of more tools in an already complicated interface. The balance between a rich tool set and an inviting interface is a difficult balance.

3.3. The Development of the World Wide Web from Web 1.0 to Web 2.0

It is important to understand the difference between Web 1.0 and Web 2.0. The first generation of World Wide Web (referred to as Web 1.0 and abbreviated as WWW) was first launched in 1991 and it was conceived as a method of delivering knowledge and resources efficiently. This is well articulated by Schneckenberg et al. (2011) who clarify that web 1.0 was primarily a means for distributing information and learning materials whereas the adoption of Web 2.0 technologies facilitates participation and interaction between students and teachers. This view was highlighted earlier by Ajjan and Hartshorne (2008) who state that Web 2.0 tools offer a key addition to the role of online learning namely, creation and collaboration.

In web 1.0, a small number of writers created web pages for a large number of readers. As a result, users could get information by going directly to the source. The Web 1.0 is a system of interlinked, hypertext documents accessed via the Internet. According to Berners-Lee, the founder of the web, Web 1.0 could be considered the “read-only web.” In other words, the first generation web allowed us to search for information and read it. There was very little in the way of user interaction or content contribution. However, this is exactly what most website owners wanted: their goal for a website was to establish an online presence and make their information available to anyone at any time

Web 2.0 is a buzzword introduced in the first half of the 21st Century by O’Reilly (2005), which is commonly used to encompass various novel phenomena on the World Wide Web. According to Lai and NG (2011) Web 2.0 is now broadly defined as a second generation or a more personalised communication form of the World Wide Web (WWW) that emphasiz-

es active participation, connectivity, collaboration, and the sharing of knowledge and ideas among users. Web 2.0 sometimes referred to as the "social web" (Wheeler, 2009) or the "read/write web" (Hemmi, Bayne, and Land, 2009), provides users with interactive services in which they have control over their own data and information (Dabbagh and Kitsantas, 2012). Web 2.0 differs from its predecessor, Web 1.0, in that the content of the web is no longer defined by those with programming or web design knowledge. Anybody can contribute to Web 2.0, with minimal web skills. The Web 2.0 technologies are considered to be a step change in the evolution of internet technology in higher education (Wheeler, 2009) which has evolved from being primarily used to distribute course materials, communicate and evaluate to being used to enhance educational processes that support collaborative learning and knowledge building (Collins and Halverson, 2010). Examples of Web 2.0 technologies include wikis, blogs, instant messaging, internet telephony, social bookmarking and social networking sites.

Web 2.0 makes use of latest technologies and concepts in order to make the user experience more interactive, useful and interconnecting. It has brought yet another way to interconnect the world by means of collecting information and allowing it to be shared effectively. The differences between Web 1.0 and Web 2.0 can be seen in the table 3.2 below:

Table 3.2: Comparison of Old and New Ways of Working

Web 1.0	**Web 2.0**
Application based	Web based
Isolated	Collaborative
Offline	Online
Licensed or purchased	Free
Single creator	Multiple collaborators
Proprietary code	Open Source
Copyrighted content	Shared content

Adapted from: Solomon and Schrum (2007, p. 23)

In terms of applications, the following transitions all represent a shift from Web 1.0 to Web 2.0 (Weller, 2007, p. 152):

- Britannica Online → Wikipedia
- Personal website → blogging
- Mp3.com → Napster
- CMS → wikis
- Kodak/Ofoto → Flickr
- Netscape → Google

The Web 2.0 version of each of these tools is more participative. Currently, the Virtual Learning Environments, for example, Blackboard and Moodle, to name a few, have incorporated Web 2.0 features such as wikis (for example to form a student generated glossary of key concepts) and blogs (for example as reflective learning journals that may be private or shared) (Finnis, 2009). The following section focuses on the individual Web 2.0 technologies and will discuss in detail their affordances within the teaching and learning context. Web 2.0 technologies continue to impact on learning and teaching approaches. Schneckenberg et al. (2011) rightly observe that while students in Web 1.0 context have been largely concerned with mastering the acquisition of subject matter, the challenge for students in the Web 2.0 environment is to develop reflection and competences.

The Web is continuing to evolve with the concept of Web 3.0 already coined forecasting the future development of Web 2.0. Although the focus of this study is Web 2.0 the researcher will briefly explain the Web 3.0 version of the web. Web 3.0 is a term that has been coined to describe the evolution of Web usage and interaction that includes transforming the Web into a database. Web 3.0 is an era in which the back-end of the Web will be upgraded, after a decade of focus on the front-end (e.g. Web 2.0 has mainly been about AJAX, tagging, and other front-end user-experience innovations). This in turn leads us to the rumblings and mumblings we have begun to hear about Web 3.0, which seems to provide us with a guarantee that vague web-versioning nomenclature is here to stay. By extending Tim Berners-Lee's explanations, the Web 3.0 would be something akin to a "read-write-execute" web. Web 3.0 is defined as

the creation of high-quality content and services produced by gifted individuals using web 2.0 technologies as an enabling platform (Zeldman, 2005). Web 3.0 is a term that is used to describe various evolutions of Web usage and interaction among several paths. These include transforming the Web into a database, a move towards making content accessible by multiple non-browser applications, the leveraging of artificial intelligence technologies, the Semantic web, the Geospatial Web, or the 3D web. Gartner suggests the need to differentiate incremental changes to Web 2.0 from Web 3.0. Tim Berners-Lee coined Giant Global Graph (GGG) as another facet of Web 3.0 (Spalding, 2005). Web 3.0 is a web where the concept of website or webpage disappears, where data is not owned but instead shared, where services show different views for the same web / the same data. Those services can be applications (like browsers, virtual worlds or anything else), devices or other, and have to be focused on context and personalisation, and both will be reached by using vertical search (Noori, 2007) One could speculate that the Google / Sun Microsystems alliance to create a web based operating system for applications like word processing and spread sheets is an early indicator of this trend (Vallery, 2007). The table 3.3 below provides a summary of key features of the webs discussed above.

Table 3.3: Characteristics of Web 1.0, Web 2.0 and Web 3.0

No	**Web 1.0**	**Web 2.0**	**Web 3.0**
1.	1996	2006	In future
2-	The Web	The Social Web	The Semantic Web
3-	Tim Berners Lee	Tim O'Reilly	Sir Tim Berners Lee
4-	Read only web	Read and write web	Read, write and execute web
5-	Information sharing	Interaction	Immersion.
6-	Millions of users	Billions of users	Trillion of users
7-	Ecosystem	Participation	Understanding itself

No	Web 1.0	Web 2.0	Web 3.0
8-	Connect information	Connect people	Connect knowledge
9-	Brain and Eyes (=Information)	Brain, Eyes, Ears, Voice and Heart(= Passion)	Brain, Eyes, Ears, Voice, Heart, Arms and Legs (= Freedom)
10-	The Hypertext /CGI Web.(the basics)	The Community Web (for people: apps/sites connecting them)	The Sematic Web (for machines)
11-	Pushed web, text/graphics based flash	Two way web pages, Wikis, Video, pod casts, shading, Personal publishing, 2 D portals	3D portals, avatar representation, Interoperable profits, multi – user virtual environmental (MUVES) , Integrated games, education and business, all media flows in and out of virtual Web worlds
12-	Companies publish content that people consume (e.g. CNN)	People publish content that other people can consume, companies build platforms that let people publish Content for other people (e.g. Flickr, YouTube, AdSense, Wikipedia, Blogger, Maps, My Yahoo!)	People build applications that people can interact with, companies build platforms that let people publish services by leveraging the associations between people or special content (e. g. Facebook, Google MySpace, RSS, Digg)

No	Web 1.0	Web 2.0	Web 3.0
13-	In Web 1.0 search engines retrieve macro contents Search is very fast but many times results are inaccurate or more than users can chew	In Web 2.0 search engines retrieve tags with micro contents (Furl even retrieves tags with macro contents). The process of tagging is manual, tedious and covers negligible percentage of the WWW. Web 2.0 tags everything: pictures, links, events, news, Blogs, audio, video, and so on. Google Base even retrieves micro content text	In Web 3.0 search engines will hopefully retrieve micro content texts which were tagged automatically. This implies translating billions of Web 1.0 macro contents into micro contents. The result could be more precise search because tagging can solve part of the ambiguity that homonyms and synonyms introduce into the process of search.
14-	Web 1.0 was all about static content, one way publishing of content without any real interaction between readers or publishers or each other	Web 2.0 is more about a 2 way communication through social networking, blogging, wikis, tagging, user generated content and video.	Web 3.0 is curiously undefined. AI and the web learning what you want and delivering you a personalised web experience.

No	Web 1.0	Web 2.0	Web 3.0
15	The web in the beginning when it was first developing web 1.0	New advances that allow a much more sophisticated user interaction with web pages – citizen journalism, social networks and Wikis are all products of Web 2.0	Thought to be the future – where the web is more interactive with users, leading to a kind of artificial intelligence web 3.0
16-	Personal web sites	Blogs	Semantic Blogs: Semi-Blog, Haystack, Semi-blog, Structured Blogging
17	Content Management system	Wikis, Wikipedia	Semantic Wikis: Semantic MediaWiki, SemperWiki, Platypus, dbpedia, Rhizome
18-	AltaVista, Google	Google personalized, DumpFind, Hakia	Semantic Search: SWSE, Swoogle, Intellidimension
19-	Citeseer, Project Gutenberg	Community portals	Semantic Forums and community portals: SIOC, OpenLink DataSpaces
20-	Message boards	Community portals	Semantic Forums and community portals: SIOC, OpenLink DataSpaces

No	Web 1.0	Web 2.0	Web 3.0
21-	Buddy Lists, Address book	Online social networks	Semantic Social Networks: FOAF, People Aggregator
22-	-	-	Semantic Social Information Spaces: Nepomuk, Gnowsis

Cormode, G. and Krishnamurthy, B. (2008) . Naik, U., Shivalingaiah, D. (2008).

3.3.1. Web 2.0 Technologies and Their Potential Use in Teaching and Learning Context

While not designed specifically for educational purposes, Web 2.0 technologies have a number of affordances that can make them useful in teaching and learning environments and are rooted in strong pedagogical underpinnings of constructivism (Ferdig, 2007). The increasingly ubiquitous access, ease of use, functionality and flexibility of emerging Web 2.0 technologies have made them much more appealing as instructional tools (Boulos et al., 2006). Ajjan and Hartshorne (2008) cite a number of authorities who highlight the following benefits of Web 2.0 in education when they discuss the rationale for using Web 2.0 tools:

- Today's students (referred to as 'digital natives' (Prensky, 2001) find Web 2.0 tools useful in terms of fostering the development of communities of learners, creating information and knowledge and sharing ideas.
- Students can more successfully undertake self-directed; enquiry-led learning while teachers can easily observe, record and guide each student's personal learning path
- Students' work can be self or peer assessed.
- Students can bring the technological skills and experience they have developed in their personal lives to their schoolwork.
- Wherever sufficient access to a fast, reliable broadband services have been established eliminating educational disadvantages such as rural isolation, disability, disengagement and other socio-economic factors.

- Web 2.0 applications provide numerous opportunities for students to publish their work globally, which provide a number of pedagogical benefits.

In this study, focus will be on the use of the main Web 2.0 tools including the perceptions of teachers and students using the tools in the higher education context. The table 3.4 below highlights the main Web 2.0 tools including a description of their potential educational applications.

Table 3.4: Models of Integrating Web 2.0 Technologies in Higher Education.

Web 2.0 Technology	**Educational Applications**
Blogging	• Use blogs for real-world writing experiences • Pull class blogs together into one area for easy tracking • Quickly give feedback to students, and students to each other • Students use peer networks to develop their own knowledge • Update new information such as homework and assignments • Using comments in blogs can encourage students to help each other with their writing, and get responses to a question without getting the same answer twenty times, etc.
Microblogging	• Classroom community, exploring collaborative writing, reader response, collaboration across schools, countries, project management, assessing opinion, platform for metacognition, conference or a part of a presentation or workshop, for reference or research, facilitating virtual classroom discussion, creating a learning experience, a personal learning network • Use for dissemination of teachers' publications and materials, locating original sources of ideas, quotes, allows for very focused and concrete feedback to students to refine their thinking and improve their skills, fostering professional connections, informal research, for storytelling, follow a professional, get feedback on ideas, event updates, live coverage of events, build trust, build a community, etc.

Web 2.0 Technology	**Educational Applications**
Wikis	• Use for student projects; use for collaborating on ideas and organising documents and resources from individuals and groups of students • Use as a presentation tool (as e-portfolios); as a group research project for a specific idea; manage school and classroom documents; use as a collaborative hand-out for students; writing: student created books and journaling • Create and maintain a classroom FAQ; as a classroom discussion and debate area; a place to aggregate web resources; supporting committees, working parties and university projects, etc.
Photo/Slide Sharing	• Share, comment, and add notes to photos or images to be used in the classroom • Inspire writing and creativity; create a presentation using the photos • Use tags to find photos of areas and events around the world for use in the classroom • Post student presentations to an authentic audience and get feedback from around the world; share professional development materials and have it available anywhere, anytime, to anyone; post presentations of special events
Video Sharing	• Video professional development on own terms; create an own subject specific videos with students; use video sharing sites to find videos on current issues, etc.
Syndication of content through Really Simple Syndication (RSS)	• Professional development, time saving; updated information in teaching area • Information coming from constraining sources; sharing work with other educators • RSS feeds can potentially replace traditional email lists, reducing email overload • RSS feeds can be used to keep course specific webpages current and rele-

	vant, etc.
Web 2.0 Technology	**Educational Applications**
Social Book-marking	• Create a set of resources that can be accessed on any computer connected to the internet; conduct research and share that research with peers • Track author and book updates; groups of students doing a classroom project sharing their bookmarks; rate and review bookmarks to help with students decision on usefulness of resources; setup a group tag in order to share educational resources • Share one del.icio.us account between a number of different subject specific educators in order to share resources with each other, etc.
Social Net-working	• Event support and continuation, team and community support, aggregation of social media applications, personal learning environments, etc (Cobb, 2008).
Other tools	• Instant messaging increase the sense of community and accessibility which is required for collaborative learning; VoIP can promote international collaborations and understanding; calendars make calendar events, homework, anything you want available on mobile devices connected to the internet. • Survey and polls, online diagrams and web-based word processor, on-line spread sheet, social search, mind mapping; virtual worlds-virtual conferences and seminars, team meetings and collaboration spaces, simulations, etc.

Adapted from: Grosseck (2009, p. 479)

As shown in the table 3.4 above, Web 2.0 tools have great potential to enhance students' learning. Rahimi et al. (2015) provides a graphic illustration of the different tools and their affordances in teaching and learning as shown in the quote below:

> *"These tools and services provide students with "just-in-time" and "at-your-fingertips" learning opportunities and can support a wide range of teaching and learning activities including creative and collective contribution (Twitter and Face-*

book), knowledge (Co-)producing (Wikis, You Tube, Google Doc), Communication (Skype), knowledge management and organising (Delicious, Diigo), self-expressing (blogs), creating and managing personal pages (Netvibes), sharing and exchanging documents (dropbox), and analysing and developing new concepts and ideas" (Mind Meister) (p. 783).

The following paragraph will focus on the differences between dubbed Web 1.0 and Web 2.0 respectively.

3.3.2. A Description of Some Web 2.0 Technologies

This section discusses some of the individual web 2.0 technologies, features and potential benefits in teaching and learning context. This is intended to show the diversity of tools and services available that teachers and students can exploit to enhance teaching and learning processes. Educators face many challenges today as they must adapt to a generation of students who have grown up with technology. There are many Web 2.0 tools as highlighted in the preceding sections; however, an effort is made to discuss the common ones that are being used in teaching and learning at different levels. These are discussed in no specific order.

3.3.2.A: Blogs and Blogging

Blogs are web dialogues that provide a threaded record of a conversation between groups of people. This is very similar to discussion boards since they both are threaded discussions. The difference is that a blog will start with a question or theme and then become conversational in writing style whereas a discussion board will have a theme and remain generally within that theme and will be more scholarly in writing style. This tool helps students create a sense of belonging and creates a conversational tone amongst them in their interactions. (Woods and Baker, 2004). Blogs employ a more decentralised system of Web 2.0 technology (e.g. Really Simple Syndication (RSS), Open API and meta-tagging) which have the potential to enhance learner communication, interaction and collaboration (Kanniah and Krish, 2010; Kim et al., 2008).

Much earlier, blogs were described as Socratic in their nature (Golden et al., 2003) which means they employ a chronological pattern that allows a statement to be made and a question to be followed. Richardson (2006) lists five positive impacts of Blogs on students as summarized below. Blogs:

- Promote critical thinking and analytical thinking.
- Promote creative, intuitive and associational thinking.
- Promote analogical thinking.
- Are a powerful medium for increasing access and exposure to information.
- Provide solitary reflection and social interaction.

As can be gleaned from the above list of potential benefits, blogs have a number of potential areas where they can be used in education. For instance, the blog can be used to replace the traditional web page. A lecturer could post the course literature and notes, recommended reading lists, calendars and all commonly offered documents and notifications. It provides a chronological sequence to the added information and makes the effort required to upload the comments easier for a lecturer, it does not require the same level of technical expertise when developing a traditional website. It also allows student to clearly identify information in relation to dates in the academic year (Churchill, 2009).

Additionally, blogs may be used to publish links to articles and websites associated with the module, annotating what is important about the links and allowing students to submit their comments on the websites or articles, A Blog can be used as a place to organise class discussions. Downes (2004) identifies a lecturer at the State University of New York in Buffalo, New York State. The lecturer in his media law class would reward students with course credit for online discussion. Lecturers are also providing Blogs as the area to organise class seminars and to provide areas for summaries of class notes and readings.

Students can be required to complete a blog as part of the module; the blog content would be the student's critical analysis and opinions on content they have read in each class. Students can use a blog as an on-line filling cabinet where students can post and store their documents from the first day they attend the institution until the last day. This provides great opportunity for reflection upon work studied and provides an ability to share information. At the end of undergraduate college life a student would have an easily accessible area in which to develop detailed curriculum vitae which could be made available to prospective employers. Educational institutions can also use Web Logs as their web pages, each society and faculty could contribute to the web page removing the fact that many institution web pages are not regularly updated. It would obviously be good practice to designate a web master who would review the content before it is published (Richardson, 2006).

Blogs expand the walls of the classroom; they allow students to communicate with other students and groups with similar interests. Blogging provides students who may be reluctant to ask questions in the lecture hall, the opportunity to ask these questions after the initial lecture. A lecturer could upload the different components of each module and encourage students to ask questions. The linking characteristic of a blog also promotes the referencing of information to the respective source. Blogs can be used to publish examples of completed assignments either an assignment from a former/current student or example answers created by other persons or the lecturer. Lecturers can offer surveys to students on each topic or class or also ask students for feedback on a lecture. The blog can then be used to present the information and open discussions to ameliorate course content dissemination (Brown, 2004; Richardson, 2006).

An innovative lecturer could use speech to text technology which has been developed to a standard where it can record a textual record of a lecture. This allows for a full transcript of a lecture to be available to students. A lecturer would retain the ability to edit the transcript and then post it to the blog. The point that must be emphasized is that the technology is available for lecturers to present their content in a multitude of learning styles thereby enhancing the broadcasting range of their lecture to cater for a greater number of learning styles.

A number of pedagogical uses of blogs have been discussed in literature (Richardson, 2006; David, 2004). Below is a list of some of the benefits that can be exploited by teachers in their practice.

- Reflect on their teaching experiences.
- Keep a log of teacher-training experiences.
- Write a description of a specific teaching unit.
- Describe what has worked for them in the classroom or what has not worked.
- Provide teaching suggestions for other lecturers.
- Write about something they have learned from another lecturer.
- Explain teaching insights they have gained from their experience.
- Share ideas for learning activities to use in the classroom.
- Provide some guidelines on using specific technology in the class, describing how they have used this technology in their class.
- Explore important teaching and learning issues.

Blogging provides students with a space for sharing opinions and learning to develop their constructive analysis of another person's literature. It is a space that allows both students and lecturers to learn from each other. The characteristics of the blog allow learners to see that knowledge is available from multiple sources and is interconnected in many ways. It provides students with the feeling that they are a voice in the learning cycle; that their opinions are valued and can help to create an improved learning environment. If the contents of a blog is available to a worldwide audience students can feel more compelled to write contents for which they believe others will respond to. It also provides students with the potential to connect with experts on a topic and ask questions or link their own blog to an expert's blog by providing a comment informing readers of the expert's blog, to the existence of the students' blog. It allows lecturers to teach students to write publicly available documents and articles thereby learning the possible arguments for and against a topic.

Through the use of blogging, lecturers and students have become both the publisher and consumers of information on the Web. This ease of publishing information has contributed to the evolution of web sites where a personalised learning environment may be easily created. The flexibility of the blog allows lecturers to use the technology in multiple formats.

Web logging, or blogging, is 'the act of adding articles or updates to such a site at regular intervals' (Stauffer, 2002, p. 4). Blogs entries are updated in a linear, time-based way, similar to a personal journal or diary. Additionally, the contents are meant specifically for the public and are presented in reverse chronological order (Blood, 2002; Stauffer, 2002. A blog post frequently consists of a title, link, comment, date and time of the post, and archival information (Blood, 2002; Stauffer, 2002). The blog structure (Figure 1) allows a reader to see immediately how recently the blog has been updated, and it allows them to search the archives by keyword, by date, or by category (Holinka, 2004).

Figure 3.1: An example of a blog page from *Free Technology for Teachers*

The common use of a blog is a personal online diary in which an individual submits his/her entries and occasionally gets comments from outsiders. Blogs can be done by a single person or with many people putting up individual entries in a group blog. Students have the possibility of writing for a broader audience, not just to members of their class.

Using Weblogs (Blogs) For Learning and Writing

During the past two decades, there has been a proliferation of many virtual spaces for writing and communicating such as hypertext, chat rooms, newsgroups, discussion boards, MOOs (Multi-Object Orientation) which is an environment which allows more than one person to talk at one time, often allowing display of emotions and object manipulation in a given environment) and MUDs (Multi-User Domain) which is a text-based, multi-user simulation environment.) and peer-to-peer file sharing networks. Weblogs have emerged as a new space for communicating via the Internet. A number of educators have been using blogs in their classes, and they have written about how blogging is grounded in current learning theory as well as writing theory and pedagogy (e.g., process, post-process, and genre). Additionally, blogs have been used to demonstrate other theoretical and pedagogical frameworks in both academic and professional settings. A blog site was established to present scholarly discussions and papers on blogging and writing.

Various authorities have discussed the possible classroom applications for blogs (Chen and Bonk, 2008; Efimova, 2009; Li, 2010; Shim and Guo, 2009). These are presented below:

a) Learning journals.

b) Learning logs or thinking journals.

c) Reflective journals.

d) Audio learning logs.

e) Reflective or writing journals.

f) Visual learning logs'

g) Group discussion and collaborative writing spaces.

h) Knowledge management.

i) Dialogue for group work.

j) e-portfolios.

Audio/Video Blogging

Audio Blogging, also known as a podcast, is a blog comprised of audio. A podcast is relatively easy to create and does not require any great level of expertise. Audio editing software has become more and more user friendly and efficient as it has evolved over the last few years. There are many free open source options and commercial options available such as Audacity (http://audacity.sourceforge.net/) and Sony Sound Forge (http://www.sonycreativesoftware.com) respectively. These applications provide a podcast creator with the ability to delete or edit as they wish by simply cutting and pasting audio streams visualized in a wave format. A video blog is a blog where the bloggers record themselves speaking in video. A video blog can also be in the form of screen-casting where the blogger captures what is happening on the computer screen while narrating.The blogger can produce a video clip containing a recording of himself or others, or can create video contents comprised of text, images, special effects and so forth. A video blog allows the creator to edit a blog in a similar fashion to a text blog. The video blog can be updated as regular as a text blog and can also avail of the use of RSS update feeds. Video blogging provides a richer multimedia experience to the viewer. Many video bloggers would argue that a video blog pro-

vides a more natural medium for communication than text based blogs. Modern desktop computers and laptops are now equipped with webcams and the creation of a video blog requires no more than clicking a record button. The downside to video blogging is that the editing tools currently available can be somewhat time-consuming in their use if one wishes to create closely refined content (Educause Learning Intitative, August 2005). Youtube.com is the most popular video publishing web site currently available, a simple search in YouTube of many different subjects will return many results of educational offerings from individuals throughout the world. These sites not only provide a source of information for consumption but also provide a website in which the student may publish their own thoughts and opinions in both textual and visual formats. Educational institutions can record students or lecturers for their University blogs or web sites welcoming students and can also record tours of the campus in an attempt to attract prospective students. Librarians in Universities can record tours of the library showing students how to access resources and knowledge repositories.

Not only are sites such as those described previously growing in popularity and content, but education specific podcasting websites are growing. Podcasts for education (http://recap.ltd.uk/podcasting/) is a UK based website that lists over four hundred carefully selected podcast channels for educational use. This site lists podcast with topics including history, foreign languages, quantum theory, computer science and medicine. The education podcast network (http://epnweb.org) provides over five hundred podcast links.

Blogs versus Discussion Boards

Similar to discussion boards, weblogs are interactive. Readers respond to any given entry with a comment, and on-going threaded discussions can take place both within classroom settings, across other classrooms, as well provide access to other learning environments and resources. However, they are different from discussion boards in that self-publishing encourages ownership and responsibility for online content. Blogs are attached to an individual who has ownership of his or her discussions and reader contributions whereas discussion boards do not have such ownership. Discussion boards, for example those on blackboard web course tool (WebCT) are part of a class and belong to the instructor of a particular course. Such electronic spaces as blackboard and (WebCT) are “gated communities,” and discussions take place only within the confines of virtual walls that are password-protected, and the students are ‘sequestered from the discourse community of the Internet’ (Lowe and Williams, 2004, p. 7). Blogs, on the other hand, are open to the community and anyone can come in. Additional-

ly, blogging places emphasis on content, speedy feedback, working with both words and images, and links one post to another which benefits students' self-expression and interaction with peers.

Research on Blogging

The Weblog is an area of growing interest for many educational researchers because of its impact on writing. Research approaches range from personal reflections and experiences, to community building, to critical analysis of segments of blogs, to discourse analysis, to quantitative and qualitative studies of blogging activity. Building on each other by offering both in-depth descriptions and broader pictures, these articles provide a wide ranging look at the rhetorical implications of blogging.

Brooks et al. (2004) present the results of an empirical study of students' perceptions of blogging. They examined remediation, genre, and motivation as key concepts for teaching with Weblogs in order to determine if motivated and engaged Web logging would result in stronger writing. They needed more specific ways to address the pedagogical problems of teaching goals, forms, and styles and strategies for writing.

They saw blogging as a repurposing of familiar print genres, in other words, a remediation of already familiar forms. They interviewed upper-level college students to see how they preferred to use Weblogs and found that they preferred the personal and expressive aspects of Web logging but saw the value of Web logging for academic purposes. These students were surveyed on familiarity with Weblogs, use of Weblogs for journaling and note taking and how they felt about it. Based on surveys and observations, they concluded that Web logging as a general writing activity in college courses is worth pursuing.

Xie and Sharma (2004) presented findings of a phenomenological study on the use of Weblogs to identify and explore students' feelings and their experiences using a Weblog for reflective journal writing. The participants in the study were graduate students in a program for instructional systems design. Their initial findings were grouped into positive and negative (hesitant) feelings about the use of Weblogs. The initial data supported the proposition that Weblogs could be used to support reflection. The positive perceptions were that blogging helped thinking and learning, offered a sense of community, and offered exploration of new technologies. The negative or hesitant perceptions related to the uncertainty of correct usage of Weblogs because it was a new tool, the role of prior experiences, and concerns of privacy.

After they identified an initial set of themes, Xie and Sharma realized additional relevant themes that needed to be examined. These included the students' perceived comparison between Weblogs and learning environments such as WebCT, discussion boards, and listserv postings. Still other themes emerged for future study related to students' Web logging and responding patterns, students' interpreted purposes and their own usage of Weblogs, motivation, and learning curves of students' using Weblogs.

Cole (2004) analyzed Weblogs as a tool for response to literature in the middle school language arts classroom for her dissertation. The results of her qualitative study revealed that blogs provided a motivating environment and enabled students to have an audience for their writing as well as to read their peers' writing. She found that blogs fostered quality responses to the literature through higher levels of discussions. However, the data did not show the quality responses of struggling readers participating in the blog environment. Overall, Cole found that blogs appeared to have a positive impact on teachers and students' attitude toward using technology in the language arts classroom as well as on their perceptions of using blogs as a tool for responding to literature.

Campbell (2004) investigated learner attitudes toward a Weblog that he developed and set up for EFL college students. He found that students enjoyed learning with Weblogs, their attitudes toward learning English improved, and there was significant interest among learners to create their own blogs to accompany writing classes in the future.

Campbell (2003) conducted another study, a phenomenological case study, on computer supported cooperative learning using Weblogs in a university class. He demonstrated that Weblogs were beneficial for constructivist learning in a blended structure learning environment and that the public nature augmented students' interest in writing.

In a study conducted by Churchill (2009) at a University in Hong Kong, he found out that blogs were a powerful tool in terms of promoting teacher reflection. In addition, blogs were seen as a useful resource distribution medium. Using Really Simple Syndication (RSS) tool, the teacher was able to subscribe to information and access the latest posts from students' blogs in one place. In another study conducted by Zhi et al. (2010) it was established that male students were better with the use of technologies (blogging) than female counter parts. This is one aspect that this study will investigate, to establish whether there are any significant differences in the way female and male students make use of Web 2.0 tools in their

learning. This is necessary because as observed by Zhi et al. (2010) in their literature review, ‘conclusions regarding gender differences in blog use were quite different’ (p. E39).

Tweeting is a form of microblogging which is also being used in teaching and learning. The use of Twitter in higher education is in its infancy (Betrus, 2012). Earlier, Reuben (2008) suggested that there is a great potential in education for the use of social networking tools such as Facebook and You Tube; however, higher education has not yet found the right niche for Twitter. Fox and Varandarajan (2011) incorporated Twitter as a way to encourage interaction between students themselves, with the academic teaching staff and with the content of the course. A Twitter activity was implemented whereby students were required to post a minimum amount of tweets per class for a percentage of their grade. If the minimum number of tweets were executed, the student received the full mark. Results indicated that increased interaction occurred between course participants in that students voiced their opinions and shared ideas. Use of Twitter as part of assessment in a course was reported by Turcsanyi-Szabo (2012). The study reported the use of Twitter as an important part of students building a personal learning network. Other studies have investigated live tweeting during lectures and tutorials (Croxall, 2010; Parry, 2008). These researchers including Fox and Varandarajan (2011) found that Twittering during course instruction is perceived by students as a distraction to listening and taking notes. However, Croxall (2010) and Parry (2008) both describe the development of greater social interaction and the notion of course community arising from their anecdotal use of Twitter in their lectures. In response to this literature, this study will explore the use of web 2.0 including Twitter and assess the perceptions of students and teachers regarding their use of these technologies.

3.3.2.B. Wikis

Wikis are one of the many popular Web 2.0 tools that facilitate collaborative work (Lai and Ng, 2011). This study would explore the use of wikis by teachers and students and elicit their views regarding the affordances of wikis in education. In this section the researcher will highlight the features of wikis and make reference to some studies focusing on the use of wikis in teaching and learning. The word wiki originated from the Hawaiian words "wiki wiki" which mean super-fast. Wikis are collaborative sites that allow contents to be added or edited instantaneously. The wiki tool helps to build community in an online classroom, because learners have equal ownership in a creation. Students actively interact with one another

to create content. Wikis are easy to use; users do not need to know how to write HTML codes to publish their products on the internet (Heafner and Friedman, 2008).

This interaction is a two-way communication from student to student that promotes collaborative knowledge construction (Ouzts, 2006). A Wiki is a webpage that can be edited by any user, although the original creator of the page can limit the users whom may edit the page. The editing and history features of wikis are particularly helpful for users, allowing them to trace the content and timing of the revision. A Wiki page encourages collaboration amongst contributors and gives a contributor a sense of responsibility and ownership. It develops collaborative skills amongst contributors; it requires contributors to negotiate with others, to agree on the accuracy, the content and the structure of the topic. Contributors of a Wiki begin to teach each other, to refine each other's knowledge of a topic (Richardson, 2007). Earlier, Richardson (2006) suggests that there are different educational possibilities of using wikis for learning, especially for language learning. Evidently, several studies have found that wikis can foster collaborative learning, in particular, writing English from primary to University level (Wang, 2010; Mak and Coniam, 2008; Wilkoff, 2007). On the other hand, other studies have shown that wikis are also useful for fostering deep understanding of social studies (Heafner and Friedman, 2008) and helping pre-service teachers produce high quality science learning materials (Nicholas and Ng, 2009).

The main feature of the wikis is their collaborative nature. The following figures help to show in a graphic way the main difference between a wiki and a traditional web page. Figure 2 represents a traditional web page editing and publishing process, where the author provides content to a passive audience of internet users

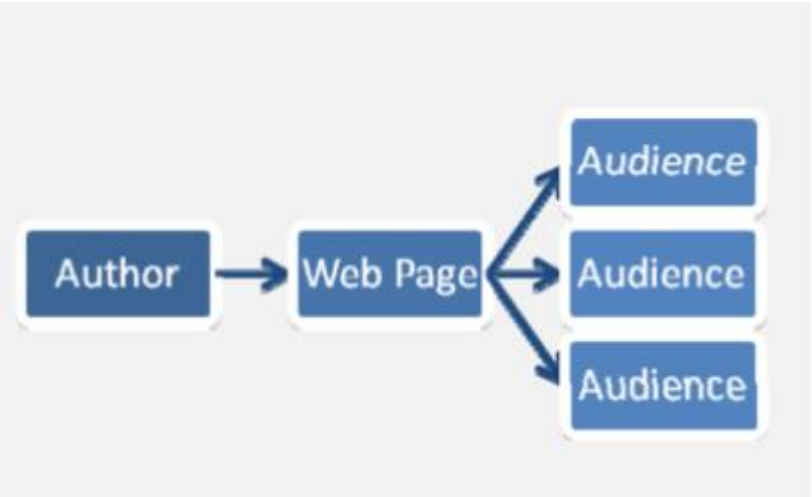

Fig 3.2: An example of a traditional web page. (Woods & Baker, 2004).

On the other hand, Figure 3.3 below illustrates that a wiki web page is readable and editable by every user.

Fig 3.3: An example of a wiki page

As indicated earlier, a wiki page generally has a history function which allows the user participating in the creation of the page to rollback to an earlier version of the page. Each user can view each version of the page and edit it accordingly. Wiki pages can often be vandalized where a vandal updates the content with incorrect or inappropriate information. The history property of a Wiki page allows a previous version of the page to be reinstated with ease and this helps to identify any corrupt activities such as vandalism of data.

A big challenge created by Wiki participative communities such as Wikipedia, is to determine which sources can be trusted and which cannot. Many educational institutions discourage the use of Wikis as trusted resources because the information contained may be inaccurate. However, Wikipedia is encouraged by many professors and lecturers as a starting point in research. For many years scholars and academics have successfully relied on published literature and peer-reviewed literature, but now they are faced with a dilemma, can they collectively produce information that is as high a quality as what a trusted few produced in the past. Halavais (2004) examined the collaborative peer review offered by the Wikipedia community; in his experiment he edited 13 separate Wikipedia entries. Each of his edits was corrected within a couple of hours. Members within the Wikipedia community discuss their potential edits before they proceed with the edit, the Web 2.0 entry in Wikipedia has forty- two active discussions where community members argue for and against particular words or paragraphs. There are certainly individuals or groups within society who will attempt to edit arti-

cles for their own personal gain. Wikipedia Scanner developed by Virgil Griffith has identified that edits in Wikipedia articles about specific companies were made by employees within the same company

The Major Differences between Wikis and Other Tools

While there are a number of similarities between wikis and other web tools, there are also some significant differences. The table 3.5 shows the similarities, the differences, and the most common uses of blogs, discussion boards, instant messaging, content management systems, and knowledge repositories in comparison with wikis.

Table 3.5: Similarities and Differences between Wikis and Other Web Tools

Tools	**Similarities with Wikis**	**Difference with Wikis**	**User Actions with the Tool**
Wiki			1-Member of community posts information 2-Other members edit current information 3-Other members add links to resources and new wiki pages
Blog	1-Community driven 2-Needs loyal audience and motivation to reach goal 3-Asynchronous communica-	1-Strong authorship (depends on reputation and notoriety of author) 2-Chronological 3-No versioning	1-Author posts a message 2-Visitors post comments on messages

	tion		
Tools	**Similarities with Wikis**	**Difference with Wikis**	**User Actions with the Tool**
Discussion board	1-Community-driven 2-Asynchronous communication	1-Mostly chronological 2-Cannot edit already posted content 3-Usually moderated 4-Usually restricted to registered users	1-Member posts a message 2-Members build argumentation over previous message in thread until consensus 3- Member starts a new thread
Instant messaging	Messy by nature	1-Synchronous communication 2-Short-lived (usually not archived) 3-Based on network of individual 4-Focus on limited number of questions	1-An individual needs a quick answer from another individual within his/her personal contacts
Content management system	1-Web page editing using browser 2-Limited mark-up language usage 3-Content-	1-Content is controlled by organization 2-Uses HTML to program 3-Workflow-driven	1-Member posts a new page or edits an existing page 2-Webmaster approves, edits or rejects post

	oriented 4-Asynchronous communica-tion 5-Versioning available		
Tools	**Similarities with Wikis**	**Difference with Wikis**	**User Actions with the Tool**
Knowled ge reposi-tory	1-Community-driven 2-Content-oriented 3-Asynchronous communica-tion 4-Versioning available	1-Somewhat im-posed structure 2-Content and con-text are usually sepa-rated (metadata and file) 3-Very restricted access 4- Workflow-driven	1-Member searches for specific file 2-Member posts a new file in the ap-propriate folder 3-Member updates an existing file

The purpose of table 3.5 is to show that wikis are very flexible tools, but other tools might be more appropriate to achieve specific goals. Wikis usually work better for projects where individual authorship is not important. Also, wikis are appropriate for content that does not need to be protected (for instance, if you build a wiki on a hot topic like illegal immigration in the United States, expect a lot of maintenance (Barton, 2004).

Use of Wikis

Wikis are used to support a large number of different activities. Here are some of the most common ways wikis are used:

a) Brainstorming: When starting a specific project or a creative process, participants are invited to add items and thoughts on a wiki. They are also asked to link all these random thoughts and concepts together in order to stimulate creativity.

b) Group project: A wiki can act as a private intranet for a specific group project so all participants can communicate, share resources (including texts, videos, spread sheets, links, etc.), and write a report or a book together.

c) Meeting support: An agenda for a specific meeting is posted on a wiki and participants are invited to consult and edit it prior to a meeting. The wiki is edited during the meeting to include what was discussed. Participants can later use the wiki to post missing information or follow-up items. This technique is also very useful for training, presentations, and birds of a feather sessions during conferences.

d) Make lists: Form a list of best restaurants in town to a glossary of terms used in a specific field of expertise, a wiki is a suitable way to organize this kind of content. In the same spirit, wikis can also be used to build an online repository of relevant documents or FAQs.

e) Collections of links: Wikis can be used for social bookmarking. They give to all participants the possibility to post, comment, group, and classify links of all nature or in a specific field of expertise.

f) Writing a collective letter, position, statement, web content: When writing something that is intended for an official legal instance, to clients, to upper management or to the general public, a wiki is an excellent tool to reach a consensus, define key ideas, and write down the content to be clear and non-offensive.

g) Building a group portfolio: Any organization can use a wiki to post past projects, testimonials from clients, history of the organization, etc. This kind of portfolio is a powerful marketing tool (Richardson, 2006).

Wikis are collaboratively created websites where users can create a series of web pages, edit and revise their and others' work, provide feedback, keep track of the changes and publish information online. The first wiki was created and developed by Ward Cunningham and was used as a composition system, a discussion medium, and a collaborative tool (Leuf and Cunningham, 2001). Cunningham believes wiki technology will facilitate the evolution of

knowledge creation and publishing, claiming that wiki is inherently democratic. The advantages of using wikis include:

1. Promoting collaborative writing: Collaborative writing skills are most widely believed to be acquired in the wiki environment (Nicholas and Ng, 2009; Engstrom and Jewett, 2005; Keith, 2006; Lamb and Johnson, 2007). The collaborative context provided by wikis enhances users to negotiate, collaborate with others as well as learn from others' work (Keith, 2006).

2. Providing open-editing: Users can change their own and others' work. Wikis provide an easy way for completing collaborative projects, extending group work by continuing it asynchronously outside the course, and encourage learners to participate discussions on their own in the online environment (Lamb, 2004; Farabaugh, 2007);

3. Allowing non-linear text structure: Wikis enable associative web pages with non-linear navigation structures which provide easy connection of meaning making previously unknown to learners and increase the speed and variety of content developing (Ebersbach, Glaser, and Heigl, 2006; Farabaugh, 2007; Keith, 2006).

4. Encouraging multiple modalities: Wikis are able to incorporate graphics, audio, video, and animation that allow learners to express themselves and communicate the meaning may not be fully expressed in the text format (Jewitt, 2005; Kress, 2003).

5. Providing a simple editing environment: Little navigation and clicking are required. The easy editing process enables non-technical users to participate in the collaborative work (Chang, 2004; Raitman, Augar, and Zhou, 2005).

On the other hand, researchers believe there are some drawbacks using wikis such as:

1. Students may not be comfortable or familiar with collaborative writing: Students may have difficulties share their works in a public space and concern deleting or making changes to others' work (Keith, 2006; Raitman, Augar, and Zhou, 2005).

2. Online texts may increase challenges in learning: Researchers asserted the concern that online text incorporating multimedia tools may lack recognizable text structures that found in formal printed text formats and reduce learners' opportunities in improving such comprehension and learning (Cairo, 2003; Literacy, 2006).

Wikis and Collaborative Approaches in the Classrooms

There are several possible uses of Wikis in education either in collaborative projects or projects completed by an individual. Wikis can be used by lecturers to publish course notes, hand-outs and recommended reading lists. Students and research groups can use a Wiki to record the documentation of module projects as centrally available files. Students can also use a Wiki to record in class discussion and in class notes. A student can create his own personal portfolio of documents throughout his college career. Students can use a Wiki as a place to document their views and opinions on recommended readings.

A Wiki can be used by lecturers to share teaching and learning information with other lecturers (Nicholas and Ng, 2009). A Wiki can be used to create a course document which allows students to comment on the course and suggest ideas that might improve the course from the student's perspective. A Wiki can become a co-construction of information between lecturers and students from separate classes who study the same module. A Wiki can be used to enable students to contribute to bodies of knowledge that are actively seeking new contributions. This can allow students contribute and then monitor their contribution and see how it is edited by others.

Lecturers can ask students to read articles on a Wiki website and ask them critically analyses a topic related to the module with the intent of updating the content on the Wiki. The lecturer could put an emphasis on readability, facts offered in the article, references etc. A lecturer may then review the analysis, select the updates offered by the students that are relevant and update the website accordingly. This provides more to the students; it enables them to see a clear objective and presents an opportunity to engage in practical exercises. Wikis can be used to determine the minutes for meetings which then can be used to serve as a note-taking template. Research students and PHD students who meet with project supervisors could make use of a Wiki (Duffy, 2006; Chao, 2007; Richardson, 2007; Lamb, 2004).

Sharing of information and collaboration is at the center of innovation and continued success in all fields. The appropriate use of a Wiki can aid the development of students in their collaborative skills, reading abilities, writing abilities and their critical thinking skills. A simple web search using the term 'Wiki' returns millions of websites. There are currently Wiki sites for music interests, sports interests, history, geography, computing, business, medicine, accountancy, science, mathematics. It is difficult to find a topic that a Wiki site has not been created for. Of course the obvious difficultly is identifying the site which is of an academic

quality; this can be the lecturer's responsibility if the editing of a Wiki article is part of a project. The use of a Wiki encourages student to become both a reader and a writer. Often it is the case that students tend to only take on the role of a writer and do not think of the structure of the document from the reader's point of view.

Bruns (2005) found that students can be reluctant to publish their work on websites in a less than perfect state as they did not want others to scrutinize their work. It was also found that many students do not edit other students work in case of offending fellow students and that some students did not in fact want their work edited by other students. Here the role of the lecturer becomes very apparent, collaborative projects must be designed in a manner to prevent or to mediate potential barriers to collaboration that students may create (Lund and Smordal, 2006).

The lecturers at the University of British Columbia in Vancouver are using a Wiki tool (http://wiki.elearning.ubc.ca/HomePage). The lecturers are contributing towards the creation of reading reference lists, outlines of courses and strategies for teaching. The University has also used Wiki Pages for communications between students and lecturers and also between students themselves. The pages are used for in-class communications and for collaborative project management..

Interoperability is a common desire amongst lecturers when introduced to a new technology. Many lecturers make use of summarized presentation slides in their modules. O'Neill (2005) has researched a new tool called 'slides2wiki' which converts the contents of a presentation file into a Wiki Page.

The system allows students to build upon questions offered by a lecturer within their slides. O'Neill found that a lecturer needs to give clear responsibility to students and therefore nominated two students per class who were responsible for the note taking on that particular day. As with the services offered by any Wiki, other students could review the notes taken on a particular day and offer their own suggestions. The slides2wiki software is publicly available from the author (http://www.cs.hmc.edu/~oneill/freesoftware/slides2wiki/).

Research on Using Wikis in Education

In a study conducted by Engstrom and Jewett (2005), involving eleven teachers and approximately 400 students, all the participating teachers agreed that their technical knowledge and skills improved after using wikis in their teaching and most of the students became independ-

ent in their learning by researching the project content without much support and facilitation from teachers. The results showed that groups with three to five students expressed the most satisfaction with their learning. Besides, students working in cooperative groups with assigned roles such as “wiki recorder,” “research note-taker,” “discussion facilitator,” had the most positive experience without being locked out by their wiki page. Encouraging and managing two-way communications were recommended to promote learning.

3.3.2.C. Discussion Boards

Discussion boards are areas of an online classroom where all learners discuss a specific topic. According to Rovai (2001), the discussion board tool of an online classroom is the second most positive and critical aspect in an online class (Rovai, Building Classroom Community at a Distance: A Case Study). The keys to success are to have small groups participating in the discussion board and have the instructor as the facilitator. This helps to create the "community of practice" (Kling and Courtright, 2003).

There are two types of discussion boards: subject specific and non-subject specific. The non-subject specific discussion boards attempt to replicate the social aspect of a face-to face classroom. Examples of non-subject specific folders are: autobiography folders, cybercafés, prayer requests, devotionals, and ritual folders. These gathering places provide a tool to create student-student and student-instructor connectedness. Students use these tools only as much as they see it as being beneficial. The most popular non subject specific folder was the autobiography folder according to the case study done by Woods and Ebersole (2003). This study was done using two online courses and 4 non subject matter specific folders in each course. There were multiple data collection methods to find which folder helped build a positive faculty-student relationship, positive student-student relationship, the greatest sense of online classroom community and the greatest overall course satisfaction. The autobiography folder provided a tool for social interaction between all members of the class and provided the most overall course satisfaction based on the positive social component.

Social Book marking is a recent phenomenon where contributors offer links to articles which are categorized by subjects. For instance if a lecturer is having difficulty finding a high quality document on a topic, they can search for the topic in a website such as del.icio.us13. Del.icio.us offers a service to a user that connects them to other users with similar interests. Each user can tag and rate particular bookmarks and this enables a catalogue of websites which are reviewed by people who have an interest in the topic, this is peer review of web-

sites (Richardson, 2006). Del.icio.us offer tool bars for users which enable the book marking of web sites with extreme ease. A person merely clicks on the icon in their toolbar and the Website the user is currently visiting is added to the list of sites in their Del.icio.us account.

The pedagogical potential is exposing students to peer reviewed articles, in the same manner that a reference list in a research paper reveals additional sources of information. Students can also contribute by submitting their own links and articles and offering their opinions and ratings on available articles.

3.3.2. D. Electronic Journals

Electronic journals are similar to discussion boards and blogs as they provide personal perspectives on subjects. The difference is that electronic journals are spaces where students can explore their own thoughts and ideas without concerns for the formalities of grammar and spelling. It is a form of free expression. Electronic journals can be private between the student and instructor or collective, which is open to all learners in the class. According to one online researcher, ‘There are always students who are reluctant to speak. Given the opportunity to 'speak' at the keyboard, many found a voice in this class’ (Bender, 1995, p. 39). This voice is the vital connection between student-student and student-instructor. These connections are the threads to building a community. By using electronic journals, ‘Students will get to 'know' each other in unanticipated ways’ (Bender, 1995, p. 42).

3.3.2. E-Chat

Chat is an asynchronous exchange of comments or questions in an online environment. This tool is very similar to blogs, only blogs can be asynchronous or synchronous. Chat (live chat or chat rooms) can be an effective tool in creating a strong online community, and is an opportunity for student-student interaction or student instructor interaction. Student-student interaction can occur when two or more students agree on a certain time to engage in a chat. Utilizing chat can facilitate group work and/or offer peer support. Student-instructor interaction can occur when one or more students agree with the instructor on a designated time to meet which can be utilized as "online office hours". This asynchronous exchange most closely replicates the verbal exchange in a face-to-face classroom. Active interactions in a chat solidify the community connections and interactions in a classroom.

3.3.2.F. RSS Feeds

The techniques and tools described so far focus on the user acting as publisher and consumer, RSS feeds change this somewhat. RSS is an abbreviation for Real Simple Syndication. RSS is a dialect of XML and an RSS feed should conform to the Extensible Markup Language (XML) standards provided by the World Wide Web Consortium (Richardson, 2007).

Most Web 2.0 software generates (XML) feeds behind the scenes, this (XML) feed contains the data which is in the component. The feed is described as a feed as it allows a person to subscribe to it. The (XML) feed describes the RSS format and the data which is in a format easily read by an RSS reader. An RSS feed reader is a relatively simple computer application similar to an e-mail application. A user subscribes to the feed and they will then receive the information as it becomes available in their application of choice. The latest version of Mozilla Firefox Version 3 which is available in beta format as of June 2007, allows a user to subscribe to RSS feeds in their browser. Regardless of the application or browser a person may subscribe to many different feeds, a student simply subscribes and the up to date and relevant information is delivered to them (Richardson, 2007).

In 2003, the internet engineering task force created a second syndication technique in an attempt to remove some inconsistencies that had occurred during the evolution of the RSS formats. This newer syndication technique is named ‘atom’. In true Web 2.0 character, the update to Atom is largely concealed from the user.

RSS feeds allow a person to subscribe to an RSS equipped article. They create the potential for many more techniques for the inclusion of technology in the classroom. If a student has a blog, a lecturer can require that assignments are written on the student’s blog which the lecturer is subscribed too. Once the student posts his assignment to his blog, the RSS feed is picked up by the lectures reader and submitted in this manner.

Students can subscribe to a lecturers blog in their RSS reader and are no longer required to visit websites to look for possible updates. How often do we see the disclaimer on module websites *“it is the responsibility of the student to check this site for updates”*, this in many cases is an unreasonable request, students should not have to continuously visit a website which may be updated once in a fortnight. Lecturers will often hear students say that “they did not read that mail”. If the notice is delivered straight to their learning page, this no longer can be claimed.

Another scenario in which RSS can be used is for Lecturers who teach a particular subject and spend time searching for relevant articles. By subscribing to websites they can receive the articles in their RSS reader cutting down on Web browsing times (Harrsch, 2003).

The use of an RSS feed allows students to create a personalized learning portal where they can subscribe to their lecturers Blogs, Wikis, and podcasts. This is the real advantage of RSS feeds and Web 2.0 tools, there are so many possibilities that a lecturer can use in their modules to offer students a true experience of differential learning.

3.3.2.G. Tagging and Book Marking

Taxonomy is the traditional classification of an object; Folksonomy is a system of text labels or tags attributed to an object by the users of the object (Russell, 2006). Tagging and bookmarking have become commonly used tools on participative websites such as Flickr and Delicious. Flickr is a community where each person can upload their images; each user within the community may then both tag the image and rate the image. Similar to the Wiki page, the up loader of the image may restrict those within the Flickr community, who view the image. The (del.icio.us) website is a site where individual users create a set(s) of related internet bookmarks.

Dr. Jill Freyne a Postdoctoral Researcher from University College Dublin, Ireland identifies four motivations in users when participating in Web Communities. The first is "Anticipated Reciprocity", Users participate in these communities as they contribute to projects if they believe they will benefit in return. A second reason is that some user's will also be motivated to participate in order to increase their reputation within the community, some participative communities recognize user contributions through the calculation of submitted posts to the community or views to that person's profile page, thereby elevating the members status within that community. A third motivational factor is a sense of efficacy, if a user feels that their contribution makes a difference, it will encourage them to participate. Many users have contributed to web sites for many years for this reason; Lonelyplanet.com and amazon.com allow users to voice their opinion on holiday destinations and consumer products respectively. A fourth motivation is the sense of community that exists within on-line communities; many computer users will feel a sense of belief that they are part of a bigger community. The community provides an environment where a person may respond to other contributions and also see the responses to their own contributions (Freyne, 2007).

3.3.2. H. Personal Homepages

Personal homepages are another tool that helps to create community and student engagement in an online class. A personal homepage is a page on the web designed to give an introduction to a person or persons. This feature is similar to the no subject specific autobiography discussion folders. The personal homepage creates an electronic personality with many technology possibilities. Homepages can include photo and/or video introductions. This space is a way for students and instructors to represent themselves virtually and get to know one another in an online classroom.

3.3.2.I. E-mail

E-mail is typically the primary mode of communication in an online classroom. An email is a method of sending messages from one person to another through electronic means. Email can be written or conducted through audio. This communication can be one-way, from student to instructor, or two-way, between student and instructor. Instructor-initiated email is extremely important to students as it provides a social presence (Orey, Koenecke, and Crozier, 2003). Students feel most successful when interacting not only with their peers but with the instructor as well. One method to personalize or "humanize" email can be done with the use of "emoticons". ‘Emoticons are short combinations of textual characters that resemble facial expressions’ (Rovai, 2001, p. 42). This direct communication method provides the social interaction which helps build community in an online classroom.

3.3.2.J. Video Conferencing

The term videoconferencing is a confusing one. Some commercial companies (AT & T in the States) are now advertising “videoconferencing: as a new technology. The fact is that videoconferencing is a function which can be hosted on a variety of technologies and has been for some years. It is not a technology in itself. In America, the term is fast becoming defined as any use of television to join people in some live interaction.

However, the term is actually applied to a wide range of situations from live video lecturing to large audiences, to a point-to-point, individual-to-individual desktop PC chats. One possible categorization is into large scale and small scale. The majority of large scale set-ups are currently satellite-based in the form of “interactive television” i.e., one-way video, two-way audio. This allows for broadcast from a central point to many different locations regardless of distance. Small scale refers to compressed video for meetings between relatively few points

for small meetings. A technology used for this function is ISDN. ISDN promises to make two-way video equally as cost effective, with potential for greater interactivity.

Traditional video conferencing requires expensive, fixed delivery and reception installations and high transmission costs over full band width analogue video channels or high capacity digital channels. Such high grade services allow full two-way audio and video communication between several locations at a price; a more common configuration is that of Interactive TV (Full service out, audio only in). High costs and lack of flexibility has limited the past educational uses in the past to research projects. Recent developments in video compression and codec technology are increasing the use of relatively low bandwidth ISDN using a variety of display formats.

Technological Issues

The technologies used to deliver video conferences currently have a dramatic effect on the quality of the communication achievable. This report concentrates on the use of ISDN with compressed video whereas earlier examples often referred to as Interactive Television use transportation media such as microwave links or satellite links and provide high cost, full motion video links. In order to understand the issues in video conferencing, a basic understanding of transmission technology is required. The issues are those of: (Webb, 1982).

- Bandwidth
- video compression
- delivery method
- standards

Video on Desktop Computers

A speed rate of 64 kbps allows video integrated into the screen. This rate is not good enough for full video conferences; however, it would suffice for one to one video phone situations. Many people in education do not feel it is adequate (Stone, 1992).

Group Video Conferencing

This kind of interaction requires a speed rate between 128 kbps and 2 Mbps. A speed rate of 384 kbps provides a good quality reception for conferencing and is used in many educational environments.

3.3.2.K. Digital Broadcasting

This tool uses a speed rate from (2- 6) Mbps. The quality is greatly increased over the previous compression levels but costs are also higher.

HDTV

This is a relatively new technology and it is not universally accepted. It stands for High Definition Television. It needs a speed ranging from (25-45) Mbps. Some vendors provide equipment that can operate at a variety of compression levels. Remember the more visuals and movements to be transmitted the greater the transmission requirements and hence the higher the cost of both transmission and site equipment. There are recommended ways of coping with video compression (Tarn, 1992).

3.3.3. Web 2.0 in Higher Education: Exploring Issues

Some of the studies on the use of Web 2.0 have been referred to under the discussion of the individual tools in the preceding section (2.3.2). However, in this section, an attempt is made to highlight the students and teachers' perceptions of using Web 2.0 in teaching and learning context. This is important in order to support or otherwise the study assumptions in the study which seeks to explore the views of teachers and students participating in using Web 2.0 tools. According to Brown (2012) 'teachers' perceptions of [Web 2.0's] potential should be viewed as a potentially rich resource through which to better understand how [the technologies] might respond to the rich and complex teaching contexts in which academics work' (p. 51). It is the need to contextualize the potential use the Web 2.0 technologies that has driven me to focus on both students and teachers' perceptions in this study.

3.3.3. a. Teachers' Perceptions of Using Web 2.0 in Teaching and Learning

Like any other technological innovation, the successful integration of Web 2.0 technologies in teaching and learning context is affected by the perceptions held by the user system which includes the teachers and students. Since this study will explore the perceptions of teachers about their use of Web 2.0 tools, this part of the literature review focuses on studies on teacher perceptions.

Web 2.0 technologies are a prime facilitator of participatory learning and knowledge building and creation (Collis and Moonen, 2008; Mcloughlin and Lee, 2007). This view is further clarified by Brown (2012) who asserts that, 'the Web 2.0 tools are people centric, interactive, so-

cial and adaptive, and therefore, can provide students with an arena in which to become collaborators in the generation of knowledge, rather than passive recipients of knowledge'.

It is true that new technologies are emerging and some of the technologies have got potential educational benefits. However, do we know whether teachers in the university are embracing the technologies and using them in their teaching as expected? Ajjan and Hartshorne (2008) indicate that, 'while students are increasing their use of emerging technologies such as text messaging, wikis, social networks and other Web 2.0 applications, this is not the case with many university teachers'. If university teachers are not adopting the use of these available tools with potential to enhance their teaching practice it becomes significantly important to explore their views. Are the teachers willing to give students more control in their learning? Use of new technologies brings a shift in the teaching approach and if teachers are not prepared for that change in their teaching, it can be difficult for them to embrace the use of the new technologies.

Some studies have shown teachers as being resistant to pedagogical change that requires the use of new technologies (Collis and Moonen, 2008). Collis and Moonen (ibid., p. 99) cite some reasons for this resistance, including a 'lack of confidence' among academics and 'uncertainty in the light of change'.

This resistance is also associated with academics driving institutional policies who may 'adopt pedagogies that actually structure, constrain and contain the somewhat anarchic and more radical potential of these technologies' (Ravenscroft, 2009, p. 2). It is believed that teachers tend to opt for closed platform Web 1.0 type technologies conducive to teacher-driven pedagogical approaches and not to pedagogies based on student contributions, and the networked and collective learning possibilities of Web 2.0.

3.3.3.B. Students' Perceptions of Using Web 2.0 in Teaching and Learning

Web 2.0 technologies are being integrated in the curriculum in different ways. Some studies have been conducted to explore the impact of using these technologies and how students respond to the use of the technologies. Interestingly, some studies have established a link between web-based learning efficacy and the students' perceptions of using the different technologies in learning (Chu, 2009; Kao and Tsai, 2009).

The introduction of Web 2.0 tools in education has empowered Personal Learning Environments. This concept is defined as the set of activities, resources and people that one has for

learning. It has two parts, one consists of tools to access information, create new knowledge and finally, share and collaborate with others (Adell and Castañeda, 2010; Castañeda and Adell, 2013).

Web 2.0 can be very useful as an educational tool. Students' attitudes towards this tool are mostly positive. Students encourage using social networking site as a supplementary to the curriculum. Most students showed that they love spending time on web and exercises, videos and other sharing in group are useful for improving their knowledge skills. There are many computer based language programs but students expect something more professional and may not view these programs as interactive experiences (Mazer et al., 2007). Taking into account the restrictions of computer based programs, this activity can be a suitable choice to improve knowledge skills. This activity is also useful for breaking ice with students. Educators are becoming aware of the possibilities for reaching students with learning materials via Facebook (Bosch, 2009). Teachers considering applying such an activity in their classrooms need to be sensitive in some points. First of all, learning goals must be defined clearly. Facebook or Twitter which are Web 2.0 tools can be used in class, definitely they would use these tools more because they are already user of them. Due to the popularity of email among university students, some students prefer using email to communicate with peers and instructor. While students reported that their future uses of these tools in the classes they would take, would be influenced by the way of its integration in terms of the role of instructor and students.A study by Huang and Lin (2011) investigated the use of different Web 2.0 tools such as blogs, Vokis and wikis in the learning of Chinese as a foreign language and the study identified that all students on the course who participated in the study were positive about web-based learning. Vokis increased opportunities for oral practice and metalinguistic awareness while on the other hand, wikis were viewed as useful in terms of pulling learners together in a group of collaborative writing project. Students acknowledged that creating wikis had a positive impact on the development of their writing skills and level of community engagement.

3.3.4. Factors Affecting the Uptake and Implementation of Technologies (including Web 2.0) in Teaching and Learning Context

Literature review was also conducted to support or otherwise the study assumptions of factors influencing the uptake and use of new technologies such as Web 2.0 in higher education settings. The study does not focus on adopting and implementing innovations per se, however, the study seeks to identify some of the factors that influence teachers and students' use of

Web 2.0 technologies. Work by Rogers (1983) and other outstanding scholars such as Ely's (1999) were consulted to provide a framework to assess the factors that might be influencing the use of Web 2.0 technologies. In the paragraphs below, an effort is made to discuss the factors that influence the 'adoption' and 'implementation' of innovative technologies.

For teachers to make use of Web 2.0 technologies there are a host of factors that need to be considered. When talking about the adopting an innovation, Rogers (1983) highlighted that the innovation itself can affect its adoption. In this case, Web 2.0 technologies is considered as the 'innovative tools' in use. Rogers identified five attributes of innovations that influence the decision to adopt an innovation. These attributes include relative advantage, compatibility, complexity, trialability and observability. In addition to these attributes of the innovation, the characteristics of an individual or group (this could be teachers or students) can also influence the rate of the adoption. This study identifies the Web 2.0 tools that are being used and establishes what teachers and students think about the tools. A number of factors have been reported in literature as important in terms of promoting or hampering the use of technologies in teaching and learning. For instance, Dhanarajan (2001) found that the lack of existing infrastructure, lack of commitment from the change agents, low level of skills and the need to provide staff development to intended users influenced the implementation. Although these factors were identified more than two decades ago, it is possible that even today, the uptake and use of new technologies such as Web 2.0 is being affected by the same factors.

If what Prensky (2001) said at the beginning of the 21st Century is true, that today's students are 'digital natives' while the teachers are 'digital immigrants' it will be interesting to find out how teachers and students in higher education are responding to the evolution of new technologies such as Web 2.0. Important questions would be, "are students really digital natives?" and "how are the digital immigrants responding to the emerging technologies?"

Ely is perhaps the most widely cited author in the area of implementation of instructional innovations. Ely (1999; 1990) lists eight conditions that facilitate implementation of an innovation and I am going to discuss these in the subsequent section. For the purpose of this study, innovations refer to the Web 2.0 technologies. The eight conditions developed by Ely are:

- Dissatisfaction with the status quo: refers to an emotional discomfort resulting from the use of current processes or technologies that are perceived as inefficient, ineffective or not competitive. This affective state is either self-induced or results from or-

ganisational awareness or leadership campaigning for the need to change. This condition is similar to relative advantage discussed by Rogers (1983).

- Knowledge and skills: refers to users possessing and or acquiring the needed skills and knowledge to employ the innovation. Staff development may be a necessary part of the implementation plan. The people who will ultimately implement any innovation must possess sufficient knowledge and skills to do the job.

- Availability of resources: refers to availability and accessibility to resources needed to implement the new technologies. These include finances, hardware, software, materials, personnel and technological support.

- Availability of time: refers to the willingness for organisations to provide paid time for users to learn the new skills or procedures in order to use the innovation, as well as the user's willingness to devote time to develop these new skills.

- Rewards or incentives exist for participants: people need to be encouraged in their performance of innovation or use of the innovation. Extrinsic or intrinsic rewards can add some value of the innovation and thus promote its implementation.

- Participation: refers to the level of involvement stakeholders have in the decision-making process to adopt and implement an innovation. Participation may take the form of user group representatives if it is difficult to get feedback from all potential users. With the opportunities to communicate their ideas and opinions, the participants can have sense of ownership of the innovation. Moreover, the communication among all parties can help monitor the progress of the innovation.

- Commitment by those involved: refers to visible support by the upper level leaders. The key to this condition is how the users perceive the leaders' commitment to the implementation of the innovation. Simple verbal endorsement of the innovation by leaders does not constitute commitment. Since the implementation take a great deal of endeavours and time, the people who are involved in the implementation need to make commitment to their efforts and time. There must be firm and visible evidence that there is endorsement and continuing support for implementation.

- Leadership is evident: refers to the level of ownership and support given by the leaders who will manage the daily activities of those using the innovation. The enthusiasm

> of these leaders directly affects the motivation of the users of the innovation. Immediate supervisors must provide support and encouragement, answer questions, address concerns, and serve as role models. Even though individuals act alone, especially in classroom endeavours, they need inspiration and continuing support of individuals whom they respect. These individuals, often called leaders, provide initial encouragement to consider new ideas; they ensure that the necessary training is given and that the materials to do the job are easily available; they are available for consultation when discouragement or failure occur; and they continually communicate their enthusiasm for the work at hand.

Although presented independently, these conditions are interrelated. They affect each other by either supporting or undermining one another. These factors constitute a good basis for analysis of factors affecting the use of innovative technologies such as Web 2.0.

In the context of ICTs adoption and use, the barriers can be classified into two levels: external barriers (e.g., limited resources, lack of time, lack of technical support, and technical problems) and internal barriers (e.g., lack of confidence, resistance to change, negative attitudes, and lack of perceived benefits) (Snoeyink and Ertmer, 2001). Surry, Ensminger, and Haab (2005) proposed the RIPPLES model to examine certain barriers to the integration of instructional technology into higher education: resources, infrastructure, people, policies, learning, evaluation, and support. The model was based on several models: Rogers' theories (1995), Ely's (1999) eight conditions that facilitate implementation, Stockdill and Morehouse's (1992) critical factors in adoption checklist, Hall and Hord's (1987) concerns-based adoption model, and Farquhar and Surry's (1994) concept of adoption analysis. In the context of Web 2.0 adoption, the barriers show disparity between the above barriers and others. Zakaria, Watson, and Edwards (2010), for example, examined several factors, (e.g., access to technology, usage trends, literacy and familiarity, learning preferences, and learning expectations) to understand how students would react if Web 2.0 technologies were adopted into their learning. In an attempt to explore the perceptions that master of library and information science students had of social software, Al-Diahani (2009) investigated several obstacles, including lack of training, information privacy, lack of technical support, level of interest, religious reasons, usefulness, lack of using the Internet, and lack of encouragement. These theoretical frameworks and empirical studies served as sources of item constructions for the addressed barriers of the present study

3.3.5. Active Learning and Student Engagement

Web 2.0 technologies support student-student and student-instructor engagement in an online classroom. This engagement is evidence of the active student participation in the learning process. Ultimately, Web 2.0 tools function "innately", as suggested by Ullrich et al. (2008, p. 709) and as a pedagogical tool "characterized by social learning and active participation".

Student engagement is a goal in most face to face and online classrooms and creates a social and active learning environment. This engagement, as you will see in the third section, helps to build a greater sense of classroom community. In a general sense, motivation drives student engagement and thus student engagement increases learning. There are many factors that motivate learners to learn, and motivation is a key component to the working memory (learning). The more motivation a person has to learn, the more engagement the student has while learning. Therefore, the more time information is processed or rehearsed in working memory, the greater likelihood it will move to long term memory. Brooks and Shell (2007) defined motivation as the conscious or subconscious allocation of working memory to particular task. Motivation however cannot be separated from emotion since both influence cognitive load.

Motivation and emotion can increase the allocation of working memory resources provided that these are regulated (Brooks and Shell, 2007). The factors that create motivation vary from student to student but many motivators are explained through such theories as Human Capital Theory (Becker, 1964), Attribution Theory with an educational emphasis (Weiner, 2000), Flow Theory (Chan and Ahern, 1999) and Social Learning Theory (Bandura and Walters, 1963). These theories provide evidence that motivation is a key element in the learning process. Many scientists and theorists have explained the origin of these motivators and how they are apparent in a classroom setting. One thread that is apparent in all theories is that motivation and learning cannot be separated from emotion and engagement. As Graham (1991) wrote, "A viable theory of motivation for educational psychology must be able to incorporate emotions. After all, the classroom is a place of multiple affective experiences with motivational significance, including those feelings associated with achievement success or failure, as well as acceptance or rejection by others" (p. 16). According to Rueda and Chen (2005) these motivational factors vary across cultural and ethnic groups. The Unified Learning Model (ULM) by Brooks and Shell (2007) describe that there are individual differences as to the amount of allocation of engagement an individual gives to a particular item to be learned. Ellis and Ashbrook (1988) suggested the resource allocation hypothesis which states that one‘s

performance on a task is dependent not on the amount of working memory capacity a person may have, but rather on the extent to which that working memory capacity is being allocated to the task. The motivational beliefs/factors differ but all groups still have motivation and engagement as a key component to the learning process (209). Brooks and Shell (2007) concurred and expanded upon this concept when proposing the Unified Learning Model.

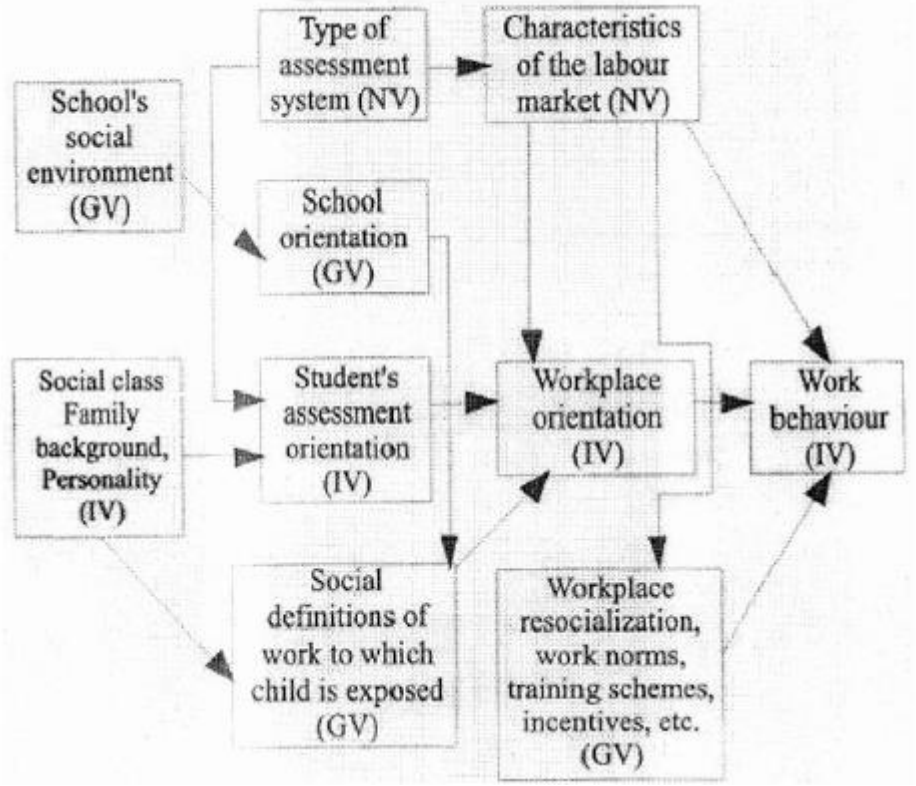

Figure 3.4: Motivators for Learning and Working

Figure 3.4 above (Little, 2003) shows that learning motivation and engagement is influenced by the school's social and cultural environment as well as the social definitions of work which motivates a learner (Little, ibid., p. 450). One's community affects the amount of student engagement.

According to Bowen (2005) student engagement is defined as being actively involved in the learning and is a four stage process. This process requires that educators:

1- Involve students in the learning process.

2- Involve students in new experiences.

3- Involve students in the context of the learning.

4- Involve students in the human element of learning. The active involvement in learning increases the amount of learning. 'Most students will learn more if they are actively involved in the learning process somehow' (Haley and Heise, 2008).

3.3.6. Building Community

What is a community? What is a classroom learning community? The definition of classroom learning community according to Alfred Rovai (2002) is based on the following characteristics:

a) 'The setting is the world of education.

b) The primary purpose is learning.

c) The community is based on a fixed organizational tenure, that is a set length of the course or program in which members are enrolled' (p. 34).

A learning community is then a group of people who share common characteristics or beliefs and who are actively engaged in learning from each other. According to Rovai a classroom learning community can be seen in four dimensions: spirit, trust, interaction, commonality of expectations and goals (which means learning). Spirit is the bond that connects student-to-student and student-to-instructor. Trust is the reliance students have on one another and their instructor. Interaction is the active involvement from one student to another and from student-to-instructor. Commonality of expectations and goals is the commitment each student has toward their learning and the commitment the instructor has for facilitating this learning (Rovai, 2002). These dimensions define a classroom learning community.

3.3.6.1. The Importance of Community

Why would one need a classroom community? The importance of community can be seen in all areas of life, especially in the classroom. In a face-to-face classroom, building community is based on the face-to-face human interaction that takes place between students and instructors. In the virtual classroom a community is based on different interactions. Both classroom environments still need a sense of community to be successful. According to Krashen (1983), by creating a community of learners one lowers the affective filter which inversely increases the comprehensible input of learning which students can process. Thus, this ―sense of com-

munity‖, increases students' capacity for processing the new material, with improved achievement being the learning outcome.

The community of learners also fosters deeper learning through interactions with one another. According to Fisher, "Learning may be best achieved through the social construction of knowledge in a 'learning community'—an environment where the student is both a member of a learning community and also an agent of learning within the environment" (Fisher, 2002-2003, p. 245). In the study done by Ouzts (2006) he found that students scored higher on the Classroom Community Scale (CCS) when there were interactions occurring in the classroom between student-student, student-instructor and student-content. Student engagement promotes ownership of learning that thrives in a community of learners. Students who feel more connected to the classroom community have greater success in their completion of online course and programs (Rovai, 2005; Palloff and Pratt, 1999).

> "Developing a learning community creates an environment that empowers students to construct their own meaning from information and resources presented to them in courses and trainings. It also creates a time for reflection (Fisher, 2002-2003, p. 245).

This act of processing information to develop one's own meaning and then reflecting allows for deeper learning to occur which activates connections to prior knowledge (Chapman, Ramondt, and Smiley, August 2005).

Building a community allows for more learning to occur through an increase in comprehensible input, student ownership of learning and deeper learning processes which take place. These positive aspects of building a community can result in increased student achievement and learning.

Web 2.0 technologies can effectively engage students in the building of a community. These engaging technologies facilitate the use of a learner-centred method of instruction called the Community of Practice. This method allows students to be part of a framework of learners that has a social construction rather than individual learners isolated from one another in the learning process. This collective structure increases student achievement through the nature of the peer pressure of social obligations (Lave, 1991). With the re-emergence of the constructivist theory of learning based on the abilities of Web 2.0 technologies, the structure of online learning has changed (Simoes and Gouveia, 2008).

CHAPTER 4: METHODOLOGY, METHODS AND PROCEDURES

4.1. Introduction

This study explored the use of Web 2.0 technologies at Sultan Qaboos university in the Sultanate of Oman. The main research questions for the study are outlined in chapter 1. This chapter presents a discussion of the methods and procedures used to generate answers to the main research questions. Stringer (2010) states that when we conduct research in relation to education, we collect information about a particular subject. In this case, the subject is the use of Web 2.0 technologies in a public higher education institution. The first part of the chapter looks at the definition of key terms such as methodology and methods. This will be followed by a discussion of the theoretical framework guiding the conduct of the study, the research design, the research approach, data collection methods used, data analysis tools and lastly but not least, the ethical considerations underpinning the conduct of the study.

The concept of research methodology is defined differently in the literature, as a result of this, in the first part of this chapter the researcher will clarify how the concept is interpreted in this study. Bassey (1990, p. 35) defines research as a 'systematic, critical and self-critical inquiry which aims to contribute to the advancement of knowledge'. This view is further buttressed by Clough and Nutbrown (2008, p. 5) who assert that, 'research is the investigation of an idea, subject or topic that enables the researcher to extend knowledge or explore theory'. They go on to demonstrate that research is a critical process and is involved with 'radical looking', 'radical listening', 'radical reading', as well as 'radical questioning'. This implies that the research process requires a careful consideration of methods to be used which allow the generation of credible knowledge. It is therefore, important to define the research methodology clearly. As indicated earlier, research methodology has been defined variously. This view has been well articulated by Clough and Nutbrown (2002, p. 2) when they say that:

> "Trying to produce a definitive definition of methodology as used in the social sciences and to serve the purposes of all researchers is rather like trying to catch water in a net. Different researchers offer slightly differing definitions according to their own training, discipline and purposes".

For the purpose of this study, research methodology shall be interpreted according to the definition proffered by Wellington et al. (2005, p.97) who say, 'methodology refers to the theory of [generating] knowledge and the activity of considering, reflecting upon and justifying the best methods'. This view is echoed by Clough and Nutbrown (2002, p.27) when they say

that: ‘one of the tasks for a methodology is to explain and justify the particular methods used in a given study’. In the same vein Sikes (2004, p. 16) observes that: ‘methodology is concerned with the description and analysis of research methods rather than with the actual, practical use of those methods. Methodological work is, therefore, philosophical, thinking work’.

It is important to notice that all the authorities cited above make a clear distinction between method and methodology. In this writing method is conceptualised as being part of methodology which is about doing, which is, generating data whereas methodology is about understanding doing. In this chapter, an effort is made to clarify the methodology and methods used in the conduct of this study. In the following section, the researcher will start by defining the theoretical framework underpinning the conduct of this study.

4.2. Theoretical Framework

This study sought to understand the perceptions of teachers and students regarding their use of Web 2.0 technologies. The researcher therefore considered the use of Interpretative Phenomenological Analysis (IPA) methodological framework. IPA attempts to view and understand the world as seen by the participant. Smith and Osborn (2007) describe IPA as follows: ‘the aim of IPA is to explore in detail how participants are making sense of their personal and social world, and the main currency for an IPA study is the meanings particular experiences, events, state, hold for participants’. According to Smith and Eatough (2007), IPA is most appropriate for research that seeks to understand how individuals perceive and understand significant events in their lives. In designing research instruments, for example, the questionnaire or interview guides, it can be said that the researcher’s own views influence the participants’ thinking. This is a fair observation and in Social sciences, it is widely accepted that research is value-laden. It is therefore my assumption is that although the participants will have an opportunity to articulate their own experiences with the use of Web 2.0 technologies in the teaching and learning process, my own views will influence the questions given to the participants. It is still possible to adopt IPA for this study especially if what Willig (2001) said can be applied. More than two decades ago, Willig (ibid,) points out that even though IPA endeavours to explore participants’ experience from their own perspective, the methodology recognises that this kind of exploration necessarily implicates the researcher’s own view of the world, and may be influenced by the nature of the interaction between the researcher and the participant. In the case of this study, the researcher intended to explore the experiences of teachers and students. Although the researcher designed a questionnaire, the

instrument included both closed-ended questions and open-ended questions to allow participants to share their full experiences without being limited by the researcher's thinking only.

4.3. Research Design

In making a decision about the appropriate research design the researcher looked at the nature of the research problem in this study and the existing research designs which include qualitative, quantitative and mixed method designs. The study sought to explore perceptions held by the participants who include teachers and students in the participating university. In this case, qualitative research would appear to be a more appropriate tool than quantitative research. Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes and the researcher making interpretations of the meaning of data. The final written report has a flexible structure. Those who engage in this form of inquiry support way looking at research that honours an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation (Adapted from Creswell, 2007 cited in Creswell, 2009).

The study also involved some quantitative data analysis, in particular, when exploring differences in the way different factors such as gender, students' level of study, field of study, age and academic performance influenced or was influenced by the use of Web 2.0 tools and applications. Quantitative research is a means for testing objective theories by examining the relationship among variables, in turn, can be measured typically on instruments, so that numbered data can be analysed using statistical procedures. The final report has a set structure consisting of introduction, literature and theory, methods, results and discussion (Creswell, 2008 cited in Creswell, 2009).

In a way, this study combined the use of qualitative and some aspects of quantitative research approach. In a quantitative approach, the researcher seeks to analyse data which is presented in numerical form. In contrast, a qualitative approach is one which describes data in words (Krathwohl, 1993, p. 740). Wiersma and Jurs (2005, p. 13-14) go deeper than just considering the way data are presented. They state that quantitative approach is deductive, reasoning from general to specific, theory-based, context-free, and it is done to determine relationships, effects and causes. On the other hand they state that a qualitative approach is more inductive, reasoning from specific to general, does not emphasize a theoretical base, context specific,

and it is done to understand social phenomena. They conclude the comparison by highlighting that both approaches are valuable and have relevance for the educational improvement.

The qualitative versus quantitative idea is widely debated in the education research literature. Some researchers advocate only one of these approaches but others support the idea of a combination or triangulation (Muijs, 2004; Cohen et.al, 2009). However, these two approaches have different complementary strengths. the researcher adopted a pragmatic stance by using mixed-method approach. By definition, mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches and the mixing of both approaches in a study. Thus, it is more than simply collecting and analysing both kinds of data; it also involves the use of both approaches in tandem so that the overall strengths of a study is greater than either qualitative or quantitative research (Creswell and Clark cited in Creswell, 2009, p. 4). The combining of both approaches can be used to correlate data and overcome the weaknesses, biases and limitations of using just one of them. In addition, using both of them helps in the collection of more comprehensive and robust data. Using different methods derived from qualitative and quantitative research approaches, the researcher collected data relating to teachers and students' perceptions of using Web 2.0 technologies.

4.4. Research Approach

This project adopted the case study approach. The research project was conducted at a Sultan Qaboos University in the Sultanate of Oman. According to Yin (2009, p. 143) a case study is, 'an empirical inquiry that investigates a contemporary phenomenon in-depth and with its real-life context, especially when the boundaries between phenomenon and context are not clearly evident'. There are several reasons why researchers adopt the case study approach. It seeks holistic explanation and justification as indicated by Denscombe (1998, p. 31) when he says, a case study tends to be 'holistic rather than deal with isolated factors'. This view was highlighted earlier by Stenhouse (1985) who recommended applying case study as a research approach because it encourages the researcher to interpret situations, use judgement and arrive at a promising course of action. The researcher wanted to explore the use of Web 2.0 technologies and discuss findings in context; hence, the researcher decided to make use of the case study approach. A case study is a particularly appropriate approach for the individual researcher because it provides an opportunity for one aspect of a problem to be studies in some depth within a limited a timescale (Bell, 1999). Similarly, Shipman (1997) argues that the practical advantage of a case study is that it is a small-scale research which requires few

resources and leads the researchers straight into the action. This study was to be accomplished in a limited time and so resources including time were limited as a PhD student. The choice of the case study approach is based on the following aspects: It provides an opportunity for one aspect of a problem to be studied in some depth within a limited timescale… (Bell, 1999, p. 10).Unlike the experimenter who manipulates variables to determine their causal significance or the surveyor who asks standardised questions of large, representative samples of individuals, the case study researcher typically observes the characteristics of an individual unit - a child, a clique, a class, a school or a community. The purpose of such observation is to probe deeply and to analyse intensively the multifarious phenomena that constitute the life cycle of the unit with a view to establishing generalisations about the wider population to which that unit belongs (Cohen and Manion, 1989, pp. 124-125). In Yin's writings the essence of case study is that it is enquiry in a real life context, as opposed to the contrived contexts of experiment or survey. It relies on multiple sources of evidence, with data needing to converge in a triangulating fashion' (Yin, 1994, p.13). This study utilised interviews and a questionnaire to establish the perceptions held by teachers and students regarding the use of Web 2.0 technologies.

The case study is criticized by some authorities in terms of the nature and difficulty of generalization. As Stenhouse (1985, p. 266) highlights: 'In case study the relationship between a case, and a collection of cases that may superficially resemble a sample, and any population in which similar meanings or relationships may apply, is essentially a matter of judgement'. The researcher was not interested in the breadth but depth of the study, hence, use of case study was appropriate. Bassey (1999) points that the reliability of the research is more important than its generalizability. The researcher agree with Bassey 's (ibid.) observation that although case studies are limited in terms of generalizability, it is possible to generate some "fuzzy generalisations" which are in essence states about the possibility of what might be found in situations which are parallel to the case study.

4.5. Research Methods

Research methods are 'the tools or instruments used for data collection or data analysis' (Dillon and Wals, 2006, p. 551). This section focuses on the process of data collection. An effort is made to justify the suitability of the particular methods of data collection employed in this research study. The most commonly used methods include documentary analysis, questionnaire, interview and observation. Each of these methods can be subdivided in several ways.

For example, different types of interviews exist including structured, semi-structured and un-structured. The researcher has to make a choice of the appropriate methods. In this study, the choice of data collection methods was done in light of the guidance offered by Cohen et al. (2000) who say that a key determining factor in choosing a particular research method, whether it lies within quantitative or qualitative approaches is the suitability of that method for use when examining the research questions. Based on the nature of the research questions and the type of data .The researcher was interested to generate, the researcher adopted the use of questionnaires and interviews as described in the following paragraphs. Furthermore, the choice of research methods was influenced by other factors including practical feasibility, for instance, accessibility, time and resources limitation. Each method has its strengths and weaknesses in different aspects. Using different methods was an attempt to enable the methods to complement each other.

4.5.1. Questionnaire

A questionnaire usually contains standardized items and supplies pre-coded answers, which allow for speedy analysis of data. While some respondents may prefer pre-coded questions as an easier and quicker way to respond, others may find it restricting their freedom to express themselves (Denscombe, 2003). A questionnaire was used to elicit teachers and students' perceptions about the use of Web 2.0 technologies in technologies. Although most of the questions in the questionnaires were closed-ended, the researcher also included open-ended questions to enable participants to give their own views in more detail without the constraint of pre-coded answers. See appendices 1 and 2 for the teachers and students' questionnaires respectively.

In order to achieve a higher response rate and reliability of the questionnaires, the researcher attached great importance to the design. The introductory part of the questionnaires explained the purpose and importance of the questionnaire, assured the respondents of anonymity and showed appreciation of the respondents' contribution. The questionnaires provided a quick and easy way of getting information and also had the advantage that questions could be standardized and anonymity could be assured. Since there is no interviewer present when a self-completion questionnaire is being completed, interviewer effects can be eliminated: '…it has been suggested that such characteristics as ethnicity, gender, and social background of interviewers may combine to bias the answers that respondents provide' (Bryman, 2004, p. 133). Use of a questionnaire made it easier for me to collect information from large numbers

of participants, in particular, students over a short time compares to interviews. It is difficult or impossible for participants to spare a lot of time to accommodate the researcher given their tight schedule in the university so use of a questionnaire for both teachers and students was really convenient. The benefits of using survey methods are well articulated in literature. Survey methods allow researchers to cover a large geographic area at minimal cost. Indeed they are easy and quick for the respondents to complete as well as being helpful to investigators in collecting feedback on facts, attitudes, opinions, and experiences (Sudman and Bradburn, 1982). Thus, the data can often be gathered and ready for analysis faster than when the data are analyzed through interviews. Because the participants and the researcher might never see each other, surveys often provide some level of anonymity. In this case, respondents might be more truthful than they would be in a face-to-face encounter (Leedy and Ormrod, 2009).

4.5.2. Semi-structured Interviews

Interviews constitute valuable tools which allow researchers to learn about participants' knowledge, experiences, feelings and expectations and to gain insight and to obtain descriptions of events that are normally unavailable for observation. Perakyla cited in Denzin and Lincoln (2005, p.869) says, 'interviews consist of accounts given to the researcher about the issues in which he or she is interested'. As indicated earlier, this study required me to explore perceptions held by the teachers in the participating university regarding their use of Web 2.0 technologies. The researcher chose semi-structured interviews to enable her to focus on the main issues of interest and at the same time allowing participants to talk freely about other issues of interest to them around the use of Web 2.0 technologies. Data from interviews was used to complement data generated from the teachers' questionnaires. Wellington (2000, p. 71) states that 'interviews can reach the parts which other methods cannot reach…allowing a researcher to investigate and prompt things that we cannot observe like the interviewee's thoughts, values, prejudices, perceptions, views, feelings and perspectives'. The issues the researcher pursued are not straight forward matters, the researcher was looking at perceptions, experiences and feelings about the use of Web 2.0 technologies and this justifies the use of interviews (Denscombe, 1998).

The use of semi-structured interviews with a clear list of issues and open-ended questions to be addressed helped me to provide the interviewees (teachers) to elaborate on points of interest. It was possible for me to probe and expand the interviewee's responses and it allowed for

deviation from a prearranged text and to change the wording of questions and the order in which they were asked (Opie, 2004). This way, the interviewees could speak widely to develop their ideas. Data is generated through genuine reflection and thoughts of the interviewees. This view is supported by Oppenheim (1992, p. 81) who claims that: 'interviews should encourage respondents to develop their own ideas, feelings, insights, expectations or attitudes and in so doing allow the respondents to say what they think and to do so with greater richness and spontaneity'. Semi-structured interviews are widely used in qualitative studies. According to Uwe (2002, p. 74), 'this interest is linked to the expectation that the interviewed participant's viewpoints are more likely to be expressed in a relatively openly designed interview situation than in a standardized interview or a questionnaire'.

All the teachers who were interviewed were chosen as Denscombe (1998, p. 119) posits, 'because they [had] some special contribution to make, because they had some unique insight or because of the position they hold'. Structured interviews have not been considered because they involve predetermined list of questions where respondents are asked to offer limited option responses. In addition to this, structured interviews give less opportunity for new and unexpected points to emerge because they use closed-ended questions. Closed questions are restricted and not suitable for the type of data the researcher intended to generate in this study. On the other hand, unstructured interviews are open-ended and free ranging such that the interview may veer from the main focuses. This is because instead of the interviewer preparing a list of questions, he or she would normally introduce the topic and what follows depends on the interviewee's thoughts, unguided by the interviewer's priorities. Therefore, unstructured interviews were not suitable for this research because the researcher already had an idea about the issues and themes the researcher wished to explore in this study and at the same time the researcher wanted to allow the opportunity for participants to come up with any issues they felt were of particular importance to them (Cohen and Manion, 1994) the researcher avoided going to talk to participants with a rigid set of questions that would limit their input due to questions asked or not asked. Instead, the researcher had a very fluid list of key topics related to the research questions the researcher wished to include. The researcher wanted an open discussion that would be more like a conversation rather than a formal interview. This allowed for more spontaneity of interaction and the direction the exchange took was in the hands of both the participants and myself as the researcher. During the course of the interview the researcher tried to talk as little as possible to allow the participants to talk about their thoughts and experiences. The researcher prompted when the she felt there was a need

and at times posed a few questions to focus the discussion. The researcher recorded the interviews using a digital voice recorder. This helped her to concentrate on how the interviews were proceeding and where to go next. The researcher also took some notes especially regarding the body language of the participants and this was very helpful during analysis of findings.

4.6. Research Procedures

The aim of this study was to explore what teachers and students think about their use of Web 2.0 technologies in teaching and learning contexts. Perceptions are hard to measure by methods such as observation because these are views held by individuals. The study made use of a mixture of quantitative and qualitative methods to collect data from the participants. In this section, an effort is made to discuss the procedures followed to generate answers to the research questions at hand. The study setting and population including sampling, data collection, data analysis, the conduct of the pilot study and the ethical considerations will be discussed in the subsequent paragraphs.

Stringer (2010, p. 3) states that 'when we conduct research in relation to education, we collect information about a particular subject'. However, Stringer also thinks that research is a form of transformational learning that increases the "stock of knowledge" that helps people to deal with their lives more effectively. In the same vein, Denscombe (2003, p.27) shows that one of the purposes of research is to develop good practice and enhance existing performance citing that:

> "The aim of the research is to arrive at recommendations for good practice that will tackle a problem or enhance the performance of the organization and individuals through changes to the rules and procedures within which they operate".

As indicated earlier, the researcher was interested in exploring the use of Web 2.0 technologies in education. This would generate useful information that can be used to solve existing problems and improve Learning performance in the university. To achieve the goals of this study, the researcher adopted a systematic approach in the conduct of the study. Firstly, the researcher examined and gathered information about the situation obtaining at the university in terms of the teachers and students' use of new technologies in their teaching and learning practice. Secondly, the researcher collected information specifically about the possible ways for changing, improving or developing the current state of Web 2.0 use in the university. The

overall aim of the study was to propose a model and draw a framework about how the existing problems could be solved and how to enhance the use of Web 2.0 technologies in teaching and learning context in the university. According to Wiersma and Jurs (2005, p. 4) the process of doing research could be summarized in five main steps: identifying the problem, reviewing information, collecting data, analyzing data and drawing conclusion. The researcher followed the same steps in conducting this study.

The first step in the research process involved clearly identifying and formulating the "problem". In order to achieve this, the researcher conducted a prior review of literature related to the development of education system by using Web 2.0 tools in the higher education sector paying particular attention to the issues and concerns at the university where the study was to be conducted. The researcher sought to understand some of the challenges web 2.0 tools. As the researcher read the literature some questions were emerging which helped to shape the main research questions highlighted in chapter 1. Some of the questions that came into mind include the following, and the researcher must say these questions also influenced the design of the questionnaires.

- To what extent are students in the university making use of online learning activities? For instance, how much time do students spend on online activities during the week and over the weekends?
- To what extent do students use online activities as learning tools?
- What factors influence students' perceptions of adopting Web 2.0 technologies and applications as learning tools?
- What factors influence students' adoption of Web 2.0 applications (online activities) as learning tools?

Understandably, the research questions form the basis of the research and the core of what the research is seeking to find. Moreover, they help in finding the suitable methodologies to undertake the research. In order to come up with appropriate solutions to the research problems, researchers are expected to employ suitable methodologies. Muijs (2004, p. 3) states that ‘while it is important to use the right data analysis tools, it is even more important to use the right research design and data collection tools’. At the preliminary stage, before deciding on the methods and after the identification of the problem, the aims and objectives of the research had to be clearly determined and the value of adopting one or more research method-

ologies had to be assessed. The methodology selected for any research project must be appropriate to the goals of the research and for answering the questions.

It is widely accepted that more than one method in any given study can be used (Cohen et al., 2009). As explained before, this study used semi-structured interviews and questionnaires. The reason why the researcher chose to use these two methods in this study was the distinctive contribution that each particular method could offer in investigating the research questions.

Research methodology can be broadly divided into quantitative and qualitative approaches. In a quantitative approach, the researcher seeks to analyse data which is presented in numerical form. In contrast, a qualitative approach is one which describes data in words (Krathwohl, 1993, p. 740). Wiersma and Jurs (2005, p. 13-14) go deeper than just considering the way data are presented. They state that quantitative approach is deductive, reasoning from general to specific, theory-based, context-free, and it is used to determine relationships, effects and causes. On the other hand, they state that a qualitative approach is more inductive, reasoning from specific to general, does not emphasize a theoretical base, context specific, and it is done to understand social phenomena. They conclude the comparison by highlighting that both approaches are valuable and have relevance for the educational improvement. The qualitative versus quantitative idea is widely debated in the learning research literature. Some researchers advocate only one of these approaches but others support the idea of a combination or triangulation (Muijs, 2004; Cohen et.al, 2009). However, the researcher believe that these two approaches have different complementary strengths. Generally, this study utilized the two approaches, qualitative and quantitative and uses more than one method to collect data. Questionnaires and interviews were both used. The combination of both approaches can be used to correlate data and overcome the weaknesses, biases and limitations of using just one of them. In addition, using both of them helps in the collection of more comprehensive and robust data. Yin (1984, p. 92) for example states that: '…any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several different sources of information'.

This study involved collecting data related to teachers and students' perceptions of using Web 2.0 technologies in teaching and learning. The present study is exploratory in nature, given that not much is known about teachers and students' perceptions of adopting Web 2.0 technologies as teaching and learning tools, especially in the Sultanate of Oman where the

use of these tools is relatively new. Several quantitative techniques were used to analyse data in an effort to statistically identify any significant differences between the mean scores of the demographic variables and predict adoption of Web 2.0 technologies based on perception of Web 2.0 attributes and perception of barriers to the adoption of Web 2.0. Babbie (2004) defined quantitative research as 'the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect' (p. 94). Thus, the research strategy of the study focuses on collecting and analyzing both qualitative and numerical data to present the answers to the research questions of the present study. The following section focuses on the study setting and the population.

4.6.1. Study Setting and Population

This study was conducted at Sultan Qaboos university in the Sultanate of Oman and involved working in partnership with teachers and students from different colleges across the university. In addition, this is the work place for the researcher which made it easy to access and to articulate issues under investigation. The number of participants and how they were recruited is explained in the following section (4.6.2). Here, an overview of the university is provided. The university was established in 1986 and has nine colleges including Engineering, Sciences, Arts and social sciences, Commerce and Economics, Medicine and Health Sciences, Education, and Agriculture and Marine Science ,Law and Nursing . Its reputation rests on its research laboratories and on its highly qualified teaching staff. The university runs several highly specialized scientific and research centres which include the following:

- Centre for Educational Technology.
- Language Centre.
- Centre for Information Systems.
- Educational Research Centre.
- College of Commerce and Economics Information Centre.
- College of Arts and Social Sciences' Radio and Television Studio.
- Solar Cells Testing Centre.
- Water Desalination Research Station.

- Agricultural Research Station.
- Earthquake Detection Centre.
- Virtual Reality Carbonic Study Centre.
- Energy Research Centre.

The university provides both undergraduate and postgraduate studies. Postgraduate Master's courses were offered for the first time in 1992/1993 academic year in the College of Education and Arts, followed by the College of Science in 1995/1996, the College of Agriculture in 1996/1997 and the College of Engineering in 1998/1999 (Ministry of Higher Education, 1999). The Royal Decree regarding University Law No. 9/1986 states the aims of the University as follows:

1. Educating Omani students by making them fully aware of their Islamic and Arab cultural heritage as well as strengthening their religious faith and patriotism.
2. Educating Omani students in both academic and technical fields and in self-reliance as well as training them to serve their country.
3. Maintaining the Omani identity and protecting its social and moral values.
4. Encouraging research in the sciences, social sciences and the humanities. The aim of this research should be to foster intellectual achievement both inside and outside Oman.
5. Playing a direct and effective role in realizing the social and economic development of Omani society by the improvement in productivity and the careful exploitation of natural resources.
6. Assisting local society in finding appropriate solutions to its cultural, social and economic problems.
7. Exchanging expertise and establishing solid cultural and academic links with Arab and non-Arab universities and other educational institutions (Sultan Qaboos University, 1997).

The university is committed to providing excellent student experience. With the advent of new technologies, the university was among the first higher education institutions to embed

new technologies in teaching and learning context across all the colleges. In this study, the researcher intend to explore the use of Web 2.0 technologies. This involves working in partnership with a sample of teachers and students from all the nine colleges in the university as highlighted above.

4.6.2. Sampling of Participants

The researcher recruited the participants of the study from most of the colleges in the university. After the study was approved and permission granted for conducting field work in the university, the researcher proceeded to recruit the participants of the study including teachers and students. Using the academic staff and all students' email distribution lists on Outlook emails were sent out inviting participants to the study. Participation in the study was voluntary.

The university has a teacher population of (1170) and student population of (3200). In the university, education is segregated by gender resulting in two campuses, one for males and another one for females. Participants in this study were drawn from both campuses, that is, the study involved both male and female teachers and students. Atotal of 300 teacher and 600 students enrolled in the study .Of these only 2 teachers from college of Law are responses , and 59 students did not provide full responses to the questionnaire, hence they were eliminated from the analyses of results leaving a total of 298 teacher and 541 student participants.

4.6.3. Data Collection

As indicated earlier on, the study involved the use of questionnaires and semi-structured interviews. The rationale for adopting the two methods has been explained and here the focus is to discuss how the interviews and questionnaires were used in the field work.

4.6.3.1. Data Collection Using Questionnaires

A questionnaire survey was employed to collect student perceptions regarding the use of Web 2.0 technologies as learning tools. A random sample of 300 teachers and 600 students was selected as the population sample from Sultan Qabooos university in Sultanate of Oman Oman were surveyed. The teachers and students were drawn from 9 different colleges across the university. After obtaining the official permission from the university, the questionnaire was translated to the Arabic language (see Appendices 1 and 2 for the teachers' and students' questionnaire respectively), which is the language spoken by the population sample of the present study.

The Arabic version of the questionnaire (for students and teachers) was distributed in print copies to the students and teachers on different campuses of the university at different periods of time, morning and afternoon. Students were handed the questionnaires in the college halls and cafeterias of both campuses. For the teachers, the questionnaires were handed to them in their offices in the college at the university. All the participants were informed about the voluntary nature of their participation in the study.

In selecting the sample for the questionnaire the researcher firstly applied for an ethical approval letter which then sent to the participating university. Later the participating university sent letters to all the Colleges to get volunteers. After that, the questionnaires were randomly distributed among the volunteers. An effort was made to ensure that participants were a good reflection of the student population. For instance, participants were drawn from all the colleges in the university. This was done to make the sample as representative as possible. The main reason behind asking for volunteers is to get more reliable data as the sample of participants are not forced to respond. So, they should provide more accurate answers. Moreover, this is more ethically accepted.

Wiersma and Jurs (2005, p. 175) state that, 'one of the persistent problems with questionnaire studies is the possibility of a high rate of non-response'. To try to avoid this common problem, the researcher distributed the questionnaires randomly herself.

Questionnaires were analyzed using SPSS. The last section (open question) was translated back into English but rather than the word by word translation, 'the sense' of these responses was translated. This is because direct translation would not make sense for some of the sentences. Thematic analysis was used with the main ideas gathered, sorted into themes and then related to the proposed use of Web 2.0 tools applied in the university. The preliminary analysis of the questionnaire served to point further avenues for the interview in the case of teachers. For example, during the conduct of the interviews the researcher tried to raise some of the problems that were highlighted in the open-ended questions of the questionnaires for discussion.

The questionnaire was designed in such a way that it contained questions that covered all the research questions. Henerson et al. (2005, p.27-29) argue that 'the questionnaire is one of the most appropriate and useful data gathering instruments with which to survey attitudes'. They state that the questionnaire is advantageous in many ways. It is anonymous and therefore can encourage greater honesty of response. Moreover, questionnaires can be more economical in

terms of time and money and can be given to many people simultaneously. This is in addition to the greater uniformity a questionnaire can provide in gathering information. Every person responds to exactly the same question. In general, the data the questionnaire provides can be easily analyzed and interpreted.

Although, the questionnaire has several advantages, it also has some limitations. Henerson et al. (2005, p. 29) state that, 'the questionnaire is not flexible; it cannot explore further any ideas or comments that a respondent makes. Henerson et al. (ibid.) also argue that written responses may be limiting for some people who might express themselves more easily orally. In this research, in order to benefit from the advantages of the questionnaire and to avoid its limitations, the researcher designed the questionnaire in a way to achieve its aim which was to gather the views from a large number of respondents in three identifiable groupings. To enrich the data, in addition to the questionnaire, a small sample of the teachers (5 teachers) was identified for semi-structured interviews.

Student Questionnaire

The student questionnaire (appendix 2) contains three sections namely:

First Section

The first section of the questionnaire is designed to collect demographic information from the academic students. The demographic variables were comprised of gender, class level, and academic field, age, and performance at High School. Servon (2002) pointed out that age, gender, economic status, and major are categories within higher education representative of the well-known concept of the racial, geographic, and class based cultural (digital divide) in technology information use, ownership, and skill.

Second Section

The second section focuses on students' on-line activities and includes two items related to the proposed principles of using Web 2.0 tools as explained in literature review. Groups of positive statements were prepared relating to each of the uses of Web 2.0 technologies: The first statement asks: how many hours do you spend on-line during the week days? And how many hours do you spend on-line over the weekend? The second statement asks: When and with what purpose do you use the following on-line activities, using devices such as computers, mobile phones, iPod, and others. This includes many different statements.

Third Section

This section focuses on use of information technologies in students' learning and includes two parts. The first part asks: "which of the following technologies do teachers encourage you to use in their courses?" Include 26 statements. The statements are to be answered by using a 5-point Likert-type scale where: 1 = *Not at all*, 2 = little, 3 = Medium, 4 = much, and 5 = *very much*

Secondly, one of the questions asks: "to what extent do you agree with the following statements regarding your use of information technology during your study at university?" This includes 33 statements which are to be answered using a 5-point Likert-type scale: 1 = *strongly disagree*, 2 = disagree, 3 = neutral, 4 = agree, and 5 = *strongly agree*

After deriving appropriate attributes and their represented items to suit the research context of student perceptions of adopting Web 2.0, the final survey in Section 3, with 33 items, reflects 8 factors: voluntariness, relative advantage, compatibility, ease of use, result demonstrability, visibility, barriers, and trialability, which in turn, represented part of the independent variables of the study.

To examine barriers that influence student perceptions of adopting Web 2.0 applications. After examining the research, the researcher found that there is no appropriate survey that gives a broad range of barriers with a sound theoretical foundation for information and communication technologies (ICTs), particularly Web 2.0 technologies. Thus, a 9-item questionnaire on the barriers of adopting Web 2.0 applications by academic students was constructed to reflect the following factors of adopting Web 2.0 applications: student lack of skills, lack of confidence, privacy, and the lack of technical support.

Wiersma and Jurs (2005, p. 169) argue that closed statements in a questionnaire enhance consistency of response across respondents; data tabulation is generally straightforward and less time consuming than open-ended questions. The questionnaire used closed statements to limit respondents to selecting one statement among five (strongly agree, agree, uncertain, strongly disagree and disagree) based on the Likert scale. The Likert scale was developed by the American educator and organizational psychologist Rensis Likert in 1932 to improve the level of measurement in social research (Infosurve, 2013). In research conducted by Infusive, the online survey professionals in 2006, they found that most modern researchers agree that the

5-point scale is more common than the 6- point scale and the neutral rating in a 5-point scale is needed when conducting survey research. A Likert Scale allows a participant to provide feedback that is a little more expansive than a simple close-ended question, but at the same time it is much easier to measure than a completely open-ended response (Idea, 2013).

The questionnaire was first written in English, and then translated into Arabic ensuring the same sense as far as possible from English to Arabic. The Arabic version was tried using other Arabic under graduate and postgraduate students at the university to ensure the meaning of the items had not been lost in translation. Some items were not clear in Arabic and needed modifications. Though the closed items demanded a specific response based on the Likert scale, there is always the possibility that the individual respondents become patterned or that they have specific views not fully reflected in the responses. Therefore, the inclusion of open ended questions was essential. Although open-ended questions might require more time than closed statements, they allow the individual more freedom of response because certain feelings or information may be revealed that would not be forthcoming with the closed statements (Wiersma and Jurs, 2005, p. 169). The questionnaire is ended by open-ended questions related to the implementation of the Web 2.0 tools in SQU. These questions are intended to gather data on the respondents' views on the obstacles and the solutions for these obstacles.

The questionnaire for the teachers followed a similar structure to that of the students with questions on demographic data and their knowledge and use of Web 2.0 technologies including their views on factors hindering the effective use of the Web 2.0 technologies and applications. The questionnaire has got an introduction where participants are informed about the purpose of the study including ethical considerations, for instance, the voluntary nature of their participation and that no names will be mentioned in any part of the study. The questions are divided into three sections: section A which focuses on teachers' information including age, gender, job title, and college in which they work. Section B which explores teachers' online activities asking questions on the time teachers spend on-line, their use of Web 2.0 technologies and awareness of different Web 2.0 tools and applications. Lastly but not least, section C focuses on the use of information technologies in teaching practice. The section includes questions like: "which Web 2.0 tools do you use in your teaching?" and questions around teachers' perceptions of different Web 2.0 tools and applications.

4.6.3.2. Data Collection Using Semi-structured Interviews

The principal purpose of the interview was to gather information on what the selected teachers know, think or like about the use of Web 2.0 technologies. As indicated earlier, the opportunity to go deeper into issues is one of the main advantages of the interview method. It allows the probing of specific issues or ideas that arise during the interview process. The interview is also flexible in a way that the interviewer can clarify the questions and ensure that the interviewees understand them (Henreson et al., 1987, p. 25). In contrast with the closed-ended questions in a questionnaire, the interview in this study provided an opportunity for the interviewer to ask for clarification in some instances during the conversation and the reasons behind some other points.

Here, the researcher explain the way the interview was designed and conducted during fieldwork. Having decided on the interview, as a method of data collection, the next step to be addressed was related to the format of the interview itself in particular, and whether the interview would be structured or unstructured. Between these two extremes lies the semi structured (Reid, 2006, p. 29). Drever (1995, p. 1) points out that 'in the semi-structured interview, the interviewer sets up a general structure by deciding what ground is to be covered and what main questions are to be asked'. This was the most convenient method to the present study as a balance between ensuring that all the information needed is collected and still there is a chance to probe deeper into respondents' answers and seek clarification or justification.

The interviews in this study are semi-structured interviews with group of Teachers from the participating university. The primary goal of the interview was not so much to receive standard answers to set questions, but rather to elicit in-depth information about the opinions and viewpoints of the interviewees. Hence, what was of greatest importance in the interviews, was to gain an understanding of the obstacles that might be faced in trying to make use of the Web 2.0 technologies in the university.

Individual interviews were thought to be more appropriate for teachers for two reasons. Firstly, there are a smaller number in this group and secondly, each teacher had a particular area of responsibility. In designing a semi-structured interview, care was taken to phrase questions to ensure that the respondents can say what they want rather than using leading questions (Stringer, 2004, p. 66). Four main questions were carefully structured to achieve the interview aims. In addition, there was a final "catch all" question that the researcher asked the re-

spondents to highlight any other issues which they considered significant in the context of the research focus. The main questions used in the interview are stated below:

1. What are your reasons for using Web 2.0 technologies in your teaching practice?
2. What do you think is needed for you to achieve your goals of using these technologies?
3. What do you consider to be barriers in the use of Web 2.0 technologies in your teaching?
4. What do you think are the major problems in the use of Web 2.0 and other related technologies in the university?

The individual interviews allowed participants to express their own views on the issues. The interviews were conducted face to face with each of the participating teachers. The researcher had to arrange convenient time and venue with each teacher for the interview. This was done through emails and phone calls. The principal rationale for choosing a face to face interview includes the need to probe issues deeper and to interpret the body language of the interviewees.

While a semi-structured interview technique was applied, open-ended questions were used to follow leads and introduce new questions. Open-ended questions allow flexibility into the interview situation: deeper probing of answers, clarification of misunderstandings and testing of what the respondents truly believe. One of the most appropriate steps in conducting an interview is the method of recording the responses. The choice lies between note taking, either during or after the interview, or tape-recording and transcription (Reid, 2006). The researcher used note-taking in order to give interviewees a sense of ease and encourage them to talk freely. This is especially because of the previous experience of the researcher with interviews with similar participants. When note taking is used in the interview, it is more natural and flows smoothly. However, when the interviews are recorded it becomes more formal and participants think deeply before speaking and keep their eyes attached with the tape recorder.

Reid (2006, p. 30) points out that ‘it is important to ensure that note taking is as unobtrusive as possible and does not hinder the flow of the interview’. The researcher allowed about 30 to 50 minutes after each interview to complete the notes.

The atmosphere in the interview was fairly relaxed and comfortable with minimal distractions from phone calls or interruptions. Building up a sense of trust and rapport between the interviewer/researcher and the respondent is a necessary part of the interview process. Through good eye contact, nods of assent and murmurs of agreement, the researcher encouraged the respondents to express themselves freely. Moreover, the interviewer made sure that she controlled the interview carefully and flexibly. In other words, the researcher made sure that the issues on the agenda were covered without duplication or omission of main elements. The researcher had to keep an eye on the time and move naturally from one question to the next, listening carefully to the answers, seeking explanation or clarification when necessary.

The interviewees were cooperative with the researcher, believing that the findings would provide valuable input into Ministry of Education's (MOE) future development. They had a clear understanding of the researcher's task and were willing to give time and assistance. Most of the teachers who were contacted agreed to participate in the study and gave freely of their time. An interview schedule was drawn up and slight changes made according to the interviewees' diaries. Then interviews were carried out during visits to each respondent.

Each interview lasted between 30 to 50 minutes. Five to ten minutes were spent in outlining the background of the study and discussing how the data would be used. As the interviewer was herself a member of the internal stakeholders, she shares some background with some participants. However, the researcher was as fair as possible and used her experience only in the planning for the data collection. Moreover, it was clear in the covering letter the aim of the study and how the data will be used.

4.6.4. Data Analysis

The study generated both qualitative and quantitative data and these two data sets were analysed differently. For qualitative data, thematic analysis was employed whereas different statistical tools were utilized to analyse the quantitative data. The following section explains how data were analysed.

4.6.4.1. Qualitative Data Analysis

The analysis of qualitative data generated mainly from interviews with teachers and from the open-ended questions from the teachers and students' questionnaires was done using a three stage model in light of Ary et al.'s (2006) proposal. Ary et al. (ibid., p. 490) state that, 'data

analysis in qualitative research involves three main stages namely, familiarization and organization, coding and recoding and summarizing and interpreting.

Stage One: Familiarization and Organization

Familiarization and organization was the first stage in qualitative data analysis. In this stage, the researcher read and reread notes in order to become familiar with the data. Then, the researcher put the open-ended questions into an organized form and completed the notes of the interviews. Next, the researcher read and reread again and took notes while reading.

Stage Two: Coding and Recoding

In this stage, the researcher identified the main categories and themes. As she became familiar with the data and the issues arose from the interviews, she found that the obstacles and the facilitating factors could be themed into the four main principles guiding teaching and learning activities in the university. The principles include: aspirations (goals for using Web 2.0 technologies), how to achieve these aspirations, Barriers, and finally major problems of using web tools. The themes are aligned with the main research questions.

Stage Three: Summarising and Interpreting Data

The last but most important of all stages was summarizing and interpreting data. In this stage, the researcher had to present the massive amount of data in a well-organized, easy to read and understandable way. This involved use of descriptive statistics tools such as use of tables, graphs and continuous prose writing skills. The following table 4.1 shows the main themes identified and these will be explained in detail in the next chapter presenting the primary data.

Table 4.1: Main themes

The Theme	**Examples of key issues (results) emerging from the study)**
Participants' aspiration	• Meet the world wide needs in Web 2.0 tools. • Activated in the teaching and learning so that education becomes more effective and flexible • it help Cooperation between different University and SQU

The Theme	Examples of key issues (results) emerging from the study)
Ways to achieve aspirations	• Need sufficient and efficient training on use of new technologies • Understand change process • Cooperation and teamwork such as curriculum, technicians and laboratories and physical capabilities • Organizational infrastructural development, for example, improvement of internet connection and allocation of sufficient time to access and make use of facilities in the university.
Barriers to change	• Poor instructional design • Time constraints • Lack of training • Lack of recognition • Lack of encouragement/incentives • Tendency of Arab students to stick to the traditional learning format and low level of English language proficiency level.
Major problems related to the use of Web 2.0 in the university	• Lack of expertise and lack of potential • Lack of communication • Unsatisfied school graduates • Lack of time management skills • Low appetite for using technology among the academic staff

4.6.4.2. Quantitative data analysis

The present study involved exploring the extent to which students and teachers were making use of Web 2.0 technologies including an analysis of factors influencing the use of these technologies which include gender, and age, among others. In order to respond to the main

research questions, the study had to analyses the quantitative data that were generated and this involved use of different statistical analyses tools.

A survey method, questionnaire, was used to gather the necessary data. Survey methods allow researchers to cover a large geographic area at minimal cost. Indeed, they are easy and quick for the respondents to complete as well as being helpful to investigators in collecting feedback on facts, attitudes, opinions, and experiences (Sudman and Bradburn, 1982). Thus, the data can often be gathered and ready for analysis faster than when the data are analyzed through interviews. Given that the participants and the researcher might never see each other, surveys often provide some level of anonymity. In this case, respondents might be more truthful than they would be in a face-to-face encounter (Leedy and Ormrod, 2009).

Several quantitative techniques were used to analyses data in an effort to statistically identify any significant differences between the mean scores of the demographic variables and predict adoption of Web 2.0 technologies based on perception of Web 2.0 attributes and perception of barriers to the adoption of Web 2.0. Babbie (2004) defined quantitative research as 'the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect' (p. 94). Thus, the research strategy of the study focuses on collecting and analyzing numeric data to present the answers to the research questions of the present study. The Statistical Package for Social Sciences (SPSS) was used for the analysis of quantitative data.

4.6.5. Pilot Study

It is often very useful to conduct a pilot study before beginning the research study. The pilot study enables the researcher to explore in advance any issues that might be problematic in the future. At the same time, it refines practice for the research before its final application. Teijilingen and Hundley (2004, p. 1) emphasize the importance of pilot study and claim that 'it both increases the likelihood of success in the main study and gives advanced warning about where the main research project may fail'. The pilot study was especially important in the present research because it aimed at collecting preliminary data that helped in the refinement of research questions and research plans. Before the researcher made her choice of research methodology, it was necessary to gain sufficient understanding of the background and development of the university and the existing problems. This helped to consider what methods might be used to address the main focus of the study, that is, the issues that need to be addressed in the university. Hence, this pilot stage provided valuable experience and feedback

to the researcher. In addition, the pilot study gave her an idea of the answers to the research questions, “What factors influence students' perceptions of adopting Web 2.0 applications as learning tools?” What obstacles influence students' adoption of Web 2.0 applications (on line activities) as learning tools among the adopters and non-adopters?). Moreover, the results of this pilot study helped the researcher to consider the suitable theories of managing change and modification and Implementation Framework, this is as the change management model should be able to help in solving existing issues in the university including the development of teaching and learning in general.

The pilot study involved working in partnership with 60 students and 10 teachers for testing. Teijilingen and Hundley (2004, p. 2) point out that ‘the first phase of pilot might involve using focus group interviews to establish the issues to be addressed in a large-scale questionnaire survey’. Similarly, Henerson et al. (1987, p. 26) say that ‘probing interviews conducted with a representative sample can provide a sound basis upon which to develop a questionnaire for wider distribution’. Moreover, interviews are simple and effective tools for collecting data. Denscombe (1998, p. 109) states that the interview is an attractive way for a project researcher because it does not involve much technical paraphernalia in order to collect data. He also adds that the most common use of interviews for project researchers is as a source of information and this is exactly what this study needs. Furthermore, the present pilot study used a semi-structured interview format in a group context to let the interviewees develop ideas and speak more widely on the issues and problems in their university regarding the use of Web 2.0 technologies. There were four main questions as follows:

1. What are your aspirations for using Web 2.0 tools in learning in your teaching practice?
2. What do you think you/we should do to achieve these aspirations?
3. What do you see as the barriers to change for using Web 2.0?
4. What would you identify as major problems in relations to the role of new technologies in the teaching and learning activities in the university?

Each interview was about an hour. The researcher assured the interviewees that their involvement was voluntary and they were free to withdraw their consent at any time. She also mentioned that the information and data obtained would be analyzed by the researcher solely for the purpose of this study and would not affect any participants in any way. She also assured participants that the final written thesis would ensure anonymity by not using any actual names or identifying individual characteristics of any participants. However, the researcher

was also known in this research role having previously conducted a small-scale study in the same university. Care was taken to ensure that the focus was on the areas relevant to this current research project.

4.6.5. Validity and Reliability

The questionnaire was tested for validity and reliability by a process that included a review of all questions by two experienced teachers, professional Professors in the university and by piloting the questionnaire (discussed in more detail under pilot study section). This exercise helped to ensure that the questionnaire was able to collect the information required to meet the survey objectives, that the questions were unambiguous, easily answered and that they reflected the theoretical constructs underpinning the survey. Along with that, Cronbach's alpha has been used to measure the internal consistency of the items of the questionnaire and its overall reliability (Cronbach, 1951). The results of reliability analysis are presented in table 4.2.

Table 4.2 Reliability analysis for the study questionnaire instrument

Subjects	Dimension	Items	Alpha Coefficient
Teachers	Perception about Web 2.0 technologies	33	0.932
	Familiarity and use of Web 2.0 technologies	25	0.854
	Over all		0.902
Students	Perception about Web 2.0 technologies	33	0.956
	Familiarity and use of Web 2.0 technologies	25	0.968
	Over all		0.966

Table 4.2 shows that for both teachers and students, Alpha coefficient for perception dimension is exceeding 90%. For familiarity dimension, the internal consistency is amounting to 85% for teachers' questionnaire, and 96.8% for students' questionnaires. This ensures that the questionnaire instrument of the study has a high internal consistency and will measure what is intended to measure effectively.

4.6.6. Ethical Considerations

The conduct of this study was guided by sound educational research ethical principles. Ethical issues for researchers are very important from the beginning of conducting research to the

end (Clough and Nutbrown, 2008). Clough and Nutbrown (ibid., p. 173) indicate that 'university research has to be approved to ensure that ethical standards are maintained, in order to assure the safety of parties involved, that "informed consent is given by the participants: and that all data is anonymised'. Hennink et al. (2011) and Willig (2008) point out that researchers need to consider several aspects, such as informed consent, access to research settings, participants' self-determination, minimization of harm, privacy, no deceit, debriefing and confidentiality.

The researcher adhered to the sound ethical procedures in the conduct of this study. First, the research project proposal was subject to Deusto university's ethical review procedures and permission to carry out the study in the Sultan Qaboos university in the Sultanate of Oman was sought and granted prior to the conduct of the study. Secondly, participants were informed about the nature of the study and what participation in the study entailed. All participants were also informed about their right to withdraw from the study at any stage during the research process. Thirdly, the researcher provided sufficient information to the participants to allow them to make an informed decision about their participation in this research study. Fourthly, the researcher ensured that no one was harmed during the conduct of the study as a result of the methods, attitudes and or materials used in the study. Finally, in order to protect the participants' anonymity and confidentiality, the researcher have concealed the participants' real names and personal information. Furthermore, although the researcher was an employee in the university where the research was conducted, the researcher ensured that the researcher maintained a "researcher qua researcher" stance in the research process. The researcher tried her best to ensure that her own views would not colour the study findings. The researcher experience in university systems helped her plan and effectively conduct field work. The researcher used her knowledge of the university system to establish important contacts and to make arrangements with participants for data collection.

This chapter outlined the research methodology, methods and procedures. The next chapter presents the primary data, that is, the findings from the study.

Chapter 5: Data Presentation and Analysis

5.1. Introduction

This chapter presents the data analysis and the results of the study. This includes exploring the pattern and use of Web 2.0 technologies by teachers and students at Sultan Qaboos university in the Sultanate of Oman. The study involved working in partnership with selected teachers and students from different colleges in the university and made use of questionnaires and semi-structured interviews to generate data. This chapter represents the attempt to construct meaningful conclusions from the data generated from the teachers and students involved in the study. Table 5.1 below shows the statistical analysis matrix, comprising the research questions, research methods and the relevant analysis approach.

Table 5.1 Research questions, research methods and statistical analysis matrix

Research Questions	Instrument (Teacher or Student Questionnaire; Interview)	Specific Items	Statistical Analysis
1**. Which Web 2.0 technologies are the participating teachers using in their teaching activities in the University?**	Teacher questionnaire (appendix 1)	B3; B4; C1;	B4: Descriptive statistics, use of tables. B3: Use of Chi-Square test- An analysis of the impact of gender on the use of technologies, for instance, is there any difference between male and female teachers in relation to the technologies they use. C1: Descriptive statistics, use of table/percentages.
2**. Which Web 2.0 technologies are the participating students using in their learning activities in the University?**	Student questionnaire (appendix 2)	Q6; Q9	

Table 5.1 Research questions, research methods and statistical analysis matrix

Research Questions	Instrument (Teacher or student questionnaire; interview)	Specific Items	Statistical Analysis
3. **What are the participating students' perceptions of the value of using Web 2.0 technologies in their learning activities?**	Student questionnaire	Q7; Q8; Q10: items i; ii; iii; iv; v; vi; vii; viii; ix; x; xi; xii; xiii; xiv; xv; xvi; xvii; xviii; xix; xx; xxii; xxiii; xxviii; xxix; xxx; xxxi; xxxii; xxxiii.	Descriptive statistics: tables An analysis of gender differences in terms of students' use of social media (Use of Chi-Square test) Thematic analysis used too.
4. **What are the participating teachers' perceptions of the value of using Web 2.0 technologies in their teaching activities?**	Teacher questionnaire & Semi structured interview	C2 & C3 (see teacher questionnaire); Semi-structured interview question number: B1 & B2	Descriptive statistics used for C2. QC3 used thematic Analysis.
5. **What are the barriers in the use of Web 2.0 technologies in teaching activities of the participating teachers in the University?**	Teacher questionnaire & Semi-structured interviews	C2: items xxi; xxiv; xxv; xxvi; xxvii; & C3 (Teacher questionnaire) Open question in interview	Descriptive statistics used. Frequency table. Thematic analysis
6. **What are the barriers in the use of Web 2.0 technologies in students' learning activities in the University?**	Student questionnaire	C2 items: xxi; xxiv; xxv; xxvi; xxvii.	Descriptive statistics: Frequency tables.

Since the teachers and students' questionnaires generated some categorical and ordinal data which could not be analyzed using parametric statistical analysis methods, non-parametric statistical analysis methods such as Chi-Square test were used. Such methods will enable to provide descriptions of data and to assess the trends and patterns of use of Web 2.0 technolo-

gies among teachers and students in the University. The study also analyzed the impact of demographic variables such as gender and age on the use of Web 2.0 technologies in teaching and learning contexts. Data are presented under the main themes that aligned with the main research questions outlined above. For clarity, teachers' data are presented separately from the students' data. The following section focuses on the presentation and analysis of data from teachers involved in the study. This will then be followed by a section on student data.

5.2. Teachers' Demographic Data

The first part of the teachers' questionnaire (section A, questions 1 to 3) elicited information about the teachers including variables like age, gender and the college where they are affiliated (refer to appendix 1 for the teachers' questionnaire). In this section, each of these variables will be discussed and data will be presented using tables and graphs.

A total of two hundred and ninety-eight teachers from Sultan Qabooos university in Sultanate of Oman Oman were surveyed. The teachers were drawn from 9 different colleges across the university. This consisted of 152 (51 %) males and 146 (49 %) females as shown in table 5.2 below.

Table 5.2 Distribution of Teacher Participants According to Gender

Gender	Frequency
Male	152 [51.0 %]
Female	146 [49.0 %]
Total	**298** **[100.0%]**

Table 5.3 below shows the number of teacher participants from each college including their gender.

Table 5.3 Distribution of Teacher Participants According to Gender & College

Gender	Colleges								
	Agriculture and Marine Science	**Social Sciences**	**Economics and Political Sciences**	**Education**	**Engineering**	**Medicine and Health Sciences**	**Sciences**	**Nursing**	**Language Centre**
Male	12 [48 %]	14 [58.3%]	16 [72.7%]	28 [52.8%]	32 [80.0%]	24 [44.4%]	21 [61.8%]	0 [0%]	5 [50 %]
Female	13 [52%]	10 [41.7%]	6 [27.3%]	25 [47.2%]	8 [20.0%]	30 [55.6%]	13 [38.2%]	36 [100%]	5 [50%]
Total	**25 [8.4%]**	**24 [8.1%]**	**22 [7.4%]**	**53 [17.8%]**	**40 [13.4%]**	**54 [18.1%]**	**34 [11.4%]**	**36 [12.1%]**	**10 [3.4%]**

Table 5.3 shows the teachers gender composition in each department. Some departments in the University have more male teachers than female teachers, for example, in Economics and Political Science (72.7%), Engineering (80%) and Sciences department (61.8%). On the contrary, some departments have more female teachers than males. For example, Nursing (100%), as well as Medicine and Health (55.6%). Participation in the study was voluntary; however, the survey tried as much as possible to ensure that both male and female teachers' views were captured. Most of the teachers were from the Medicine and Health Sciences (18.1%) and the Language Centre had the lowest number (3.4%). It is worth to mention that the study involved teachers from nine out of ten of the colleges across the university, which provides a good picture of the use of Web 2.0 technologies across the university. Initially all the ten colleges were considered in the study sample, latter, the college of Law was being excluded as only two teachers responded to the questionnaire, which will not constitute a representative sample for that faculty.

The teacher participants' ages ranged between 30 and more than 65. The table 5.4 below shows the number of teachers in each age group. Most of the teachers were aged between 30

and 39 whereas those aged 60 and above were the lowest, just 9%. The sample of teachers showed that there are more teachers between 30 to 49 compared to those above 50.

Table 5.4 Distribution of Participating Teachers by Age

Age Group	Frequency
30-39	126 [42.3%]
40-49	106 [35.6%]
50-59	40 [13.4%]
60-64	22 [7.4%]
65+	4 [1.3%]
Total	**298 [100%]**

5.3. Students' Demographic Data

The questionnaire was administered to a sample of 600 students from different academic colleges across the University, and 541 out of 600 students completed the survey questionnaire. This shows a high response rate of 92.2%. The student demographic data are presented in this section. The questionnaire had questions divided into three sections with section A containing questions to reflect participants' demographic data. For instance, the first five questions elicited information about the students including age, gender, school level percentage, level of study and college of affiliation. Section B focused on time spent by students online during week days and weekends while section C focused on technologies used by students and their perceptions of the technologies and barriers for technology use. The table 5.5 below shows the number of students from each of the colleges.

Table 5.5 Distribution of Participating Students by College of Affiliation

College of Affiliation	Frequency
Agriculture & Marine Sciences	22 [4.1%]
Arts & Social Sciences	128 [23.7%]
Commerce, Economics & Political Sciences	79 [14.6%]
Education	33 [6.1%]
Engineering	60 [11.1%]
Medicine & Health Sciences	56 [10.4%]
Nursing	122 [22.6%]
Language Centre	41 [7.6%]
Total	**541 [100%]**

The number of students from each college was assigned depending on the total number of students enrolled, with the college with the highest number of students having the highest proportion in the sample and vice versa. As can be seen from the table 5.5 above, the majority of students (23.7%) are from the college of Arts and Social Sciences. The lowest number of students is from the college of Education (6.1%). Students were drawn from most of the colleges in the university and this was helpful in terms of facilitating comparison of student behaviors regarding the use of Web 2.0 technologies and applications as well as providing a good picture regarding the use of Web 2.0 technologies in the University.

The age of students who participated in the study ranged from 18 to above 26. The different age groups are shown in the table 5.6 below.

Table 5.6 Distribution of Participating Students by Age

Age Group	Frequency
17-18	130 [24%]
19-20	224 [41.4%]
21-22	152 [28.1%]
23-24	16 [3%]
25-26	19 [3.5%]
Total	**541 [100%]**

The table 5.6 above shows that the majority of students in the study were aged between 19 and 20 years (41.4 % of the student participants). The lowest number is that of students aged 23 to 24. The study did not involve working with mature students aged 30 and above and so no effort was made to make any comparisons regarding differences in use of technology between young and mature students.

In addition, the questionnaire elicited information on the number of participating students according to their gender. This is shown in table 5.7 below.

Table 5.7 Distribution of Participating Student by Gender

Gender	Frequency
Male	168 [31.1%]
Female	373 [68.9%]
Total	**541 [100.0%]**

It can be seen from the table 5.7 above those female students constituted 68.9% of the student participants; hence, they were by far more than their male counterparts who constituted 31.1% of the participants. Female participants were more than the male participants, and this reflects the student composition in the whole university at the time of the study. The University enrolls students with high grades from high school and female students tend to obtain better results in high school than male students. This might be a possible explanation for the big difference between the numbers of male and female students in the University.

Students were also asked to indicate their high school performance which is expressed as a percentage. The results are shown in the table 5.8 below.

Table 5.8 Distribution of Participating Students According to High School Performance

Achieved Marks	Frequency
≤80%	22 [4.1%]
81-90%	140 [25.9%]
91-100%	379 [70.1%]
Total	**541 [100%]**

The table 5.8 above shows that 70% of the participants passed their high school education with very high grade (91-100%). Only 4% of the students had a grade that was below or equal to 80. These results show that the students who participated in the study were high attaining students with the potential to articulate the issues under consideration with no problem.

The survey aimed to explore the level of study of the students involved in the project, whether fresh students or postgraduates. There was a good mix of students ranging from freshmen (first years) to postgraduate students. The results are shown in table 5.9 below.

Table 5.9 Distribution of Participating Students According to Level of Study

Level of Study	Frequency
First Year	125 [23.1%]
Second Year	99 [18.3%]
Third Year	125 [23.1%]
Fourth Year	171 [31.6%]
Postgraduate	21 [3.9%]
Total	**541 [100%]**

As can be seen from the table 5.9 above, fourth level students constituted the majority of the participants (31.6%). As expected, the postgraduate students were the least making up only 3.9%. The study tried at best to ensure that views of students are all captured: from different levels of study, and across different colleges in the university.

5.4. Web 2.0 Technologies Used in Teaching and Learning

The study sought to find out the use of Web 2.0 technologies in teaching and learning context. Question 1 focused on establishing the technologies that teachers were using in teaching while question 2 focused on establishing the tools used by the students. The data generated from teachers and students are presented under question 1 and question 2 respectively.

5.4.1. Research Question 1: Which Web 2.0 Technologies are the Participating Teachers Using in Their Teaching Activities in the University?

A total of 298 teachers were surveyed regarding the tools and applications they used in teaching. In addition, a survey was also conducted to estimate the time the teachers spend online during week days and during weekends. The teachers' responses are discussed in the following section.

5.4.1.1. Teachers' Familiarity with Web 2.0 Technologies

Question 4 in section B of the teacher questionnaire (refer to appendix 1) asked teachers to indicate their level of familiarity with some key Web 2.0 technologies namely Wikipedia, YouTube, Facebook, Flickr and Myspace. The following table 5.10 shows the results obtained.

Table 5.10 Teachers Familiarity with Web 2.0 Technologies (N=298)

Web 2.0 Technology	Responses			
	a-Yes, I know	b- No, I don't	c- Uncertain	d-No answer
Wikipedia	238 [79.9 %]	52 [17.4 %]	6 [2%]	2 [0.7 %]
YouTube	278 [93.3 %]	16 [5.4 %]	4 [1.3 %]	0 [0%]
Facebook	227 [76.2 %]	61 [20.5 %]	8 [2.7 %]	2 [0.7 %]
Flickr	155 [52.0 %]	121 [40.6 %]	16 [5.4 %]	6 [2.0 %]
MySpace	99 [33.2 %]	121 [40.6 %]	72 [24.2 %]	6 [2.0 %]

As can be seen from table 5.10 above, the majority of teachers, in general, were familiar with most of the Web 2.0 technologies. For instance, 80% of the teachers were familiar with Wikipedia, 93% were familiar with YouTube and 75% were familiar with Facebook. Other technologies including Flickr and MySpace did not appear to be highly popular with the teachers as only 52% and 33% of the teachers were familiar with the respective technologies. This high familiarity was identified by many scholars are characteristics of this Digital age (Collins and Halverson, 2010; Ely's, 1999; Rogers, 1983)

Furthermore, the relationship between teachers' familiarity with the Web 2.0 technologies and demographic variables such gender, age and college of affiliation was analyzed. The results are discussed in the following section.

5.4.1.1. A. Teacher Familiarity with Wikipedia

Results in table 5.10 in the preceding section show that a considerable majority of teachers (80%) were familiar with Wikipedia. The table 5.11 below shows teacher familiarity with Wikipedia according to gender. The results show that the majority of male and female teachers in the study were familiar with Wikipedia. The relationship between gender and teacher familiarity with Wikipedia was analyzed and shown in table 5.11 below.

Table 5.11 Teachers Familiarity with Wikipedia by Gender

		Familiarity with Wikipedia				**Total**
		Yes, I know	**No, I don´t**	**Uncertain**	**No answer**	
Teacher Gender	**Male**	134 [88.2%]	12 [7.9%]	4 [2.6%]	2 [1.3%]	152 [100%]
	Female	104 [71.2%]	40 [27.4%]	2 [1.4%]	0 [0%]	146 [100%]
Total		**238 [79.9%]**	**52 [17.4%]**	**6 [2.0%]**	**2 [0.7%]**	**298 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	21.413	3	0.000
N of valid cases	298		

Interpretation

The results in table 5.11 show that 88.2% of male teachers were familiar with Wikipedia while 71.2% of female teachers were familiar with Wikipedia, that is, more male teachers compared to female teachers were familiar with the Web 2.0 tool. The Chi-Square results show that there is a statistically significant relationship between gender and teacher familiarity with Wikipedia (Chi-Square= 21.413, df= 3, P-value =0.000). Based on the results, it can be concluded that male teachers are more familiar with Wikipedia compared to female teachers.Similarly, the relationship between teacher age and teacher familiarity with Wikipedia was analyzed and shown in table 5.12 below.

Table 5.12 Teachers Familiarity with Wikipedia by Age

		Familiarity with Wikipedia				**Total**
		Yes, I know	**No, I don´t**	**Uncertain**	**No answer**	
Teacher Age	**30 to 39**	106 [35.57%]	14 [4.70%]	6 [2.01%]	0 [0%]	126 [42.28%]
	40 to 49	82 [27.52%]	22 [7.38%]	0 [0%]	2 [0.67%]	106 [35.57%]
	50 to 59	34 [11.41%]	6 [2.01%]	0 [0%]	0 [0%]	40 [13.42%]
	60 to 64	12 [4.02%]	10 [3.36%]	0 [0%]	0 [0%]	22 [7.38%]
	65+	4 [1.34%]	0 [0%]	0 [0%]	0 [0%]	4 [1.34%]
Total		**238 [79.9%]**	**52 [17.4%]**	**6 [2.0%]**	**2 [0.7%]**	**298 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	28.572	12	0.005
N of Valid Cases	298		

Interpretation

Results in the table 5.12 appear to show that teachers within the age 30 to 49 years are more familiar with Wikipedia compared to the teachers aged 50 and above. Chi-Square results show that there is a statistically significant relationship between teacher age and teacher familiarity with Wikipedia (Chi-Square=28.572, df= 12, P-value=0.005). Based on these results, it can be concluded that young teachers (those below 50) are more familiar with the technology in question compared with the more experienced teachers aged 50 and above.

Table 5.13 below shows the results of the relationship between the teacher familiarity with Wikipedia and their college of affiliation.

Table 5.13 Teachers Familiarity with Wikipedia and College of Affiliation

		Familiarity with Wikipedia				Total
		Yes, I know	No, I don´t	Uncertain	No Answer	
Teacher Colleges	Agriculture and Marine Science	17 [68%]	8 [32%]	0 [0%]	0 [0%]	25 [8.4%]
	Arts and Social Sciences	20 [83%]	4 [17%]	0 [0%]	0 [0%]	24 [8.1%]
	Economics and Political Sciences	22 [100%]	0 [0%]	0 [0%]	0 [0%]	22 [7.1%]
	Education	37 [70%]	16 [30%]	0 [0%]	0 [0%]	53 [17.8%]
	Engineering	36 [90%]	2 [5%]	0 [0%]	2 [5%]	40 [13.4%]
	Medicine and Health Sciences	38 [70.4%]	10 [18.5%]	6 [11.1%]	0 [0%]	54 [18.1%]
	Sciences	30 [88%]	4 [12%]	0 [0%]	0 [0%]	34 [11.4%]
	Nursing	30 [83%]	6 [17%]	0 [0%]	0 [0%]	36 [12.1%]
	Language Centre	8 [80%]	2 [20%]	0 [0%]	0 [0%]	10 [3.4%]
Total		**238 [79.87%]**	**52 [17.45%]**	**6 [2.01%]**	**2 [0.67%]**	**298 [100%]**

Chi-Square Tests			
	Value	Df	Asymptotic Significance (P-value)
Pearson Chi-Square	59.829	24	0.000
N of Valid Cases	298		

Interpretation

The Chi-Square results show that there is a statistically significant relationship between teachers' college of affiliation and familiarity with Wikipedia (Chi-Square=59.829, df= 24, P-value =.000). Although in general, the majority of teachers from each college indicated that they are familiar with Wikipedia, there are some colleges revealed higher rates of familiarity. For example, table 5.13 reveals that the Faculty of Economics and Political Sciences showed a familiarity of 100%, followed by the Faculty of Engineering (90%), and the Faculty of Sciences (88%).

5.4.1.1. B. Teacher Familiarity with YouTube

YouTube is one of the key Web 2.0 technologies being used widely in educational contexts. In this section, teachers' familiarity with YouTube by gender, age and college of affiliation of the teachers will be analyzed. Table 5.14 below shows the overall results of teacher familiarity with YouTube according to gender. It can be seen from the Table that a majority of the teachers are familiar with YouTube. More than 90% of both male and female teachers are familiar with the tool. The Chi-Square test was employed to analyze the significance of the relationship between gender and teacher familiarity with YouTube.

Table 5.14 Gender/Teacher Familiarity with YouTube

		Familiarity with YouTube			Total
		Yes I know	No ,I don´t	Uncertain	
Teacher Gender	Male	142 [93.4%]	8 [5.3%]	2 [1.3%]	152 [51%]
	Female	136 [93.2%]	8 [5.5%]	2 [1.4%]	146 [49%]
Total		**278 [93.3%]**	**16 [5.4%]**	**4 [1.3%]**	**298 [100%]**

Chi-Square Tests			
	Value	Df	Asymptotic Significance (P-value)
Pearson Chi-Square	0.009	2	0.996
N of Valid Cases	298		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between gender and teacher familiarity with YouTube (Chi-Square=0.009, df= 2, P-value =0.996). It can be concluded that both male and female teachers are equally familiar with YouTube.

Below in table 5.15, the analysis of the relationship between teacher age and teacher familiarity with YouTube is provided.

Table 5.15 Teachers Familiarity with YouTube by Age

		Familiarity with YouTube			Total
		Yes, I know	No, I don´t	Uncertain	
Teacher Age	30 to 39	118 [93.7%]	6 [4.8%]	2 [1.6%]	126 [42.28%]
	40 to 49	100 [94.3%]	6 [5.7%]	0 [0%]	106 [35.37%]
	50 to 59	34 [85%]	4 [10%]	2 [5%]	40 [13.42%]
	60 to 64	22 [100%]	0 [0%]	0 [0%]	22 [7.38%]
	65+	4 [100%]	0 [0%]	0 [0%]	4 [1.34%]
Total		**278 [93.29%]**	**16 [5.37%]**	**4 [1.34%]**	**298 [100]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	9.346	8	0.314
N of Valid Cases	298		

Interpretation

Chi-Square test results in Table 5.15 reveal that there is no significant relationship between teacher age and teacher familiarity with YouTube (Chi-Square=9.346, df= 8, P-value =.314). This would mean that teachers of different age groups are equally familiar with YouTube.

Similarly, the relationship between the teachers' college of affiliation and teachers' familiarity with YouTube was analyzed in table 5.16 below.

Table 5.16 Teachers Familiarity with YouTube by College of Affiliation

		Familiarity with YouTube			Total
		Yes, I Know	No, I don´t	Uncertain	
Teacher Colleges	Agriculture and Marine Science	19 [76%]	6 [24%]	0 [0%]	25 [8.39%]
	Arts and Social Sciences	24 [100%]	0 [0%]	0 [0%]	24 [8.05%]
	Economics and Political Sciences	22 [100%]	0 [0%]	0 [0%]	22 [7.38%]
	Education	49 [92.5%]	4 [7.5%]	0 [0%]	53 [17.78%]
	Engineering	38 [95%]	0 [0%]	2 [5%]	40 [13.42%]
	Medicine and Health Sciences	48 [88.9%]	4 [7.4%]	2 [3.7%]	54 [18.12%]
	Sciences	32 [94.1%]	2 [5.9%]	0 [0%]	34 [11.41%]
	Nursing	36 [100%]	0 [0%]	0 [0%]	36 [12.08%]
	Language Centre	10 [100%]	0 [0%]	0 [0%]	10 [3.36%]
Total		**278 [93.29%]**	**16 [5.37%]**	**4 [1.34%]**	**[100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	34.497	16	0.005
N of Valid Cases	298		

Interpretation

Chi-Square test results indicate that there is a statistically significant relationship between the teachers' college of affiliation and the teachers' familiarity with YouTube (Chi-Square=34.497, df=16, P-value =.005). Colleges such as Arts and Social Sciences, Economics and Political Sciences, Nursing, and Language Centre showed a familiarity of 100% compared to colleges of Agriculture and Marine Science that showed a familiarity of only 76%.

5.4.1.1. C. Teacher Familiarity with Facebook

The other tool that has been analysed is Facebook. Table 5.17 shows the result of the relationship between gender and teachers' familiarity with Facebook, using Chi-Square test.

Table 5.17 Teachers Familiarity with Facebook by Gender

		Familiarity with Facebook				**Total**
		Yes, I know	**No, I don´t**	**Uncertain**	**No answer**	
Teacher Gender	**Male**	109 [71.7%]	37 [24.3%]	6 [3.9%]	0 [0%]	152 [51%]
	Female	118 [80.8%]	24 [16.4%]	2 [1.4%]	2 [1.4%]	146 [49%]
Total		**227 [76.17%]**	**61 [20.47%]**	**8 [2.68%]**	**2 [0.67%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**

			(2-sided)
Pearson Chi-Square	7.009	3	0.072
N of Valid Cases	298		

Interpretation

Results in table 5.17 above shows that 71.7% of male teachers were familiar with Facebook compared to 80.8% of that to females. Chi-Square test results show that there is no statistical correlation between gender and teacher familiarity with Facebook (Chi-Square=7.009, df=3, P-value =.072).

Relationship between teacher age and the teacher familiarity with Facebook was analyzed and given in Table 5.18 below.

Table 5.18 Teachers Familiarity with Facebook by Age

		Familiarity with Facebook				Total
		Yes, I know	**No, I don´t**	**Uncertain**	**No answer**	
Teacher Age	**30 to 39**	100 [79.4%]	20 [15.9%]	6 [4.8%]	0 [0%]	126 [42.28%]
	40 to 49	82 [77.4%]	22 [20.8%]	2 [1.9%]	0 [0%]	106 [35.57%]
	50 to 59	26 [65%]	12 [30%]	0 [0%]	2 [5%]	40 [13.42%]
	60 to 64	18 [81.8%]	4 [18.2%]	0 [0%]	0 [0%]	22 [7.38%]
	65+	1 [25%]	3 [75%]	0 [0%]	0 [0%]	4 [1.34%]
Total		**227 [76.17%]**	**61 [20.47%]**	**8 [2.68%]**	**2 [0.67%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	28.206	12	0.005
N of Valid Cases	298		

Interpretation

The Chi-Square test results show that there is a statistically significant relationship between teacher age and the teacher familiarity with Facebook (Chi-Square=28.206, df= 12, P-value =0.005). With the exception to the age group 60-64, the general trend is that young teachers are more familiar with Facebook than the elderly teachers.

Table 5.19 shows the relationship between teachers familiarity with Facebook according to the teachers' college of affiliation.

Table 5.19 Teachers Familiarity with Facebook and Teachers College of Affiliation

		Familiarity with Facebook				**Total**
		Yes, I know	**No, I don´t**	**Uncertain**	**No answer**	
Teacher Colleges	**Agriculture and Marine Science**	11 [44%]	14 [56%]	0 [0%]	0 [0%]	25 [8.39%]
	Arts and Social Sciences	16 [66.7%]	8 [33.3%]	0 [0%]	0 [0%]	24 [8.05%]
	Economics and Political Sciences	22 [100%]	0 [0%]	0 [0%]	0 [0%]	22 [7.38%]
	Education	41 [77.3%]	10 [18.9%]	2 [3.8%]	0 [0%]	53 [17.79%]
	Engineering	30 [75%]	8 [20%]	0 [0%]	2 [5%]	40 [13.42%]
	Medicine and Health Sciences	38 [70.4%]	10 [18.5%]	6 [11.1%]	0 [0%]	54 [18.12%]
	Sciences	28	6	0	0	34

		[82.4%]	[17.6%]	[0%]	[0%]	[11.41%]
	Nursing	34 [94.4%]	2 [5.6%]	0 [0%]	0 [0%]	36 [12.08%]
	Language Centre	7 [70%]	3 [30%]	0 [0%]	0 [0%]	10 [3.36%]
Total		**227** **[76.17%]**	**61** **[20.47%]**	**8** **[2.68%]**	**2** **[0.67%]**	**298** **[100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	66.440	24	0.000
N of Valid Cases	298		

Interpretation

Table 5.19 shows that the proportions of teachers who confirmed that they were familiar with Facebook according to their colleges of affiliation. This result is confirmed by the Chi-Square that there is a statistically significant relationship between teachers' college of affiliation and the teachers' familiarity with Facebook (Chi-Square=66.440, df=24, P-value =.000). The Colleges of Economics and Political Sciences. Nurse and Education have shown higher familiarity with Facebook compared with other colleges such as the colleges of Agriculture and Marine Science, Arts and Social Sciences.

5.4.1.1. D. Teacher Familiarity with Flickr

The table 5.20 below shows the results of the teachers' familiarity with Flickr. Almost 56.6 % of male teachers indicated that they were familiar with Flickr while 47.3 % of female teachers were also familiar with the tool. It is evident that a high proportion of teachers were not familiar with the tool. About 43% of male teachers indicated that they did not know about Flickr, compared with 53% of the female teachers. Surely, the number of teachers without an idea of about this tool is high. However, it might be that the teachers have not been able to identify how to use it in their disciplines.

The Chi-Square test was used to analyze the significance relationship between gender and the teacher familiarity with Flickr. The results are shown in the table 5.20 below.

Table 5.20 Teacher Gender/Familiarity with Flickr

		Familiarity with Flickr				Total
		Yes, I know	**No, I don´t know**	**Uncertain**	**No, Answer**	
Teacher Gender	**Male**	86 [56.6%]	52 [34.2%]	10 [6.6%]	4 [2.6%]	152 [51%]
	Female	69 [47.3%]	69 [47.3%]	6 [4.1%]	2 [1.3%]	146 [49%]
Total		**155 [52.01%]**	**121 [40.60%]**	**16 [5.37%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value) (2-sided)**
Pearson Chi-Square	5.801	3	0.122
N of Valid Cases	298		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between gender and teacher familiarity with Flickr (Chi-Square=5.801, df=3, P-value =0.122). This means that there is no concrete evidence to suggest that male teachers are more familiar with Flickr than female teachers.

The relationship between teacher age and teacher familiarity with Flickr is shown in table 5.21 below.

Table 5.21 Teachers Familiarity with Flickr and Teachers Age

		Familiarity with Flickr				Total
		Yes, I know	No, I don´t know	Uncertain	No, answer	
Teacher Age	30 to 39	66 [52.5%]	50 [39.6%]	10 [7.9%]	0 [0%]	126 [42.28%]
	40 to 49	56 [52.8%]	40 [37.7%]	6 [5.7%]	4 [3.8%]	106 [35.57%]
	50 to 59	22 [55%]	16 [40%]	0 [0%]	2 [5%]	40 [13.42%]
	60 to 64	10 [45.5%]	12 [54.5%]	0 [0%]	0 [0%]	22 [7.38%]
	65+	1 [25%]	3 [75%]	0 [0%]	0 [0%]	4 [1.34%]
Total		**155 [52.01%]**	**121 [40.60%]**	**16 [5.37%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	14.863	12	0.249
N of Valid Cases	298		

Interpretation

As can be seen from table 5.21, the Chi-Square results indicate that there is no statistically significant relationship between teacher age and teacher familiarity with Flickr (Chi-Square=14.863, df=12, P-value =0.249).

Table 5.22 below shows that result of the analysis of the relationship between the teachers' college of affiliation and the teachers' familiarity with Flickr. The Chi-Square test results are shown in table 5.22 below.

Table 5.22 Teachers Familiarity with Flickr and Teachers College of Affiliation

		Familiarity with Flickr				Total
		Yes, I know	No, I don´t know	Uncertain	No, Answer	
Teacher Colleges	Agriculture and Marine Science	10 [40%]	15 [60%]	0 [0%]	0 [0%]	25 [8.39%]
	Arts and Social Sciences	12 [50%]	12 [50%]	0 [0%]	0 [0%]	24 [8.05%]
	Economics and Political Sciences	12 [54.5%]	10 [45.5%]	0 [0%]	0 [0%]	22 [7.38%]
	Education	36 [67.9%]	17 [32.1%]	0 [0%]	0 [0%]	53 [17.79 %]
	Engineering	16 [40%]	12 [30%]	6 [15%]	6 [15%]	40 [13.42 %]
	Medicine and Health Sciences	30 [55.6%]	18 [33.3%]	6 [11.1%]	0 [0%]	54 [18.12 %]
	Sciences	26 [76.5%]	8 [23.5%]	0 [0%]	0 [0%]	34 [11.41 %]
	Nursing	8 [22.2%]	24 [66.7%]	4 11.1%]	0 [0%]	36 [12.08 %]
	Language Centre	5 [50%]	5 [50%]	0 [0%]	0 [0%]	10 [3.36%]
Total		**155 [52.01%]**	**121 [40.60%]**	**16 [5.37%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	89.184	24	.000
N of Valid Cases	298		

Interpretation

As can be seen from table 5.22, the Chi-Square results show that there is a statistically significant relationship between teachers' college of affiliation and the teachers' familiarity with Flickr (Chi-Square=89.184, df=24, P-value =0.00). Lack of familiarity with Flickr is predom-

inant in some colleges such as the college of Nursing, whose unfamiliarity percent amounts to 66.7%), followed by the faulty of Agriculture and Marine (i.e. amounting to 60%).

5.4.1.1. e. Teachers' familiarity with Myspace

The last tool to investigate is the MySpace. A Chi-Square test was used to analyse the relationship between teachers' gender and teachers' familiarity with MySpace. Results are provided in table 5.23 below.

Table 5.23 Teachers Familiarity with Myspace by Gender

		Familiarity with Myspace				Total
		Yes, I know	No, I don´t	Uncertain	No answer	
Teacher Gender	Male	52 [34.2%]	50 [32.9%]	46 [30.3%]	4 [2.6%]	152 [51%]
	Female	47 [32.2%]	71 [48.6%]	26 [17.8%]	2 [1.4%]	146 [49%]
Total		**99 [33.22%]**	**121 [40.60%]**	**72 [24.16%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	10.003	3	.019
N of Valid Cases	298		

Interpretation

Results shown in table 5.23 above indicate that about 66% of male teachers are not familiar with MySpace or uncertain compared with 68%% of females. Chi-Square results show that there is a statistically significant relationship between teacher gender and teacher familiarity with MySpace (Chi-Square=10.003, df=3, P-value =0.019). It can be concluded that male teachers are more familiar with MySpace compared with female teachers. In fact, this is one of the tools that a majority of teachers in the study reported to be unfamiliar with.

On the other hand, the relationship between teacher age and teacher familiarity with MySpace was conducted and reported in table 5.24 below.

Table 5.24 Teacher Age/Teacher Familiarity with Myspace

		Familiarity with Myspace				Total
		Yes, I know	No, I don´t	Uncertain	No answer	
Teacher Age	30 to 39	48 [38.1%]	40 [31.7%]	38 [30.2%]	0 [0%]	126 [42.28%]
	40 to 49	34 [32.1%]	46 [43.4%]	22 [20.7%]	4 [3.8%]	106 [35.57%]
	50 to 59	9 [22.5%]	19 [47.5%]	10 [25%]	2 [5%]	40 [13.42%]
	60 to 64	8 [36.4%]	12 [54.5%]	2 [9.1%]	0 [0%]	22 [7.38%]
	65+	0 [0%]	4 [100%]	0 [0%]	0 [0%]	4 [1.34%]
Total		**99 [33.22%]**	**121 [40.60%]**	**72 [24.16%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value) (2-sided)
Pearson Chi-Square	23.251	12	0.026
N of Valid Cases	298		

Interpretation

Results shown in table 5.24 indicated that in general, the younger teachers are familiar with MySpace more than the elderly teachers. For example, 38.1% of teachers in the 30-39 age

group are familiar with Myspace; 32.1% of teachers in the 40-49 age group are familiar compared to only 22.5% of teachers in the age group 50-59 years. Chi-Square test results show that there is a statistically significant relationship between teachers age and teachers familiarity with Myspace (Chi-Square=23.251, df=12, P-value =0.029). It can be concluded that teachers who are young are more familiar with Myspace compared to the elderly teachers.

In addition, the relationship between the teachers' college of affiliation and the teachers' familiarity with Myspace was analyzed and shown in table 5.25 below.

Table 5.25 Teacher Familiarity with Myspace by Colleges

		Familiarity with Myspace				Total
		Yes, I know	No, I don´t	Uncertain	No Answer	
Teacher Colleges	Agriculture and Marine Science	7 [28%]	12 [48%]	6 [24%]	0 [0%]	25 [8.39%]
	Arts and Social Sciences	8 [33.3%]	8 [33.3%]	8 [33.3%]	0 [0%]	24 [8.05%]
	Economics and Political Sciences	8 [36.4%]	12 [54.5%]	2 [9.1%]	0 [0%]	22 [7.38%]
	Education	16 [30.2%]	23 [43.4%]	14 [26.4%]	0 [0%]	53 [17.79%]
	Engineering	8 [20%]	10 [25%]	16 [40%]	6 [15%]	40 [13.42%]
	Medicine and Health Sciences	20 [37.1%]	24 [44.4%]	10 [18.5%]	0 [0%]	54 [18.12%]
	Sciences	17 [50%]	7 [20.6%]	10 [29.4%]	0 [0%]	34 [11.41%]
	Nursing	12 [33.3%]	18 [50%]	6 [16.7%]	0 [0%]	36 [12.08%]
	Language Centre	3 [30%]	7 [70%]	0 [0%]	0 [0%]	10 [3.36%]
Total		**99 [33.22%]**	**121 [40.60%]**	**72 [24.16%]**	**6 [2.01%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	66.557	24	0.000
N of Valid Cases	298		

Interpretation

Chi-Square test results show that there is low familiarity with Myspace by the college of affiliation, (Chi-Square=66.557, df=24, P-value =0.000). However, some colleges have shown relatively greater familiarity with that tools compared to others. For example, College of sciences has scored the highest familiarity of 50% with this tool.

5.4.1.2. Use of Web 2.0 Technologies

Question 3 in section B of the teachers' questionnaire (refer to appendix 1) required the teachers to indicate whether they used Web 2.0 applications or not during their teaching practice. The responses given by the teachers are shown in table 5.26 below.

Table 5.26 Teachers' Use of Web 2.0 Technologies

		Use of Web 2.0 in teaching			Total
		Yes, I do	**No, I don´t**	**No answer**	
Teacher Gender	**Male**	81 [53.3%]	51 [33.6%]	20 [13.2%]	152 [51%]
	Female	72 [49.3%]	36 [24.7%]	38 [26%]	146 [49%]
Total		**153 [51.34%]**	**87 [29.19%]**	**58 [19.46%]**	**298 [100%]**

The table 5.26 above shows that only 51.3% indicated that they were using Web 2.0 technologies in their teaching practice. This low percentage indicates that Web 2.0 technologies are not widely used in teaching practice in the University. This might be due to many barriers such as weak infrastructure, lack of training and incentives to use these tools (Dhanarajan, 2001; Snoeyink and Ertmer, 2001). Surely more work still needs to be done to ensure that more teachers are introduced to the use of Web 2.0 technologies.

Moreover, the use of Web 2.0 technologies has been analyzed by gender, using Chi-square test to assess the influence of gender. The results are given in table 5.27 below..

Table 5.27 Chi-Square Tests

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	8.585	2	0.014
N of Valid Cases	298		

Interpretation

Results in table 5.27 revealed that the Chi-Square test indicated a statistically significant relationship between Web 2.0 use and gender (Chi-Square=8.585, df=2, P-value =0.014). Based on these results, it appears that male teachers in the study are using Web 2.0 technologies more than the female teachers (53.3% compared to 49.3%). A bigger difference is observed in the 'No answer' where the number of females is double that of male teachers. It is not clear why so many female teachers chose the option of 'No answer'.

The relationship between the use of Web 2.0 in teaching and the age of the teacher is shown in the table 5.28 below.

Table 5.28 The Use of Web 2.0 in Teaching and Teacher Age

		Use of Web 2.0 in teaching			Total
		Yes, I do	No, I don´t	No answer	
Teacher Age	30 to 39	68 [54%]	28 [22.2%]	30 [23.8%]	126 [42.28%]
	40 to 49	45 [42.4%]	39 [36.8%]	22 [20.8%]	106 [35.57%]
	50 to 59	24 [60%]	12 [30%]	4 [10%]	40 [13.42%]
	60 to 64	14 [63.6%]	6 [27.3%]	2 [9.1%]	22 [7.38%]
	65+	2 [50%]	2 [50%]	0 [0%]	4 [1.34%]
Total		**153 [51.34%]**	**87 [29.19%]**	**58 [19.46%]**	**298 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value) (2-sided)
Pearson Chi-Square	13.006	8	0.112
N of Valid Cases	298		

Interpretation

Results shown in table 5.28 above do not show any clear pattern to suggest that age is an important variable in terms of Web 2.0 technologies use. The Chi-Square results show that there is no statistically significant relationship between teacher age and Web 2.0 use (Chi-Square=13.006, df=8, P-value =0.112).

The relationship between the teachers' college of affiliation and the Web 2.0 use was investigated and reported in table 5.29 below.

Table 5.29 The use of Web 2.0 by College

		Use of Web 2.0 in teaching			Total
		Yes, I do	**No, I don´t**	**No answer**	
Teacher Colleges	**Agriculture and Marine Science**	19 [76%]	6 [24%]	0 [0%]	25 [8.39%]
	Arts and Social Sciences	14 [58.3%]	4 [16.7 %]	6 [25%]	24 [8.05%]
	Economics and Political Sciences	8 [36.4%]	10 [45.5%]	4 [18.1%]	22 [7.38%]
	Education	32 [60.4%]	13 [24.5%]	8 [15.1%]	53 [17.79%]
	Engineering	16 [40%]	14 [35%]	10 [25%]	40 [13.42%]
	Medicine and Health Sciences	18 [33.3%]	20 [37.1%]	16 [29.6%]	54 [18.12%]
	Sciences	26 [76.4%]	4 [11.8%]	4 [11.8%]	34 [11.41%]
	Nursing	14 [38.9%]	12 [33.3%]	10 [27.8%]	36 [12.08%]
	Language Centre	6 [60%]	4 [40%]	0 [0%]	10 [3.36%]
Total		**153 [51.34%]**	**87 [29.19%]**	**58 [19.46%]**	**298 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	38.019	16	.002
N of Valid Cases	298		

Interpretation

The results shown in table 5.29 above indicate that the use of Web 2.0 is varied across the different colleges. While some colleges like Agriculture and Marine Sciences, and Sciences have at least 76% of their teachers using Web 2.0, the rest of the colleges have got 60% or less of their teachers using Web 2.0 technologies. It therefore appears that the use of Web 2.0 technologies is related to the colleges. The Chi-Square test results show that there is a statistically significant relationship between the teachers' college of affiliation and the Web 2.0 use in teaching (Chi-Square=38.019, df=16, P-value =0.002).

5.4.1.3. Web 2.0 Tools Being Used by Teachers

One of the main research questions sought to establish the Web 2.0 tools that teachers were making use of in their teaching. As a result, question 1 in section C of the teachers' questionnaire (refer to appendix 1) focused on generating answers to the main research question regarding which technologies were being used by teachers.

The responses given by teachers indicate that a range of technologies and applications were being used and there were variations in the extent to which different teachers used the technologies. The study shows that there are some tools and applications that are very popular with teachers. For instance, email applications, downloading videos, downloading or purchasing e-books, searching for information, and the library catalog, among others, were used by a considerable majority of teachers. It appears that not many teachers make use of games applications. The table 5.30 below summarizes the responses given by the teachers.

Table 5.30 Web 2.0 Technologies Used by Teachers (N=298)

Technology and Applications		Response on technology use in teaching					Mean	Standard Deviation
		Not at all	Little	Medium	Much	Very much		
I	Using e-mail	22 [7.4%]	12 [4%]	54 [18.1%]	82 [27.5%]	128 [43%]	3.95	1.2
Ii	Downloading, viewing, listening audio/video clips	16 [5.4%]	29 [9.7%]	73 [24.5%]	77 [25.8%]	103 [34.6%]	3.74	1.2
Iii	Uploading audio/video clips	33 [11.1%]	63 [21.1%]	63 [21.1%]	64 [21.5%]	75 [25.2%]	3.29	1.3
Iv	Downloading or purchasing e-books	61 [20.5%]	56 [18.8%]	57 [19.1%]	39 [13.1%]	85 [28.5%]	3.1	1.5
V	Uploading copyright or CC licensed documents	98 [32.9%]	63 [21.1%]	55 [18.5%]	34 [11.4%]	48 [16.1%]	2.6	1.4
Vi	Playing games	131 [44%]	63 [21.1%]	37 [12.4%]	33 [11.1%]	34 [11.4%]	2.3	1.4
Vii	Using cloud storage sites (e.g. Drop box)	131 [44%]	41 [13.8%]	31 [10.4%]	32 [10.7%]	63 [21.1%]	2.5	1.6
Viii	Creating documents in collaborative work (e.g. Google docs)	96 [32.2%]	43 [14.4%]	64 [21.5%]	48 [16.1%]	47 [15.8%]	2.7	1.5
Ix	Text Chatting (e.g. Twitter, Facebook chat)	95 [31.9%]	66 [22.1%]	44 [14.8%]	37 [12.4%]	56 [18.8%]	2.6	1.5
X	Using VoIP, Web conference, Hangout programs (e.g. Skype, Google, Blackboard)	111 [37.2%]	46 [15.4%]	53 [17.8%]	42 [14.1%]	46 [56.4%]	2.6	1.5
Xi	Reading from external Wikis (e.g. Wikipedia)	69 [23.2%]	48 [16.1%]	63 [21.1%]	59 [19.8%]	59 [19.8%]	3.0	1.4

Table 5.30 Web 2.0 Technologies Used by Teachers (N=298)

	Technology & Applications	Response on technology use in teaching					Mean	Standard deviation
		Not at all	Little	Medium	Much	Very Much		
Xii	**Writing in external Wikis (e.g. Wikipedia).**	102 [34.2%]	48 [16.1%]	40 [13.4%]	42 [14.1%]	66 [22.1%]	2.7	1.6
Xiii	**Reading external Blogs.**	107 [35.9%]	69 [23.2%]	43 [14.4%]	29 [9.7%]	50 [16.8%]	2.5	1.5
Xiv	**Writing external Blogs.**	115 [38.6%]	60 [20.1%]	41 [13.8%]	40 [13.4%]	42 [14.1%]	2.4	1.5
Xv	**Reading external Discussion Boards.**	99 [33.2%]	60 [20.1%]	49 [16.4%]	48 [16.1%]	42 [14.1%]	2.6	1.4
Xvi	**Writing external Discussion Boards.**	104 [34.9%]	71 [23.8%]	40 [13.4%]	49 [16.4%]	34 [11.4%]	2.5	1.4
Xvii	**Reading from Wikis on Learning Management System (LMS) provided by the university (Moodle, Blackboard).**	82 [27.5%]	45 [15.1%]	61 [20.5%]	63 [21.1%]	47 [15.8%]	2.8	1.4
Xviii	**Writing in Wikis on Learning Management System (LMS) provided by the university (Moodle, Blackboard).**	105 [35.2%]	39 [13.1%]	73 [24.5%]	44 [14.8%]	37 [12.4%]	2.6	1.4
Xix	**Reading from Discussion Boards on Learning Management System (LMS) provided by the university (Moodle, Blackboard).**	106 [35.6%]	42 [14.1%]	55 [18.5%]	45 [15.1%]	50 [16.8%]	2.6	1.5
Xx	**Writing in Discussion Boards on LMS provided by the university (Moodle, Blackboard).**	95 [31.9%]	35 [12.4%]	81 [27.2%]	43 [14.4%]	42 [14.1%]	2.7	1.4

Xxi	**Downloading free lessons on the Internet (such as Open Course Ware).**	97 [32.6%]	49 [16.4%]	72 [24.2%]	46 [15.4%]	34 [11.4%]	2.6	1.4
Xxii	**Using Twitter, Facebook, Linked in, Flickr; Google.**	68 [22.8%]	63 [21.1%]	58 [19.5%]	61 [20.5%]	48 [16.1%]	2.9	1.4
Xxiv	**Searching in LMS platform (e- learning Management System)**	90 [30.2%]	33 [11.1%]	66 [22.1%]	37 [12.4%]	72 [24.2%]	2.9	1.6
Xxv	**Library catalog**	56 [18.8%]	37 [12.4%]	72 [24.2%]	43 [14.4%]	90 [30.2%]	3.3	1.5

Table 5.30 Web 2.0 Technologies Used by Teachers (N=298)

The results shown in table 5.30 highlight clearly which technologies are popular among the teachers and also show the technologies that have not gained popularity as yet among the teachers. The most five technologies commonly used by the teachers include email applications, Downloading, viewing, listening audio/video clips, uploading audio/video clips, Library catalog, and Downloading or purchasing e-books. These types of technologies cited by many as popular types of technology used (Orey, Koenecke, and Crozier, 2003; Rovai, 2001, p. 42).

Table 5.30 showed that E-mail application has got the highest mean score of 3.95 and a standard deviation of 1.2, followed by downloading and viewing audio/video clips with a mean of 3.74 and a standard deviation of 1.2. This shows that on average a considerable majority of the teachers were actually making use of email applications and downloading audio/video clips. On the other hand, some technologies such as game applications, writing external Blogs, using cloud storage sites, and writing external discussion boards were not being used as much by most of the teachers. They revealed a low average score of use of 2.4 and 2.5 respectively. However, a small group of teachers claimed to be using games quite a lot in their teaching. It is possible that these individual teachers are intrinsically motivated regarding the use of games in their teaching.

5.4.1.4. Amount of Time Spent Online by Teachers

To further assess teachers' engagement with Web 2.0 technologies and other online tools an effort was made to establish the average time spent by teachers online during week days and during the weekends. A total of 298 teachers were surveyed and the results are presented and analyzed in the following section.

5.4.1.4. A. Time Spent Online By Teachers during Week Days

Question 1 in section B of the teacher questionnaire (refer to appendix 1) required teachers to indicate the average time they spend online during each of the working week days (that is, Sunday to Thursday). The study established that there were variations in the amount of time teachers spent online during working week days. About 50% of the teachers claimed that they spend on average between 3-6 hours per day online. That with a considerable majority of teachers stating that they spent on average 6-10 hours online during a week day. The table 5.31 below shows the results of the amount of time teachers spent online during a working week day.

Table 5.31 Average Time Spent Online By Teachers during a Working Week Day

Time		**Frequency**
Valid	**less than 3 hours**	45 [15.1%]
	3 to 6 hours	148 [49.7%]
	6 to 10 hours	35 [11.7%]
	More than 10 hours	70 [23.5%]
	Total	**298** **[100%]**

Also, table 5.31 above shows that 23.5% of the teachers indicated that they were spending more than ten hours working online during a working week day. They justified all that time as they are preparing for lessons and searching information online for more demonstration in class. Also, some of the teachers had more research work compared to teaching hours in the university and as a result they tend to spend more time searching for information online. A

small group of teachers (15%) showed that they spend less than 3 hours online. It was evident in the study that some teachers were keeping a distance from the new technologies as they preferred the traditional way of doing their work, for example, using books to prepare for lessons and asking students to submit hard copies of assignments instead of marking work online. To see whether the average time teachers spent online during week days is influenced by gender, a Chi-Square test was conducted and results are shown in table 5.32.

Table 5.32 Time Spent Online During Week Days and Gender

		Teacher Gender		Total
		Male	**Female**	
Time spent online during week days	**less than 3 hours**	25 [16.4%]	20 [13.7%]	45 [15.10%]
	3 to 6 hours	64 [42.1%]	84 [57.7%]	148 [49.66%]
	6 to 10 hours	19 [12.5%]	16 [10.9%]	35 [11.74%]
	More than 10 hours	44 [28.9%]	26 [17.8%]	70 [23.49%]
Total		**152 [51%]**	**146 [49%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	8.026	3	0.045
N of Valid Cases	298		

Interpretation:

The results in table 5.32 indicate that 57.7% of the female compared to 42.1% of the male teachers spend between 3-6 hours on line during week days. But as time spend online increases, female percentage decreases and males percentage increases. However, Chi-square

result indicates that the relationship between the time spend online and gender of the teacher is not statistically significant (Chi-Square=8.026, df=3, P-value =0.045).

In addition, the relationship between the teachers' age and the time teachers spent online during working week days was investigated and shown in table 5.33 below.

Table 5.33 Time Spent Online During Working Week Days by Age

		Teacher Age				Total
		30 to 39	40 to 49	50 to 59	60+	
Time spent online during week days	less than 3 hours	26 20.6%	13 12.3%	4 10.0%	2 7.8%	45 15.1%
	3 to 6 hours	58 46.0%	58 54.7%	18 45.0%	14 53.9%	148 49.7%
	6 to 10 hours	14 11.1%	7 6.6%	8 20.0%	6 23.1%	35 11.7%
	More than 10 hours	28 22.2%	28 26.4%	10 25.0%	4 15.5%	70 23.5%
Total		126 42.3%	106 35.6%	40 13.4%	26 8.7%	298 100.0%

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	27.3	12	0.008
N of Valid Cases	298		

Interpretation:

In the teacher sample, it must be noticed that 77.9% of the teachers are within the 30-39 and 40-49 categories. The other categories, 50 to 59, 60 to 64 and 65+ have less numbers.

The Chi-Square test result shows that there is a statistically significant relationship between age and the time spent online during week days by the teachers (Chi-Square=27.3, df=12, P-

value =0.008). About 22% in the age group 30-39, and 26% in the age group 40-49 spend more than 10 hours online compared with 15.5% in the age group 60 years plus.

The analysis of results also explored the relationship between time spent online by teachers and the college of affiliation. The results are shown in table 5.34 below.

Table 5.34 Time Spent Online by Teachers During Working Week Days by College of Affiliation

		Time spent online during week days				Total
		less than 3 hours	3 to 6 hours	6 to 10 hours	More than 10 hours	
Teacher Colleges	Agriculture and Marine Science	2 [8%]	14 [56%]	5 [20%]	4 [16%]	25 [8.39%]
	Arts and Social Sciences	6 [25%]	14 [58.3%]	0 [0%]	4 [16.7%]	24 [8.05%]
	Economics and Political Sciences	4 [18.2%]	4 [18.2%]	6 [27.3%]	8 [36.3%]	22 [7.38%]
	Education	3 [5.6%]	22 [41.5%]	8 [15.2%]	20 [37.7%]	53 [17.79%]
	Engineering	10 [25%]	10 [25%]	4 [10%]	16 [40%]	40 [13.42%]
	Medicine and Health Sciences	4 [7.4%]	44 [81.5%]	2 [3.7%]	4 [7.4%]	54 [18.12%]
	Sciences	8 [23.6%]	18 [52.9%]	2 [5.9%]	6 [17.6%]	34 [11.41%]
	Nursing	8 [22.2%]	20 [55.5%]	2 [5.6%]	6 [16.7%]	36 [12.08%]
	Language Centre	0 [0%]	2 [20%]	6 [60%]	2 [20%]	10 [3.36%]
Total		**45 [15.10%]**	**148 [49.66%]**	**35 [11.74%]**	**70 [23.49%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value) (2-sided)**
Pearson Chi-Square	91.773	24	0.000
N of Valid Cases	298		

Interpretation

The results in table 5.34 above show a mixed picture with some departments having their teachers spending more time online compared to others. For example, 81.5% of teachers in Medicine and Health Sciences colleges spend between 3-6 hours online, compared to 58.3% in college of Arts and Social Sciences college. On the other hand, some colleges have more than half of their staff spending more time online, for example, 80% of teachers from the Language Centre spend more than 6 hours online and 63.6% of teachers from Economics and Political Sciences spend more than 6 hours online. Other colleges such as Engineering have half of its teachers spending up to six hours and more than six hours online. The mixed picture is confirmed by the statistical analysis results which show that there is a statistically significant relationship between the college of affiliation and the amount of time teachers spent online (Chi-Square=91.773, df=24, P-value =0.000). In other words, it can be concluded that the amount of time spent online by teachers varies according to their colleges of affiliation. This might be due to the fact that some colleges are more technology-based in their subjects than others.

5.4.1.4. B. Time Spent Online by Teachers during Weekends

Question 2 in section B of the teacher questionnaire (refer to appendix 1) required teachers to indicate the amount of time they spend online during weekends, that is, Friday and Saturdays which are the non-working days in Oman. The results are shown in table 5.35.

Table 2.35 Average Time Spent on Online Activities by Teachers during Weekends

		Frequency
Valid	Less than 5 hours	46 [15.4%]
	6 to 15 hours	108 [36.2%]
	16 to 20 hours	127 [42.6%]
	More than 20 hours	17 [5.7%]
	Total	**298 [100%]**

The study showed that the participating teachers engaged in online activities during weekends, and interestingly, they tend to spend more time online during weekends compared to working week days. For instance, 42.6% of the teachers spend between 10-20 hours online during weekends, and 36.2% spend between 6-15 hours. Most of the teachers indicated that they used between 16 to 20 hours for online activities. The other big group of teachers stated that they used between 6 to 15 hours which is also a lot of time spent on online activities. In addition, there was a group of teachers who claimed that they used more than 20 hours of their weekend time online, this group amounting to 5.7%. On the other hand, a small group of teachers reported to spend less than 5 hours online over the weekend (15.4%).

It is not clear whether these teachers will be online engaging with their teaching activities or just for social networking or other personal activities, however, the results help us to appreciate that the participating teachers are engaging in online activities during weekends.

The study analyzed how different variables including gender, age and the college of affiliation impacted on the time spent online by the teachers during weekends. The table 5.36 below shows the results of the analysis of the relationship between gender and the time spent online by the teachers.

Table 5.36 Teacher Gender/Average Time Spent Online Over a Weekend

		Average time spent online over a weekend				Total
		Less than 5 hours	6 to 15 hours	16 to 20 Hours	More than 20 hours	
Teacher Gender	Male	17 [11.2%]	67 [44.1%]	61 [40.1%]	7 [4.6%]	152 [100%]
	Female	29 [19.9%]	41 [28.1%]	66 [45.2%]	10 [6.8%]	146 [100%]
Total		46 [15.4%]	108 [36.2%]	127 [42.6%]	17 [5.7%]	298 [100%]

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	9.999	3	0.019
N of Valid Cases	298		

Interpretation

Results in table 5.36 show that female tend to spend more time online during weekends than male. For example, 52% of female compared to 44.7% of male spend 16+ hours online. The Chi-Square test result shows that there is a statistically significant relationship between the average time teachers spent online during weekends and gender (Chi-Square= 9.999, df=3, P-value =0.019). It can be concluded that female teachers spend more time online compared to male teachers during weekends.

The relationship between teacher age and the average time they spend online during week-ends was analyzed and shown in table 5.37 below.

Table 5.37 Average Time Spent Online During a Weekend by Teacher Age

		Average time spent online over a weekend				Total
		Less than 5 hours	6 to 15 hours	16 to 20 hours	More than 20 hours	
Teacher Age	30 to 39	20 [15.9%]	42 [33.3%]	54 [42.9%]	10 [7.9%]	126 [100%]
	40 to 49	15 [14.2%]	30 [28.3%]	57 [53.8%]	4 [3.8%]	106 [100%]
	50 to 59	4 [10%]	21 [52.5%]	12 [30%]	3 [7.5%]	40 [100%]
	60 to 64	7 [31.8%]	11 [50%]	4 [18.2%]	0 [0%]	22 [100%]
	65+	0 [0%]	4 [100%]	0 [0%]	0 [0%]	4 [100%]
Total		**46 [15.4%]**	**108 [36.2%]**	**127 [42.6%]**	**17 [5.7%]**	**298 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value) (2-sided)
Pearson Chi-Square	28.909	12	0.004
N of Valid Cases	298		

Interpretation

Results from table 5.37 above show that in general the amount of time teachers spend online varies depending on age groups. For instance, 50.8% of teachers aged between 30 and 39 spend 16 or more than 16 hours online; 57.6% of teachers within the 40 to 49 age group spend 16 or more than 16 hours online. On the other hand, only 37.5% of teachers in 50 to 59

age group spend 16 or more hours online. It appears that the more elderly teachers tend to spend less time online during weekends compared to the young teachers.

The Chi-Square test results show that there is a statistically significant relationship between the teacher age and the average time spent online during weekends (Chi-Square= 28.909, df= 12, P-value = 0.004). It can be concluded that young teachers spend more time online than the old teachers.The relationship between the teachers' college of affiliation and the amount of time spent online was analyzed and reported in table 5.38 below.

Table 5.38 Average Time Spent Online Over a Weekend According Teachers' College of Affiliation

		Average time spent online over a weekend				Total
		Less than 5 hours	6 to 15 hours	16 to 20 hours	More than 20 hours	
Teacher Colleges	Agriculture and Marine Science	7 [28%]	4 [16%]	12 [48%]	2 [8%]	25 [100%]
	Arts and Social Sciences	4 [16.7%]	10 [41.7%]	10 [41.7%]	0 [0%]	24 [100%]
	Economics and Political Sciences	4 [18.2%]	8 [36.4%]	10 [45.5%]	0 [0%]	22 [100%]
	Education	7 [13.2%]	24 [45.3%]	20 [37.7%]	2 [3.8%]	53 [100%]
	Engineering	4 [10%]	12 [30%]	22 [55%]	2 [5%]	40 [100%]
	Medicine and Health Sciences	8 [14.8%]	18 [33.3%]	24 [44.4%]	4 [7.4%]	54 [100%]
	Sciences	7 [20.6%]	12 [35.3%]	13 [38.2%]	2 [5.9%]	34 [100%]
	Nursing	4 [11.1%]	12 [33.3%]	16 [44.4%]	4 [11.1%]	36 [100%]
	Language Centre	1 [10%]	8 [80%]	0 [0%]	1 [10%]	10 [100%]

Total	**46 [15.4%]**	**108 [36.2%]**	**127 [42.6%]**	**17 [5.7%]**	**298 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	27.116	24	0.299
N of Valid Cases	298		

Interpretation

Results in table 5.38 above show that some colleges have more than half of their teachers spending 16 or more hours online during weekends, for example, College of Agriculture and Marine science (54%), Engineering (60%), Medical and Health Sciences (51.8%) and Nursing (55.5%). The rest of the colleges have more than 50% of their teachers spending either less than 5 hours or between 6 to 15 hours online during the weekend. This may appear to show that there is a relationship between the amount of time spent online and the teachers' college of affiliation. However, the Chi-Square test results show that there is no statistically significant relationship between the teachers' college of affiliation and the average time teachers spend online during weekends (Chi-Square=27.116, df= 24, P-value =0.299).

5.4.2. Research Question 2: Which Web 2.0 Technologies are the Participating Students Using in Their Learning Activities in the University?

A total of 541 students were surveyed to establish which technologies they own, which Web 2.0 technologies they use in their learning, and how much time they spend online during week days and during weekends. This was useful to generate answers to the research question 2. The student data in this section are presented using the following themes:

- Technology owned by students.
- Technologies teachers encourage students to use in their learning.
- Time spent online by students during week days.

- Time spent online by students during weekends.

Where possible, data analysis also includes an exploration of the relationship between variables such as students' gender and age and the amount of time students spend online during the week and weekends as well as their overall use of Web 2.0 technologies.

5.4.2.1. Technology Owned by Students

The study aimed to identify the technologies that students were either possessing or using in their day to day life. Question 6 in section A of the questionnaire (refer to appendix 2) asked students to indicate the technologies they own. The responses from students are shown in table 5.39 below.

Table 5.39 Technologies Possessed by Students (N=541)

Statement on technology ownership	Response	
	No	**Yes**
I have an ordinary mobile phone	454 [84%]	88 [16%]
I have a smart mobile phone	54 [10%]	487 [90%]
I have a tablet PC	329 [61%]	212 [39%]
I have a Desktop computer	416 [77%]	125 [23%]
I have a laptop	88 [16%]	453 [84%]
I have an electronic book reader (e.g. Kindle)	477 [88%]	64 [12%]
I have an iPod	451 [83%]	90 [17%]
I have a non-iPod MP3 player/other players	376 [70%]	165 [30%]
I have home internet service	129 [24%]	412 [76%]

I have a blog	392 [72%]	149 [28%]
I have one or more accounts in Social Networks (Twitter, Facebook)	121 [22%]	420 [78%]

As shown in table 5.39 above, question 6 helped to generate useful data on the types of technologies that students possessed. Although these data do not tell us to what extent the students made use of each technology they possessed, it can be extrapolated that they make use of a wide range of it. In this technological era, the high ownership and use of Web 2.0 technologies are well documented by many studies ((Dabbagh and Kitsantas, 2012; McLoughlin & Lee, 2010; Sandars and Schroter, 2007; Alexander, 2006).

5.4.2.1. a. Mobile Phones

Different types of mobile phones are available and the broad categories used include smart phones and ordinary phones. The main difference between the two groups of phones is that smart phones usually have an advanced operating system and most of them can access the internet as opposed to the ordinary phone. In most cases students with smart phones have internet and can download a variety of applications that can be used in their learning, for example, social media applications like Facebook and Twitter.

A significant majority of the students who participated in the study indicated that they had smart phones (90%). Those with no smart phones, they are using ordinary mobile phones. There is great potential for teachers to exploit the use of different applications in their teaching practice given the number of students with smart phones. The minority group of students with no smart phones will need support from the institution if technology use emerges as an essential tool in education.

An analysis of the ownership of smart phones among male and female students was conducted to assess the relationship between gender and the ownership of smartphones. The results are shown in table 5.40 below.

Table 5.40 Smart Phone Ownership/Gender

Student Gender	**I have a smart phone**		**Total**
	Yes	**No**	
Male	141	27	168

	[83.9%]	[16.1%]	[100%]
Female	346 [92.8%]	27 [7.2%]	373 [100%]
Total	487 [90%]	54 [10%]	541 [100%]

Chi-Square Test Results

	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	10.058	1	0.002
N of Valid Cases	541		

Interpretation

The results in table 5.40 above show that 93% of female students own smartphones compared to 84% of male students. The Chi-Square test results indicate that there is a statistically significant relationship between smartphone ownership and gender (Chi-Square=10.058, df=1, P-value =0.002). It appears that more female students own smart phones compared to male students.

The relationship between smart phone ownership and student age was analyzed and results are shown in table 5.41 below.

Table 5.41 Smart Phone Ownership/Age

Student Age		**I have a smart phone**		**Total**
		Yes	**No**	
	17-18	116 [89.2%]	14 [10.8%]	130 [100%]
	19-20	200 [89.3%]	24 [10.7%]	224 [100%]
	21-22	141 [92.8%]	11 [7.2%]	152 [100%]
	23-24	13 [81.3%]	3 [18.8%]	16 [100%]
	24+	17 [89.5%]	2 [10.5%]	19 [100%]
Total		**487 [90%]**	**54 [10%]**	**541 [100%]**

It must be noted that the students in the study could not all be considered young. Still, the analysis exploring the relationship between age and smart phone ownership was conducted using Chi-Square test below.

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	2.873	4	0.579
N of Valid Cases	541		

Interpretation

The results shown in table 5.41 above indicate that most of the students in each age group possessed a smart phone. The Chi-Square test results shows that there is no statistically significant relationship between smart phone ownership and student age (Chi-Square=2.873, df=4, P-value =0.579). This is could be explained by the fact that most of the students are practically of the same age group and that is why there is no relationship between smart phone ownership and student age.

5.4.2.1. b. Computers

Students were also asked to indicate whether they possessed a tablet PC, a desktop computer and a laptop. The results captured in table 5.41 above show that only 23% of students stated that they had a desktop computer and 39% had a tablet PC. On the other hand, a considerable majority of students (84%) had a laptop. Such a mobile device can be used in teaching and learning given that students can be invited to bring their own devices in the classrooms. It is possible that some students had all the three technologies while others had nothing at all. This level of detail was not explored in the study but generally, it can be seen that most of the students had one of the technologies (either a tablet PC, desktop computer or a laptop).

An analysis of the relationship between gender and ownership of the different types of devices was conducted. It emerged that there was no difference based on gender regarding the ownership of laptops and Desktop computers. The results are shown in table 5.42 and table 5.43 below.

Table 5.42 Ownership of Laptop/Gender

Student Gender		I have a Laptop		Total
		Yes	No	
Student Gender	Male	138 [82.1%]	30 [17.9%]	168 [100%]
	Female	315 [84.5%]	58 [15.5%]	373 [100%]
Total		**453 [83.7%]**	**88 [16.3%]**	**541 [100%]**

Chi-Square tests

	Value	Df	Asymptotic Significance (P-value)
Pearson Chi-Square	0.453	1	0.501
N of Valid Cases	541		

Interpretation

As can be seen from the results in table 5.42, the Chi-Square test indicate that there is no statistically significant relationship between gender and ownership of laptops (Chi-Square= .453, df=1, P-value =0.501). Which means that both gender own equally laptops (82.1% for male compared 84.5% for female students).

Table 5.43 Ownership of Desktop Computer/Gender

		I have a desktop computer		Total
		Yes	No	
Student Gender	Male	47 [28%]	121 [72%]	168 [100%]
	Female	77 [20.6%]	296 [79.4%]	373 [100%]
Total		**124 [22.9%]**	**417 [77.1%]**	**541 [100%]**

Chi-Square tests

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	3.525	1	0.060
N of Valid Cases	298		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between ownership of a desktop computer and gender (Chi-Square=3.525, df=1, P-value =0.060). However, there was a statistically significant relationship between the ownership of a Tablet PC and gender as shown by the results in the table 5.44 below.

Table 5.44 Ownership of Tablet PC/Gender

		I have a Tablet PC		Total
		Yes	**No**	
Student Gender	**Male**	84 [50%]	84 [50%]	168 [100%]
	Female	128 [34.3%]	245 [65.7%]	373 [100%]
Total		**212** **[39.2%]**	**329** **[60.8%]**	**541** **[100%]**

Chi-Square Test Results

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	11.956	1	0.001
N of Valid Cases	541		

Interpretation

Results in table 5.44 above show that there is statistically significant relationship between gender of the students and the ownership of a Tablet PC with 50% of male students compared to 34% of female students shown to own the Tablet PC device. The Chi-Square test results supported this conclusion (Chi-Square=11.956, df=1, P-value =0.001). This result indicates that male students own more Tablets PC compared to female students.

5.4.2.1. C. Electronic Book Reader

Eighty-eight percent of the students in the study indicated that they did not own electronic book readers (for example, Kindle) making this one of the least used technologies by the students. The results are shown in table 5.45 below.

Table 5.45 Ownership of Electronic Book Reader/Gender

		I have an electronic book reader (e.g. Kindle)		Total
		Yes	No	
Student Gender	Male	17 [10.1%]	151 [89.9%]	168 [100%]
	Female	47 [12.6%]	326 [87.4%]	373 [100%]
Total		**64** **[11.8%]**	**477** **[88.2%]**	**541** **[100%]**

Chi-Square Test Results

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	0.684	1	0.408
N of Valid Cases	541		

Interpretation

The results in table 5.45 above appear to show that there is no relationship between ownership of electronic book readers and gender with 13% females compared to 10% male students indicating that they do own these devices. The Chi-Square test results confirmed this conclusion (Chi-Square=.684, df=1 , P-value =0.408).

5.4.2.1. d. iPod

The study showed that very few students (17%) owned iPods. The majority of students (83%) indicated that they did not own iPods. The results including analysis of the relationship between gender and ownership of iPods is shown below.

Table 5.46 Ownership of an iPod

		I have an iPod		Total
		Yes	No	
Student Gender	Male	33 [19.64%]	135 [80.36%]	168 [100%]
	Female	58 [15.5%]	315 [84.5%]	373 [100%]
Total		**90 [16.6%]**	**450 [83.2%]**	**541 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	3.306	2	0.192
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between ownership of iPods and gender (Chi-Square=3.306, df=2, P-value=0.192).

5.4.2.1. E. MP3 Player & Other Players

Students were also being asked to indicate whether they owned MP3 and/or other players. The table 5.47 below shows the results obtained.

Table 5.47 Ownership of MP3 and Other Players

		I have an MP3 player/other players		Total
		Yes	No	
Student Gender	Male	62 [36.9%]	106 [63.1%]	168 [100%]
	Female	103 [27.6%]	270 [72.4%]	373 [100%]
Total		**165 [30.5%]**	**376 [69.5%]**	**541 [100%]**

The analysis of the significance of the relationship between gender and the ownership of MP3 and other players is shown below.

Chi-Square Test Results

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	4.717	1	0.030
N of Valid Cases	541		

Interpretation

The results shown in table 5.47 above indicate that 37% of the male students owned MP3 or other players while 27.4 % of female students owned the same devices. This appears to show a difference based on the students' gender. The Chi-Square test results shows that there is a statistically significant relationship between ownership of MP3 and or other players (Chi-

Square=4.717, df=1, P-value =0.030). It appears that male students possess the MP3 or other players more that female students.

5.4.2.1. f. Internet Services

It was observed that 76% of the students had internet service at home. Surely, this would make it difficult for students without internet to be asked to do some tasks at home that involve using internet searching. The results of students' ownership of internet services are summarized in the table 5.48 below.

Table 5.48 Home Internet Access

		I have Home Internet Service		Total
		Yes	**No**	
Student Gender	**Male**	117 [69.6%]	51 [30.4%]	168 [100%]
	Female	295 [79.1%]	78 [20.9%]	373 [100%]
Total		**412** **[76.2%]**	**129** **[23.8%]**	**541** **[100%]**

Chi-Square Test Results

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	5.691	1	0.017
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is a statistically significant relationship between ownership of MP3 and other players and gender (Chi-Square=5.691, df=1, P-value=0.017). Female students appear to have more access to internet services compared to male students.

5.4.2.1. g. Blog

Similarly, 72% stated that they do not have blogs. This shows that this example of Web 2.0 technologies has not yet been explored adequately by students in the University. The results are obtained are shown in the table 5.49 below.

Table 5.49 Ownership of a Blog

		I have a Blog		Total
		Yes	No	
Student Gender	Male	50 [29.8%]	118 [70.2%]	168 [100%]
	Female	99 [26.5%]	274 [73.5%]	373 [100%]
Total		**149 [27.5%]**	**392 [72.5%]**	**541 [100%]**

Chi-Square Test Results

	Value	Df	Asymptotic Significance (P-value)
Pearson Chi-Square	0.602	1	0.438
N of Valid Cases	541		

Interpretation

The Chi-Square test results indicate that there is no statistically significant relationship between ownership of a blog and gender (Chi-Square=.602, df=1, P-value 0.438).

5.4.2.1. h. Accounts on Social Networks

With regard to accounts on social networks, the majority of students (77.6%) indicated that they have an account on social networking media, including Twitter and Facebook. The results are shown in table 5.50 below.

Table 5.50 Ownership of Accounts of Social Media

		I have one or more accounts in social networks (Twitter, Facebook)		Total
		Yes	No	
Student Gender	Male	130 [77.4%]	38 [22.6%]	168 [100%]
	Female	290 [77.7%]	83 [22.3%]	373 [100%]
Total		**420 [77.6%]**	**121 [22.4%]**	**541 [100%]**

Chi-Square Test Results

	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	0.009	1	0.924
N of Valid Cases	541		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between ownership of accounts on social networks and gender (Chi-Square= .009, df=1, P-value =0.924).

From the results, 77.4% of the male students indicated that they had more than a single account on social media, compared to 77.7% of female students. In the Arabic culture, it was expected that women would be conservative and shy off from using the social media. However, the results showed that both male and female students in this study were using the social media almost in the same way.

5.4.2.2. Technologies Teachers Encourage Students to Use in Their Learning

Students were asked to indicate the technologies that they were encouraged to use by their teachers. The table 5.51 below shows the results obtained, including the average score and standard deviation of use for each of the mentioned technologies. There were five responses

ranging from 1 to 5 that students were to choose to indicate the extent to which teachers were encouraging them to use from the listed technologies.

Key: 1=Not at all; 2=little; 3=Medium; 4=Much; 5=Very Much.

SD=standard deviation

Table 5.51 Technologies That Student Were Encouraged To Use by Their Teachers

Technology used	Responses					Mean	SD
	1	2	3	4	5		
Use of email	52 [9.6%]	7 [1.3%]	10 [1.8%]	73 [13.5%]	399 [73.6%]	4.4	1.2
Downloading videos	88 [16.2%]	38 [7%]	17 [3.1%]	108 [19.9%]	290 [53.5%]	3.9	1.5
Uploading videos	108 [19.9%]	44 [8.1%]	42 [7.7%]	70 [12.9%]	277 [51.1%]	3.7	1.6
Downloading or purchasing e-books	99 [18.3%]	42 [7.7%]	26 [4.8%]	109 [20.1%]	265 [48.9%]	3.7	1.6
Uploading copy-right or cc Documents	119 [22%]	49 [9%]	36 [6.6%]	80 [14.8%]	257 [47.4%]	3.6	1.6
Playing games	269 [49.6%]	94 [17.3%]	35 [6.5%]	44 [8.1%]	99 [18.3%]	2.3	1.6
Using cloud stor-age sites	156 [28.8%]	82 [15.1%]	59 [10.9%]	84 [15.5%]	160 [29.5%]	3.0	1.6
Creating docu-ments in collabo-rative work	146 [26.9%	66 [12.2%]	60 [11.1%]	94 [17.3%]	175 [32.3%]	3.2	1.6
Text chatting, e.g. Twitter	165 [30.4%]	90 [16.6%]	59 [10.9%]	74 [13.7%]	153 [28.2%]	2.9	1.6
Using VOIP, Web conference	187 [34.5%]	107 [19.7%]	68 [12.5%]	64 [11.8%]	115 [21.2%]	2.7	1.6

Table 5.51 Technologies That Student Were Encouraged to Use by Their Teachers

Technology used	Responses					Mean	SD
	1	2	3	4	5		
Using VOIP, Web conference	187 [34.5%]	107 [19.7%]	68 [12.5%]	64 [11.8%]	115 [21.2%]	2.7	1.6
Reading from external wikis	113 [20.8%]	84 [15.5%]	63 [11.6%]	74 [13.7%]	207 [38.2%]	3.3	1.6
Writing in external wikis	180 [33.2%]	109 [20.1%]	72 [13.3%]	55 [10.1%]	125 [23.1%]	2.7	1.6
Reading external blogs	143 [26.4%]	108 [19.9%]	73 [13.5%]	76 [14.0%]	141 [26.0%]	2.9	1.6
Writing external blogs	170 [31.4%]	114 [21.0%]	80 [14.8%]	71 [13.1%]	106 [19.6%]	2.7	1.5
Reading external discussion boards	146 [26.9%]	75 [13.8%]	70 [12.9%]	82 [15.1%]	168 [31.0%]	3.1	1.6
Writing external discussion boards	145 [26.8%]	77 [14.2%]	74 [13.7%]	87 [16.1%]	158 [29.2%]	3.1	1.6
Reading from wikis on LMS	48 [8.9%]	41 [7.6%]	47 [8.7%]	109 [20.1%]	296 [54.6%]	4.0	1.3
Writing in wikis on LMS	130 [24%]	66 [12.2%]	72 [13.3%]	100 [18.5%]	173 [31.9%]	3.2	1.6
Reading from discussion boards on LMS	64 [11.8%]	41 [7.6%]	54 [10%]	126 [23.2%]	256 [47.2%]	3.9	1.4

Table 5.51 Technologies That Student Were Encouraged to Use by Their Teachers

Writing in discussion boards on LMS	70 [12.9%]	55 [10.1%]	56 [10.3%]	116 [21.4%]	244 [45%]	3.8	1.4
Downloading free lessons on the internet	113 [20.8%]	73 [13.5%]	52 [9.6%]	96 [17.7%]	207 [38.2%]	3.4	1.6
Using Twitter, Facebook, LinkedIn	93 [17.2%]	51 [9.4%]	62 [11.4%]	115 [21.2%]	220 [40.6%]	3.6	1.5
Searching for information	119 [22.0%]	63 [11.6%]	60 [11.1%]	101 [18.6%]	198 [36.5%]	3.4	1.6
Searching in LMS platform	105 [19.4%]	50 [9.2%]	53 [9.8%]	109 [20.1%]	224 [41.3%]	3.5	1.6
Library catalogue	121 [22.3%]	59 [10.9%]	52 [9.6%]	87 [16.1%]	222 [41.0%]	3.4	1.6

5.4.2.2. a. Use of e-mail

The results in table 5.51 above showed that the mean score of the use for e-mail was amounting to 4.4; and standard deviation of 1.2. This shows that a significant majority of students were using email facility. The relationship between gender and the use of email was analyzed and shown below in table 5.52.

Table 5.52 Use of e-mail/Gender

		Use of Email					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	11 [6.5%]	5 [3.0%]	4 [2.4%]	30 [17.9%]	118 [70.2%]	168 [100%]
	Female	41 [11%]	2 [.5%]	6 [1.6%]	43 [11.5%]	281 [75.3%]	373 [100%]
Total		**52 [9.6%]**	**7 [1.3%]**	**10 [1.8%]**	**73 [13.5%]**	**399 [73.8%]**	**541 [100%]**

Chi-Square tests

	Value	Df	Asymptotic Significance (P-value)
Pearson Chi-Square	11.930	4	0.018
N of Valid Cases	541		

Interpretation

The results in table 5.52 above show that less male students (6.5%) compared to female students (11 %) indicated that they did not use e-mail. On the other hand a slightly greater proportions of male students (88.2%) use the e-mail technology more than ('much' or 'very much') the female students (86.8%).

The Chi-Square test results indicate that there is a statistically significant relationship between gender and students' use of e-mail technology (Chi-Square=11.930, df=4, P-value =0.018). In this case, it can be concluded that male students use email technology more often than female students.

5.4.2.2. B. Downloading, Viewing, Listening Audio/Video Clips

The results shown in table 5.51 indicate an average score of 3.9 and a standard deviation of 1.5 regarding the use of downloading, viewing or listening of audio or video clips by students. This shows that some students make 'little' use of the related technologies, while on the other hand the majority of students use the technology either 'much' or 'very much'. An analysis of the relationship between gender and use of downloading, viewing and listening of audio and video clips produced the results shown in table 5.53 below.

Table 5.53 Downloading, Viewing and Listening to Audio or Video Clips/Gender

		Downloading Videos					Total
		Not at all	**Little**	**Medium**	**Much**	**Very Much**	
Student Gender	**Male**	34 [20.2%]	18 [10.7%]	5 [3%]	36 [21.4%]	75 [44.6%]	168 [100%]
	Female	54 [14.5%]	20 [5.4%]	12 [3.2%]	72 [19.3%]	215 [57.6%]	373 [100%]
Total		**88 [16.3%]**	**38 [7.0%]**	**17 [3.1%]**	**108 [20%]**	**290 [53.6%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	11.022	4	0.026
N of Valid Cases	541		

Interpretation

The table 5.53 above shows that 76.9% of female students either selected 'much' or 'very much' as responses to the downloading of audio/video clips compared to 66.0% of male students. The Chi-Square results show that there is a statistically significant relationship between gender and the use of technology to download audio or video clips (Chi-Square=11.022, df=4, P-value =0.026). It can be concluded that female students tend to use downloading of audio and video clips more than male students.

5.4.2.2. C. Uploading Audio/Video Clips

The mean use of technology to upload audio or video clips was amounting to 3.7 and standard deviation 1.6 as indicated in table 5.51. On average it can be seen that many students were using this technology. An analysis of the relationship between gender and students' use of technology to upload audio or video clips produced results shown in table 5.54 below.

Table 5.54 Uploading Audio or Video Clips/Gender

		Uploading Videos					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very Much**	
Student Gender	**Male**	42 [25%]	21 [12.5%]	9 [5.4%]	26 [15.5%]	70 [41.7%]	168 [100%]
	Female	66 [17.7%]	23 [6.2%]	33 [8.8%]	44 [11.8%]	207 [55.5%]	373 [100%]
Total		**108 [20%]**	**44 [8.1%]**	**42 [7.8%]**	**70 [12.9%]**	**277 [51.2%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	16.166	4	0.003
N of Valid Cases	541		

Interpretation

The results shown in table 5.54 above indicate that more female students (67.3%) chose 'much' or 'very much' compared to male students (57.2%). The Chi-Square results show that there is a statistically significant relationship between use of technology to upload audio or video clips and gender (Chi-Square= 16.166, df=4, P-value =0.003). This means that it can be concluded that female students use technology to upload audio or video clips more often than the male students.

5.4.2.2. D. Downloading or Purchasing e-Books

Students were asked to indicate whether teachers encouraged them to download or purchase e-books. The responses of students indicated a mean score of 3.7 and a standard deviation of 1.6 as shown in table 5.51. This shows that the use of technology to download or purchase e-books by students was above 'medium' on the scale and very close to 'much'. However, it can be seen that there is also a group of students who were making 'little' use of technology to download or purchase e-books. An analysis of use of technology to download or purchase e-books in terms of gender was conducted and produced the results shown in table 5.55 below.

Table 5.55 Downloading or Purchasing e-books/Gender

		Downloading or purchasing e-books					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	26 [15.5%]	19 [11.3%]	6 [3.6%]	35 [20.8%]	82 [48.8%]	168 [100%]
	Female	73 [19.6%]	23 [6.2%]	20 [5.4%]	74 [19.8%]	183 [49.1%]	373 [100%]

Total	**99 [18.3%]**	**42 [7.8%]**	**26 [4.8%]**	**109 [20.1%]**	**265 [49%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	5.839	4	0.211
N of Valid Cases	541		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between use of technology to download or purchase e-books and gender (Chi-Square=5.839, df=4, P-Value =0.0.211). This means that both male students and female students are equally often in the use of technology to download or purchase e-books.

5.4.2.2. E. Uploading Copyright or CC licensed Documents

The study showed that students were also encouraged to upload documents by their teachers. The mean use of technology to upload documents was 3.6 with a standard deviation of 1.6. An analysis of gender and use of technology to upload documents was conducted and produced shown in the table 5.56 below.

Table 5.56 Uploading Copyright or CC Licensed Documents/Gender

		Uploading copyright or CC documents					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	31 [18.5%]	23 [13.7%]	4 [2.4%]	28 [16.7%]	82 [48.8%]	168 [100%]
	Female	88 [23.6%]	26 [7%]	32 [8.6%]	52 [13.9%]	175 [46.9%]	373 [100%]
Total		**119 [22%]**	**49 [9.1%]**	**36 [6.7%]**	**80 [14.8%]**	**257 [47.5%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	14.523	4	0.006
N of Valid Cases	541		

Interpretation

The results in table 5.56 above indicate that 65.5% of male students chose 'Much' or 'Very Much' compared to 60.8% of female students. The Chi-Square results indicate that there is a statistically significant relationship between uploading of documents and gender (Chi-Square=14.523, df=4, p=.006). This means that male students in the university tend to use technology to upload documents more often than the female students.

5.4.2.2. F. Playing Games

The study also showed that the teachers were encouraging students to play games online. However, the results indicate that students made 'little' use of technology to play games with an average score of 2.3 and a standard deviation of 1.6.

An analysis of the relationship between use of technology to play games and gender was conducted and the results are shown in table 5.57 below.

Table 5.57 Playing Games/Gender

		Playing games					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	65 [38.7%]	31 [18.5%]	6 [3.6%]	19 [11.3%]	47 [28%]	168 [100%]
	Female	204 [54.7%]	63 [16.9%]	29 [7.8%]	25 [6.7%]	52 [13.9%]	373 [100%]
Total		**269 [49.7%]**	**94 [17.4%]**	**35 [6.5%]**	**44 [8.1%]**	**99 [18.3%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	24.782	4	0.000
N of Valid Cases	541		

Interpretation

The results in table 5.57 show that the majority of female students (54.7%) stated that they do not play games at all compared to 38.7% of male students. On the other hand, 28% of male students compared to 13.9% of female students indicated that they play games 'Very Much'.

The Chi-Square results show that there is a statistically significant relationship between playing games and gender (Chi-Square=24.782, df=4, P-value =0.000). It can therefore, concluded that male students play games online more often than the female students.

5.4.2.2. G. Using Cloud Storage Sites (E.G. Dropbox)

When asked about the use of cloud storage sites such as dropbox, a considerable majority of students indicated that the use of technology such as dropbox is 'medium' as portrayed by the mean score of 3.0 with a standard deviation of 1.6 as shown in table 5.51 An analysis of the relationship between gender and use of cloud storage sites was conducted and results are shown in table 5.58 below.

Table 5.58 Use of Cloud Storage Sites/Gender

		Using cloud storage sites					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	46 [27.4%]	24 [14.3%]	14 [8.3%]	31 [18.5%]	53 [31.5%]	168 [100%]
	Female	110 [29.5%]	58 [15.5%]	45 [12.1%]	53 [14.2%]	107 [28.7%]	373 [100%]
Total		**156 [28.8%]**	**82 [15.2%]**	**59 [10.9%]**	**84 [15.5%]**	**160 [29.6%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	3.443	4	0.487
N of Valid Cases	541		

Interpretation

The table 5.58 above shows that 29.5% of female students compared to 27.4% of male students indicated that they do not use cloud storage sites at all. On the other hand, 28.7% of female students compared to 31.5% of male students reported that they used cloud storage sites 'very much'. However, despite these differences, the Chi-Square results show that there is no statistically significant relationship between use of cloud storage sites and gender (Chi-Square=3.443, df=4, P-value =0.487). It can be concluded that both male and female use the cloud storage sites in the same way.

5.4.2.2. H. Creating Documents in Collaborative Work

The study also sought to establish whether students were making use of technology such as Google Docs to create documents collaboratively. The results show that students are making 'medium' use of such technology as can be seen from a mean score of 3.2 in students' responses with a standard deviation score of 1.6 (Table 5.51).

The relationship between gender and the creation of documents in collaborative work using technologies such as Google Docs was conducted and results are shown in the table 5.59.

Table 5.59 Creating Documents in Collaborative Work/Gender

		Creating documents in collaborative work					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	34 [20.2%]	22 [13.1%]	14 [8.3%]	38 [22.6%]	60 [35.7%]	168 [100%]
	Female	112 [30%]	44 [11.8%]	46 [12.3%]	56 [15%]	115 [30.8%]	373 [100%]
Total		**146 [27%]**	**66 [12.2%]**	**60 [11.1%]**	**94 [17.4%]**	**175 [32.3%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	10.653	4	0.031
N of Valid Cases	541		

Interpretation

Results in table 5.59 above indicate that 35.7% of male students compared to 30.8% of female students create documents in collaborative work very much. On the other hand, 30% of female students compared to 20.2% of male students stated that they do not create documents in collaborative work at all.

The Chi-Square test results show that there is a statistically significant relationship between creation of documents in collaborative work and gender (Chi-Square=10.653, df=4, P-value=0.031). Based on these results, it can be concluded that male students tend to use technology such as Google docs more often to create documents in collaborative work compared to female students.

5.4.2.2. I. Text Chatting

When students were asked to indicate whether they were encouraged to make use of social media such as Twitter and Facebook for text chatting, the average score of students' responses was 2.9 with standard deviation of 1.6, indicating 'medium' use of text chatting on social media (Table 5.51). The relationship between gender and text chatting on social media was analyzed and the results obtained are shown in table 5.60 below.

Table 5.60 Text Chatting/Gender

		Text Chatting e.g. Twitter					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	43 [25.6%]	25 [14.9%]	16 [9.5%]	23 [13.7%]	61 [36.3%]	168 [100%]
	Female	122 [32.7%]	65 [17.4%]	43 [11.5%]	51 [13.7%]	92 [24.7%]	373 [100%]
Total		**165 [30.5%]**	**90 [16.6%]**	**59 [10.9%]**	**74 [13.7%]**	**153 [28.3%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	8.353	4	0.079
N of Valid Cases	541		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between gender and use of text chatting on social media (Chi-Square=8.353, df=4, P-value =0.079). Both male and female students do not appear to be very active with the use of social media for communication.

5.4.2.2. J. Using VOIP, Web Conference, Hangout Programmes

The study also required students to indicate their use of technologies such as VOIP, web conferencing and other hangout programmes such as Google hangouts. An average score of 2.7, with standard deviation of 1.6 were obtained, indicating that the use of these technologies was not that much (Table 5.51). The relationship between gender and use of VOIP and other technologies highlighted above are shown in the table 5.61 below.

Table 2.61 Using VOIP by Gender

		Using VOIP, web conference					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	51 [30.36%]	35 [20.83%]	16 [9.52%]	24 [14.29%]	42 [25%]	168 [100%]
	Female	136 [36.46%]	72 [19.30%]	52 [13.94%]	40 [10.72%]	73 [19.57%]	373 [100%]
Total		**187 [34.57%]**	**107 [19.78%]**	**68 [12.57%]**	**64 [11.83%]**	**115 [21.26%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	6.032	4	0.197
N of Valid Cases	541		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between the use of VOIP and other technologies such as Web conferencing and gender (Chi-Square=6.032, df=4, P-value =0.197). In other words, male and female students are equally little in making use of these technologies in their learning.

5.4.2.2. K. Reading from External Wikis

The study wanted to know the extent to which students were making use of external wikis such as Wikipedia in their learning. It emerged that students make moderate use of external wikis for reading purposes (mean=3.3, with standard deviation of 1.6 as shown in table 5.51). An analysis of the relationship between gender and reading from external wikis was conducted and the results are shown in the table 5.62 below.

Table 5.62 Reading from External Wikis/Gender

		Reading from external wikis					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	28 [16.67%]	29 [17.26%]	14 [8.33%]	33 [19.64%]	64 [38.1%]	168 [100%]
	Female	85 [22.79%]	55 [14.75%]	49 [13.14%]	41 [10.99%]	143 [38.34%]	373 [100%]
Total		**113 [20.89%]**	**84 [15.53%]**	**63 [11.65%]**	**74 [13.68%]**	**207 [38.26%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	11.185	4	0.025
N of Valid Cases	541		

Interpretation

The results in table 5.62 above show that more male students read from the external wikis compared to female students. For example 57.6.9% of male students stated that they use that tool much and very much compared to 49.3% of female students.

The Chi-Square results show that there is a statistically significant relationship between reading from external wikis and gender (Chi-Square=11.185, df=4, P-value =0.025). Based on the results, it can be concluded that male students read from external wikis more than female students.

5.4.2.2. l. Writing in External Wikis

Students were also asked to indicate whether they participated in writing in external wikis. The average response of 2.7 and standard deviation of 1.6, indicating that in general writing on the external wikis was done moderately (Table 5.51). The relationship between gender and writing on external wikis was analyzed and reported in table 5.63 below.

Table 5.63 Writing on External Wikis/Gender

		Writing in External Wikis					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	50 [29.76%]	34 [20.24%]	16 [9.52%]	24 [14.29%]	44 [26.19%]	168 [100%]
	Female	130 [34.85%]	75 [20.11%]	56 [15.01%]	31 [8.31%]	81 [21.72%]	373 [100%]
Total		**180 [33.27%]**	**109 [20.15%]**	**72 [13.31%]**	**55 [10.17%]**	**125 [23.11%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	8.597	4	0.072
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between writing on external wikis and gender (Chi-Square=8.597, df=4, P-value =0.072). It can be concluded that there is no difference in the way male and female students were writing on the external wikis.

5.4.2.2. M. Reading External Blogs

The study investigated if students were reading articles on external blogs and went on to ask them to indicate the extent to which they were participating in reading external blogs. The average score of 2.9, with standard deviation score of 1.6 was obtained, indicating that in general students were reading external blogs moderately. An analysis of the relationship between gender and reading of external blogs was conducted and obtained and shown in table 5.64 below.

Table 5.64 Reading External Blogs/Gender

		Reading External Blogs					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	39 [23.21%]	35 [20.83%]	17 [10.12%]	27 [16.07%]	50 [29.76%]	168 [100%]
	Female	104 [27.88%]	73 [19.57%]	56 [15.01%]	49 [13.14%]	91 [24.40%]	373 [100%]
Total		**143 [26.43%]**	**108 [19.96%]**	**73 [13.5%]**	**76 [14.05%]**	**141 [26.06%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	5.093	4	0.278
N of Valid Cases	541		

Interpretation

The Chi-Square test results indicate that there is no statistically significant relationship between reading of an external blog and gender (Chi-Square=5.093, df=4 and P-value=0.278). It can be concluded that there is no difference in the reading of external blogs between male and female students.

5.4.2.2. N. Writing External Blogs

In the same vein, students were asked to indicate how much of writing they do in external blogs. A mean score of 2.7 and a standard deviation of 1.5 was obtained, indicating that less than half of the students were not writing on external blogs. An analysis of the relationship between gender and students' writing on external blogs was conducted and results were shown in table 5.65 below.

Table 5.65 Writing on External Blogs/Gender

		Writing External Blogs					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	48 [28.57%]	43 [25.6%]	17 [10.12%]	24 [14.29%]	36 [21.43%]	168 [100%]
	Female	122 [32.71%]	71 [19.03%]	63 [16.89%]	47 [12.60%]	70 [18.77%]	373 [100%]
Total		**170 [31.42%]**	**114 [21.07%]**	**80 [14.79%]**	**71 [13.12%]**	**106 [19.6%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	7.257	4	0.123
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between gender and the students' writing on external blogs (Chi-Square = 7.257, df=4, P-value =0.123).

5.4.2.2. 0. Reading External Discussion Boards

The study sought to establish students' use of external discussion boards. The students' average score regarding reading external discussion boards is 3.1 as shown in table 5.51. This means that reading from external discussion boards was being done moderately. A considerable majority of the students were not reading external discussion boards, and a small group of students were actually making an effort to read from these external discussion boards. An analysis of the relationship between reading external discussions and gender produced the results shown in table 5.66 below.

Table 5.66 Reading External Discussion Boards/Gender

		Reading external discussion boards					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	39 [23.21%]	20 [11.9%]	14 [8.33%]	31 [18.45%]	64 [38.1%]	168 [100%]
	Female	107 [28.69%]	55 [14.75%]	56 [15.01%]	51 [13.67%]	104 [27.88%]	373 [100%]
Total		**146 [26.99%]**	**75 [13.86%]**	**70 [12.94%]**	**82 [15.16%]**	**168 [31.05%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	11.590	4	0.021
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is a statistically significant relationship between gender and the reading from external discussion board (Chi-Square=11.590, df= 4, P-value= 0 .021). Based on the results, it can be concluded that male students read from external discussion boards more than their female counterparts. The results shown in table 5.66 above indicate that 56.6% of male students were using external discussion tables much and very much, compared to at all 41.5% of female students.

5.4.2.2. P. Writing External Discussion Boards

Apart from reading, the study also sought to establish whether students were making use of the Web 2.0 technologies, in particular, the external discussion board for reading. Similar results were obtained to that of writing on the external discussion board discussed above, scoring a mean of 3.1 and standard deviation of 1.6. An analysis of gender and writing on external discussion boards was conducted and results are shown in table 5.67 below.

Table 5.67 Writing on External Discussion Boards with gender

		Writing external discussion boards					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	39 [23.21%]	23 [13.7%]	15 [8.93%]	32 [19.05%]	59 [35.12%]	168 [100%]
	Female	106 [28.42%]	54 [14.48%]	59 [15.82%]	55 [14.75%]	99 [26.54%]	373 [100%]
Total		**145 [26.8%]**	**77 [14.23%]**	**74 [13.68%]**	**87 [16.08%]**	**158 [29.21%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	9.491	4	0.050
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between writing on external discussion boards and gender (Chi-Square=9.491; df=4, P-value =0.050). Unlike reading on external discussion boards, here there is no difference in the way male and female students read external discussion boards.

5.4.2.2. Q. Reading from Wikis on LMS Provided by the University

The University is using two learning management systems (LMS) platforms, the Moodle and the Blackboard. The study wanted to know whether students were making use of some of the technologies on these LMSs. Students were asked to indicate if they read articles from Wikis on LMS provided by the University. The average score was 4.0 which shows that most of the students were reading from the Wikis on LMS as a score of 4 indicates 'Much' on the scale (table 5.51). The standard deviation of 1.3 shows that there was variation in terms of the way students read from the Wikis ranging from 'medium' to 'very much'.

The relationship between gender and reading from Wikis on LMS was analyzed and the results are shown in table 5.68 below.

Table 5.68 Reading from Wikis on LMS/Gender

		Reading from wikis on LMS					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	15 [8.93%]	15 [8.93%]	10 [5.95%]	33 [19.64%]	95 [56.55%]	168 [100%]
	Female	33 [8.85%]	26 [6.97%]	37 [9.92%]	76 [20.38%]	201 [53.89%]	373 [100%]
Total		**48 [8.87%]**	**41 [7.58%]**	**47 [8.69%]**	**109 [20.15%]**	**296 [54.71%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	2.866	4	0.581
N of Valid Cases	541		

Interpretation

The Chi-Square test results indicate that there is no statistically significant relationship between reading from Wikis on LMS provided by the University and gender (Chi-Square=2.866, df=4, P-value =0.581). It can be concluded that there is no difference in the way male and female students read from the Wikis on LMS provided by the University.

5.4.2.2. R. Writing in Wikis on LMS Provided by the University

While students tend to read a lot from the Wikis on the LMS, it appears that they do less writing activity on the Wikis. The average mean score for writing on Wikis is 3.2 which show a moderate engagement with the Wikis for writing purposes (Table 5.51). A standard deviation of 1.6 indicates that the range of responses from students is spread from close to 'little' use to 'very much'. An analysis of the relationship between gender and the use of Wikis on the LMS was conducted using Chi-Square test and the following results were obtained in table 5.69.

Table 5.69 Writing on Wikis on the LMS According Gender

		Writing on wikis on LMS					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	37 [22.02%]	23 [13.69%]	17 [10.12%]	33 [19.64%]	58 [34.52%]	168 [100%]
	Female	93 [24.93%]	43 [11.53%]	55 [14.75%]	67 [17.96%]	115 [30.83%]	373 [100%]
Total		**130 [24.03%]**	**66 [12.2%]**	**72 [13.31%]**	**100 [26.81%]**	**173 [31.98%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	3.385	4	0.496
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between writing on Wikis on the LMS provided by the University and gender (hi-Square=3.385, df=4, P-value =0.496). There no difference between the writing activity on Wikis on the LMS by students that can be explained by gender.

5.4.2.2. S. Reading from Discussion Boards on LMS Provided by the University

Most of the students indicated that they were reading articles from the discussion boards on LMS provided by the University. The results show that more students read from discussion boards on LMS provided by the University than external discussion boards. The average score for reading on discussion boards on LMS is 3.9 which indicates that many students were actually reading from these discussion boards (Table 5.51). A standard deviation of 1.4 shows a range of responses from above 'little' use to 'very much'.

An analysis of gender on the students' reading activity on discussion boards on LMS was conducted and the following results were obtained in table 5.70.

Table 5.70 Reading from Discussion Boards on LMS according gender

		Reading from Discussion boards					**Total**
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	21 [12.5%]	17 [10.12%]	12 [7.14%]	36 [21.43%]	82 [48.81%]	168 [100%]
	Fe-male	43 [11.53%]	24 [6.43%]	42 [11.26%]	90 [24.13%]	174 [46.65%]	373 [100%]
Total		**64 [11.83%]**	**41 [7.58%]**	**54 [9.98%]**	**126 [23.29%]**	**256 [47.32%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	4.612	4	0.330
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between reading from discussion boards on LMS provided by the University and gender (Chi-Square=4.612, df=4, P-value= 0.330). This means that male and female students are equally read from discussion boards on the LMS provided by the University.

5.4.2.2. T. Writing in Discussion Boards on LMS Provided by the University

Students were asked to indicate whether they participated in writing on discussion boards on LMS provided by the University. Similarly to reading, the results indicated that a significant majority of students participated in writing on discussion boards on LMS provided by the University, with an average score of 3.8, and standard deviation of 1.4 (Table 5.51). The mean score is closer to 'much' use and we can see from the standard deviation that some students did make 'little' use of the writing in discussion boards whereas some students made relatively more usage of the discussion board. The relationship between gender and the writing on the discussion board on LMS was further analyzed using Chi-square test. The results are shown in the table 5.71 below.

Table 5.71 Writing in Discussion Board on LMS Provided by the University/Gender

		Writing in discussion boards on LMS					Total
		Not at all	Little	Medium	Much	Very much	
Student Gender	Male	20 [11.9%]	19 [11.31%]	15 [8.93%]	44 [26.19%]	70 [41.67%]	168 [100%]
	Fe-male	50 [13.4%]	36 [9.65%]	41 [10.99%]	72 [19.30%]	174 [46.65%]	373 [100%]
Total		**70 [12.94%]**	**55 [10.17%]**	**56 [10.35%]**	**116 [21.44%]**	**244 [45.10%]**	**541 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	4.191	4	0.381
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between writing on discussion boards on LMS provided by the University and gender (Chi-Square=4.191, df=4, P-value= 0.381). It can be concluded that there is no difference in the way male and female students engage with writing on the discussion boards on LMS.

5.4.2.2. u. Downloading Free Lessons on the Internet (e.g. Open Courseware)

Students were also asked if their teachers encouraged them to download free lessons on the internet using technologies such as open courseware. The results indicate that this technology was used moderately by the majority of students with a mean score of 3.4 and a standard deviation score of 1.6 (Table 5.51). An analysis of the relationship between gender and the downloading of free lessons on the internet was conducted, and the results shown in table 5.72 below.

Table 5.72 Downloading Free Lessons from the Internet/Gender

		Downloading free lessons on the internet					Total
		Not at all	Little	Medium	Much	Very much	
Student Gender	Male	34 [20.24%]	26 [15.48%]	11 [6.55%]	31 [18.45%]	66 [39.29%]	168 [100%]
	Female	79 [21.18%]	47 [12.6%]	41 [10.99%]	65 [17.43%]	141 [37.8%]	373 [100%]
Total		**113 [20.9%]**	**73 [13.5%]**	**52 [9.6%]**	**96 [17.7%]**	**207 [38.26%]**	**541 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	3.275	4	0.513
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between downloading of free lessons from internet and gender (Chi-Square=3.275, df=4, P-value = 0.513). It can be concluded that males and females students are equally in downloading of free lessons from internet.

5.4.2.2. v. Using Twitter, Facebook, LinkedIn, Flickr, and Google

The study was also interested to know the extent to which students were making use of social media technologies such as Twitter, Facebook, LinkedIn, Flickr and Google. The average score was 3.6 which indicate that the majority of students were making use of the social media technologies in their learning (Table 5.51). The standard deviation of 1.5 shows that the

responses of students were spread from ‘little’ use to ‘very much’. The relationship between gender and students’ use of social media was analyzed and the following results were obtained in table 5.73.

Table 5.73 Use of Social Media Technologies/Gender

		Using Twitter, Facebook, LinkedIn					Total
		Not at all	Little	Medium	Much	Very much	
Student Gender	Male	31 [18.45%]	16 [9.52%]	13 [7.74%]	40 [23.81%]	68 [40.48%]	168 [100%]
	Female	62 [16.62%]	35 [9.38%]	49 [13.14%]	75 [20.11%]	152 [40.75%]	373 [100%]
Total		**93 [17.19%]**	**51 [9.43%]**	**62 [11.46%]**	**115 [21.26%]**	**220 [40.67%]**	**541 [100%]**

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	3.923	4	0.417
N of Valid Cases	541		

Interpretation

The Chi-Square results show that there is no statistically significant relationship between use of social media technologies and gender (Chi-Square=3.923, df=4, P-value= 0.417). Based on these results, it can be concluded that there is no difference in the way female and male students were using the social media technologies in their learning.

5.4.2.2. W. Searching For Information

When students were asked to indicate whether they searched for information online, the average score was found to be 3.4 with standard deviation of 1.6 (Table 5.51). This shows that most of the students searched for information moderately. An analysis of the relationship between gender and the search of information was conducted and the results are provided in table 5.74 below.

Table 5.74 Searching for Information According to Gender

		Searching for Information					Total
		Not at all	Little	Medium	Much	Very much	
Student Gender	Male	37 [22.02%]	20 [11.90%]	14 [8.33%]	34 [20.24%]	63 [37.5%]	168 [100 %]
	Female	82 [21.98%]	43 [11.53%]	46 [12.33%]	67 [17.96%]	135 [36.19%]	373 [100 %]
Total		**119 [22%]**	**63 [11.65%]**	**60 [11.09%]**	**101 [18.67%]**	**198 [36.6%]**	**541 [100 %]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	2.060	4	0.725
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between searching for information and gender (Chi-Square=2.060, df=4, P-value =.725). This means that male and female students are equally searching for information online.

5.4.2.2. X. Searching in LMS Platform (e-Learning Management System)

The study sought to find out the extent to which students searched for information on the LMS. The average score was found to be 3.5 with standard deviation of 1.4 (Table 5.51). This result shows that most of the students engaged in searching for information on the LMS. An analysis of the relationship between gender and the search of information on LMS was conducted and produced results shown in table 5.75 below.

Table 2.75 Searching in LMS Platform According to Gender

		Searching in LMS platform					Total
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	25 [14.9%]	18 [10.7%]	13 [7.7%]	43 [25.6%]	69 [41.1%]	168 [100%]
	Female	80 [21.4%]	32 [8.6%]	40 [10.7%]	66 [17.7%]	155 [41.6%]	373 [100%]
Total		**105 [19.4%]**	**50 [9.2%]**	**53 [9.8%]**	**109 [20.1%]**	**224 [41.4%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	7.794	4	0.099
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between searching for information on LMS and gender (Chi-Square=7.794, df=4, P-value = 0.099). It can be concluded that male and female students are equal in the way they search for information on LMS.

5.4.2.2. y. Library Catalog

The study also explored the use of the library catalog by the students. An average score of 3.4 was obtained in the responses showing that most of the students were using the library catalog but moderately (medium use) (Table 5.51). As the case with other technologies, this case shows a standard deviation of 1.6, indicating a spread of responses by the students from 'little' use of the technology to 'very much' use. The relationship between gender and the use of the library catalog was analysed and results were reported in table 5.76 below.

Table 5.76 Library Catalog/Gender

		Library Catalogue					Total
		Not at all	**Little**	**Medium**	**Much**	**Very much**	
Student Gender	**Male**	32 [19.05%]	23 [13.69%]	10 [5.95%]	26 [15.48%]	77 [45.83%]	168 [100%]
	Female	89 [23.86%]	36 [9.65%]	42 [11.26%]	61 [16.35%]	145 [38.87%]	373 [100%]
Total		**121 [22.37%]**	**59 [10.91%]**	**52 [9.61%]**	**87 [16.08%]**	**222 [41.04%]**	**541 [100%]**

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	7.750	4	0.101
N of Valid Cases	541		

Interpretation

The Chi-Square test results show that there is no statistically significant relationship between use of library catalog and gender (Chi-Square=7.750, df=4, P-value =0.101). Based on these results, it can be concluded that there is no difference between the way male and female students used the library catalog in their learning.

5.4.2.3. Students' Online Activities

To explore students' engagement with Web 2.0 technologies and other tools, the study involved asking students to indicate the amount of time they spend online. Section B of the student questionnaire contains two questions, question 7 and 8. Both questions focused on eliciting information on the amount of time spent by students engaging in online activities (refer to appendix 2). Question 7 aimed to investigate the average amount of time students spend engaging in online activities during a week day. On the other hand, question 8 focused on the average amount of time students spent online over a weekend.

5.4.2.3. A. Time Spent Online by Students during Week Days

As stated in the preceding paragraph, question 7 asked students to indicate the average amount of time they spend online during the week days, that is, from Sunday to Thursday. The study showed that there are some variations in the amount of time students spent online during working week days with a considerable majority of students stating that they spend on average 7 to 10 and more than 10 hours per day. The results shown in table 5.77 below were obtained.

Table 5.77 Average Time Spent Online By Students during Working Week Days

Time Spent Online		Frequency
Valid	**More than 10 hours**	205 [37.9%]
	7-10 hours	223 [41.2%]
	3-6 hours	77 [14.2%]
	Less than 3 hours	36 [6.7%]
	Total	**541 [100%]**

As can be seen from the table 5.77 above, most of the students spent an average time of between 7 to 10 hours (41%) and more than 10 hours (38%) online during a working week day. Only 7% of the students indicated that they spend an average time of less than 3 hours online during a working week day. These results show that the majority of students are using different technologies as they engage in different online activities.

Although this was not one of the research objectives, the study sought to analyse whether the time spent online during week days was related to the students' gender. A Chi-Square test was conducted and produced the following results.

Table 5.78 Time Spent Online During Week Days According Students' Gender

		Time spent online during week days				Total
		More than 10 hours	**7-10 hours**	**3-6 hours**	**Less than 3 hours**	
Student Gender	**Male**	60 [35.7%]	77 [45.8%]	17 [10.1%]	14 [8.3%]	168 [100%]
	Female	145 [38.9%]	146 [39.1%]	60 [16.1%]	22 [5.9%]	373 [100%]
Total		**205 [37.9%]**	**223 [41.2%]**	**77 [14.2%]**	**36 [6.7%]**	**541 [100%]**

Chi-Square Tests			
	Value	**Df**	**Asymptotic Significance (P-value)**
Pearson Chi-Square	5.493	3	0.139
N of Valid Cases	541		

Interpretation

The results in table 5.78 above do not give a clear pattern regarding students' gender and time spent online. For instance, more female students (39%) compared to male students (36%) spent more than 10 hours online while more male students (46%) compared to 39% female

students spent between 7 and 10 hours online. Similarly, 16% of female students compared to 10% of male students spent between 3 and 6 hours online.

The Chi-Square results show that there is no statistically significant relationship between the average time spent online by male and female students in the university (Chi-Square=5.493, df=3, P-value = 0.139). In general, it can be concluded that there is no difference in the amount of time spent online by male and female students.

5.4.2.3. B. Time Spent Online by Students during Weekends

The study sought to establish the amount of time students spent online during weekends. This was again, a way to characterize the students and identify the extent to which they could be using the Web 2.0 technologies. The table 5.79 below shows the amount of time spent online by students in general.

Table 5.79 Time Spent Online by Students during Weekends

Time Spent Online		Frequency
Valid	More than 20 hours	171 [31.6%]
	16-20 hours	231 [42.7%]
	5-15 hours	88 [16.3%]
	Less than 5 hours	51 [9.4%]
	Total	**541 [100%]**

The results in table 5.79 above show that students' engagement with online activities is variable, ranging from less than five hours to more than 20 hours during the weekend. In this case, weekend is interpreted as the two days, Fridays and Saturdays and students do not attend university on these days. The question focused on identifying the average time students spent online over the two days. It can be seen that a significant majority of students spend a lot of time online during the weekends. For instance, 43% of the students indicated that they spend between 16 to 20 hours online during weekends and 32% spend more than 20 hours

online. It was beyond the scope of the question to establish what sort of activities they do engage in and what kind of technologies they make use of actually. However, from the responses given by students regarding technology ownership, it can be gleaned that various technologies including some Web 2.0 technologies were actually being utilized.

The study also analysed whether the time spent by students online during weekends is related to their gender. The results obtained are shown in table 5.80 below.

Table 5.80 Time Spent Online during Weekends According Students' Gender

		Time spent online during week days				Total
		More than 20 hours	16-20 hours	5-15 hours	Less than 3 hours	
Chi-Square Tests	Male	77 [45.8%]	50 [29.8%]	26 [15.5%]	15 [8.9%]	168 [100%]
	Female	94 [25.2%]	181 [48.5%]	62 [16.6%]	36 [9.7%]	373 [100%]
Total		171 [31.6%]	231 [42.7%]	88 [16.3%]	51 [9.4%]	541 [100%]

Chi-Square Tests			
	Value	df	Asymptotic Significance (P-value)
Pearson Chi-Square	25.3	3	0.000
N of Valid Cases	541		

Interpretation

The results in table 5.80 above show that 75.6% of male students spent 16+ hours compared to 73.7% of female students. On the other hand, 24.4% of male students spent up to 15 hours online compared to 26.3% of female students.

The Chi-Square test results show that there is statistically significant relationship between gender and the time spent online during weekends (Chi-Square=25.3, df=3, P-value =0.00). Based on these results, it can be concluded that male students tend to spend more time online during weekends compared to female students.

5.5. Student and Teacher Perceptions about Use of Web 2.0 Technologies in Teaching and Learning

The study sought to establish the views of both students and teachers regarding the use of Web 2.0 technologies in learning and teaching contexts. The generated data are presented in the following section under research question 3 (for students) and research question 4 (for teachers).

5.5.1. Research Question 3: What are the Participating Students' Perceptions of the Value of Using Web 2.0 Technologies in their Learning Activities?

Question 10 in section C of the students' questionnaire (refer to appendix 2) focused on eliciting students' views regarding the value of the different technologies in their learning. They were asked to indicate their level of agreement or disagreement using the Likert's scale where 1= Strongly Disagree (SD); 2= Disagree (D); 3=Neutral (D); 4=Agree (A); 5=Strongly Agree (SA). A list of 33 statements that students were to agree or disagree with covers a range of subthemes that can be categorised into two main groups related to the key research questions. Some of the statements indicate the motivation or reasons why students make use of the different technologies and some of the statements enable us to glean some of the barriers to students' use of technology in their learning. These results are presented and analysed in the following sections.

5.5.1.1. Motivations for Students' Use of the Web 2.0 Technologies in Learning Contexts

The study identified a number of sub-themes that help to show why students thought use of Web 2.0 technologies was good in their learning process. These include:

- Easy access to help and sources of information
- Improvement in communication
- Good for social networking
- Improvement of knowledge on technology use
- Enhancement of the learning experience
- Student expectations

A Literature documented a positive perception of students about Web 2.0 technologies are positive (Brown, 2012; Collis and Moonen, 2008; Mcloughlin and Lee, 2007) provides a prime facilitator of participatory learning and knowledge building and creation

5.5.1.1. A. Easy Access to Help and Sources of Information

A number of statements helped to elicit students' views on the role of technology in their learning, in particular, how technology helps them to access help and different sources of information. The results are shown in the following table 5.81.

Table 5.81 Students' Perceptions of Technology as a Source of Information and Help

Statement	Students' Responses	
	Mean	Standard Deviation
ii). Help me to know about what is happening at the University	4.0	1.0
vi). Make it easy for me to get help at any time	3.8	1.0
ix). Make me better prepared for my graduate studies	3.7	1.0
xii). Give me room to gain access to a variety of sources of information	4.0	1.0
xiii). Guide me through the various educational resources available online	4.0	1.0
xvi). Help me to identify many educational programmes and activities that are available online which could support my course	3.8	1.0
xvii). Help me access information and find answers for my scientific questions through multimedia, including images, video, graphics and shapes that support the curriculum	3.7	1.0
xx). Help people find better training opportunities	3.0	1.3

The results in the table 5.81 above show that in general students viewed use of Web 2.0 technologies as a source of help and information, as indicated by the mean score that exceeding 3.0 in seven of the 8 statements listed above. This positive view of students about use of Web 2.0 was well documented in the literature (Ajjan and Hartshorne, 2008; Chu, 2009; Kao and Tsai, 2009). With regard to the 8th statement, it seems that the majority of students were not sure whether the technologies would help them find training opportunities as shown by the lowest mean score of 3.0.

5.5.1.1. B. Improvement in Communication

There was also a feeling that Web 2.0 technologies offered excellent opportunities in terms of communication as indicated by the results summarised in table 5.82 below.

Table 5.82 Students' Views on Use of Technology in Communication

Statement	Students' Responses	
	Mean	Standard Deviation
iii). Help me to communicate with other students	4.0	1.0
iv). Help me to communicate with teachers	3.9	1.0
v). Help me to communicate with researchers	3.6	1.0
x). Help me to communicate with other universities to complete graduate studies	3.4	1.0

Use of Web 2.0 technologies was viewed as useful helping students to enhance their communication with peers, teachers and other researchers as shown by the mean greater than the neutral level of 3. On the other hand, there was an almost 'neutral' position from the majority of students regarding whether technologies helped them to communicate with other universities to complete further studies.

5.5.1.1. C. Good for Social Networking

The study found that students had a feeling that the use of Web 2.0 technologies provided them with excellent opportunities to network. A mean score of 3.8 out of 5 shows that most of the students were happy that use of these technologies enabled them to network with friends and other people in their field. A standard deviation score of 1.0 shows that students are consistently having a positive view with regard to the usefulness of the Web 2.0 technologies.

5.5.1.1.D. Improvement of Knowledge on Technology Use

One of the reflections made by students showed that they appreciated the use of Web 2.0 technologies in learning as this expanded their knowledge in the use of technologies related to their field. A mean score of 3.7 shows that the majority of students were agreeable to the notion that use of technology was helpful in their learning. Similarly to views the role of technology in social networking A standard deviation score of 1.0 shows that students are consistently having a positive view that the use of Web 2.0 technologies will improve their knowledge.

5.5.1.1.E. Enhancement of the Learning Experience

Some of the statements elicited students' views on the impact of use of Web 2.0 technologies in their overall learning experience. The results are shown in table 5.83 below.

Table 5.83 Role of Technology Use on Overall Student Learning Experience

Statements	Students' Responses	
	Mean	Standard Deviation
i).Help me to speed the performance of my work.	4.0	1.0
vii). Help me in completing the tasks and duties of a higher quality.	4.0	1.0
viii). Help me to gain greater experience in my field.	3.9	1.0
xi). Make learning more creative and fun.	3.9	1.0
xiv). Make my study easier.	3.8	1.0
xv). Increase the level of students' academic achievement.	3.6	1.0

It can be gleaned from the results shown in table 5.83 above that a significant majority of students viewed the use of Web 2.0 technologies positively stating that Web 2.0 technologies helped to enhance the overall learning experience. Similar positive views can be observed in the responses given by students regarding how they felt teachers should do in terms of maximizing the use of Web 2.0 technologies in learning and teaching contexts (refer to table 5.84 below). These data were obtained from responses to question 10 in section C of the students' questionnaire.

Table 5.84 Students' Perceptions of Web 2.0 Use

Statements	**Students' Responses**	
	Mean	**Standard Deviation**
xxii). I would like to see teachers use more ICTs in their teaching	3.8	1.0
xxiii). I believe teachers should be more competent in the use of ICTs	3.4	1.1
xxviii). Courses should be dealt with in specific platforms (e.g. Moodle)	3.4	1.1
xxix). Social networks such as Twitter & Facebook impact positively on my study	3.2	1.2

Table 5.84 Students' Perceptions of Web 2.0 Use

	Mean	Standard Deviation
xxx). I would like teachers to integrate social media such as Twitter and Facebook in their courses	3.3	1.1
xxxi). Study-oriented issues should be dealt with in social media (e.g. Twitter and Facebook)	3.4	1.1
xxxii). I feel comfortable interacting with teachers on social networks (e.g. Twitter and Facebook).	3.2	1.1
xxxiii). I feel comfortable participating in discussion boards in specific platforms such as Moodle which is provided by the University.	3.2	1.0

While the majority of students indicated that they would like to see teachers using more ICTs in their teaching it does seem that in the rest of the statements shown in the table 5.84 above, the majority of students were not very sure on whether to agree or disagree with most of the statements. However, it is clear that the range of results include a minority of students who either disagreed or agreed with the statements. These results might be a reflection of the extent to which teachers are using or not using social media in teaching and learning contexts.

5.5.2. Research Question 4: What are the Participating Teachers' Perceptions of the Value of Using Web 2.0 Technologies in their Teaching Activities?

Question 2 in section C of the teachers' questionnaire (see appendix 1) focused on eliciting teachers' views regarding the value of the different information technologies to their teaching practice. They were asked to indicate their thoughts by either agreeing or disagreeing with a

statement about the use of technology where 1=Strongly Disagree (SD); 2=Disagree (D); 3=Neutral (N); 4=Agree (A); 5=Strongly Agree (SA).

A list of 33 statements that teachers were to agree or disagree with covers a range of sub-themes that can be categorised into two main themes related to the key research questions. For instance, some of the statements indicate the motivations for teachers' use of different technologies while some of the statements enable us to glean some of the barriers to teachers' use of technologies in their teaching. Barriers to teachers' use of technology will be presented separately.

5.5.2.1. Motivations for Teachers' Use of the Web 2.0 Technologies in Teaching Contexts

A number of sub-themes were identified from the data, which help to show the reasons why teachers make use of different Web 2.0 technologies in their teaching. These include the following:

- Easy access to help and information
- Help in preparing lectures
- Improvement of teaching
- Benefits to students
- Knowledge enhancement
- Improvement in communication

5.5.2.1.1. Easy Access to Help and Information

There was consensus among a considerable majority of teachers that technology use facilitated easy access to information and help. The results related to easy access to help and information are shown in table 5.85 below.

Table 5.85 Summary of Responses on Teachers' Views on Easy Access to Help and Information (n=298)

Statement	Mean Score	Standard Deviation
vi). Make it easy for me to get help at any time	3.8	1.0
xii). Give me room to gain access to a variety of sources of information	4.0	1.0
xiii). Guide me through the various educational resources available online	4.0	1.0
xvi). Help me to identify many educational programmes and activities that are available online which could support my course	3.8	1.0
xvii). Help me to access information and find answers for my scientific questions through multimedia, including images, video, graphics and shapes that support the curriculum	3.7	1.0
xviii). Allow me to follow up on social networking related scientific disciplines	3.8	0.9
xx). Help people find better training opportunities	3.0	1.3

As shown by the results in the above table 5.85 a considerable majority of students show that they felt that technologies facilitated access to information, as shown by the mean score exceeding 3 for almost all of 8 statements. This positive view of teachers about use of Web 2.0 was well documented in the literature (Brown, 2012; Collis and Moonen, 2008; Mcloughlin and Lee, 2007).

5.5.2.1.2. Help in Preparing My Lectures

Responses to statement ix show that teachers agreed that technologies helped them to prepare for their lectures. The table 5.86 below shows the results. A considerable majority of teachers are either strongly agreed or very strongly agreed. A standard deviation score of 1.1 shows that some teachers were not decided as to whether the use of technologies enhanced their lecture preparation or not.

Table 5.86 Impact of Technology on Lecture Preparation

Statement	Mean Score	Standard Deviation
ix). Make me better prepared for my graduate studies	4.1	1.1

5.5.2.1.3. Improvement in Teaching

The high mean scores shown in Table 5.87 indicate that teachers in the study felt that use of technology was indeed helpful citing that technology:

- Helps to speed the performance of their work
- Helps them to complete their tasks and duties with high quality
- Helps them to get more experience in their disciplines
- Makes teaching easier

Table 5.87 Impact of Technology Use on Teaching

Statement	Mean score	Standard Deviation
i). Help me to speed the performance of my work	4.0	1.0
vii). Help me in completing the tasks and duties of a higher quality	4.0	1.0
viii). Help me gain greater experience in my field	3.9	1.0
xiv). Make my teaching easier	3.8	1.0

5.5.2.1.4. Benefits to Students

Teachers feel that technology benefits students in their learning. A number of benefits of technology to student learning were agreed upon and there was a feeling that:

- Students should use more technology in their learning
- Courses should be embedded on the Moodle (the VLE used in the university). There was also a feeling among some of the teachers that courses should be embedded on the Moodle. Here, it is interesting to note that the average score is neutral.

Although some of the teachers prefer the use of Moodle, it does appear that a considerable majority are neither in agreement nor in disagreement with the statement.

- Students should integrate social media such as Twitter and Facebook in their learning.

The results are shown in table 5.88 below.

Table 5.88 Teacher's Perspectives on the Benefits of Technology to Students

Statement	Mean Score	Standard Deviation
xxii). I would like to see students use more ICTs in their learning	3.8	1.0
xxviii) Courses should be dealt with in specific platforms (e.g. Moodle)	3.4	1.1
xxx). I would like students to integrate social networks such as Twitter and Facebook in their learning	3.3	1.1

5.5.2.1.5. Knowledge Enhancement and Improved Communication

Using technologies was considered quite positively by most of the teachers. There was consensus that use of technology expanded the teachers' knowledge of the different technologies available although it must be noted that some teachers felt differently. On the other hand, one of the motivations for using technology is the ability of technology to enhance communication between teachers and different stakeholders which include:

- Students
- Researchers
- Colleagues in other universities

Although there are some teachers stating that they are neutral, it is evident from the results that most of the teachers agree or strongly agree that technology use helps them to network with researchers in other similar institutions. A summary of responses given by teachers is presented in table 5.89 below.

Table 5.89 Impact of Technology Use on Knowledge and Communication

Statement	Mean Score	Standard Deviation
xix). It helps me grow my knowledge in the use of new technologies that are related to my field of teaching	3.7	1.0
iv). Help me to communicate with other teachers	3.9	1.0
v). Help me to communicate with researchers	3.6	1.1
x). Help me communicate with other universities to know the new ideas	3.4	1.0

5.6. Barriers in the Use of Web 2.0 Technologies in Teaching and Learning

The study also sought to establish the barriers in the use of Web 2.0 technologies by both teachers and students. The responses given by teachers and students are presented and analysed under research question 5 and research question 6 respectively.

5.6.1. Research Question 5: What are the Barriers in the Use of Web 2.0 Technologies in Teaching Activities of the Participating Teachers in the University?

The study sought to identify some of the factors that militate against teachers' use of technologies in teaching. Statements xxi, xxiv, xxv, xxvi and xxvii in question C2 contained different factors that were thought to be possible barriers to technology use by teachers. These include:

- Lack of interest.
- Lack of time to learn how to use the technologies.
- Cultural shift.
- Lack of technical support/training.
- Low level of English.

Teachers were asked to show the degree of agreement or disagreement with some statements presenting possible barriers to technology use. The summary of results obtained are shown in table 5.90 below.

Table 5.90 Barriers to Technology Use by the Teachers

Statement	Mean Score	Standard Deviation
xxi). I am not interested in using new technologies/devices and I am forced to use them	3.3	1.3
xxiv). Teachers do not use ICTs because they do not have enough time	3.2	1.6
xxv). Teachers don't use Web 2.0 because they have difficulty in moving from traditional to modern methods of teaching	2.8	1.3
xxvi). Teachers do not use Web 2.0 because they do not have enough training	2.8	1.3
xxvii). Teachers do not use Web 2.0 because of their low level of English	2.5	1.3

5.6.1.1. Lack of Interest

It emerged from the study that one of the barriers to teachers' use of Web 2.0 technologies is lack of interest in technology use. Item xxi asked teachers to indicate whether they were interested or not in the use of technology in teaching context. The results shown in table 5.90 above indicate that large number of teachers agree or strongly agree with the statement 'I am not interested in using technologies' as shown by the mean score of 3.3 and standard deviation of 1.3. Lack of interest and negative attitude to change were well documented in the literature (Al-Diahani, 2009; Surry, Ensminger and Haab, 2005)

5.6.1.2. Lack of Time to Learn How to Use the Technologies

Some of the teachers cited that despite having interest to learn new technologies, time was a constraint. Most of the teachers chose to take the middle option (Mean score of 3.2), that is, they did not know whether their failure to use technology was a result of failing to get time or it was because of other factors. A small number of teachers did agree that time was a limiting factor whilst others disagreed (standard deviation of 1.4).

5.6.1.3. Cultural Shift

A handful of teachers felt that it was difficult for them to use new technologies because they are so used to the traditional way of teachers (see results in table 5.90 above). A mean score

close to 3 shows that the majority of teachers were not decided regarding to whether it was a difficult transition to make between the traditional and the use of new technologies in teaching.

5.6.1.4. Lack of Technical Support/Training

The study wanted to find out whether teachers were getting enough training to support their use of Web 2.0 technologies. The results shown in table 5.90 revealed a low average of 2.8 for lack of training. This shows that this barrier should be into account when initiating policies to support use of Web 2.0 technologies.

5.3.6.2.5. Low Level of English

One of the barriers to technology use by teachers that emerged from the questionnaire is the teachers' low level of English language proficiency. The results of item xxvii are shown in table 5.90 above. The results indicated a low mean score of 2.5. Teachers felt that their lack of good understanding of the English language caused their failure to use Web 2.0 technologies.

However, the responses by the teachers did not show any of these factors to be critical. On average, teachers were not sure whether they could attribute their lack of technology use to any of the above factors. However, it is worth noting that some individual teachers felt that the above factors explained their failure to use technology in their teaching.

To try and develop an understanding of why some of the teachers were not using technologies in their teaching practice, the study conducted some semi-structured interviews with 5 teachers selected from across the departments. The table 5.91 below summarizes the main themes cited by teachers as being the key to explain their failure in using technologies in their teaching practice.

Table 5.91 Why Teachers Fail to Use Technology in Teaching and Learning Contexts.

Theme	Examples of quotations made by teachers	Frequency*
Time Constraints	"It takes too much time" (Teacher, Law college)	20
Lack of Technical Support	"I do not know how to use Web 2.0 tools" (Engineering)	25

Theme	Examples of quotations made by teachers	Frequency*
Shortage of Facilities	"shortage of facilities such as computers"(Teacher, Medicine college) "Poor Wi-Fi connectivity" (Teacher, Language school).	15
Theme	**Example of quotations made by teachers**	**Frequency***
Disciplinary Constraints	"Many of teaching activity in medical field require hands-on teaching that cannot be done through internet" (Teacher, Medicine college). "I teach chemistry courses which may not reach the Facebook, Twitter) (Teacher, Science college). "The type of courses we teach requires direct interaction with the students through writing on the board and explanation" (Teacher, Medicine College).	10
Cultural Concerns	"I believe students here are not mature enough for such contact" (Teacher, Education college).	28
Teacher Preference	"We prefer to write on the board and use some slides when it is needed" (Science College)	10
Lack of Knowledge on the use of New Technologies	"I don't know how to use Web 2.0" (Teacher, Science College)	8
Technology use can be Exclusive	"Not all of the students might have access to technologies" (Teacher, Education college)	22

*This represents the number of teachers who highlighted the issue at hand during the interview.

5.6.2. Research Question 6: What are the Barriers in the Use of Web 2.0 Technologies in Students' Learning Activities in the University?

Some of the statements in question 10 of section C on the student questionnaire (refer to appendix 2) were helpful in terms of identifying some of the factors or barriers to the use of technology by both students and the teachers. The key sub-themes identified are shown below:

- Students' level of interest in technology use.

- Students' views regarding barriers to teachers' use of technology in teaching.

5.6.2.1. Students' Level of Interest in Technology Use

Statement xxi required students to indicate their level of interest in the use of technologies in their learning. The results show that most of the students were undecided as to whether they would use technology in their learning or not. This result is surprising if we look at some statements, for instance where students are calling for teachers to integrate ICTs in their teaching. However, it might simply reflect that the students were not agreeable to the idea that they were being forced to use technologies in their learning. A standard deviation of 1.3 shows that some students disagreed with the statement implying that they were actually interested in technology use. It is possible that the way the question was structured might have influenced the students' responses.

Table 5.92 Students' Level of Interest in Using Web 2.0 Technologies

Statement	Students' Response	
	Mean	Standard deviation
xxi). I am not interested in using new technologies/devices and I am forced to use them.	3.3	1.3

5.6.2.2. Students' Views Regarding Barriers to Teachers' Use of Technology in Teaching

Students were asked to indicate what they thought to be the possible barriers to teachers' use of technology in teaching. The results obtained are shown in table 5.93 below.

Table 5.93 Students' perceptions of barriers to teachers' use of technology

Statement	Students' Responses	
	Mean	Standard Deviation
xxiv). Teachers do not use ICTs because they don't have enough time	3.2	1.6
xxv). Teachers don't use Web 2.0 technologies because they have difficulty in moving from traditional to modern methods of teaching	3.2	1.0
xxvi). Teachers do not use Web 2.0 because they do not have enough training	3.3	1.0
xxvii). Teachers do not use Web 2.0 because of their low level of English	3.3	1.0

It appears from the results shown in the table 5.93 above that a considerable majority of students were not sure about the reasons why their teachers were not using Web 2.0 technologies in their teaching. All the mean scores were falling in the 'neutral' category. However, standard deviation scores ranging from 1.0 to 1.6 indicate that there were actually some students, although in the minority who agreed that teachers were not using technology because of

- Lack of time to integrate technologies in their teaching
- Difficulty in moving from traditional to modern way of teaching
- Lack of technical support/training
- Low level of English language proficiency

On the other hand, a minority group of students dispelled the above factors as potential barriers to teachers' use of Web 2.0 technologies. Students were not given an open-ended question to find out what they thought could be possible reasons for teachers' failure to use Web 2.0 technologies, however, this information was gathered from the teachers themselves as explained earlier in this chapter. The above barriers were well documented in the literature (Al-Diahani, 2009; Snoeyink and Ertmer, 2001; Surry, Ensminger, and Haab, 2005; Ely's; 1999; Rogers, 1995).

Interviews Data analysis

After the researcher became familiar with the data and the issues emerged from the data analysis of the closed and open-ended questions, four themes regarding obstacles of using Web

20 have been identified. These themes include: aspirations (goals for using Web 2.0 technologies), how to achieve these aspirations, barriers, and finally major problems of using web tools. These themes are aligned with the main research questions.

To explore these themes with more insights, some interviews with five teachers were conducted. For maintaining anonymity of these teachers, the study will refer to them by T1, T2,…T5. The results of these interviews were summarised in table 5.94 and table 5.95

Table 5.94 Interviewees Profiles

Interviewee	Description	College
T1	Male, working as a Lecturer, interviewed on 25/12/2013 for 35 minutes.	Science
T2	Male, working as an Associate Professor. Interviewed on 5/1/2014 for 30 minutes	Medicine & Health Sciences
T3	Female, working as a Language Instructor. Interview on 12/1/2014 for 40 minutes.	Education
T4	Male, Assistant Professor. Interviewed on 14/1/2014 for 30 minutes.	Engineering
T5	Female, working as lecturer interviewed on 16/1/2014 for 45 minutes.	Economic & political Sciences

Table 5.95: Interviewees Insights about Web 2.0 Themes

Theme	Views
Aspirations for using Web 2.0 tools in learning in SQU	SQU be pioneer in using Web 2.0 in its teaching, and learning process. Web 2.0 can be one of the pillars that the university should consolidate in its education and learning. Widely sued in SQU as they provide cheap, interactive and collaborative environment that support learning and learners
How these aspirations can be achieved	Through using discussion forums, chats, synchronous writing tools. Libraries should work collaboratively to develop a mechanism to benefit effectively from these tools in learning at SQU. Improving the infrastructure particularly the internet connectivity, and providing efficient training in these tools to help teachers incorporate these into their courses.
Barriers to change for using Web 2.0	Lack of efficient IT infrastructure at SQU is the biggest barrier. Also, lack of awareness of the importance and potentials of the Web 2.0 tools. Finally lack of teachers' interest, expertise, and incentives, in addition to the heavy of administrative load levied on the teaching staff.
Major problems of using Web 2.0 in relation to the role of SQU	No serious policies to encourage the use of e-learning, lack of incentives for those who use e-learning effectively, lack of proper training, and weakness of the IT infrastructure at the SQU.

5.7. Conclusion

This chapter presented the primary data from teachers and students who participated in the study. No effort was made to compare findings from the teachers and students in this chapter but simply to present the primary data from each group of participants. The next chapter will focus on the discussion of these findings in light of the existing literature.

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CHAPTER 6: DISCUSSION OF FINDINGS

6.1. Introduction

This chapter presents an outline of the responses to the main research questions. The responses are drawn from the data presented in chapter 5 and will be discussed in light of the consulted literature. The study involved working in partnership with 298 teachers and 541 students drawn from different academic departments across the university.

6.2. Response to Research Question 1

Which Web 2.0 technologies are the participating teachers using in their teaching activities in the University?

To answer the first question, a total of 298 teachers who participated in the study were asked to indicate: a) their familiarity with some key Web 2.0 technologies, b). whether they used Web 2.0 technologies in current teaching activities or not, c). which Web 2.0 tools they used, and d). time spent online during working days and during weekends. The key findings from each of the subthemes are discussed in the following section.

6.2.1. Teachers' Familiarity with Web 2.0 Technologies

The study showed that a significant majority of teachers surveyed were familiar with the use of most of the Web 2.0 technologies. In particular, teachers were asked to comment on their familiarity with commonly used Web 2.0 technologies including Wikipedia, YouTube, Facebook, Flickr and MySpace. In addition, the study evaluated the relationship between variables such as teachers' gender, age and college of affiliation with the teachers' familiarity with the Web 2.0 technologies.

The study findings revealed that the majority of teachers in the study were familiar with Web 2.0 technologies such as Wikipedia, YouTube and Facebook. For instance, 80% of the teachers indicated that they were familiar with Wikipedia while 93% were familiar with YouTube and 75% were familiar with Facebook. Familiarity is interpreted as 'being aware of' the existence and also the possible use of the technologies in the teaching and learning contexts. The results indicated that some of the Web 2.0 technologies such as Flickr and MySpace were not popular among the teachers in the study compared to the other technologies such as Facebook, YouTube and Wikipedia. Fifty-two percent of the teachers were familiar with Flickr and on the other hand, only 33% of the teachers indicated that they were familiar with

MySpace. The study did not seek to explore why there was such a variation in teachers' familiarity with the different Web 2.0 technologies; however, it could be extrapolated from the findings that familiarity was linked to the use of the technologies in teaching and learning contexts as well as in the teachers' everyday lives.

The study findings revealed some variations in the relationships between teachers' familiarity with different Web 2.0 technologies and different variables such as teachers' gender, age and college of affiliation. For instance, it appears that more male teachers compared with female teachers were familiar with the use of Wikipedia. However, there were no differences shown to exist between the different gender groups and their familiarity with Web 2.0 technologies such as YouTube, Facebook, Flickr and MySpace. On the other hand, age was shown to be important in the extent to which teachers were familiar with some of the Web 2.0 technologies such as Wikipedia, and Facebook. The results showed that young teachers (those aged below 50) were more familiar with Wikipedia and Facebook. However, there was no difference among different age groups of teachers and their familiarity with Web 2.0 technologies such as YouTube, Flickr and MySpace. Lastly but not least, the teachers' college of affiliation appears to influence teachers' familiarity with the Web 2.0 technologies. The statistical analysis results indicate that in all cases, there was a statistically significant relationship between the college of affiliation and teachers' familiarity with each of the Web 2.0 technologies at hand.

The study findings resonate with previous studies which also showed an increasing awareness of the Web 2.0 technologies among teachers in higher education. For instance, Bosch (2009) found that educators were increasingly embracing and using Web 2.0 technologies, in particular, the social media, to reach out to students. Similarly, Fox and Varandarajan (2011) found that the use of social media such as Twitter was being popularised as teachers sought to increase interaction with their students.

6.2.2. Teachers' Use of Web 2.0 Technologies

The study findings indicated that more than half of the teachers (51.34%) involved in the study were using Web 2.0 technologies in their teaching practice. This consisted of male (27.18%) and female (24.16%) teachers. It can be gleaned from these figures that a considerable majority of teachers (48.66%) in the study were not yet using Web 2.0 technologies in their teaching practice. This shows that there is more work that needs to be done regarding encouraging more uptake of these technologies into the teaching and learning contexts within

the University. While the use of Web 2.0 is generally on the increase in higher education as suggested by Kok (2010) who contends that teaching and learning has been taken to new dimensions with the use of these technologies, on the other hand, it is also evident in literature that not every teacher has started using the new technologies (Ajjan and Hartshorne, 2008). As can be seen in the study, almost half of the teachers indicated that they were not using the technologies in their practice. This highlights the need to continue to encourage and provide support to the teachers to enable them to enjoy the benefits of using new technologies in their practice. Given the type of students in today's institutions of higher education who are described by Prensky (2001) as 'digital natives' the need for teachers to embrace technologies in their teaching cannot be overemphasised.

An analysis of the impact of gender on the teachers' use of Web 2.0 technologies revealed that there is a difference in the way male and female teachers respond to the use of the technologies. It appears that male teachers use Web 2.0 technologies more than female teachers. On the other hand, the study revealed that there is no statistically significant relationship between the teachers' age and their use of Web 2.0 technologies. This means that the use of these new technologies cuts across all the different age groups.

On the other hand, the study results indicate that the use of Web 2.0 is varied across the different colleges. While some colleges like Agriculture and Marine Sciences, Arts and Social Sciences, Education, Sciences and Language centre have more than half of their teachers using Web 2.0, the rest of the colleges have got less than half of their teachers using Web 2.0 technologies. It therefore appears that the use of Web 2.0 technologies is related to the teachers' colleges of affiliation.

6.2.3. Web 2.0 Tools Being Used by the Teachers

The study established that participating teachers were employing a range of Web 2.0 technologies in their teaching practice. These technologies include among other: email applications, downloading audio/video clips, uploading audio/video clips, downloading or purchasing e-books, uploading copyright documents, playing games, using cloud storage sites such as Dropbox, creating documents in collaborative ways using Google documents, text chatting, using VoIP/web conferencing, use of wikis, blogs, discussion boards and learning management systems. It emerged that there is variation in the extent to which teachers were using the different Web 2.0 technologies and applications highlighted here. Tools that appear to have been used widely by a considerable majority of teachers include email applications, down-

loading videos, purchasing e-books, searching for information and the library catalogue. On the other hand, some tools such as game applications were used by a small group of teachers. Arguably, the small group of teachers would be intrinsically motivated to use these applications as there were no other incentives in the University for anyone to consider using the technologies. The pattern of using Web 2.0 technologies is consistent with developments in the sector where teachers are choosing to adopt technologies to enhance communication and interaction with their students. In a study by Sandars and Schroter (2007) similar results were shown where students used instant messaging and social networking with their peers and teachers.

6.2.4. Time spent online by teachers

The study found that teachers make use of the online resources to either support their work or to introduce new learning experience. As argued by Crook (2008), the affordances of Web 2.0 technologies appear to harmonise well with the contemporary way of thinking about teaching and learning. Teachers are seeking to make sessions as interactive as possible; hence, they tend to look for available resources online as they prepare their lectures. This implies spending some time online during the week and during weekends. According to the findings of this study, the majority of teachers tend to spend 6 or more hours on average online during week days. In Oman where this study was conducted, a working week runs from Sunday to Thursday. About 15% of the teachers indicated that they spend less than three hours per working day engaging in online activities. It seems these teachers are dependent on books. This might be a result of not having enough confidence with the use of new technologies. The amount of time spent online by the teachers during the week days does not depend on gender, no statistically significant difference exists. No relationship was established between the teachers' age and the amount of time spent online. However, a mixed picture exists between the teachers' college of affiliation and the amount of time spent online. It appears that teachers from different colleges spend different amounts of time online during working week days with some departments spending more time that other departments.

The study also revealed that teachers engage in online activities during weekends. In Oman, Friday and Saturday are the non-working days or weekend days. It appears teachers tend to spend more time online during weekends compared to working week days. On average, 42.6% of the teachers spend 16 to 20 hours online during weekends. Unlike during working week days, over weekends, women tend to spend more time online than men. The amount of

time spent online also varied according to the age of the teachers. The study showed that more experienced teachers (those above the age of 50) spend less time online during week-ends compared with the young teachers. No clear pattern could be established between the college of affiliation and the amount of time spent online. In other words, no clear relation-ship is evident between the two variables namely college of affiliation and the amount of time teachers spent online.

6.3. Response to Research Question 2

Which Web 2.0 technologies are the participating students using in their learning activities in the University?

A total of 541 students were surveyed to establish their use of Web 2.0 technologies and applications. To achieve a comprehensive picture, students were asked to indicate the technologies they owned, technologies that teachers encouraged them to use, time spent online during week days and during weekends. A discussion of responses is provided in the following section where each subtheme is handled separately from the rest of the subthemes.

6.3.1. Technologies owned by students

The study found that students either possess or make use of a range of Web 2.0 technologies and applications. Students indicated that they owned the following technologies: smart phones (90%), Laptop (84%), Social media accounts (78%), Internet services (76%), tablet PC (39%), iPod (17%), electronic book reader (12%), MP3 players (30%), blogs (28%) and desk top computer (23%). As can be seen from the percentages against each technology or application, there are some technologies and applications that are popular with students and others that are possessed by a small number of students. The study did not explore the extent to which students made use of these different technologies and applications, however, it can be extrapolated that students in the study made use of a wide range of technologies either in their learning or everyday lives. With 90% of students having smart phones, it becomes easier for teachers to embrace and adopt the use of innovative learning approaches such as mobile learning. As indicated by Hargadon (2008), Web 2.0 technologies are transforming teaching and learning experiences in higher education. Students are adopting these technologies and exploring ways of using them to enhance their learning experience. In the same vein, Schunk (2009) highlighted that these new technologies are facilitating teaching and learning in many different ways.

An exploration of the relationship between different technologies possessed by students and variables such as gender and age was conducted and the study found that in general no differences existed between male and female students in terms of their possession and use of Web 2.0 technologies and applications. However, the results show that female students appear to have more smart phones than their male counterparts. Although, the study expected that female students may be shy away from the use of social media, the findings of the study showed the contrary, that both male and female students make use of the social media accounts in the same way. Seventy-eight percent of students indicated that they had accounts on social media and these included both male and female students. Statistical analysis results showed that there is no difference in the way male and female students make use of social networks such as Facebook and Twitter. No differences were perceived as a result of age or the college of affiliation showing that the pattern of use of these technologies was the same across students of different age groups. It is worth highlighting that the students in the study can all be considered to be of the same age group although they were at different level of study. The study did not involve working with many mature students to be able to identify any significant differences based on age in the way students made use of new technologies.

6.3.2. Technologies Teachers Encourage Students to Use in Their Learning

It emerged from the study that teachers were playing an important role in terms of encouraging the uptake and use of Web 2.0 technologies and applications by the students. Students indicated that they were making use of a range of Web 2.0 technologies and applications. An analysis of results gives a mixed picture of the way these technologies were being used by male and female students. Technologies that students were using include: email applications, downloading and uploading of audio and video clips, downloading or purchasing of e-books, playing games, use of cloud storage sites such as Dropbox, creating documents in collaborative work using Google documents, text chatting, using VOIP or web conferencing and hangout programmes, reading and writing from wikis, blogs, discussion boards, downloading free lessons on the internet, using social media such as Twitter, Facebook, LinkedIn, Flickr and Google as well as searching for information and using the library catalogue.

The study showed that some of the Web 2.0 technologies were being used by a significant majority of students, for example, email applications, writing on external blogs, writing on discussion boards on LMS, use of social media accounts on Twitter, Facebook, LinkedIn,

Flickr and Google drive. Similarly, most of the students indicated that they made use of facilities for searching information in LMS and use of the library catalogue.

In general, there was no difference between male and female students in the way they made use of the different Web 2.0 technologies. Statistical analysis of results showed that both male and female students used a number of technologies in the same way, for example, there was no difference in the way both gender groups used software for downloading or purchasing e-books, use of cloud storage sites such as Dropbox, text chatting, writing on external wikis, writing on external discussion boards, writing on wikis on LMS, reading from discussion boards on LMS, use of social media, searching for information and use of library catalogue. However, it also emerged that in some cases, there were notable differences between the gender groups. For instance, male students tend to use email applications more than female students. On the other hand, results show that female students engage in downloading and uploading of materials such as videos or audio clips more often than male students. Male students appear to use software for playing games, creating documents in collaborative work, reading from external wikis, reading from external wikis and external discussion boards more often than female students. The observed differences that emerged from analysis of results were not explored to establish why male and female students behaved differently. However, it was useful to know that male and female students responded differently to some Web 2.0 technologies and yet they made use of some of the technologies in the same way. The study results are consistent with findings from previous studies which revealed that teachers were actually encouraging students to make use of Web 2.0 technologies that promote social networking and collaboration (Fox and Varandarajan, 2011; Bosch, 2009). As discussed by Jonassen et al. (2009), both teachers and students appreciate the several benefits of using these new technologies in teaching and learning contexts which include easy communication and access to information and help.

6.3.3. Time Spent Online

The study explored student engagement with Web 2.0 technologies and applications by eliciting information on the amount of time they spend online during the week and over the weekends. The findings show that the majority of students spend a lot of time engaging in online activities. For example, during the week days, that is, Sunday to Thursday, 37.9% of the students spend more than 10 hours online, while 41.2% spend between 7 and 10 hours online. A very small proportion of students (6.7%) spend less than 3 hours online. On the other hand,

during weekends (Friday and Saturday), most of the students appear to spend more time online compared to week days. A total of 31.6% of the students indicated that they spend more than 20 hours online over the two days they are away from school. Almost 43% of the students spend between 16 and 20 hours online. These figures indicate very high engagement with the use of Web 2.0 technologies and applications.

No differences were identified between male and female students in terms of the amount of time they spend online during the week and over the weekends. This means both male and female students in the study were spending almost the same time engaging with technologies online.

6.4. Response to Research Question 3

What are the participating students' perceptions of the value of using Web 2.0 technologies in their learning activities?

The study found that students were positive about their experience of using Web 2.0 technologies and applications in their learning. A number of benefits of technology use were identified by the students and these include but not limited to: a). easy access to help and sources of information, b). improvement in communication, c). good for social networking, d). improvement of knowledge on technology use, and e). enhancement of the learning experience.

6.4.1. Easy Access to Help and Sources of Information

The students indicated that they found Web 2.0 technologies and applications to be useful in terms of providing them with opportunities to access help from peers or their teachers 'anytime'. This was considered important in the students' learning experience as it meant technology enabled them to deal with questions and misunderstandings much quicker by asking their peers online. On the other hand, students perceived these technologies to be valuable in terms of accessing information about their course and events and programmes at the University. In some cases, students stated that they were able to access information to prepare themselves for further studies as Universities were making use of Web 2.0 technologies to advertise or provide information about their educational programmes online. The students were generally positive about the value of Web 2.0 technologies and this resonates with findings by Mazer et al. (2007) who found that students' in their study had positive attitudes towards the use of new technologies in their learning. In the same vein, students in this study com-

mented that they valued the 'just in time' learning opportunities presented to them by the use of the new technologies (Rahimi et al., 2015).

6.4.2. Improvement in Communication

One of the benefits of using Web 2.0 technologies that students highlighted in this study was the opportunity provided by technology in enhancing communication with different people. Students cited that technology was helping them to communicate with their peers on matters related to the course. This way, it was possible for students to share ideas and help each other to develop skills and understanding critical for their success on their educational programmes. The students also treasured the opportunity to communicate more effectively with their tutors and researchers in other educational institutions. They also reiterated the enhanced communication between themselves and the other universities where they intended to pursue further studies. In this case, technology provided them the chance to access information and to communicate with the universities to get more information about their future plans. Huang and Lin (2011) also found that students appreciated the opportunities to communicate easily with their peers and teachers as a result of technology use.

6.4.3. Good for Social Networking

It also emerged from the study that students valued the opportunity to connect with other people via the social media like Facebook, Twitter, LinkedIn, Flickr and Google hangouts. The majority of students were actually using the social media widely in their learning activities and other everyday activities.

6.4.4. Improvement of Knowledge on Technology Use

Students in this study also stated that use of Web 2.0 technologies and applications was helping them to expand their knowledge of the different technologies they could use in their studies. They felt that it was a good experience to gain a better understanding of how the different technologies work in educational contexts.

6.4.5. Enhancement of the Learning Experience

Lastly but not least, the use of Web 2.0 technologies and applications was seen as a catalyst for the enhancement of the overall student learning experience. Students mentioned that Web 2.0 technologies were helping them to speed up the rate at which they finish their work and also talked about increased quality of work produced. There was a feeling that use of tech-

nology helps to make learning more creative and fun. Some students also cited that technology was making it easier for them to study and they were also experiencing an improvement in their overall performance on the programme.

Given what they considered to be a good learning experience for them, students reiterated the need for integrating more ICT in teaching and learning contexts. They felt that teachers should continue to use more technology to enhance their practice as well as ensuring that all courses were being delivered via the virtual learning environments such as Moodle and the Blackboard. The study noted that most of the students were quite confident with the use of technology and were calling for more opportunities to interact with their teachers online using social media technologies as Facebook, Twitter and Google hangouts. These findings are consistent with discussions in literature, for instance, Fox and Varandarajan (2011) highlighted the use of social media such as Twitter to promote interaction between teachers and students allowing sharing and exchange of ideas. Similarly, Huang and Lin (2011) found that students' use of wikis had a positive impact on the development of writing skills and engagement with learning materials and peer support mechanisms. Overall, as argued by Bingimlas (2009), students had a feeling that the technologies were enabling them to learn in ways that prepare them to operate in an information age.

6.5. Response to Research Question 4

What are the participating teachers' perceptions of the value of using Web 2.0 technologies in their teaching activities?

With respect to the perceptions about using Web 2.0 technologies, the study found that teachers were motivated to use the Web 2.0 technologies for a number of reasons. There was an overwhelming consensus on the usefulness of technology with teachers stating that technology was helping them to: a). have easy access to help and information, b). prepare for lectures (lessons), c). Improve teaching practice, d). help students' learning, e). enhance knowledge, f). Improve communication.

6.5.1. Easy Access to Help and Information

Similarly, to what students stated, teachers also indicated that they appreciated the use of Web 2.0 technologies as they provided easy access to the sources of information. Teachers felt that the technologies were making it easier for them to access help 'anytime' as they could easily contact their peers for help if faced with a question. For those interested in pur-

suing professional development, they also cited that the Web 2.0 technologies were giving them access to information about available training opportunities as was documented by (Bosch, 2009).

6.5.2. Preparation of Lectures

One of the benefits of using Web 2.0 technologies was the availability of resources that teachers could make use of when preparing their lectures. This view was confirmed by the findings of Richardson (2006) and Churchill (2009) who says that the use of Web 2.0 technologies was benefiting teachers in their preparation of lectures. Use of technologies such as Blogs allowed exchange of ideas with colleagues and enriched teachers' understanding of their subject and ways to teach the material to their students.

6.5.3. Improving Teaching

Teachers in the study were positive about the contribution of different technologies they were using in terms of improving their teaching. They stated that they found technologies to be useful by helping them to speed up their performance and gaining more information in their disciplines. Use of technologies enabled them to provide some learning materials online and as a result they felt that this was a big relief as teaching was made easier (Dabbagh and Kitsantas, 2012). Students could access some information prior to attending sessions and this helped to prepare students for learning during class time.

6.5.4. Knowledge Enhancement

Using Web 2.0 technologies helped teachers to expand their knowledge and skills in the use of technology in their teaching practice. In addition, technology also enabled the teachers to access more information online which helped to prepare them in their disciplines.

6.5.5. Improvement in Communication

It also emerged from this study that teachers found use of Web 2.0 technologies and applications to be useful in terms of networking with colleagues in other universities. This way, teachers could share ideas on innovations in their disciplines and explore some collaborative research opportunities. Teachers also stated that the use of Web 2.0 technologies enabled them to contact their students easily for passing information and helping with clarification of concepts and other tasks in their disciplines.

6.6. Response to Research Question 5

What are the barriers in the use of Web 2.0 technologies in teaching activities of the participating teachers in the University?

The study established a number of possible barriers to teachers' use of Web 2.0 technologies. These were elicited through the questionnaire and some semi-structured interviews. Some of the main factors highlighted by teachers include: a). lack of interest in technology use, b). lack of time to learn about the new technologies, c). lack of technical support/training, d). low level of English language, e). lack of infrastructure/facilities, f). disciplinary constraints, g). fear of excluding some students. These factors are discussed below.

6.6.1. Lack of interest

Among some of the factors affecting the teachers' use of Web 2.0 technologies and applications is a lack of interest. Almost a third of the teachers stated that they were not using technologies because they did not have the interest in embedding technologies in their teaching practice. This might be due to lack of training of teachers in the Web 2.0 technologies

6.6.2. Lack of time

Teachers feel that there is not enough time for them to learn about using new Web 2.0 technologies in their teaching practice. As a result, this constituted a limiting factor in their effort to embrace the new technologies.

6.6.3. Cultural Shift

The study also established that the use of Web 2.0 technologies was being undermined by teachers' preference for traditional way of teaching compared to the modern use of technology in teaching learning contexts. There has to be a well thought out strategy to enable some teachers to buy into the idea of using new technologies in teaching. It emerged during the interviews with some of the teachers that some teachers felt very strongly about sticking to their traditional way of teaching.

6.6.4. Low Level of English Language

A small proportion of teachers in the study felt that their incompetence or their low level of understanding English language could be one of the reasons why using Web 2.0 technologies is a problem. They felt that it is difficult to make use of the technologies if you do not understand instructions provided in English language.

6.6.5. Lack of Infrastructure

There was also a feeling that in some cases use of Web 2.0 technologies was being affected by inadequate facilities in the University, for instance, some teachers reported that Wi-Fi connectivity was erratic in the university frustrating their use of Web 2.0 technologies and applications. Surely, if teachers are to be encouraged to make use of technologies there is need for the university to provide adequate infrastructure.

6.6.6. Disciplinary Constraints

Some teachers stated that their failure to use Web 2.0 technologies was due to constraints presented by their disciplines. For example, there was a feeling that in some disciplines students need to have more hands-on approach than using technology. This is understandable but surely, technology use permeates across all disciplines. Arguably, the extent to which technology can be used in each discipline differs from one discipline to another.

6.6.7. Fear of Excluding Some Students

There was also a feeling that technology use can be exclusive given that some students may not access the technologies. While this view is true, it is also necessary for the University to ensure that conditions are created to help all students if a decision to use technology is made.

It was clear from the study that most of the teachers could not identify genuine reasons why they were not using Web 2.0 technologies. The factors cited above provide useful insights into what can be the barriers to the uptake and adoption of technologies in teaching and learning contexts. The researcher strongly feel that all the above factors need to be addressed if the teachers are to be encouraged to use the technologies effectively in their teaching practice. Similarly, students also need to be supported if they are to adopt the use of Web 2.0 effectively in their learning experience.

As can be seen, the factors identified by teachers as barriers to their use of Web 2.0 technologies have been discussed widely in literature. For instance, Rogers (1983) and Ely (1999) discuss a number of factors including time, incentives, training, leadership that play a pivotal role in the adoption and implementation of new technologies in teaching and learning contexts. In the same vein, Dhanarajan (2011) discuss factors including lack of existing infrastructure, lack of commitment from the change agent, low level of skills and the need to pro-

vide staff development to intended users. These are the same issues that emerged from the teachers in the study except that, in this study, there was also a feeling that low level of English language proficiency could be one of the barriers to technology use. This is understandable in the context of Oman, it is possible that some teachers who are not fluent in English language may be discouraged to read and prepare themselves in the use of different technologies with instructions in English language. However, as argued previously, the researcher does not believe that this is a major reason for failure of teachers to adopt the use of the technologies. Possibly, lack of technical support would be one of the major reasons why some teachers may fail to get started on the use of new technologies in their practice. In another study conducted by Crook (2008), it was shown that lack of time is a potential barrier to technology use as some teachers can be hesitant to invest time in acquiring the new competencies required by Web 2.0.

6.7. Response to Research Question 6

What are the barriers in the use of Web 2.0 technologies in students' learning activities in the University?

The study also explored the possible barriers in the use of Web 2.0 technologies from students' perspectives. Students indicated their views focusing mainly on the role of the teachers, that is, the survey questions asked students to comment on what factors they considered to be limiting teachers' use of new technologies. Some of the factors that students highlighted include: a). time constraints, b). teacher preference of traditional way over the modern approaches to teaching, c). lack of training, d). low level of English language proficiency.

6.7.1. Time Constraints

Similarly, to the view held by some teachers, some students also felt that teachers were limited in their use of Web 2.0 technologies and applications because of lack of time. According to students, teachers do not have enough time to learn how to use the new technologies to give them enough confidence to embrace these technologies in teaching and learning contexts.

6.7.2. Teacher Preference

Some students thought that teachers had a chance to decide what works best for them in their teaching practice, hence, some teachers choose to stick to the traditional way of teaching

while others adopt the use of new technologies. Students commented that teachers might be struggling to move away from the traditional approach to teaching in favour of the innovative approaches involving the use of new technologies.

6.7.3. Lack of Training

One of the limiting factors in the teachers' use of new technologies is lack of training. Students acknowledge that for the teachers to be adept at technology use, there is need for them to be trained to do so. However, this training is not always available and as a result, teachers who may not have the knowledge and skills of using the new technologies find it difficult to embrace technology use in their practice.

6.7.4. Low Level of English Language Proficiency.

The study also established that some students think the teachers are not using new technologies in their practice because of their low level of English language proficiency. I think this is because students understand that English is a second language to most of the staff in the University and given that most of the computer programmes and software are in English this might actually be the barrier for their use. However, this does not explain why some teachers who are fluent in English language are not making use of technologies in their practice.

The study does appear to show that students' use of new technologies in their learning is closely linked to the way teachers use these technologies. Where teachers have been slow to adopt the technologies, this has been a barrier to students' use of the technologies. This result is consistent with findings by Mallak (2001) and Sinay et al. (2004) who argue that the teachers' adoption rate of technology can be a stumbling block to the use of new technologies. Arguably, if teachers embrace the new technologies and encourage students to use them, it will be easier for the students to make an effort to use the technologies to enhance their learning experiences. The students will certainly require some training in the use of Web 2.0 technologies to ensure they appreciate the educational value of these technologies they use in their everyday lives. (Crook, 2008). As argued by Ely (1999), training is significantly important for both teachers and students to ensure that these users acquire the skills that are necessary to navigate and interrogate the new knowledge space. It was interesting to note that no student indicated that they find technology use to be exclusive. This may suggest that basically most of the students would probably own the necessary devices such as smartphones and laptops and have access to internet that they can exploit in their learning.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1. Introduction

This study was conducted to develop an understanding of teachers and students' use of Web 2.0 technologies and applications in higher education context. The study involved working in partnership with a total number of 298 teachers and 541 students from Sultan Qaboos university in the Sultanate of Oman. The study made use of a combination of data collection tools including semi-structured interviews and questionnaires to elicit the views of participants. Data analysis involved use of both quantitative data analysis using SPSS and qualitative data analysis involving thematic analysis approach.

This chapter focuses on providing an outline of some of the main conclusions the researcher came up with from the study including limitations and recommendations for future work in the same area. The conclusions from the key findings of the study are presented in terms of the areas corresponding to the main research questions.

7.2. Web 2.0 Technologies Being Used in Teaching and Learning Context

The study findings reveal that teachers and students in the university are using a wide range of Web 2.0 technologies and applications in various ways. Tools that appear to have been used widely by a considerable majority of teachers include email applications, downloading videos, purchasing e-books, searching for information and the library catalogue. On the other hand, some tools such as game applications were used by a small group of teachers. The study also showed that teachers were also making use of social media such as Facebook, Twitter, YouTube, LinkedIn, Flickr and MySpace.

It can be concluded that the level of awareness of Web 2.0 tools and their use is high among teachers and students at the university under study. For instance, out of the 298 teachers involved in the study, more than 50% of the teachers are not only aware of the Web 2.0 tools but indicated that they actually make use of the tools in their teaching practice. However, there is a big group of teachers (48.66%) who are aware of Web 2.0 technologies but who are currently not using the technologies in their teaching. This means that more encouragement and technical support is needed for such teachers to be able to adopt and embed the technologies in their teaching. Without technical support it is difficult for teachers to embed technologies in their teaching activities.

In general, male teachers appear to use Web 2.0 technologies more than female teachers. On the other hand, the study assessed the impact of different demographic factors on the extent to which teachers made use of Web 2.0 technologies and applications during week days and over the weekends. The following demographic factors were analysed: age, gender and college where teachers were affiliated. The study concluded that the amount of time spent online by teachers did not depend on their age, gender or college of affiliation. The use of Web 2.0 tools was common across teachers of different age groups, gender and colleges in the university. This is important in terms of providing support to teachers. Both male and female teachers of different age groups need support to continue or to start to use technologies in their teaching.

Similarly, to the teachers, a considerable majority of students in the study showed that they are not only aware of the Web 2.0 technologies and applications but they are actually making use of a wide range of these technologies in their learning. Looking at the amount of time spent online by students during week days and weekends, the following key conclusions were drawn regarding the impact of selected demographic factors:

- Age did not influence the amount spent online by students during week days and over the weekends. It appears the amount of time spent online has nothing to do with the students' age groups.
- Gender did not appear to play an important role in the amount of time spent online by students. The study shows that both male and female students made use of Web 2.0 technologies in their learning.
- The students' high school performance did not seem to affect the extent to which students make use of the Web 2.0 technologies during both week days and during weekends.
- The students' level of study did not affect the amount of time spent online by students.
- The college where students were affiliated did not determine the amount of time spent online by students.

7.3. Teachers and Students' Perceptions of the Value of Using Web 2.0 Technologies

The study established that a considerable majority of students were positive about the use of information and communication technologies including Web 2.0 technologies in their learn-

ing. A number of benefits of using different technologies were cited and these include the following:

- Easy access of information.
- Students can communicate easily with peers and their teachers.
- Use of technologies helped students to do their assignments easily as they could access more information sources and discuss online with peers.
- Students are happy as they are kept informed about what is happening at university via the learning Management System and other technologies such as Facebook and Twitter.
- Easy to network with peers.

It was evident from the study findings that students were making use of a number of technologies. In addition, when asked to comment on what they considered should be the best way forward in terms of enhancing their learning, they indicated that they would like to see more use of technology in the classrooms and in their overall learning experience. It was indicated that teachers should integrate tools such as Facebook and Twitter in their learning which are some of the most commonly used Web 2.0 technologies by the student community. There is therefore evidence that students intend to make use of the technologies they are familiar to in their everyday life to improve their learning experience. It is therefore significantly important for teachers to be able to adopt and make use of technologies that students are aware of and use in their day to day life. If not, it is difficult or rather impossible to ensure that students enjoy their learning experience.

The study helped to show that the majority of teachers are not only aware of the emerging new technologies but are also making efforts to integrate the use of the new technologies in their classrooms. More than half of the teachers surveyed in the study indicated that they had started using Web 2.0 technologies and applications in their teaching. They viewed the use of new technologies helpful and a means to enhance students' learning experience.

All the teachers in the university were making use of the learning management system provided in their college, either Blackboard or Moodle. When asked to indicate tools they used in their learning, students highlighted that they were using a number of Web 2.0 tools such as

blogs, and wikis that are integrated in the learning management system. This vindicated that teachers were giving tasks to students that involved the use of these technologies.

A few teachers who were not using Web 2.0 technologies in their teaching cited lack of adequate training as one of the factors for not adopting the technologies. However, the teachers showed enthusiasm and were keen to learn how to embed Web 2.0 technologies in their teaching. There is, therefore, need for more technical support to be provided in the university across all the colleges to ensure that all teachers are provided with the necessary skills and knowledge regarding how to enhance their teaching practice with the use of new technologies. It was interesting to note that there were no differences in the use of new technologies between male and female teachers. In addition, age was not an important variable in terms of the use of web 2.0 technologies in teaching. This was rather surprising because literature reveals that in most cases young teachers, that is, those who are new to the profession are more likely to embrace new technologies in their teaching compared to the experienced teachers. One more intriguing result was that there were no significant differences in terms of the areas of specialisation of the teachers in their attitude towards the use of Web 2.0 technologies. The new technologies were being used across all the colleges with no significant differences.

7.4. Barriers in the Use of the Web 2.0 Technologies in the University

The study highlighted the possible barriers in the use of Web 2.0 technologies from both teachers and students perspectives. A number of factors were identified that appear to militate against the effective use of Web 2.0 technologies and applications. Teachers and students cited the following factors:

- Lack of time to learn how to use the Web 2.0 technologies.
- Teacher preference.
- Low level of English language proficiency.
- Lack of infrastructure.
- Disciplinary constraints.
- Fear of excluding some students.

7.5. Limitations of the Study

The present study was useful in terms of exploring how the Web 2.0 technologies and applications are being used in the University. The case study is SQU University. It is, therefore, difficult to generalise the findings of this study to other different universities although important insights into the use of new technologies and the challenges being faced can be gleaned. On the other hand, the study was conducted over a short period of time and this limited the extent to which different data collection tools could be exploited. For instance, the study surveyed students using a questionnaire and could not apply other methods such as interviews or focus group discussions to explore some of the issues in greater detail. In future, studies in the same area could take advantage of different data collection methods to explore issues emerging in this study in more detail.

The study focused on teachers and students only and did not include participants from two other academic departments in the University including the School of Law. In addition, the study was undertaken over a short period of time and so not many issues that require more careful study could be included. To gain a good idea of the extent to which the technologies were being used, lesson observations could have been conducted including participation of more stakeholders in the study.

7.6. Recommendations for Future Work

Based on the findings of this study, the following recommendations are made with a view to enhancing the use of Web 2.0 technologies as learning tools.

- Firstly, there is need to increase teachers and students' awareness of Web 2.0 technologies and applications as teaching and learning tools. This can be achieved by developing effective policies in the university to support technology use strategically. This process of increasing the awareness should be supported at different level and by several stakeholders including the administration, the faculty members, and the academic librarians. The administration should encourage the faculty members to introduce the importance of Web 2.0 applications in the curricula, and the faculty, in turn, should employ the Web 2.0 applications to not only to improve instructional delivery but also to increase the relevance with additional support from different resources. Among the Web 2.0 technologies, the faculty should have a direct connection with the librarians

whose role in this case is to provide the faculty with potential electronic and paper collections.

- Secondly, there must be guidance to staff and students within the university on some of the issues need to be considered before using such Web services for teaching and learning purposes. The guidance should be helpful for all students and staff, including researchers, teaching staff, and support staff. Since the Web 2.0 technologies and applications are external services, not all issues must be specifically addressed. It is important to discuss the guidelines based on the three dimensions, including service providers' issues, legislative and regularity issues, and university regulations. Some of the popular issues in using Web 2.0 technologies for university purposes include security, confidentiality, and ownership of data, accessibility, connectivity and privacy. The University of Edinburgh (2007) has published Guidelines for Using External Web 2.0 Services which can be a good guide for other universities.
- Thirdly, there should be opportunities for all staff and students to receive adequate training. The library can take the responsibility for arranging such activities for groups or individuals in an adequate environment. During the training, there should be discussions on the Web 2.0 attributes and provision of the best tools to match them. Staff who have relevant practical experience should act as technology champions and help to provide others with examples on how to use Web 2.0 applications. This could contribute to overcoming some of the system's norms that negatively influence the rate of Web 2.0 adoption.
- Fourthly, there is a need for the university to provide adequate infrastructure, improve the internet connectivity and avail up-to-date Web 2.0 technologies that enhance teaching and learning at the University.
- Fifthly, the University should provide some incentives to staff to encourage the effective use of such technologies in teaching and research, and linking that to be part of the promotion criteria for the academic staff.

This study provides a good platform for further research in the field of technology use in higher education in Oman and elsewhere around the world. It addressed the general use of Web 2.0 technologies including the perceptions of teachers and students as well as the barriers for the effective use of the technologies. As can be appreciated, the study is a small scale project and, hence, no broad generalisations can be made about the use of Web 2.0 technologies in Oman. However, some important insights into the way Web 2.0 technologies are be-

ing used in teaching and learning at SQU have been thoroughly identified and discussed. The study, suggested further research to be undertaken in other higher education institutions in Oman to explore the use and challenges of Web 2.0 services.

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APPENDICES

APPENDIX NUMBER 1: TEACHERS' QUESTIONNAIRE

Dear Teacher

I would like to invite you to complete the following questionnaire that has been designed to investigate your views about the use of **Web 2.0 technologies in your teaching practice in the university.** The information you provide will be used for a thesis that is a requirement for a PhD degree in Education, University of Deusto. Participants are anonymous and all information you provide will be handled with confidentiality and will not be passed on to other parties. However, the research findings may be shared with the university staff and students.

Your participation is **voluntary** but **highly appreciated**. Completing the questionnaire should not take longer than 10 minutes. Please follow the instructions.

A- Teacher's Information

a- 30 – 39		b-40 – 49		c-50-59		d-60-64		e-65+

1. **How old are you?**

a-Male		b-Female

2. **Gender**

3. **Your Institution/College**

Agriculture and Marine Sciences
Arts and Social Sciences
Economics and Political Sciences
Education
Engineering
Medicine and Health Sciences
Sciences
Nursing
Language centre

B. Teachers' Online Activities

1. **On average, how much time do you spend online during each of the working week days (i.e. each day from Sunday to Thursday)?**

a-less than 3 hours		b-3-6 hours		c-6-10 hours		d-more than 10 hours

2. **How many hours do you spend on-line over the weekend?**

a-less than 5 hours		b-6-15 hours		c-16-20 hours		d-more than 20 hours

3. Do you usually use any Web 2.0 applications when you teach students?"

a-Yes I do		b-No I don't		c-No answer

4. Are you familiar with any of the following Web 2.0 technologies?

	a-Yes I know	**b**- No I don't	**c**- Uncertain	d-No answer	
Wikipedia					
YouTube					
Facebook					
Flickr					
MySpace					

C-<u>Using information technologies in your Teaching:</u>

1. **Which Web 2.0 tools do you usually use as a lecturer in your teaching?**

Statement about using information technologies in your Teaching		Not at all	Little	Medium	Much	Very much
I	Using e-mail.					
II	Downloading, viewing, listening audio/video clips.					
III	Uploading audio/video clips.					
IV	Downloading or purchasing e-books.					

V	Uploading copyright or CC licensed documents.					
VI	Playing games.					
VII	Using cloud storage sites (e.g. Drop box).					
VIII	Creating documents in collaborative work (e.g. Google docs).					
IX	Text Chatting (e.g. Twitter, Face-book chat).					
X	Using VoIP, Web conference, Hangout programs (e.g. Skype, Google, and Blackboard).					
XI	Reading from external Wikis (e.g. Wikipedia).					
XII	Writing in external Wikis (e.g. Wik-ipedia).					
XIII	Reading external Blogs.					
XIV	Writing external Blogs.					
XV	Reading external Discussion Boards.					
XVI	Writing external Discussion Boards.					
XVII	Reading from Wikis on Learning Management System (LMS) provid-					

	ed by the university (Moodle, Blackboard).					
XVIII	Writing in Wikis on Learning Management System (LMS) provided by the university (Moodle, Blackboard).					
XIX	Reading from Discussion Boards on Learning Management System(LMS) provided by the university (Moodle, Blackboard).					
XX	Writing in Discussion Boards on LMS provided by the university (Moodle, Blackboard).					
XXI	Downloading free lessons on the Internet (such as Open Course Ware).					
XXII	Using Twitter, Facebook, Linked in, Flickr; Google.					
XXIII	Searching for information					
XXIV	Searching in LMS platform (e-learning Management system					
XXV	Library catalogue					

2. To what extent do you agree with the following statements regarding your use of information technology during your Teaching at university?

Statement about the use of ICT		Strong disagree	Disagree	Neutral	Agree	Strong agree
I	Help me to speed the performance of my work.					
II	Help me to know about what is happening at the university.					
III	Help me to communicate with other teachers.					
IV	Help me to communicate with students					
V	Help me to communicate with researchers.					
VI	Make it easy for me to get help at any time.					
VII	Help me in completing the tasks and duties of a higher quality.					
VIII	Help me to gain greater experience in my field.					
IX	Make me better prepared for my lecture					
X	Help me communicate with other universities to know the new idea					

XI	Make learning more creative and fun.					
XII	Give me room to gain access to a variety of sources of information.					
XIII	Guide me through the various educational resources available on-line.					
XIV	Make my teaching easier.					
XV	Increase the level of teacher' academic achievement.					
XVI	Help me to identify many educational programs and activities that are available online which could support my courses.					
XVII	Help me access information and find answers for my scientific questions through multimedia, including images, video, graphics and shapes that support the curriculum.					

Statement about the use of ICT		Strong disagree	Disa-gree	Neutral	Agree	Strong agree
XVIII	Allow me to follow-up on social networking related scientific disciplines.					
XIX	It helps to further develop my knowledge in the use of new technologies that are related to my field of teaching.					
XX	Help teachers to find better training oppor-tunities.					
XXI	I am not interested in using new technolo-gies /devices and I am forced to use them.					
XXII	I would like to see students use more ICTs in their learning.					
XXIII	I believe students should be more competent in the use of ICTs.					
XXIV	Teacher do not use ICTs because they don't have enough time.					
XXV	Teachers don't use Web 2.0 because they have difficulty in moving from traditional to modern methods of teaching.					
XXVI	Teachers do not use Web 2.0 because they do not have enough training.					

XXVII	Teachers do not use web 2.0 because of their low level of English.					
XXVIII	Courses should be dealt with in specific platforms (e.g., Moodle).					
XXIX	Social networks such as (Twitter and Face-book) impact positively on my teaching.					
XXX	I would like students to integrate social net-works such as Twitter and Facebook in their learning.					
XXXI	Teaching oriented issues should be dealt in social networks (Twitter, Facebook).					
XXXII	I feel comfortable interacting with students on social networks (Twitter, Facebook).					
XXXIII	I feel comfortable participating in discussion boards in specific platforms such as Moodle which is provided by SQU.					

3. Do you have any comments you want to add about the use of web 2.0 technologies in the university?

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Thank you for participating in the study!

APPENDIX NUMBER 2: STUDENTS' QUESTIONNAIRE

Dear students

I would like to invite you to complete the following questionnaire that has been designed to investigate **how you use Web 2.0 technologies for educational purposes.** The information you provide will be used for a thesis that is a requirement for a PhD degree in Education, University of Deusto. Participants are anonymous and all information you provide will be handled with confidentiality and will not be passed on to other parties. However, the research findings may be shared with the university staff and students.

Your participation is **voluntary** but **highly appreciated**. Completing the questionnaire should not take longer than 10 minutes. Please follow the instructions.

A- Student's Information

1. **How old are you?**

a-17 – 18		b- 19 – 20		c- 21 – 22		d- 23 – 24		e- > 24	

2. **Gender**

a-Male		**b-Female**	

3. **What was your overall percentage at High School?**

a- 80%		b-81% - 90%		c-91%-100%	

4. **Which year of study are you in?**

a-First		b-Second		c-Third		d-Fourth		e- post gradu-ate

5. What is your college?

N	College	Undergrad-uate	postgrad-uate
1	Agriculture and Marine Sciences		
2	Arts and Social Sciences		
3	Commerce and Economics and Political Sciences		
4	Education		
5	Engineering		
6	Law		
7	Medicine and Health Sciences		
8	Sciences		
9	Nursing		

6. Which of the following statements are true about the technology you own?

Statement		NO	YES
I	I have an ordinary mobile phone.		
ii	I have a smart mobile phone.		
iii	I have a tablet PC.		

IV	I have a Desktop computer.		
V	I have a laptop.		
VI	I have an electronic book reader (e.g. Kindle).		
VII	I have an iPod.		
VIII	I have a non-iPod MP3 player/other players.		
IX	I have home internet service.		
X	I have a blog.		
XI	I have one or more accounts in Social Networks (Twitter, Facebook).		

B. Students' Online Activities

7. **On average, how many hours do you spend on-line during a working week day (i.e. Sunday to Thursday)?**

a-Less than 3 hours		b-3-6 hours		c-7-10 hours		d-More than 10 hours	

8. **On average, how many hours do you spend on-line over the week end (i.e. Friday & Saturday)?**

a-Less than 5 hours		b-6-15 hours		c-15-20 hours		d-More than 20 hours

C-Using Information Technologies in Your Learning.

9. **Which of the following technologies do teachers encourage you to use in their courses?**

Statement of technologies do teachers encourage you to use in their courses		Not at all	Lit-tle	Medi-um	Much	very Much
I	Using e-mail.					
II	Downloading, viewing, listening audio/video clips.					
III	Uploading audio/video clips.					
IV	Downloading or purchasing e-books.					
V	Uploading copyright or CC licensed documents.					
VI	Playing games.					
VII	Using cloud storage sites (e.g. Drop box).					
VIII	Creating documents in collaborative work (e.g. Google docs).					

IX	Text Chatting (e.g. Twitter, Facebook chat).					
X	Using VoIP, Web conference, Hangout programs (e.g. Skype, Google, Blackboard).					
XI	Reading from external Wikis (e.g. Wikipedia).					
XII	Writing in external Wikis (e.g. Wikipedia).					
XIII	Reading external Blogs.					
XIV	Writing external Blogs.					
XV	Reading external Discussion Boards.					
XVI	Writing external Discussion Boards.					

Statement of technologies do teachers encourage you to use in their courses		Not at all	Little	Medium	Much	very Much
XVII	Reading from Wikis on Learning Management System (LMS) provided by the university (Moodle, Blackboard).					
XVIII	Writing in Wikis on Learning Management System (LMS) provided by the university (Moodle, Blackboard).					
XIX	Reading from Discussion Boards on Learning Management System (LMS) provided by the university (Moodle, Blackboard).					

XX	Writing in Discussion Boards on LMS provided by the university (Moodle, Blackboard).					
XXI	Downloading free lessons on the Internet (such as Open Course Ware).					
XXII	Using Twitter, Facebook, Linked in, Flickr; Google.					
XXIII	Searching for information					
XXIV	Searching in LMS platform (e- learning Management system					
XXV	Library catalogue					
XXVI	Others					

10. To what extent do you agree with the following statements regarding your use of information technology during your study at university?

Key: Strongly Disagree (SD); Disagree (D); Neutral (N); Agree (A); Strongly Agree (SA)

Statement about the use of information technology during study at university		SD	D	N	A	SA
I	Help me to speed the performance of my work.					
II	Help me to know about what is happening at the university.					
III	Help me to communicate with other students.					
IV	Help me to communicate with teachers					
V	Help me to communicate with researchers.					
VI	Make it easy for me to get help at any time.					
VII	Help me in completing the tasks and duties of a higher quality.					
VIII	Help me to gain greater experience in my field.					

IX	Make me better prepared for my graduate studies.					
X	Help me communicate with other universities to complete graduate.					
XI	Make learning more creative and fun.					
XII	Give me room to gain access to a variety of sources of information.					
XIII	Guide me through the various educational resources available on-line.					
XIV	Make my study easier.					
XV	Increase the level of students' academic achievement.					
XVI	Help me to identify many educational programs and activities that are available online which could support my course					
XVII	Help me access information and find answers for my scientific questions through multimedia, including images, video, graphics and shapes that support the curriculum.					
XVIII	Allow me to follow-up on social networking related scientific disci-					

	plines					
XIX	Help improving my knowledge in the use of new technologies that are related to my field of study					
XX	Help people find better training opportunities					
XXI	I am not interested in using new technologies/ devices and I am forced to use them					
XXII	I would like to see teachers use more ICTs in their teaching					
XXIII	I believe teachers should be more competent in the use of ICTs					
XXIV	Teachers do not use ICTs because they don't have enough time					
XXV	Teachers don't use Web 2.0 because they have difficulty in moving from traditional to modern methods of teaching					
XXVI	Teachers do not use Web 2.0 because they do not have enough training					
XXVII	Teachers do not use Web 2.0 because of their low level of English					

XXVIII	Courses should be dealt with in specific platforms (e.g. Moodle)					
XXIX	Social networks such as Twitter & Facebook impact positively on my study					
XXX	I would like teachers to integrate social networks such as Twitter and Facebook in their courses.					
XXXI	Study-oriented issues should be dealt in social networks (Twitter, Facebook)					
XXXII	I feel comfortable interacting with teachers on social networks (Twitter, Facebook)					
XXXIII	I feel comfortable participating in discussion boards in specific platforms such as Moodle which is provided by the university.					

Thank you for participating in the study!