FACTORS INFLUENCING THE USAGE OF WEB 2.0 TOOLS IN HIGHER EDUCATION

by

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ABSTRACT

The purpose of this study was to investigate the factors that influence the usage of Web 2.0 tools among academics in higher education in South Africa as well as the barriers that may arise when using these tools.

Web 2.0 technology tools have potential for teaching and learning, but currently there is a low rate of usage in higher education in South Africa (Yadav & Patwardhan, 2016). Therefore, this study examined the current situation of Web 2.0 technology tools in two private, South African higher education institutions (Monash South Africa and Pearson Institute of Higher Education) in Gauteng.

The main research objective was to determine the factors that influence the usage of Web 2.0 tools in higher education. A case study approach was adopted to determine how an institution can effectively manage the use of Web 2.0 tools by performing a cross case study of the two organisations. The researcher used a mixed methods approach, combining quantitative and qualitative analysis. The quantitative data was analysed using descriptive and inferential statistics and the qualitative data was analysed using thematic analysis. The results of the qualitative analysis were triangulated with the findings of the quantitative analysis and compared to the findings of the literature study.

The researcher developed a conceptual model representing the factors that influence the usage of Web 2.0 tools in higher education. The proposed model is based on the empirical results of this study. The study identified the contributory factors of usage of Web 2.0 tools. This comprised of *individual factors, organisational factors, perceived usefulness and perceived quality characteristics* that influenced academics to use Web 2.0 tools to supplement traditional classroom teaching.

The findings revealed the current level of usage of Web 2.0 tools among academics in higher education. The current level of usage of Web 2.0 technology tools are low at Pearson Institute of

Higher Education and Monash South Africa. A total of 7% of academics at Pearson Institute of Higher Education make use of Web 2.0 tools for teaching and only 16% of academics at Monash South Africa made of Web 2.0 tools in education. Individual factors (barriers) was one of the main factors that influenced the usage of Web 2.0 tools in higher education; organisational factors (training and support) is crucial for the successful usage of Web 2.0 tools; academics agree on the different perceived usefulness that exist to enhance and supplement traditional learning; perceived quality characteristic factors (ease of use) also contributed towards the usage of using Web 2.0 tools in teaching and learning.

This study contributed to the general area of technology integration in education. It provided insight into the factors predicting usage of Web 2.0 tools in higher education to supplement traditional teaching approach.

Key words*:* Web 2.0 tools, Web 2.0 usage, higher education, academics, individual factors, pedagogic factors, perceived usefulness, pedagogical characteristics of Web 2.0 tools, pedagogical beliefs, organisational factors, perceived quality characteristics.

DEDICATION

In dedication to my daughter, Aranya. I hope this dissertation inspires you to reach for your dreams.

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CHAPTER 1

Introduction

1.1 Introduction

The advancement of technology has grown at such a rapid rate and has become such a common place for students that it would be ideal for academics to adopt technology in higher education. Technology can be an enabler for academic staff to develop and broaden their teaching skills but this requires that the curriculum be redesigned to accommodate for these tools. The aim of this research was to uncover the factors influencing the integration of learning technologies in the classroom. It sought to measure the degree of technology, specifically Web 2.0 tool usage in higher education. Web 2.0 tools when used in an educational setting allows educators and students to create, collaborate, edit and share content on-line (Tyagi, 2012). Web 2.0 is the term given to describe a second generation of the World Wide Web from static web pages to a more dynamic Web with applications like wikis and blogs that allows greater collaboration, enhanced communication and easy access to material (Bower, 2015).

Web 2.0 technology tools have potential for teaching and learning, but currently there is a low rate of usage in higher education in South Africa. The usage of Web 2.0 tools in higher education in South Africa is low and will have to overcome many obstacles in order to hold its ground in higher education. Therefore, this study will examine the factors that influences the usage of Web 2.0 technology tools in two South African higher education institutions.

The researcher assessed the extent to which Web 2.0 technologies are utilised to support the teaching in two South African higher education institutions, with a specific focus on Gauteng's private institutions. The study provides empirical findings on the use of Web 2.0 tools in higher education and the factors that influences the usage of Web 2.0 tools by academics in a higher education context.

The remainder of the chapter 1 is organised as follows: Section 1.2 will provide a brief overview of the background of the study, the problem statement is discussed in section 1.3, the research questions are outlined in section 1.4 and the research objectives follow in section 1.5. The contribution of the study is described in section 1.6, in section 1.7, the significance of the study is discussed and the scope and context of the study is found in section 1.8. The conceptual framework is discussed in section 1.9, the research design in section 1.10 and section 1.11 describes the data analysis. Section 1.12 outlines the layout of the chapters of this study and section 1.13 is a summary of Chapter 1.

1.2 Background of the study

The purpose of this study is to assess the usage and satisfaction on the teaching and learning process by introducing Web 2.0 tools in the traditional face-to-face teaching and learning environment. The use of this technology for teaching and learning opens a door of opportunities for students in higher education. Despite the benefits of Web 2.0 tools in higher education, the technology has not been widely used by academics in South Africa (Ngcobo, 2016). Thus, the purpose of this research is to investigate what factors play a role in the usage of Web 2.0 tools among academics at higher education institutions in South Africa.

Web 2.0 tool uses the online platform that includes a variety of web sites and applications where you can create and share information or material. This allows people to create, share, collaborate and communicate (Ajise & Fagbola, 2013). Thus, higher education organisations can use this tool to communicate and interact with students and academics amongst other activities. Web 2.0 applications includes blogs, social networking (Facebook), wikis and podcasting just to name a few (Okello-Obura & Ssekitto, 2015).

The usage of Web 2.0 tools can assist students to participate in groups by means of collaborative learning in higher education. The use of traditional (face-to-face) teaching styles linked with Web 2.0 tools can change the way education is taught to students in higher education.

Web 2.0 tools are important to implement in education because it will increase students' interests in the course, provide an exciting learning environment and improve learning by introducing appropriate technologies into the curriculum (Dooley & Jones, 2012).

According to Junco (2012), students prefer to communicate with their fellow classmates by means of their cellular phones, e-mail, and social networks, therefore, it would be a good idea to integrate in classroom learning with Web 2.0 technology tools with which students are familiar and enjoy using.

1.3 Problem statement

The emergence of the Internet brought along new ways and opportunities to extend the teaching and learning process to students than just the normal face-to-face interaction. The usage of Web 2.0 tools in education holds a lot of benefits like giving students access to material anytime and anywhere by enhancing teaching and learning experiences, improving access to educational resources and programmes, collaboration and easier communication with the lecturer and peers (McKnight, O'Malley, Ruzic, Horsley, Franey & Bassett, 2016).

With so many benefits, one would wonder why there is a reluctance to implement Web 2.0 technology tools in education. Some of the factors that explain this reluctance factors range from the technological infrastructure, high cost of the technology, instructional efforts, graduate competencies, technology satisfaction (Venter, Jansen van Rensburg, & Davis, 2012), management support, methodology, resource accessibility and availability, culture of education and learning styles, intellectual investment, design of assistive tools, and global business (Lwoga, 2014). One must also keep in mind that the acceptance of these technologies by the student plays a pivotal role in the usage of Web 2.0 technological tools in higher education.

According to Echeng (2014), the use of Web 2.0 technology tools has made more educational organisations aware of their usefulness when implementing them or incorporating them into a learning management system.

An empirical study conducted in Nigeria in 2013 (Echeng, 2014), examined the use of Web 2.0 in learning amongst librarians, academics and students in Nigeria. The findings revealed that the use

of these tools were lacking and identified four major problems. These problems comprised of personality characteristics, motivation, lack of facilities and lack of computer expertise. Further to this, it was also noted that more research into how these technologies can be adopted for teaching and learning should be investigated.

The purpose of this study is to investigate the factors that influence the usage of Web 2.0 technology tools in higher education organisations. According to Pušnik, Šumak and Heric (2011, p.2068) research shows that, "weight of the impact of these factors may differ for different user types and e-learning technology types". Thus, it is important to understand the academic's attitude and continual usage of teaching styles as this will assist the higher education institution to align their strategic goals with the educational objectives, thereby justifying the ICT investments and optimising the use of technology in education (Farahat, 2012).

Web 2.0 technologies enables learning to take place best within technology-supported environments where students can collaboratively create and use content (Okello-Obura, 2015). Many higher education institutions around the world are integrating Web 2.0 technological tools to enhance the teaching and learning process, however, most African higher education institutions are still faced with challenges that affect the effective use of Web 2.0 technologies in education (Kumar 2008 and Hramiak & Boulton, 2013). Some of these challenges comprise of inadequate access to the Internet, poor ICT infrastructure and limited technological skills (Olasina 2011; Okonedo, Azubuike, & Adeyoyin, 2013; Olatokun & Ntemana, 2015).

As mentioned in Section 1.3, there are many barriers to the usage of Web 2.0 tools. One contributing factor is that there is little knowledge of how Web 2.0 technologies can be integrated by academics into the curriculum in higher education. Traditional classroom is very lecture based, confined with no rich interaction, there is no 24hrs engagement between academics and the student. Thus, the researcher aims to bridge the gap that currently exists in higher education. Furthermore, the researcher aims to investigate the current level of Web 2.0 usage as well as the factors that promote and influence Web 2.0 tools in higher education organisations as currently there is very little research on this. Thus, there is a need to conduct an empirical study to investigate factors that would influence the use of Web 2.0 learning practices in higher education. Therefore,

the purpose of this study is to investigate the factors that influence the usage of Web 2.0 technology tools in higher education organisations.

1.4 Research Questions:

Research questions are an answerable inquiry into a specific concern or issue. It is the initial step in the study that will assist the researcher to investigate the factors influencing the usage of Web 2.0 tools in education. Based on this, the study consisted of three main research questions:

1. What are the factors that influence the use of Web 2.0 technology tools among academics in higher education?

- What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the individual factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived usefulness influence in the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived quality characteristics in the use of Web 2.0 technology tools among academics in higher education?

2. How are Web 2.0 tools used by academics in higher education?

3. Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?

1.5 Research objectives

Based on the research questions, the research objectives were formulated. The purpose of the study is:

- To determine the organisational factors that influence academics to use Web 2.0 tools in higher education to supplement traditional classroom teaching.

- To determine the individual factors that influence academics to use Web 2.0 tools in higher education to supplement traditional classroom teaching.

- To determine the pedagogical factors that influence academics to use Web 2.0 tools in higher education to supplement traditional classroom teaching.

- To determine the perceived usefulness that influence academics to use Web 2.0 tools in higher education to supplement traditional classroom teaching.

- To determine the perceived quality characteristics that influence academics to use Web 2.0 tools in higher education to supplement traditional classroom teaching.

- To determine how are Web 2.0 tools used by academics in higher education.

- To determine why these factors influence academics to use Web 2.0 tools in higher education supplement traditional classroom teaching.

1.6 Contribution of the study

This study contributes to the general area of technology integration in education. Based on literature, it should be noted that the majority of studies focus on the context of use of the Web 2.0 tools as opposed to what factors influences academics to use Web 2.0 tools in higher education. Thus, the study provides insight into the factors predicting the usage of Web 2.0 tools in higher education to supplement traditional teaching approach. Furthermore, the study describes and demonstrates a research approach for investigating the usage of Web 2.0 tools in higher education in South Africa.

The main theoretical contribution is the body of knowledge by developing a conceptual model for Web 2.0 usage in higher education. Therefore, the conceptual model will assist academics and academic managers to identify the individual factors, organisational factors, perceived quality characteristic, perceived usefulness and pedagogical factors (pedagogical characteristics of Web 2.0 and pedagogical beliefs) that influences the usage of Web 2.0 tools to enhance the teaching and learning process. In addition, the study will provide valuable information to higher education

institutions on how to enhance teaching and learning in higher education in South Africa with the use of Web 2.0 tools.

1.7 Significance of the study

The research study contributes to knowledge in the usage of Web 2.0 tools in higher education by presenting a conceptual model (Web 2.0 usage factors model) to inform academics and academic managers of the factors that influences Web 2.0 tools in education. Thus, this model provides practical guidance to academics and academics managers who might find introducing Web 2.0 tools in higher education a challenge.

This study will provide insights to stakeholders in higher education institutions on integrating Web 2.0 tools in the traditional teaching and learning environment. This will encourage collaboration amongst students as well as the sharing of information and ideas. This will help students to become actively involved in the learning process than just absorbing the information that is disseminated.

1.8 Scope and context of the study

1.8.1 Scope of the study

The study focused on factors that influence the usage of Web 2.0 technology from a multi-dimensional perspective. The first factor was Organisational factors, which examined the constructs of *barriers and support*. Second factor was Individual factors, which examined the constructs of *teaching style, rank, effort, familiarity, computer experience and personal barriers*. Thereafter, perceived usefulness were explored which investigated the usefulness of Web 2.0 tools (technological). The fourth factor was perceived quality characteristics, which examined the constructs of ease of use, *and general quality characteristics.* The last factor is pedagogical factors, which examined the constructs of *pedagogical characteristics of Web 2.0 and pedagogical beliefs of Web 2.0 tools.*

1.8.2 Limitations of the study

The main limitation the researcher experienced was that the researcher was not be able to explore the continued usage of Web 2.0 tools. There have not been many studies investigating the factors that determine continual usage intentions of Web 2.0 tools amongst academics in the African context, however due to time constraints the researcher only focused on determining factors that influence the usage of Web 2.0 tools in higher education.

The researcher is also not considering all educational tools and is only focusing on two private higher educational organisations in South Africa. Out of a total of 210 academics from both of the institutions, only 127 academics had participated in the study. The researcher conducted the research among 57 academics from Monash South Africa and 70 academics at Pearson Institute of Higher Education. Thus, many academics were not willing to share their opinions and experiences of Web 2.0 technology tools. The researcher conducted the questionnaire among all Departments/Faculties at Monash South Africa and Pearson Institute of Higher Education in order to eliminate non responses/low level of respondents.

The researcher chose to investigate the usage of Web 2.0 tools at two private higher education institutions and not at any government institution. These two institutions were selected because they were the only two institutions that had given the researcher approval to conduct the study at their organisation. In addition, two private institutions were chosen as government institutions had been on strike and this was ongoing throughout the year. Due to this, the researcher decided to focus on private institutions usage of Web 2.0 tools.

1.9 Conceptual Framework

This section introduces the theoretical models that guided the study. The detailed description of the theory/models underpinning this study are presented in Chapter Two (Literature review). This study was guided by a blend of theoretical frameworks that included the updated DeLone & McLean Information Systems Success Model (D&M model) complemented by (Technology Acceptance Model) TAM to understand the extent of use of Web 2.0 technologies at two private higher education institutions in South Africa. These theories have been used in many other studies (Ryoo & Koo, 2010; Phan & Daim, 2011; Onyedimekwu & Oruan, 2013 and Ani, 2013). The study modelled academics experience with the use of Web 2.0 technologies using selected

constructs from D&M model and TAM theories/models namely perceived ease of use (perceived quality characteristics) which is discussed as a construct under perceived quality characteristics, attitude, use, and perceived usefulness that influence the usage of Web 2.0 tools in higher education.

1.10 Research Design

The study was conducted with the purpose of investigating the usage of Web 2.0 tools in higher education by considering the influence of certain factors namely organisational factors, individual factors, pedagogical factors, perceived usefulness and perceived quality characteristics. A research design was used to link the data collected to the initial questions of the study. The data was collected using online questionnaires from academics from Pearson Institute of Higher Education (PIHE) and Monash South Africa (MSA) as well as interviews to confirm the quantitative findings. The next section briefly introduces the research strategy/method used, data collection and data analysis techniques and model development.

1.10.1 Research Strategy

Due to the nature and pattern of the research, a case study approach was adopted to determine how an institution can effectively use Web 2.0 tools by performing a cross case study of the two organisations. A case study is a research method that involves a detailed examination of a subject of study and its related contextual conditions in order to investigate a phenomenon within its real-life context (Yin, 2014).

The researcher used a mixed methods approach, combining quantitative and qualitative analysis. The mixed methods approach was used to get a better understanding of the research problem while offsetting the weaknesses inherent to using each approach by itself (Terrell, 2012). This assisted the researcher to accurately identify aspects of a phenomenon from different viewpoints, methods and techniques. There have been a number of studies that show the usage of Web 2.0 technology in other countries and the researcher validated these results obtained from other methods. Another reason mixed methods approach was beneficial is because the researcher was able to look at a

research question from different angles, thereby getting a better understanding of the usage of Web 2.0 tools. The mixed methods approach was also ideal as the researcher can generalise findings from the qualitative research.

This research design helped to integrate the different components of the study in a coherent and logical way in order to assist the researcher to effectively address the research problem. The case study will focus on the academic staff at two private higher education organisations in South Africa, Gauteng. The case study is the most appropriate research method considering the contextual, iterative and phenomenological nature of the study.

1.10.2 Data collection

1.10.2.1 Data Collection Method

As mentioned above, the researcher used a mixed methods approach. This was facilitated in two ways:

- *Structured questionnaire.* This was used to collect data. Questionnaires were designed in such a way that they collected data related to the phenomenon under study.

- *Semi-structured in-depth interviews* with academics was conducted to gather information about their attitudes, perceptions and actions with regard to the phenomenon under study (usage of Web 2.0 tools).

1.8.2.2 Population and sampling

The researcher distributed the questionnaire to 173 academics. A total of 57 were from Monash South Africa and a total of 70 respondents from Pearson Institute of Higher Education. Three of the questionnaires were regarded as spoilt questionnaires.

For the qualitative analysis, a purposive sampling technique was used to select potential participants for the focused interviews. A sample of 15 academics were interviewed. Interviews were conducted with academic staff from varying disciplines at Pearson Institute of Higher Education and Monash South Africa in order to determine usage and satisfaction levels of Web 2.0 tools in education among academics.

1.10.2.2 Ethical considerations

Ethical clearance was obtained from the relevant higher education institutions before commencing with the collection of data.

All participants signed an informed consent form before engaging in the research. The researcher ensured that the respondent's details and information were kept private and confidential by not divulging any information to anyone about the participants.

1.11 Data analysis

The data were organised and interpreted as follows:

- *Qualitative data:* The data was analysed using thematic analysis i.e. a descriptive presentation of qualitative data. The approach helped the researcher to move the analysis from a broad reading of the data towards discovering patterns (Maguire & Delahunt, 2017). Thus, a way of getting closer to the data and developing some deeper appreciation of the content.

  A cross sectional analysis of the data collected at the two organisations were analysed to determine the similarities and differences between the results.

- *Quantitative data:* This data was analysed using descriptive or inferential statistics. Inferential statistics assisted the researcher to reach conclusion by trying to infer from the sample data what the population might think (Trafimow, 2016). Thus, the researcher used inferential statistic to make inferences from the data to conditions that are more general.

  Descriptive statistic was used to describe what was going on with the data by describing and summarising the data in a meaningful way (Satake, 2015).

1.12 Outline of this study

The study was divided into 8 chapters:

Chapter 1 describes the background to the study and introduces the concept of Web 2.0 technologies use in higher education. The chapter further covers an overview of the research including the background, research problem, research questions, scope, research method and design, and potential contribution of the study.

Chapter 2 provides a comprehensive review of the literature on the use of Web 2.0 tools in education. Relevant theories and models are also discussed. Thereafter, the initial conceptual framework, which underpins the study, is described.

Chapter 3 provides a description of the research methodology used in this study. It presents the research paradigm, research approach, research design, population of the study, sampling procedures, data collection procedures, data analysis strategies, validity and reliability of data collection instruments, and ethical considerations.

Chapter 4 presents the quantitative analysis of results from the surveys administered at Pearson Institute of Higher Education and Monash South Africa to determine the factors that influenced the usage of Web 2.0 tools in higher education. The quantitative data was analysed using SPSS.

Chapter 5 presents the qualitative analysis of the results from interviews conducted at Pearson Institute of Higher Education and Monash South Africa to determine the major themes/sub themes and relationships thereof pertaining to the usage of Web 2.0 tools in higher education. The qualitative data was analysed thematically using NVivo.

Chapter 6 provides a discussion on the proposed conceptual framework based on the empirical results. This chapter discusses the theories and models that guide the study. The theories include the updated D&M model and TAM. What about the

Chapter 7 presents the confirmation of the Web 2.0 usage model.

Chapter 8 provides a summary of findings, conclusion of the study, and recommendations. In addition, recommendations for further studies are outlined.

1.13 Summary

This chapter introduced the phenomenon being investigated, namely the usage of Web 2.0 technologies in higher education. This chapter discussed the background of the study, the research problem, research questions, significance of the study, data collection methods and the limitations of the study.

In chapter 2, the research study will provide a deeper understanding of the usage of Web 2.0 tools by academics in higher education i.e. the opportunities of Web 2.0 tools as well as the barriers that may be encountered and how to effectively implement these technologies in teaching and learning. The literature review will describe the derivation of a conceptual framework for the usage of Web 2.0 tools that is based on selected technology models and the literature review existing technology models. An overview of the potential factors that contribute to Web 2.0 use discussed and thereafter the research study will end with a summary of this chapter.

CHAPTER 2

Literature Review

2.1 Introduction

The overall objective of this chapter is to present a review of relevant literature to understand the phenomenon of Web 2.0 usage for teaching and learning in higher education and potential factors that contribute to the use of Web 2.0 tools in teaching practice.

According to Thomas and Thomas (2012), the last decade has seen such a rise in the status of social media and Web 2.0 technologies, which has had an impact on how people communicate. Technology has become a major force in education by offering students a greater variety of options when it comes to learning as well as flexibility in terms of how, when and where learning takes place. The paradigm shift from traditional teaching to a more digital one will greatly affect how academics and students connect with one another. Thus, it is important that higher education institutions harness technology's potential, and for every academic and student to use it confidently. Therefore, it is important for the researcher to investigate the extent to which Web 2.0 technologies are used to support teaching and learning in a South African context, as well as factors that contribute to its usage.

The literature review covered in this chapter will discuss Web 2.0 tools as well as a conceptual framework designed to conduct the study on the usage of Web 2.0 tools in higher education. The literature review includes an overview of the factors that influence the usage of Web 2.0 tools in higher education as well as theoretical models that could be used to underpin the study of the usage of Web 2.0 tools in education. Section 2.2 will provide an overview of the definition and background of Web 2.0 tools, Section 2.3 describes the benefits of using Web 2.0 tools, Section 2.4 discusses the adoption and usage of Web 2.0 tools for educational purposes and Section 2.5 discusses the challenges of adopting and using Web 2.0 tools in education. Section 2.6 outlines existing technology adoption and usage models, Section 2.7 discusses possible factors influencing Web 2.0 usage in education, Section 2.8 provides an overview of the conceptual model of Web

2.0 tools adopted for this study with Section 2.9 providing a summary of the chapter. The next section will provide an overview of Web 2.0 tools.

2.2 Overview of Web 2.0 tools

2.2.1 What are Web 2.0 tools?

Web 2.0 is a new version of the World Wide Web which Tim Berners-Lee had designed in 1990. Web 2.0 tools enables users to continuously edit content, participate and collaborate, thus it is referred to as the participatory web (Kamboj & Dayal, 2014). This is a huge difference from Web 1.0 (first generation of Web) where one could only access and read information but not edit or contribute to the content. This was known as a read-only, static or closed web. O'Reilly (2007) described Web 2.0 as the rebirth of the Web after the dotcom bust.

Web 2.0 tools brought about a new and innovative way of interacting with the World Wide Web by transforming the information gathering process (Web 1.0) to one that brings about creativity, secure information sharing, increased collaboration, and improved functionality of the Web (Mergel, Schweik, & Fountain, 2009). Web 2.0 is a term describing a new era in the way users interact with the World Wide Web that has led to the creation of Web-based communities and social-networking sites such as Facebook, Twitter, MySpace as well as video sharing platforms like YouTube, wikis and blogs among others.

These tools are Internet tools that allow the user to go beyond just receiving information through the Web. The usage of Web 2.0 tools (read/write medium) in higher education will allow students to not only find information on the Internet, but to also create and share content (Thompson, 2007), thereby playing a more active role. Types of social media sites and applications include forums, microblogging, social networking, social bookmarking and wikis. These tools can be used to enhance teaching and collaboration among academics and students as well as increase professional collaboration between educators (Tarade & Singh, 2014).

Technology has become such a common place for students as they make use of social media on a daily basis, however, academics may not have the same sentiments about technology. In order for technology to be successful in higher education, there are a number of factors that need to be

considered. According to Prensky (2007), although technologies are more accessible, integrating these tools in teaching and learning may require the combination of learning environments, student characteristics, content and pedagogy to create successful usage of technology in education.

If social media is implemented by taking the above factors into account, then it could arguably become a more effective educational tool than a social one. Web 2.0 tools such as Facebook, MySpace, and Twitter are very popular social media platforms among students but have not been fully adopted in education (Boumarafi, 2015). Thus, the main aim of the study is to determine what factors would influence the usage of Web 2.0 tools in higher education. In order to get a better understanding of Web 2.0 tools in education, the next section will discuss the general characteristics of Web 2.0 tools.

2.2.2 General characteristics/features of Web 2.0 tools

The main characteristics of Web 2.0 tools in education are openness, interactivity, collaboration, social networking, and collective intelligence which are consistent with the teaching practice of constructivism and connectivism (Kurelović, Tomljanović, & Ružić-Baf, 2012). An important characteristic of Web 2.0 tools is that they do not need to be installed before they can be used. Web 2.0 websites typically include some of the following features/functions (Hanif, 2009):

- **Search**: the ease of finding information through keyword searching.
- **Links**: guides to important pieces of information.
- **Authoring**: the ability for users to create and update content through platforms such as wikis.
- **Tags**: categorisation of content by creating tags that are simple, one-word descriptions to facilitate searching.
- **Extensions**: automation of pattern matching for customisation by using algorithms.
- **Signals**: the use of Real Simple Syndication technology to create a subscription model that notifies users of any content changes.

Different researchers categorise Web 2.0 tools in novel ways. For example, Anderson (2007) describes the following six big ideas behind Web 2.0: *Individual production and User Generated*

Content; harness the power of the crowd; data on an epic scale; architecture of participation; network effects and openness.

Selwyn et al. (2008) categorises Web 2.0 tools as *expressive* (media creation and sharing) e.g. YouTube; *reflective* (blogging, wikis and social networking); *exploratory* (social bookmarking, syndication, folksonomies); and *playful* (games and virtual worlds). Strawbridge (2010) adds a fourth category – *social* technologies such as Facebook.

The most significant characteristics that a Web 2.0 service possess are: *User-centered design, crowd-sourcing, Web as platform, collaboration, power decentralisation, dynamic content, software as a web service with no platform dependency and rich user experience* (Selwyn et al., 2008). Web 2.0 tools could be characterised by openness, user participation, knowledge sharing, collaboration and user-created content (Alexander, 2006; Thompson, 2007, & Richardson, 2009). Based on these characteristics, a brief overview of the typologies of Web 2.0 learning technologies are discussed below.

2.2.3 A typology of Web 2.0 learning technologies

Web 2.0 tools also have the characteristic of being an instructional learning tool where the student contributes, rather than passively consumes content. Web 2.0 tools enable users to run rich Internet applications rather than just using the web to gather information, which is ideal for education (Wesch, 2008, & Jordan, 2012). These characteristics are in line with modern educational theories such as Vygotsky's (1978) socio-constructivist learning theory. This learning theory states that meaningful learning occurs when people are involved in a social activity.

This section provides an overview of a typological analysis of Web 2.0 learning technologies. In order for academics to effectively implement Web 2.0 tools in higher education, they first need to understand and be aware of the different Web 2.0 technologies that are available as well as the features of these tools (Redecker, AlaTMutka, Bacigalupo, Ferrari, & Punie, 2009). The Web 2.0 learning technologies can be found in Appendix 5.

The typologies discussed below are based on the most commonly used Web 2.0 tools for teaching and learning in South African higher education institutions (Bower, 2015):

2.2.3.1 Website creation tools

- **Blogs**

A blog is like a journal in the form of text and images that links to web content. Blogs can be used in education to promote open discussions and encourage students to voice their opinions and ideas (Bower, 2015). Academics can use blogs to publish course notices where students can then comment, post instructional notes, resources, and annotated links. Both academics and students can write, share, and collaboratively create content. Content can be shared with peers and the public, and blog commenting may increase learning for the course and interaction with classmates and peers.

- **Wikis**

A wiki is a collaborative website that allow users to interact by adding, removing, or editing site content (Payne, 2008, p. 5-12). Wikis can be used in education to support individualised learning and promote collaboration (Ben-Zvi, 2007). Students are able to generate and edit content. Wikis provides opportunities to work together to create documents such as reports or reference a book, etc. Wikis are also useful tools for promoting writing skills.

2.2.3.2 Audio tools

- **Podcasts**

A podcast is an audio program that is posted to the Internet for you to download and listen to (Costello, 2018). Podcasts are useful for summarising lecture notes, sharing information and providing additional information in a media format for students to listen to whenever they need to. This tool is useful if a student misses a class as it allows them to access the missed class content by downloading the recorded podcast.

Although podcasts can be very beneficial, a study conducted by Mugwanya and Marsden (2010) revealed that podcasting has not been fully adopted by faculty and students in South African higher education institutions. The study identified the following as possible reasons for lack of adoption: resistance to change, lack of knowledge, skills and awareness on the importance of Web 2.0 tools in teaching and learning, lack of reliable internet connectivity, lack of e-learning policy, and lack of ICT facilities (Mugwanya and Marsden, 2010)

2.2.3.3 Video tools

- **YouTube**

YouTube is an online video repository. YouTube can be used in education where students and academics can watch videos relating to the course content. Students can be encouraged to create videos and share it on YouTube.

2.2.3.4 Social networking systems

Social networks allow users to create personal profiles and connect with family and friends (Boyd & Ellison, 2007). Social networking can be used in education to promote collaboration by creating groups and discussing course content, or to post notices about the course.

A popular social networking system is Facebook. Facebook can be used as a teaching and learning tool as (Boyd & Ellison, 2007):

- it is an interactive and less formal channel of communication for academics and students,
- it provides a quick and easy means of communication by providing students with feedback,
- it is convenient as it allows both academics and students to share videos, photos and study materials,
- it automatically generates a free-access RSS feed, which can be used as a news distribution to students and
- it can be easily customised by academics for diverse teaching purposes.

2.2.3.5 Text based tools

- **Forums**

A forum is a platform that can be used to share ideas or views on a particular topic (Bower, 2015). Academics can use forums in education as a discussion tool and to gauge students' understanding of the course material. This also helps to promote collaboration and student engagement.

2.2.3.6 Knowledge organisation and sharing tools

- **Aggregators (RSS)**

Aggregators use Really Simple Syndication or Rich Site Summary (RSS). RSS feeds allows users to interact with content online and to receive updates from websites without having to visit each site. RSS feeds can be used in education to share material with students from many sources.

2.2.3.7 Image based tools

- **Image creation and editing**

Image creation and editing sites allows students and academics to create and edit images and then share them using URLs.

2.2.3.8 Learning tools and theories

These tools can be used by academics to create online quizzes for teaching and learning purposes with a range of question types. In the study of the usage of Web 2.0 tools by Al-Kharousi, Jabur, Bouazza and Al-Harrasi (2016), it was revealed that the most commonly used Web 2.0 learning technology tools are wikis, blogs and social media. Thus, academics can use wikis, blogs and podcasts to teach with as these are commonly used learning technology tools. Similarly, Solomon and Schrum (2007) investigated the usage of Web 2.0 tools for teaching and learning purposes and concluded that social networking sites, podcasts, blogs, wikis, and social bookmarking sites were amongst the most popular.

Table 2.1 below, illustrates the relationship between learning theories and practices derived from Conole (2010). The first column, perspectives relates to the fundamental assumptions about the processes and outcomes that constitute learning. Three perspectives as stated by Mayes and de Freitas' (2004) are also mentioned in Table 2.1. These perspectives are broken down into *associative* (learning as activity), *cognitive* (learning through understanding) and *situative* (learning as social practice). These can be sub-divided into a number of different approaches, each emphasising different aspects of learning. For example, the cognitive perspective relates to approaches to learning such as Problem-Based Learning, Inquiry-Based Learning and Dialogic Learning. Table 2.1 describes the characteristics of each of these approaches with examples of how these are reflected in a Web 2.0 context.

Perspective	Approach	Characteristics	Web 2.0 Application	Models and Frameworks
Associative	Behaviourism; Instructional design; Intelligent Tutoring; Didactic and E-training	Focuses on behaviour modification, via stimulus-response pairs; Controlled and adaptive response and observable outcomes; Learning through association and reinforcement	Content delivery plus interactivity linked directly to assessment and feedback	1. Merrill's instructional design principles 2. A general model of direct instruction
Cognitive	Constructivism; Constructionism; Reflective Problem-based learning; Inquiry-learning; Dialogic-learning; Experiential learning	Learning as transformations in internal cognitive structures; Learners build own mental structures; Task orientated, self-directed activities; Language as a tool for joint construction of knowledge;	Development of intelligent learning systems and personalised agents; Structured learning environments (simulated worlds); Support systems that guide users; Access to resources and expertise to	3. Kolb's learning cycle 4. Laurillard's conversational framework 5. Community of Inquiry framework 6. Jonassen et al.'s constructivist model 7. N-Quire model

		Learning as the transformation of experience into knowledge, skill, attitudes, and values emotions.	develop more engaging active, authentic learning environments; Asynchronous and synchronous tools offer potential for richer forms of dialogue/interacti on; Use of archive resources for vicarious learning;	
Situative	Cognitive apprenticeship; Case-based learning; Scenario-based learning; Vicarious learning; Collaborative learning; Social Constructionism	Take social interactions into account; Learning as social participation; Within a wider sociocultural context of rules and community;	New forms of distribution archiving and retrieval offer potential for shared knowledge banks; Adaptation in response to both discursive and active feedback; Emphasis on social learning and communication/ collaboration;	8. Activity Theory 9. Wenger's Community of Practice 10. Salmon's 5-stage e-moderating model 11. Connectivism 12. Preece's framework for online community

			Access to expertise; Potential for new forms of communities of practice or enhancing existing communities	
Assessment		Focus is on feedback and assessment (internal reflection on learning, and also diagnostic, formative and summative assessment)	E-learning applications range from in-text interactive questions, through multiple choice questions up to sophisticated automatic text marking systems	13. Gibbs and Boud models 14. Nicol and the REAP framework
Generic		Do not align to any particular pedagogical perspective but provide a useful overview	Often translated into underpinning ontologies or learning systems architectures	15. The OU (SOL) model 16. The OU LD & Course Business Models 17. The 3D pedagogy framework 18. Bigg's constructive alignment

			19. The Hybrid Learning model 20. Gee's affinity Model

Table 2.2 relationship between learning theories and practice (Conole, 2010)

The above learning theories are important as they support the educational use of Web 2.0 tools and its associated technologies. As mentioned above, learning theories can assist academics to choose the right Web 2.0 learning technology to enhance teaching and learning by choosing a Web 2.0 tool that can be linked to a specific learning theory. Finally, the researcher believes that these recommendations are needed in order to improve and encourage faculties to use Web 2.0 technologies in education.

The aim of the study is to determine the extent of the usage of individual Web 2.0 tools in higher education in order to understand which ones are more popular. The study also aims to ascertain awareness, knowledge and familiarity of academics on Web 2.0 for teaching and learning. The next section will provide an overview of the importance of Web 2.0 tools in higher education.

2.3 Benefits of using Web 2.0 tools in higher education

The usage of Web 2.0 tools in higher education provides students with opportunities to develop and maintain their own learning activities at a pace that they are comfortable with thereby being in control of their learning as compared to traditional teaching methods. This leads to an increase in self-directed learning (Redecker, Ala-Mutka, & Punie, 2010). Web 2.0 tools provides a participatory platform for students with the use of wikis, blogs, and social networking which encourages a more active role in the teaching and learning process. Thus, to provide a better learning experience for students, there is a need for higher education institutions to adopt 21st century technologies such as Web 2.0 tools.

According to Grand-Clement, Devaux, Belanger and Manville (2017), technology's usage in education can enhance teaching and learning by providing a platform where students can fully express themselves, often in creative ways. There are wide varieties of technology tools that help

to enhance the teaching and learning process in higher education such as multiple representations of understanding that brings about creativity and helps academics to provide individualised instruction and tailored learning opportunities for students.

The implementation of Web 2.0 technology tools in higher education encourages and enables academics to use new and innovative ways of teaching and for students to share ideas and collaborate with one another. Web 2.0 tools provides academics with more interactive and powerful learning environments in which learners become knowledge creators, producers, editors, and evaluators (Richardson, 2009). Students also benefit with the use of Web 2.0 tools, as they are able to sharpen their critical thinking skills by comparing their own work to those of their fellow classmates. Web 2.0 tools are beneficial for students as they can use Web 2.0 tools to prepare for tests, complement what they have learnt in class and to assist them when completing projects.

Redecker, Ala-Mutka, Bacigalupo, Ferrari and Punie (2009), indicates that Web 2.0 tools gives rise to technological innovation in education and training by:

- Increasing the accessibility and availability of learning content
- Providing new formats for knowledge dissemination, acquisition and management
- Allowing for the production of dynamic learning resources and environments of high quality and interoperability
- Embedding learning in more engaging and activating multimedia environments;
- Supporting individualised learning processes by allowing learner preferences to be accounted for
- Equipping learners and teachers with versatile tools for knowledge exchange and collaboration, which overcome the limitations of face-to-face instruction

Web 2.0 tools can be very beneficial in education as these technologies makes it so much easier for students to get access to their course material and electronic versions of textbooks; to be able to retain the knowledge they have just learnt as well as an increase in engagement.

Student engagement fosters an active and collaborative learning approach that encourages students to learn more when they are passionately involved in their education (Eison, 2010). Web 2.0 tools

can implement collaboration and active learning by using blogs which helps bring about self-reflection; bookmarking applications to share resources; wikis; social networking applications to extend the learning environment beyond the classroom; etc. (Redecker & Punie, 2012). Engagement is vital to academic success as it moulds students to be more confident, knowledgeable, skilful and make good decisions not only in higher education but in also when they enter the work place. Thus, technology-enhanced learning will provide an environment where students become engaged, critical thinkers, collaborators and expressive to their fellow classmates (Goodyear & Retalis, 2010).

Web 2.0 technologies not only encourage learners to collaborate and share ideas but also force the lecturer to think of new and innovative ways to transform the learning process that supports more active and meaningful learning. Web 2.0 has the ability to create more interactive and powerful learning environments in which learners become collaborators, knowledge creators, producers, editors, and evaluators (Richardson, 2009).

With this type of technology tool, learners are forced to become critical thinkers as they regularly compare their own contributions to those of their fellow classmates. Thus, the researcher will ascertain whether Web 2.0 technology tools has the ability to support active and social learning, provide opportunities and venues for student publication, to provide effective and efficient feedback to learners, and provide opportunities for social interactions and collaboration amongst students that would not have necessarily been available to achieve during face-to-face interaction with the lecturer (Hartshorne & Ajjan, 2009).

According to Wesch (2008, pg. 69), we are enveloped in a "cloud of ubiquitous digital information where knowledge is made, not found and authority is continuously negotiated through discussion and participation". This is what Web 2.0 tools offers to education. A world of digital information where knowledge is not just read (Web 1.0) but a place where one can create and share information with one another. The introduction of Web 2.0 tools in higher education automatically shifts the learning where the academic is no longer the distributor of knowledge, but is now the facilitator of learning and assessors of competency (Vijayakumar, 2010). Web 2.0 tools brings about active and meaningful learning with an increase in collaboration among students (Majhi & Maharana,

2010). Web 2.0 tools opens a world of information for academics where they can freely access various course material and adapt it to their curriculum. Academics can use Web 2.0 tools to create educational content, track their progress, set online assessments, etc.

Despite the benefits of Web 2.0 tools in higher education, research shows that Web 2.0 technology tools are not widely used (Olasina, 2011; Anunobi & Ogbonna, 2012) even though students are currently using the technology for social purposes (Baxter & Sommerville, 2011). Therefore, the researcher's aim is to address this knowledge gap in terms of perceived usefulness by conducting research into the role of benefits in the usage of Web 2.0 tools by academics in South African higher education institutions.

According to Zhou (2011), Web 2.0 development is shown to improve teaching and learning, and encourage student's participation and collaboration. Web 2.0 tools can improve the teaching and learning process if it is used effectively with clear goals and proper methods (Reynard, 2009, & Hurlburt, 2008). It is not meant to remove the face-to-face interaction between the academic and student but to be supplemented as an additional teaching method. The next section will outline the adoption and usage of Web 2.0 tools in higher education.

2.4 Adoption and usage of Web 2.0 tools in higher education

A number of studies shows that Web 2.0 tools can be used as a means to promote more student-centred learning (Almeshal, 2015; Asma, 2012, & Chen, 2012). Thus, the usage of Web 2.0 tools can offer new opportunities for flexibility in learning, with potential for new markets such as distance and part-time students.

Literature shows that the usage of Web 2.0 tools in higher education may be a result of individual efforts rather than institutional policies and strategies (Yadav & Patwardhan, 2016). Thus, a knowledge gap exists in terms of individual and organisational factors. Therefore, the research will investigate the extent to which these technologies are used in higher education with a specific focus on the individual and organisational factors that influences the usage of Web 2.0 tools.

The three main uses of Web 2.0 tools in a university environment are: (1) *To communicate classroom and research activities;* (2) *To keep up-to-date on topics of interest and* (3) *To make professional contacts* (Yadav & Patwardhan, 2016). Regarding the first main use: *To communicate classroom and research activities*, Eyyama, Menevis and Dogruer (2011) explained that academics mostly use Web 2.0 technology tools as a means of communication. To communicate course material, announcements, etc. Students also use Web 2.0 tools to communicate with each other *To keep up-to-date on topics of interest.* Web 2.0 tools such as Facebook and Twitter enable academics and students to save pages that interest them and the use of RSS feeds (Really Simple Syndication) assists students to keep up to date with world events as well as stay connected with their friends (Greenhow, Robelia, & Hughes, 2009) and *To make professional contacts.* Web 2.0 tools enable academics and students to share ideas, interests, or meet people with similar professional ideas and interests (Rosielle & Lindley, 2015).

Web 2.0 tools have already been adopted in many countries such as the United States of America and Europe. In the United States of America, Web 2.0 technologies have brought about a collaborative and active community of learners (Ferdig, 2007). According to Virkus (2008), Web 2.0 technologies were used at universities in Europe to deliver content and the results of the study demonstrated that some academics had successfully adopted Web 2.0 technologies in supporting face-to-face lectures or online learning. Gupta, Singh and Marwaha (2013) pointed out that Web 2.0 technologies have changed the way that distance education is facilitated by making learning more flexible, interactive and collaborative for academics and students and in Africa (Uganda). However, Mbatha (2013) has indicated that academics at the University of South Africa have not fully utilised Web 2.0 technologies for educational purposes.

Thus, this study will investigate the usage of Web 2.0 tools at two private South African higher education institutions in order to determine the extent of usage of Web 2.0 tools as well as to determine the reasons if there is a lack of usage of Web 2.0 tools. In addition, this study aims at determining the factors that influence the usage of Web 2.0 tools in South African higher education institutions. To assess effective use of Web 2.0 tools in education, the researcher would need to acquire this understanding on Web 2.0 tools used and extent of usage.

Based on the research findings of a study conducted by Jimoyiannis, Tsiotakis, Roussinos and Siorenta, (2013), academics' beliefs and perceptions of Web 2.0 in relation to its impact on learning and instruction revealed that academics in the sample were positive towards Web 2.0 in education.

A study by Dadzie (2009) showed that the usage of technologies in education in Africa is very low due to many factors such as lack of training, time and resistance to change. In addition, limited ICT infrastructure and low Internet bandwidth contribute to the low usage levels (Regmi & Chautari, 2017). A study in the Western Cape University showed that only 32% of academics used a computer for educational activities, whereas the use of ICTs for communication and administration was more frequent (Zerniewicz & Brown, 2005).

A further study about the usage of Web 2.0 tools was conducted by Tyagi (2012) in six universities in India among faculty members. The results revealed that the usage of Web 2.0 tools were associated with important challenges such as potential risks and institutional fears. Thus, an effective strategy needs to be developed to manage these problems. The results also indicated that faculties' attitude and their perceived behavioural control were strong predictors of intention to use Web 2.0 tools.

A study conducted by Bagarukayo and Kalema (2015) revealed that academics are not using Web 2.0 technologies to their potential, thereby contributing to the low usage rates in South African higher education institutions. This can change if effective training on the usage of Web 2.0 tools are provided to assist academics in adapting their curriculum and teaching methods to the new environment rather than just moving the content to the Web. One can only see the full potential and benefits of Web 2.0 tools if clear goals and proper methods are used to implement and adopt these tools in education thereby improving teaching and learning.

The usage of Web 2.0 tools in education can be very beneficial and effective in delivering educational value; however, difficulties may arise as mentioned in Section 2.4. The study will develop a conceptual model to study the research problem pertaining to the lack of usage of Web

2.0 tools. The next section will discuss the challenges of adopting and using Web 2.0 tools in education.

2.5 Challenges of adopting and using Web 2.0 tools in education

Many barriers exist that could hinder the usage of Web 2.0 tools in higher education. According to Keats and Schmidt (2007), major barriers that limit most African universities from adopting Web 2.0 technology tools are related to poor ICT infrastructure, limited access to computing technologies, and high cost and scarcity of Internet bandwidth, etc. Other factors that affect the implementation of Web 2.0 tools in South African higher education institutions are the lack of e-learning policy, the need for appropriate training and capacity development, a lack of relevant digital content, and the cost of implementation (Unwin, Kleessen, Hollow, Williams, Oloo, Alwala, Mutimucuio, Eduardo, & Muianga, 2010). Higher education institutions need to understand these challenges in order to successfully implement e-learning in South Africa with the use of Web 2.0 tools.

According to Keats and Schmidt (2007), major challenges that limit most African universities to use Web 2.0 tools are poor ICT infrastructure, limited access to computing technologies, and high cost and scarcity of Internet bandwidth. Thus, it is of utmost importance that these barriers are overcome in order to effectively implement e-learning in South African higher education institutions.

According to Suni (2010), the following are some of the limitations to the usage of Web 2.0 tools:

- An Internet connection is required
- Low quality of the actual content
- Limited security
- The speed of programs is lower than the one of desktop programs
- A lot of time and knowledge needs to be invested in the Web 2.0 technologies.

Other factors that may prevent the use of these tools are insufficient resources, and a lack of adequate instructional design. Staff and other technological support issues can also impede the usage of Web 2.0 technologies (An, Aworuwa, Ballard, & Williams, 2010). According to Tyagi

(2012, pg.28), “Web 2.0 tools are still in its infancy in terms of its use in education due to a range of factors, which are principally technical, institutional and social”.

A study conducted by Munguatosha, Muyinda and Lubega (2011) states that there are a number of factors that impede the usage of new learning media that include:

1. Security and privacy in social networked learning. Prensky (2010) states that issues of ownership and control will become more complicated with the use of Web 2.0 tools as content is increasingly freely shared and re-used worldwide. However, institutions can filter and apply security measures against both incoming and outgoing content (Munguatosha, Muyinda, & Lubega, 2011).

2. Technical support and infrastructure. Lack of reliable power supply and Internet connection, and limited supply of computers are considered major infrastructure constraints in the usage of Web 2.0 technologies (Munguatosha, Muyinda, & Lubega, 2011). Furthermore, the lack of competent technical staff, irrelevant ICT policies, lack of exposure and irregular professional training for technical staff are the technical support related challenges for adopting new learning media today (Munguatosha, Muyinda, & Lubega, 2011).

3. Administrative support. According to a study conducted by Munguatosha, Muyinda and Lubega (2011), they found that out of the 70 executives interviewed; only 35 per cent were comfortable with the use of ICT enabled facilities in their offices. This has a negative effect on the planning and policy development of Web 2.0 tools when adopted and used in higher education.

4. Institution policy. In order to overcome any potential risks and institutional fears with the usage of Web 2.0 tools, there is a need for an effective strategy to deal with implementation problems (Tyagi, 2012).

Besides the barriers mentioned above, research has shown that lack of Internet use is also a limitation to the usage of Web 2.0 tools in higher education. This statement is evident in a study conducted by Redecker (2010), who identified that as many as 30% of Europeans aged 16 to 74

had never used the Internet. Other factors that may hinder the use of Web 2.0 tools for teaching and learning were the following individual (personal barriers), technical, pedagogical and organisational issues (Okello-Obura & Ssekitto, 2015):

1. **Access to ICT and basic digital skills:** Access to ICT at home and in schools as well as basic computer skills constitute a major obstacle for the use of Web 2.0 tools in education. Although a large percentage of students are quite confident using technology, academics on the other hand may not be. Thus, a low usage level in higher education.
2. **Advanced digital competence:** Web 2.0 strategies require the confident and critical use of ICT and an informed and critical attitude towards interactive media and digital information. Some students may lack these skills. Academics require assistance in supplying students with the necessary advanced digital skills in order to safely use Web 2.0 tools.

3. **Special needs:** Web 2.0 tools have the ability to support different learning paces and cognitive styles, however they may also increase difficulties for students who have physical or cognitive disabilities, or possess special learning needs. One particular example of a learning disability is dyslexia. If academics make use of text-based collaboration and knowledge, building activities with wikis and blogs, this can disadvantage dyslexic students. To overcome this problem, academics can use other forms of Web 2.0 tools that will accommodate for these differences and mediate the inclusion of students with special needs.

4. **Pedagogical skills:** The use of Web 2.0 tools in education forces academics to take on a new role i.e. they now become mentors thereby enabling and facilitating self-regulated learning processes. This process needs to be accompanied by training for academics so that this transition is a smooth one.

5. **Uncertainty:** Web 2.0 tools bring about transformation and change in education with many issues that needs to be resolved for successful usage of these tools. However, issues relevant for sustained deployment of Web 2.0 in teaching and learning have not yet been addressed or solved. For example, uncertainties have arisen concerning the future development and availability of current applications and services; the reliability of user-produced content;

suitable assessment and certification strategies; and valid pedagogical concepts and methods for learning with social media (Redecker, Ala-Mutka, & Punie, 2010).

6. **Safety and privacy concerns:** The implementation of Web 2.0 tools brings about the issues of privacy in relation to identity, safety, reputation and trust. These were the findings according to a recent IPTS conducted by Lusoli and Miltgen (2009). These tools can bring about certain self-destructive behaviours in students such as cyberbullying and online grooming (Paine, 2009). This is when academics need to step in and play an important role in ensuring student's identities are protected; that rules of conduct are implemented and adhered to; and that intellectual property rights are respected.

7. **Requirements on institutional change:** The use of Web 2.0 tools in higher education requires higher education institutions to re-evaluate their role as knowledge providers. There needs to be an institutional policy developed that looks at new ways to support academics, students and administrators. However, resistance to change may cause higher education institutions to not take an active role in deploying promising Web 2.0 strategies.

According to An et.al (2010), the major barriers in higher education are uneasiness with openness, technical problems, and time. This is explained in more detail below:

- ***Uneasiness with openness***

The open nature of Web 2.0 technology tools is still new to many students; thus, they are quite reluctant to participate in class activities that utilise Web 2.0 technology tools. These students preferred one-to-one teacher-student interaction.

- ***Technical problems***

Technical issues may arise when interacting with Web 2.0 technology tools when using older computers as well as technical glitches when using these tools with a course management system. Another issue is that some universities may not provide enough technical support for students and faculty who are unfamiliar with Web 2.0 technology tools.

This section discussed the challenges of adopting and using Web 2.0 tools in education. In order to get a better understanding of the usage of Web 2.0 tools in education, the next section will provide an overview of previous studies of Web 2.0 tools in an educational context.

2.6 Existing technology adoption and usage models

According to Stephen and Geoff (2014), a conceptual model can provide a road map or guide for higher education organisations looking to improve the learning platform from an ad-hoc based process to an integrated process that strives to expand student learning. In the next section, a brief overview of existing technology models will be discussed to develop a conceptual/research model for the study.

2.6.1 Theory of Reasoned Action

This theory was developed by Fishbein and Ajzen (1975) and was the first theory to predict acceptance of technology. The constructs in this theory were focused around behaviour, attitudes, beliefs and norms to predict behavioural intent. The theory states that the decision to adopt and use new technology is based on the individual's intention, which is influenced by the attitude towards the technology. Attitude as a construct would be included in the conceptual model as an individual's attitude can influence the usage of Web 2.0 tools.

The Theory of Reasoned Action is shown in Figure 2.1 below. The Theory of Reasoned Action was later extended to theory of planned behaviour (Ajzen & Fishbein, 1980). Two theories that extended from the Theory of Reasoned Action were Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989), Unified Theory of Acceptance, and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003).

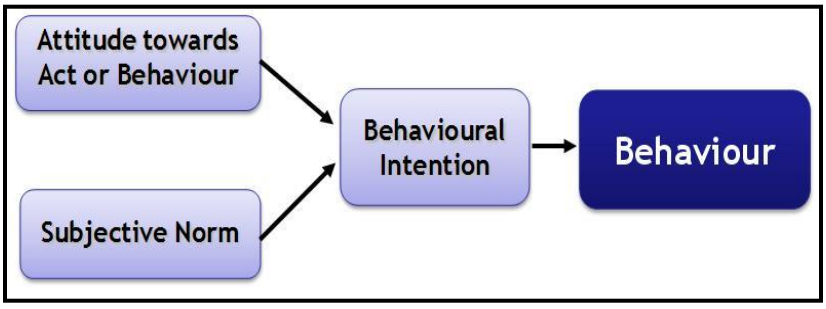


Figure 2.1 Theory of Reasoned Action model

2.6.2 Technology Acceptance Model (TAM)

Another existing model that was used to investigate factors that influence the usage of the Web 2.0 technology in teaching and learning is the TAM model by Davis in 1989 (Technology Acceptance Model). This model is shown in Figure 2.2, below. TAM is a good theoretical tool to understand users' acceptance and usage of Web 2.0 tools and can assist the researcher to explain and predict the behaviour of usage of Web 2.0 tools.

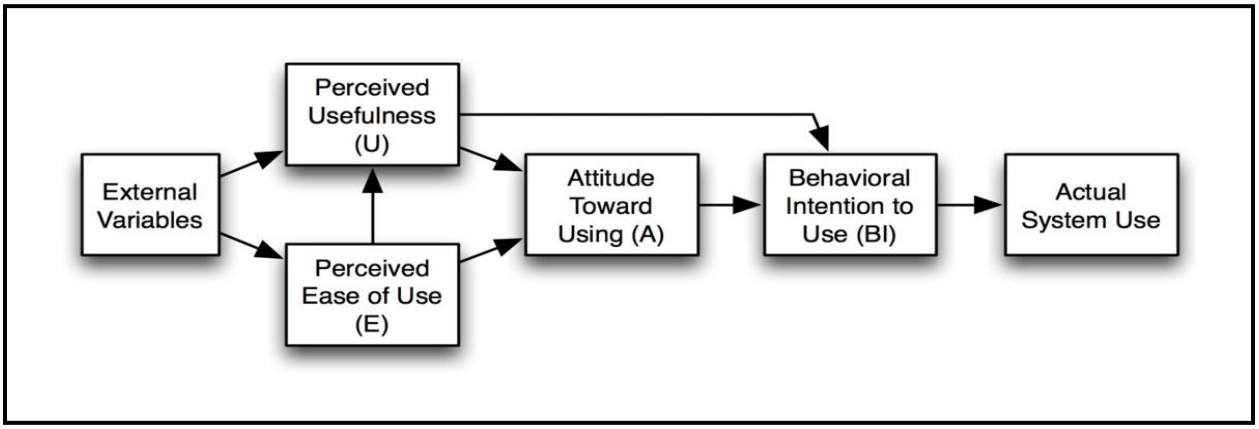


Figure 2.2 Technology Acceptance Model

Venkatesh and Davis (2000) proposed a new version of TAM called TAM2, which added new variables to the existing model. Venkatesh et al. (2003) in a study proposed the Unified Theory of Acceptance and Use of Technology (UTAUT) Model as the original TAM did not test all aspects with regard to the usage. A number of researchers validate the creation/modification of TAM. For example, Agarwal and Prasad (1998a, 1998b) modified TAM by adding the construct of compatibility; Lin and Bhattacherjee (2010) proposed to modify TAM by adding variables like experience, self-efficacy, perceived risk and social influence. Agarwal and Karahanna (2000) added cognitive absorption, playfulness and self-efficacy to the TAM model; Chau (1996) included two types of perceived usefulness: near-term and long-term and Van der Heijden (2000) added two new constructs to TAM, namely perceived entertainment value and perceived presentation attractiveness.

Studies have shown that the constructs of the TAM model did not show significant results. For example, McFarland & Hamilton (2006) pointed out that the TAM model only explained a portion of the variance of the outcome variable for IT usage of 4% to 45%. A study done by Liu (2010)

stated that the TAM model only explains a fraction of the variance in technology usage intentions and behaviour. According to Teo, Luan and Chai (2008), TAM was not valid across cultures. Additionally, Bagozzi (2007) and Chuttur (2009) explained that TAM contains inadequate explanatory and predictive ability and lacks empirical and practical value.

Based on TAM, the constructs of *perceived usefulness and perceived ease of* use will be investigated to determine if these constructs influence the usage of Web 2.0 tools in higher education.

2.6.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

This is a technology acceptance model created by Venkatesh et.al (2003). The Unified Theory of Use and Acceptance of Technology emerged from the combination of eight models namely: Theory of Reasoned Action, Theory of Planned Behaviour, Motivational model, Social Cognitive Theory, Model of PC Utilisation, Innovation Diffusion Theory and Technology Acceptance Model (TAM1 and TAM2). This is shown in Figure 2.3, below.

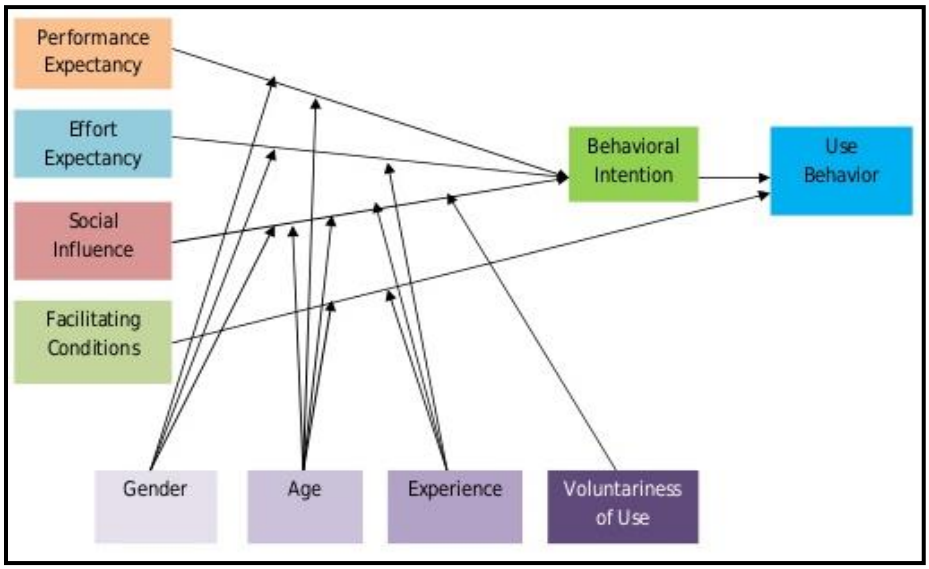


Figure 2.3 Unified Theory of Use and Acceptance of Technology model

The UTAUT aims to explain user intentions to use an information system and subsequent usage behaviour (Venkatesh et al., 2003). Based on UTAUT, *facilitating conditions* (organisational

factor in this study) will be investigated to determine if this construct influences the usage of Web 2.0 tools in education.

2.6.4 Information success model (ISM) of Delone and Mclean (2003, 2004)

Information success model is an information systems (IS) theory aimed at getting a better understanding of IS success by identifying and describing the relationships among six critical dimensions of success (Delone & Mclean, 2003). The model is shown in Figure 2.4.

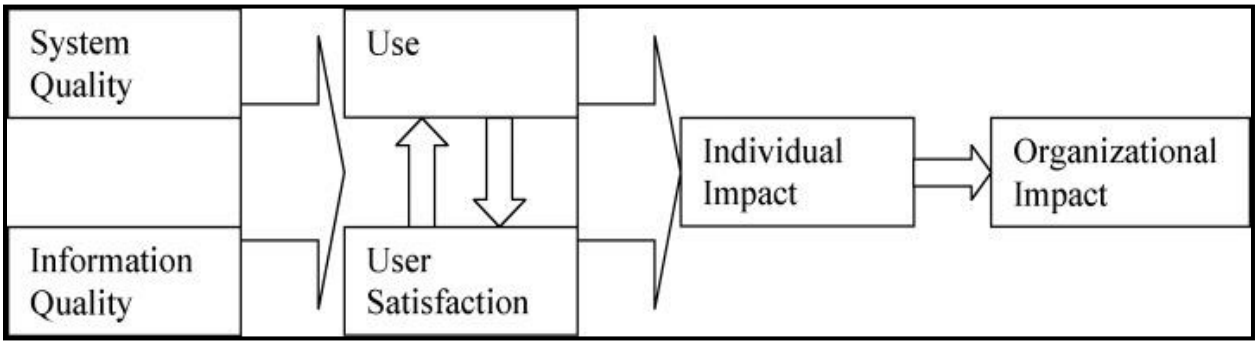


Figure 2.4 Information Success Model

The construct (system quality) of the Information Systems (IS) success model of Delone and McLean (1992), and its extended model informs the study on the phenomenon of Web 2.0 tool usage in higher education (Delone & Mclean, 2003, 2004).

The construct of information quality and perceived quality characteristics have been noted to have significant positive influence on system use and user satisfaction (Petter & McLean, 2009). However, Dwivedi, Wade and Schneberger (2012) explained in their study that Delone and McLean's (2003) argument relating to service quality is not an appropriate construct for examining individual systems as it was found to be insignificant for explaining use.

Other studies also explained that some of the constructs of the Delone and McLean's Information Systems Success Model do not show significant results, as it does not examine the use of Information Systems. One example, as pointed out by Livari (2005), a measure of the Delone and McLean Information System success model, showed that actual use is insignificant as a predictor of individual impact. However, based on ISM, the construct of system quality (perceived quality

characteristics in this study) will be investigated to determine if this construct has an influence on usage of Web 2.0 tools in higher education.

2.6.5 Diffusion of Innovation Theory

According to LaMorte (2016), the Diffusion of Innovation (DOI) Theory was developed by E.M. Rogers in 1962 and is one of the oldest social science theories that aimed at explaining how an idea gains momentum and diffuses through a specific population or social system. This model is shown in Figure 2.5, below.

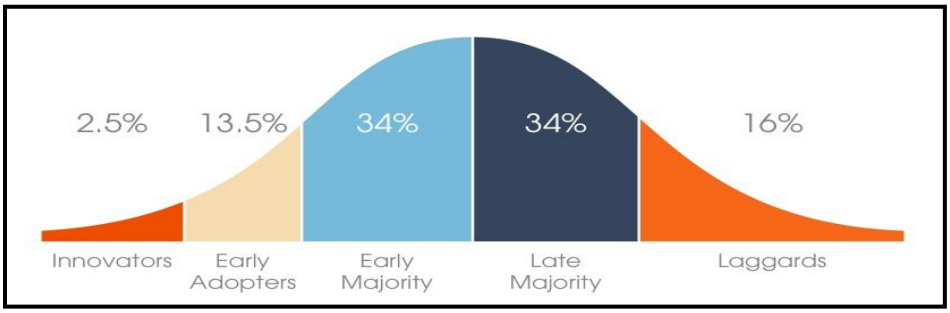


Figure 2.5 Diffusion of Innovation Theory

The principle behind the diffusion in this model is that people will adopt and use a new idea, behaviour or product (innovation) i.e. people will do something differently than before, therefore in this study the usage of a new idea may bring about change in a person's behaviour (Rogers, 2003). In order for the usage to be a success, the idea or behaviour will have to be regarded as innovative. In the case of this research, a new idea is the usage of Web 2.0 tools and the innovation is a new way of teaching in higher education. The stages of the Diffusion of Innovation Theory indicates how a person adopts and uses an innovation and accomplishes it. According to LaMorte (2016), this depends on the awareness of the need for an innovation, decision to adopt (or reject) the innovation, initial use of the innovation to test it, and continued use of the innovation. According to Rogers (2003), "innovation is an idea perceived as new". Thus, the researcher would like to investigate the idea of usage of Web 2.0 tools in education using the study's conceptual model.

The limitation of this theory is that it does not consider pedagogical factors and organisational factors. Institutional culture, policies and frameworks as well as the teaching methods and learning styles are important constructs in this research. Therefore, the researcher created a conceptual model to fit the study's objectives. Another limitation related to the usage of Web 2.0 tools is that the Diffusion of Innovation does not take into consideration the resources or support to adopt the new behaviour i.e. the organisational factors.

The above mentioned theories and conceptual frameworks can assist in identifying the factors that influence the usage of Web 2.0 tools. Thus, the next section will provide a brief overview of the potential factors influencing Web 2.0 usage in higher education.

2.7 Potential factors influencing Web 2.0 usage

Web 2.0 tools used in education can engage students in meaningful learning as well as social interactions (Atkinson & Swaggerty, 2011). These tools also have the ability to provide effective and efficient feedback to students (Hartshone & Ajjan, 2009). Thus, factors need to be identified that influence the usage of Web 2.0 tools in education. These factors were identified in various literature and are briefly discussed below.

2.7.1 Individual factors

2.7.1.1 Computer experience

This consists of knowledge, awareness and familiarity of Web 2.0 tools which can have a positive impact on the usage of this tool in education (Okello-Obura & Ssekitto, 2015). In terms of computer usage and experience, in a study conducted by Zerniewicz and Brown (2005), the findings revealed that academics had relevant knowledge and experience in computer and Internet usage. These findings were also in line with a study conducted by Olanike (2016). This construct will help to establish an academic's knowledge and familiarity of Web 2.0 tools and how this influences usage.

2.7.1.2 Personal barriers

This relates to the personal elements that restricts academics from using Web 2.0 tools. Lack of time, lack of necessary knowledge and skills are the most commonly identified personal barriers associated with the usage of Web 2.0 tools.

According to Wachira and Keengwe, (2011) technical support, teacher expertise, time for planning and pedagogical applications are barriers when integrating technology into the classroom. A study conducted by An and Reigeluth (2011) reported that lack of technology, lack of time, and assessment were the leading barriers to creating technology enhanced classrooms. Additionally, a study conducted by Al-Kharousi, Jabur, Bouazza and Al-Harrasi (2016) indicated that the usage of Web 2.0 tools is affected by internal factors such as the low motivation of staff regarding usage of Web 2.0 applications and lack of knowledge and awareness of Web 2.0 tools. On the other hand, the external factors consisted of lack of organisational policy and regulations and weakness of the Internet. This is discussed in more detail in Section 2.7.3 under organisational factors. Based on the research findings of the study conducted by Jimoyiannis, Tsiotakis, Roussinos and Siorenta (2013), academics' stated that the main barriers of usage of Web 2.0 tools in education were:

- Difficulties to plan their instructional choices and to design learning activities based on Web 2.0 tools
- Lack of time to design learning activities based on Web 2.0 tools
- Lack of resources available in the classrooms
- Restrictions and the need to cover the content set by the national curriculum
- Lack of time for further training and developing Web 2.0 technical skills

2.7.1.3 Teaching style

Teaching styles are considered to be the general principles, educational, and management strategies for classroom instruction. The type of teaching style can affect the usage of Web 2.0 tools in education. Teaching style in the study is based on the traditional teaching approach (face-to-face) coupled with online teaching methods as well as purely online. Huang, Yoo and Choi's (2008) study found that correlations exists between teaching style preference and academics' attitudes towards using Web 2.0 tools in education.

Teaching strategies in blended learning with the use of Web 2.0 tools facilitates self-directed learning, enables students to access learning content at any time and place (LeNoue, Hall, & Eighmy, 2011). Thus, Web 2.0 tools take on a constructivist approach, allowing students to be actively involved in their learning by creating knowledge rather than the traditional teaching style where students take on a passive role in the teaching and learning process (Golding, 2011; LeNoue, Hall, & Eighmy, 2011).

The traditional teaching and learning process (face-to-face) of a student attending class, taking notes and preparing for a test does not prepare the student for the working world (Industry) and should be reinforced with technology enhanced learning environments (Groff, 2013) such as Web 2.0 tools. Technology enhanced learning (blended learning) instils knowledge and skills to students to be the type of dependable, educated problem solvers which employers are looking for (Lam, 2007). Technology enhanced learning environments, like those that use Web 2.0 tools, prepare students with the knowledge and skills needed for success in the twenty-first century. Employers are hiring employees who are dependable, educated, technologically savvy, and able to reason, communicate, and solve problems. (Lam, 2007). Thus, teaching strategies in blended learning are important factors in enhancing the teaching and learning process.

2.7.2 Attitude

Attitude is defined as the degree to which the individual favours the behaviour being examined (Ajzen & Fishbein, 2000). Attitude in the research is defined as the academic's desirability to use Web 2.0 in the teaching and learning process.

2.7.3 Organisational factors

This section discusses organisational factors from the literature that can potentially influence the use of Web 2.0 tools in education. Organisational factors are related to the higher education institutions. In the study, this is based on *institutional support, training and barriers.*

2.7.3.1 Support

This is related to a higher education institutions' ability to provide support to academics and students when using Web 2.0 tools. The higher education institution needs to ensure that there is

adequate awareness of ICT and usage of Web 2.0 tools. Higher education institutions need to have an ICT policy that includes the usage of Web 2.0 tools in their ICT policy. With the usage of Web 2.0 tools also comes privacy and online security issues (Cohere, 2011). Therefore, higher education institutions need to ensure they have institutional policies and procedures in place when using Web 2.0 tools.

A previous study of 14 universities in South Africa revealed that four of the institutions had an e-learning policy, followed by four institutions who had the policy in draft form. The remaining six did not have any policy in place (Bagarukayo & Kalema, 2015). These findings do not show a satisfactory level of support and commitment from the higher education institution regarding the usage of Web 2.0 tools. Thus, it is crucial that policies are developed in order to guide and support academics in the implementation of Web 2.0 technology tools. However, higher education institutions need to make sure they provide an infrastructure in which social media tools are accessible to all students and academics; create an atmosphere of support for Web 2.0 tools; foster and integrate new teaching and learning models; and be open to new assessment and grading strategies (Al-Mukhaini, Al-Qayoudhi, & Al-Badi, 2014).

Therefore, in order for Web 2.0 tools to be a success in higher education, staff and students require technical support. Technical support should be provided for academics who are unfamiliar with Web 2.0 tools. Academics should also be assisted in developing new ways of teaching by using these tools rather than simply teaching them how to use these tools. Therefore, there is a need to understand educator perceptions on the support of using Web 2.0 tools in teaching and learning in higher education.

2.7.3.2 Training

Higher education institutions can also provide support in terms of training and professional development. Based on a study (usage and barriers of Web 2.0 technology applications) by Pritchett, Pritchett and Wohleb (2013), the participants stated that they would use Web 2.0 tools if training/professional development was provided. The training would address how to use and effectively implement Web 2.0 tools in education. In a study by Akoh (n.d.), it was revealed that

if academics had received training and/or professional development for using Web 2.0 technology applications, then they would be more likely to use this tool in education.

Web 2.0 tools can be successful in higher education as they are tools that have many publicly and freely available educational applications to assist academics in the teaching and learning process. However, academics need to be trained and educated on the effective use of Web 2.0 tools in education in order to be properly prepared for this transition in teaching. According to Jimoyiannis et al. (2013), a key issue of 21st century education is preparing academics to effectively use ICT in the classroom. Academics must be trained to successfully integrate ICT, in this case Web 2.0 tools into instruction and learning. However, literature shows that the application of Web 2.0 tools in education is used as an "add on" feature for formal academic activities like using the Internet to search for information rather than as a learning tool (Jimoyiannis & Komis, 2007; Tondeur, van Keer, van Braak, & Valcke, 2008).

It has also been noted that Web 2.0 training tends to focus on how to use Web 2.0 tools while pedagogical and instructional issues of how and why to use Web 2.0 tools in education are often taken for granted (Jimoyianis, 2008). Based on this, it is very important to consider the influence of training as an organisational factor (Jimoyiannis et al., 2013). Therefore, academics need to be adequately trained on how to effectively integrate Web 2.0 tools into the curriculum.

According to Herman and Stander (2017), a challenge facing universities in Africa is the balance between effective use of existing resources and the demand for the delivery of better education. However, besides training and adopting an institutional policy, other factors have hindered the use of Web 2.0 tools in education such as unreliable power supply, poor Internet connectivity and poor ICT infrastructure (Okello-Obura & SsekittoIt, 2015). This is discussed in more detail in section 2.6.3.3.

2.7.3.3 Barriers

Organisational barriers are a construct which may influence the usage of Web 2.0 tools in education. In a study by An and Reigeluth (2011), they reported lack of technology to be a leading barrier to creating technology enhanced classrooms. In addition, Whitehead, Jensen, and Boschee

(2010) identified lack of resources and funding as major barriers to the usage of Web 2.0 tools in higher education.

According to Prensky (2010), security and privacy in social networked learning is an organisational barrier as issues of ownership and control will become more complicated with the use of Web 2.0 tools. However, academic institutions must apply security measures against digital content (Munuatosha, Muyinda and Lubega 2011).

Lack of internet connection, lack of ICT policies and limited supply of computers are major constraints in the usage of Web 2.0 technologies (Munuatosha, Muyinda and Lubega 2011). In a study conducted in Tanzania, it was identified that poor infrastructure such as low Internet bandwidth and high cost of internet connectivity were major barriers to the usage of Web 2.0 tools (Anya et al, 2010). Other challenges were related to limited security and privacy which included lack of centralised systems for storage of data and inappropriate use of content. A similar study in Africa showed barriers to include large class sizes, limited bandwidth and financial limitations (Kinuthia et al, 2006).

Unwin et al. (2010) also identified barriers to Web 2.0 usage to include lack of infrastructure and the cost of implementation (Unwin et al, 2010). Therefore, based on all of the barriers identified, it is crucial to investigate the organisational barriers in order to effectively implement Web 2.0 tools in South African higher education.

2.7.4 Pedagogical factors

This section discusses pedagogical factors from the literature that can potentially influence the use of Web 2.0 tools in education. The sub-sections to be discussed under pedagogical factors are educational Web 2.0, pedagogical content knowledge, pedagogical characteristics afforded by Web 2.0 tools and pedagogical beliefs.

2.7.4.1 Educational Web 2.0

Web 2.0 tools needs to be implemented in higher education as a learning platform and a learning attitude rather than just technology (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, (2013). In

order to enhance education with the usage of Web 2.0 tools, Jimoyiannis, Tsiotakis, Roussinos and Siorenta (2013) defined the educational Web 2.0 by developing six interrelated aspect dimensions (Figure 2.1):

Participatory web: This feature promotes students' engagement and provides effective personal learning environments (blogs, wikis, etc.) for the students.

Open web: The open features of Web 2.0 tools support creativity.

Collaboration: Web 2.0 tools support collaborative learning where students can share and transform material, create new content and develop new forms of thinking.

Sociability: Web 2.0 offers new and innovative ways for communication and supports autonomous communities of learning.

Open classroom: Web 2.0 extends students' learning beyond the walls of the classroom.

Web as a learning platform: This platform is based on all of the above dimensions: participation, open Web, collaboration, sociability, open classroom and the development of sustainable learning systems and learning ecologies. Thus, Web 2.0 tools are more than a simple technology but as a learning platform and a learning attitude. This is illustrated in Figure 2.6, below.

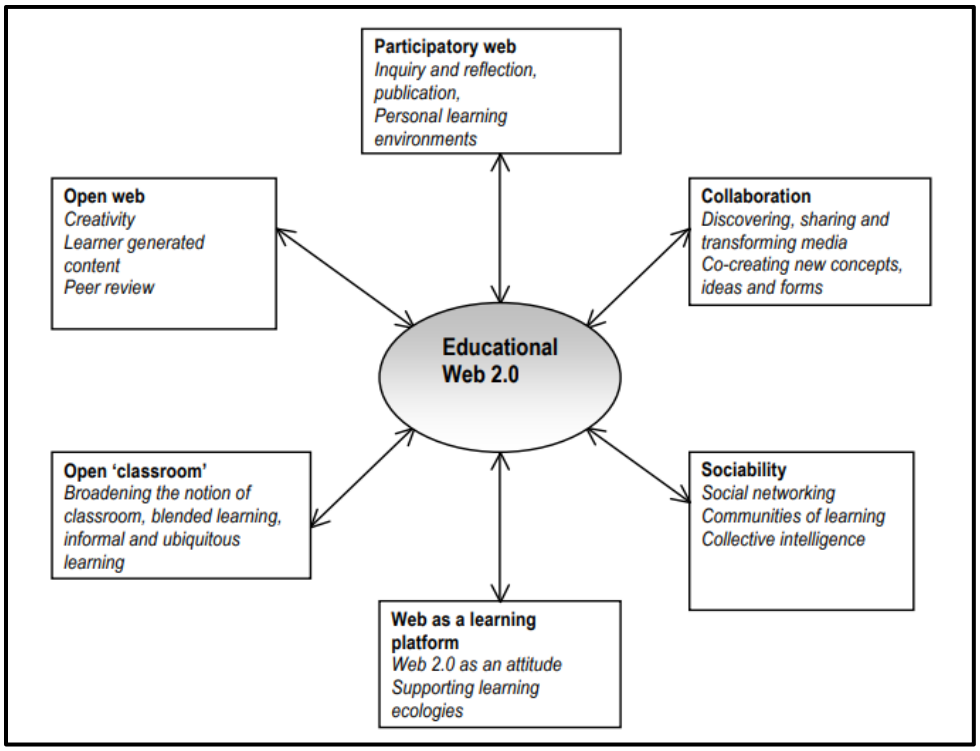


Figure 2.6 Conceptualising the educational Web 2.0 (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013)

Based on Figure 2.6, the following key-principles support the proposed pedagogical framework for Web 2.0 usage in education (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013):

1. Moving from teaching to learning: This entails moving towards active, reflective and collaborative learning.

2. Moving beyond constructivism: Supporting learning where students play a key role as content creators.

3. Moving beyond the classroom boundaries: Changing from a traditional teaching style towards blended learning.

4. Teachers need to develop new roles: The teachers (academics) in Web 2.0 environments act as learning designers as they provide support and act as mentors to their students' learning.

In Figure 2.6, the knowledge gaps that will be studied in this research are in relation to the *pedagogical characteristics* influencing the usage of Web 2.0 tools in higher education (storing information online and resource sharing, flexible teaching, community building, student engagement, flexible learning environments) and *pedagogical beliefs* (student support, creative expression, informal learning and team work).

The usage of Web 2.0 tools in higher education will enable students to take a more participatory role in their learning as Web 2.0 tools promotes a collaborative learning environment. Web 2.0 tools forms part of e-learning, where the design, development and delivery of learning content is implemented using technologies to enhance and support teaching and learning (Smith, 2013). Web 2.0 technologies inspire active and social learning by providing effective and efficient feedback to students as well as opportunities for social interactions and collaboration among students and academics (Hartshorne & Ajjan, 2009). Web 2.0 tools also enable students to become active participants in the learning process by creating and sharing content rather than passively receiving information from academics (Eison, 2010).

Web 2.0 technologies aim to support learning from different contexts such as formal education, workplace learning, and informal learning. This brings about a more personal learning environment that supports learning in diverse contexts (Binulal, 2015). This encourages students to take control and manage their own learning thereby increasing collaboration amongst students.

Okello-Obura and Ssekitto (2015) states that Web 2.0 applications, such as blogs and wikis have a participative element, which allows academics to add and modify content. Thus, Web 2.0 tools encourage participation and collaboration to take place. A brief overview of the typologies of Web 2.0 learning technologies are discussed below.

A study conducted by Breier and Mabizela (2008), Strydom, Mentz and Kuh (2010), revealed that there is a shortage of critical skills in the South African economy because traditional universities in South Africa are not producing enough quality graduates. Zulu (2011) revealed that fifty-five percent of first-year students would not graduate, whereas only 5% of the enrolled non-white students will finish their undergraduate degrees in the prescribed time. Based on this information, it is crucial that higher education institutions look at innovative and better ways to facilitate the teaching and learning process. Thus, there is a knowledge gap and there is a need to explore the usage of Web 2.0 tools in an effort to improve the throughput rate in higher education and to address critical skills shortage in the South African economy.

An integrated framework can also assist in providing knowledge on implementing and adopting Web 2.0 tools in education. Section 2.7.4.2 will provide a brief overview by using the technological pedagogical content knowledge framework.

2.7.4.2 Web 2.0 pedagogical content knowledge

Technological pedagogical content knowledge (TPACK) describes an integrated framework outlining the critical parameters relating to technology integration in education (Mishra & Koehler, 2006). TPACK allows academics to focus upon the technology, content and pedagogy (Koehler & Mishra, 2009; So & Kim, 2009; Doering, Veletsianos, Scharber, & Miller, 2009; Lee & Tsai, 2009, & Jimoyiannis, 2010a). In order to ensure a successful implementation of Web 2.0 tools in education, one needs to view academics' knowledge of Web 2.0 tools, Pedagogy, and Content (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013). This is explained in Figure 2.7, below.

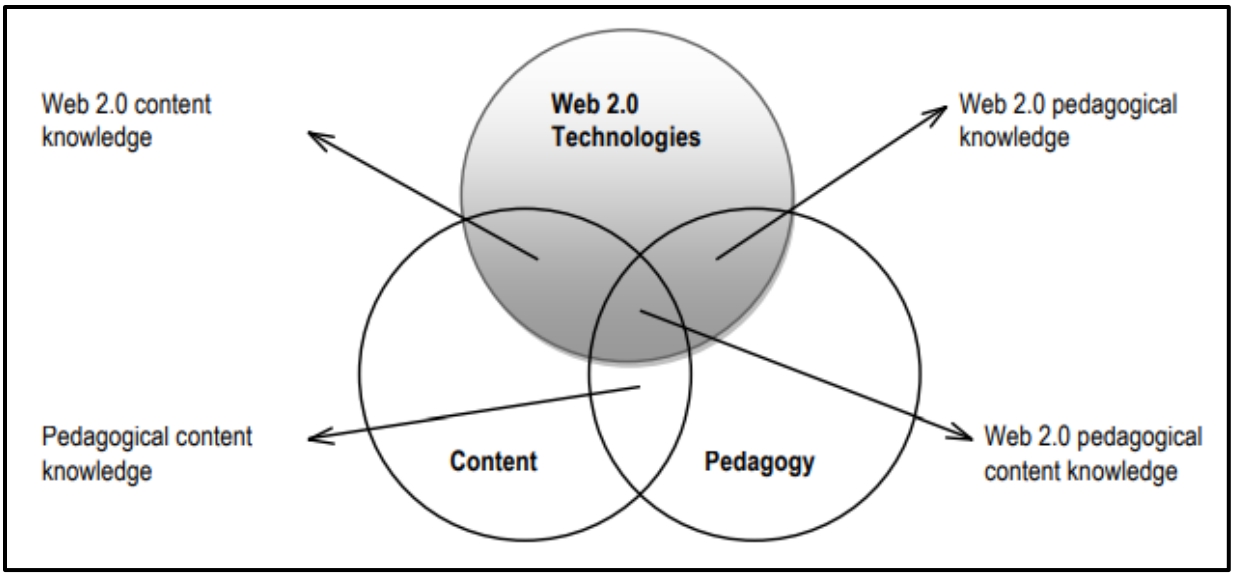


Figure 2.7 TPACK for Web 2.0 tools

Based on Figure 2.7, the TPACK 2.0 model integrates the three constitutional knowledge elements and defines three new dimensions-areas of knowledge: a) Pedagogical Content Knowledge, b) Web 2.0 Content Knowledge, and c) Web 2.0 Pedagogical Knowledge (Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013):

Pedagogical content knowledge: This denotes the knowledge of pedagogy relating to the instruction of specific content.

Web 2.0 content knowledge: This describes academics' knowledge of how learning content is transformed with the usage Web 2.0 tools.

Web 2.0 pedagogical knowledge: This refers to the knowledge of the pedagogical affordances of Web 2.0 tools and knowledge of how Web 2.0 tools can support specific pedagogical strategies in education.

Figure 2.7 helps to encourage academics to think about how to use Web 2.0 tools, in both the technological and the pedagogical perspectives, in their own instructional context. This research study will focus on the pedagogical knowledge gaps based on academics' pedagogical beliefs and pedagogical characteristics of Web 2.0 tools.

2.7.4.3 Pedagogical characteristics afforded by Web 2.0 tools

A study conducted by An, Aworuwa, Ballard and Williams (2009), identified pedagogical characteristics of using Web 2.0 technologies in teaching which include interaction, communication and collaboration, knowledge creation, ease of use and flexibility, and writing and technology skills.

According to Exter, Rowe, Boyd and Lloyd (2012), Web 2.0 tools used in higher education help to engage students in their learning, provide a social platform where students can interact with their peers, develop a deep understanding of content and collaboratively learn by working in groups.

The Internet has become a new platform for students by enhancing creativity, better communication, collaboration and sharing of material between fellow students as it provides real time and live connection. By using Web 2.0 tools, the teaching and learning process can be supplemented with multimedia, online assessments, discussion forums, interactive learning tools, etc. Web 2.0 tools linked with higher education brings about new and innovative approaches to teaching and learning with a focus on collaboration, engagement and experiencing rather than a constructivist approach (McLoughlin & Lee, 2008). McLoughlin and Lee (2008), further state that Web 2.0 also provides academics with a repository of services and applications that assist in setting learning goals and creating a learning environment that supports those goals.

According to Jimoyiannis, Tsiotakis, Roussinos and Siorenta, (2013) there are three key arguments for drawing Web 2.0 into education (p. 3-4):

a) "The forms of learning activities used cultivated within Web 2.0 are widely endorsed as important by current thinking of the nature of learning that 21st century education must provide and the theoretical perspectives of pedagogy as well".

This approach encourages a shift from traditional teaching style towards a more collaborative approach centered on students. This is based on contemporary pedagogy.

b) "Web 2.0 tools provides enhanced learning opportunities by strengthening students' critical thinking, writing, and reflection; and engaging students in a new world of information sharing and social learning."

Based on previous research by Siemens (2005), Hall and Hall (2010) and Ravenscroft (2009), Web 2.0 tools allow students to take control over the learning process as Web 2.0 tools promote learner autonomy and participate in social networks independently of physical, geographical and institutional boundaries.

c) "Students' readiness to adopt Web 2.0 as an effective learning environment."

Students are already using Web 2.0 tools in their personal lives and are familiar and comfortable using this tool. Thus, in an educational environment, students would be able to easily adopt and use Web 2.0 tools in education.

Web 2.0 technology and tools can enhance learning and be seen as a very versatile and valuable educational tool that supports the following pedagogical characteristics (Steinweg, Williams, & Stapleton, 2010):

- ***Interaction, communication and collaboration***

Based on prior research, most students believed that using Web 2.0 technology tools in teaching helped to build a sense of community, increase interaction and communication amongst the instructor, students and promoted collaboration and resource sharing. If these tools are used correctly, they can help students to better connect with their classmates and the lecturer. This tool can help bridge the gap between the lecturer and the students, thus improving the collaboration and communication levels.

- ***Knowledge creation***

Web 2.0 technology tools enable students to "become creators of knowledge" as they are no longer just listening to the lecturer but are instead creating the content and sharing this knowledge with everyone thereby supporting an active and student-centred learning. An important point to note is that the role of the lecturer is now one where the lecturer becomes a facilitator of learning rather than a distributor of knowledge (Steinweg, Williams, & Stapleton, 2010).

- ***Ease of use and flexibility***

Web 2.0 technology tools are easy-to-use and flexible in terms of providing a more flexible learning environment that is not inhibited to classroom walls.

- ***Writing and technology skills***

The use of Web 2.0 technology tools helps students to become more proficient in writing and in the application of technology. Web 2.0 tools not only help to engage students but can also be used as an instrument to enhance education by providing unique techniques that bring about collaboration and communication between the academic and the student thereby eliminating any distractions that may exist in the classroom. This tool brings another meaning to the term, 'beyond the classroom'.

Thus, learning becomes more meaningful when students engage in active, constructive, intentional, authentic, and cooperative learning and this is the primary goal of education (Wong, 2015). This can be achieved with the use of Web 2.0 tools such as blogs and discussion forums. Web 2.0 tools also promote reflective learning through group collaboration.

2.7.4.4 Pedagogical beliefs

Pedagogical beliefs are the understandings, premises or propositions about teaching that are thought to be true (Okello-Obura & Ssekitto, 2015). According to Exter, Rowe, Boyd and Lloyd (2012), Web 2.0 tools used in higher education help to engage students in their learning, provide a social platform where students can interact with their peers, develop a deep understanding of content and collaboratively learn by working in groups. These are examples of pedagogical beliefs.

2.7.5 Perceived usefulness

This is the degree to which an individual believes that using a particular system will enhance job performance (Davis, 1989). In the study it is referred to the usage of Web 2.0 tools that will enhance the teaching and learning process. This construct is related to the TAM model, which assumes that an application that is perceived to be beneficial is more likely to encourage a perception of usefulness and in turn intention to use it. Therefore, if academics perceive Web 2.0 tools to be beneficial then they will most likely use the tools in education.

Web 2.0 offers many benefits such as facilitating technology enhanced learning through self-guided learning (Chatti et al., 2008), provides collaborative tools such as wikis, blogs and podcasts which improve information literacy (Harinarayana and Raju, 2010; Linh, 2008) and Web 2.0 tools which also assist users in creating content (Mahmood and Selvadurai, 2006).

2.7.6 Perceived quality characteristics

This is related to the *quality characteristics of Web 2.0 tools* and *perceived ease of use*.

2.7.6.1 Web 2.0 quality characteristics

Web 2.0 quality characteristics are linked with the system quality construct of the Information Systems (IS) success model of Delone and McLean (1992), and its extended model (Delone and Mclean, 2003, 2004). The system quality measures the desired characteristics of the technological tool. This is measured by means of responsiveness, usability, availability, reliability, and adaptability (Delone and Mclean, 2004). Thus, the more reliable the tool is, easily adapted as a learning tool to create interaction, enable knowledge sharing; efficient and effective and allowing for rich and responsive interactions, the more the academic will want to engage and embrace Web 2.0 tools in education.

2.7.6.2 Perceived ease of use

Ease of use is defined as the extent to which consumers believe that the use of these applications is free of effort (Vijayasarathy, 2004). An example of ease of use of Web 2.0 tools is affordance. According to Akoh and Atleo (2011), affordance is a precondition for an activity (usage of Web 2.0 tools) to take place. The usage of Web 2.0 tools requires affordances such as the presence of the tool for teaching and learning and the agents (academics) who must apply these tools in order to produce learning (Kuswara & Richards, 2011). Ajjan and Hartshorne (2009) on the other hand state that "access" to resources (the tool needs to be available), "expression" (intention of the proposed action), "creation" of content (blogs, wikis and podcast), "interaction" (occuring between the tool and the academic) and "aggregation" of resources (such as RSS feeds) are preconditions for an activity to take place. In this case, the activity relates to the usage of Web 2.0 tools to be effectively implemented in higher education for teaching and learning with as little effort in terms ease of use and ease of understanding. The next section will provide an overview of the conceptual model that was used for this study.

2.8 Conceptual model for study

The purpose of this section is to describe and illustrate the conceptual model derived from the extant conceptual frameworks and literature. Many of the extant conceptual frameworks such as

UTAUT, TAM, DOI, TRA and ISM relates to a framework for acceptance and adoption of e-learning and not on the use of Web 2.0 tools in education. Thus, the researcher developed an initial conceptual model to investigate the factors that influences the usage of Web 2.0 tools in education. This model provides the conceptual lens for the study.

A conceptual model was developed to investigate the natural progression of the phenomenon (usage of Web 2.0 tools in education). This model examines the research problem from the multi-dimensional perspective by identifying relevant constructs/factors that influence the usage of Web 2.0 tools and the significant relationships between the different constructs/factors and usage of Web 2.0 tools. According to Akintoye (2015) a conceptual model is mostly used when existing theories are not adequate in creating a firm structure for the study. The conceptual model is derived from selected constructs from extant technology models and potential factors from the literature review are shown below in Figure 2.8.

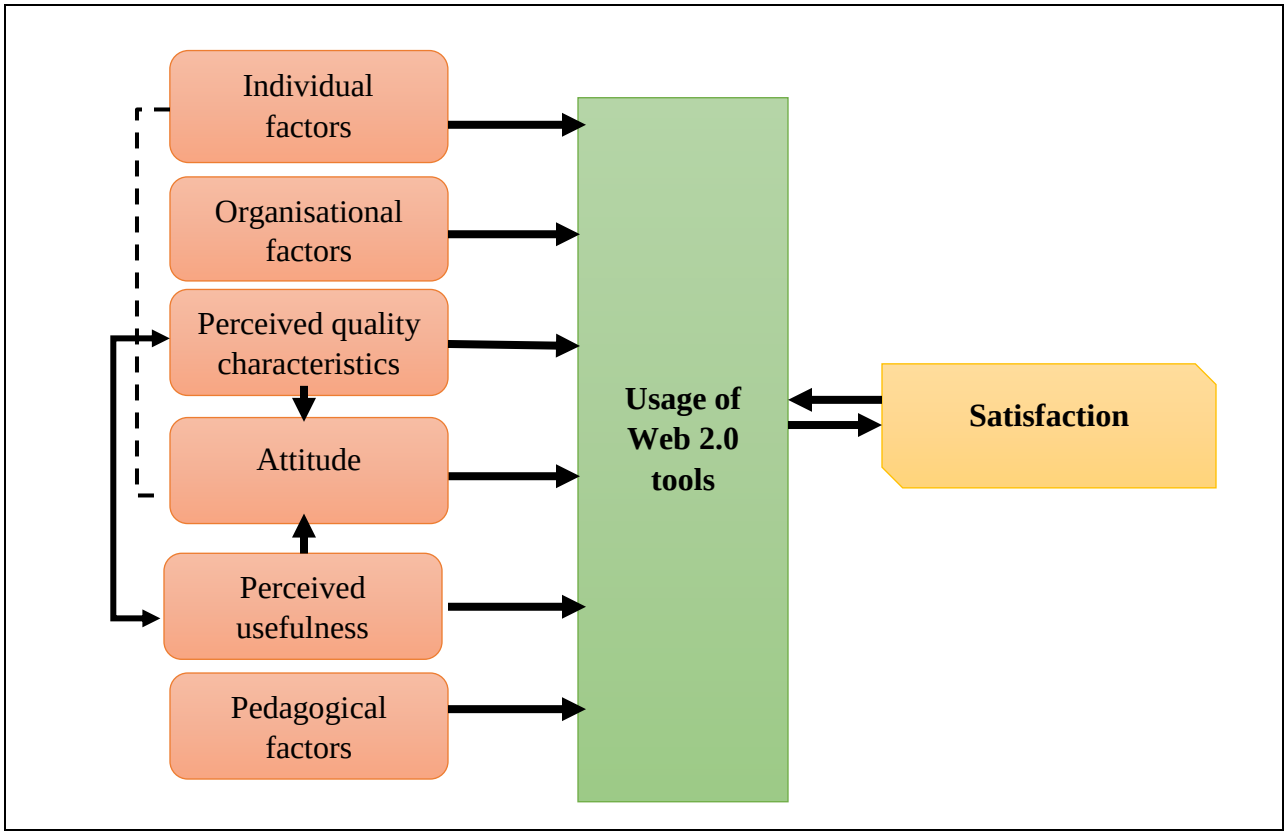


Figure 2.8 initial conceptual model

A dotted line between Attitude and Individual factor is used to depict that Attitude is related to an individual's feeling or position towards something. Figure 2.8 is further explained by outlining the constructs for each of the Web 2.0 usage factors. This is displayed in Table 2.2 below:

Factors	Constructs	Definitions
Individual	*Computer experience*	This construct will help to establish an academic's level of usage and familiarity of computer applications in education.
	Personal barriers	This relates to the personal elements that restricts academics from using Web 2.0 tools.
	Teaching style	Refers to traditional versus traditional and online combined results in a blended learning approach. The latter resulting in a blended learning classroom.

Pedagogical	*Pedagogical characteristics of Web 2.0 tools*	Pedagogical characteristics of using Web 2.0 technologies in teaching include characteristics such as increased interaction, communication and collaboration; flexible leaning environment and flexibility, and writing and technology skills.
	Pedagogical beliefs	Pedagogical beliefs is the understanding, premises or propositions about teaching that are thought to be true (Okello-Obura & Ssekitto, 2015).
Organisational	*Support*	This is related to an academic institutions ability to provide support to academics and students when using Web 2.0 tools.

	Training	This is described as providing adequate training/workshops to staff in the usage of ICT applications such as Web 2.0 tools.
	Barriers	This relates to the technological barriers such as poor Internet connection and lack of security and privacy in social networked learning (An, Aworuwa, Ballard, & Williams, 2010).
Attitude		Attitude in the research is defined as the degree to which the academic favours the behavior of usage of Web 2.0 tools in the teaching and learning process (Ajzen & Fishbein, 2000).

Perceived Usefulness		Perceived usefulness in this study is the degree to which an academic believes that using Web 2.0 tools will enhance their productivity (Davis, Bagozzi, & Warshaw, 1989).
Perceived quality characteristics	*Perceived ease of use*	The degree to which a person believes that using a particular system would be free from effort (Davis, 1989).
	Web 2.0 quality characteristics	The system quality measures the desired characteristics of the technological tool by means of responsiveness, usability, availability, reliability, and adaptability (Delone and Mclean, 2004).

User satisfaction	*Degree of positive experience*	The satisfaction level of using Web 2.0 tools in education. Refers to the positive feeling that the user receives during and after the interaction with Web 2.0 tools.

Table 2.2 Web 2.0 table of factors and constructs

The constructs from the Initial Conceptual Model (Figure 2.8) are derived as follows:

- **Attitude**

The Theory of Reasoned Action (Fishbein and Ajzen, 1975) states that the decision to adopt and use new technology is based on the individual's intention, which is influenced by the attitude towards the technology. In a study conducted by Kale and Goh (2012, p.15), teachers' attitudes were examined towards Internet in teaching. The results revealed that "almost two-thirds of teachers (64%) reported they were somewhat satisfied or very satisfied with using the Internet for education". Based on this finding, attitude as a construct would be included in the model which can have an influence on the usage of Web 2.0 tools.

- **Perceived usefulness**

In the TAM model, the usage of e-learning innovation is explained by the perceived usefulness and the ease of use of the system. Thus, *perceived usefulness* and the *ease of use* can potentially have an influence on usage of Web 2.0 tools. In a study conducted by Usoro and Echeng (2015), the findings revealed that perceived usefulness positively influence use of Web 2.0 tools for learning. Perceived usefulness and ease of use (Perceived quality characteristics) are displayed in the Figure 2.8.

- **Perceived ease of use**

This construct is derived from TAM and is similar to the construct of effort expectancy in UTAUT. The UTAUT aims to explain user intentions to use an information system and subsequent usage

behaviour. UTAUT makes mention of Effort expectancy that is an important factor in determining the degree of ease associated with the use of the technology. This falls under *Perceived quality characteristics* in the conceptual model displayed in Figure 2.8. However, UTAUT does not address pedagogical factors (pedagogical beliefs), which is an important construct to be considered for the usage of Web 2.0 tool in higher education. According to a study conducted by Cheung and Vogel (2013), perceived ease of use was a significant determinant towards usage of Web 2.0 tools.

- **Perceived quality characteristics**

The conceptual model displayed in Figure 2.8 is linked with system quality of the Information Systems (IS) Success Model of Delone and McLean (1992), and its extended model (Delone & Mclean, 2003, 2004). In Figure 2.8, System quality of IS success model is referred to as *Perceived quality characteristics.* System quality measures the desired characteristics of the e-learning system in the IS success model. This is measured by means of responsiveness, usability, availability, reliability, and adaptability (Delone & Mclean, 2004) which are the Perceived quality characteristic constructs in Figure 2.8. Perceived quality characteristics is a significant predictor of perceived usefulness of e-learning system (Chen, 2010, & Cheng, 2012). Thus, the more reliable the use of Web 2.0 tools are, the easier it is to use and understand, the more likely the academic will want to engage and embrace this technology.

- **Web 2.0 tools usage**

In the Innovation Diffusion Theory (1962), in order for usage to be a success, the idea or behaviour will have to be regarded as innovative. In the case of this research, a new idea is the usage of Web 2.0 tools and the innovation is a new way of teaching in higher education. Thus, the researcher adapted Rogers Innovation Diffusion Theory (1962) to investigate the likelihood that a new idea (Web 2.0 tools) will be used in higher education in South Africa. The usage may not be accepted by all academics, which is exactly what the theory states. As mentioned in the theory, the diffusion is a process whereby some people are more suitable to use the innovation than others (LaMorte, 2016).

The initial conceptual model (Figure 2.8) on which the study is based integrates key factors (pedagogical, individual and organisational factors) as discussed in Section 2.7, as well as

constructs from extant technology adoption and usage models. It is envisaged that the findings of this study will provide greater insights when analysing users' acceptance and usage of Web 2.0 tools. The results of the study can provide recommendations to prepare the right environment before introducing Web 2.0 technology and tools for students and academic usage. Therefore, the selected factors and constructs from extant models will serve as theoretical underpinnings of this research.

2.9 Summary

The overall objective of this chapter was to present a review of relevant literature to understand the phenomenon of Web 2.0 usage for teaching and learning in Higher Education and potential factors that contribute to the use of Web 2.0 tools in teaching practice. The chapter also briefly described the derivation of the conceptual model that underpins the study design of a new conceptual framework for the usage of Web 2.0 tools in higher education in South Africa. Finally, this chapter confirmed the research questions that this study has been designed to answer. The next chapter will discuss the research design and methodology.

Figure 2.1

CHAPTER 3

Research design and methodology

3.1 Introduction

This chapter discusses the research methodology that was used to gather and analyse data regarding the usage of Web 2.0 tools by academics to support teaching and learning in higher education in South Africa. The chapter is structured with the purpose of discussing the research philosophy in relation to other philosophies, explanation of the research strategy, as well as the research design and methodologies adopted. The research instruments are also discussed with the aim of answering the research questions identified in Chapter 1.

The structure in this chapter is as follows: Section 3.2 discusses the research philosophy, Section 3.3 discusses the research approach/paradigm and Section 3.4 discusses the data quality control. Section 3.5 discuss the sampling strategies that were adopted. The research methodology is discussed in Section 3.6, which is followed by the case study research design in Section 3.7. The data collection methods are discussed in Section 3.8. Section 3.9 goes on to discuss the data analysis and triangulation in Section 3.10. Section 3.11 briefly describes the study site. In section 3.12 the target population of the study is discussed and the sample size is outlined in section 3.13. This is followed by a summary of the chapter in section 3.14.

This chapter will describe the research approach followed to provide answers to the research questions. It will address issues such as the data collected, the sources of data, data processing, the case study protocol and limitations of this research approach. The next section will briefly discuss the hypothesis of the study.

3.2 The research hypothesis

The hypothesis for the study is based on the conceptual model developed to conduct the study. Based on the extensive literature on prior theory and research presented in Chapter 2, this study

uses a conceptual model to examine the factors that influences the usage of Web 2.0 tools in higher education. Based on the conceptual model, the following hypotheses were formulated:

3.2.1 Perceived quality characteristics (PQC)

Perceived quality characteristics in this study is linked to the *Ease of use* (easy to use and understand) and *general Web 2.0 quality factors*. Perceived *ease of use* was a construct in the Technology Acceptance Model. *General quality characteristics* is linked to the Information Systems (IS) success model of Delone and McLean (1992), and its extended model (Delone & Mclean, 2003, 2004) to better explain the usage of Web 2.0 tools in education. Thus, the researcher proposes that:

H1: PQC will positively influence the usage of Web 2.0 tools in education.

3.2.2 Attitude

Attitude is related to examining the behaviour to use Web 2.0 tools in education. Attitude in the research is defined as the academic's desirability to use Web 2.0 in the teaching and learning process. The Theory of Reasoned Action (Fishbein and Ajzen, 1975) states that the decision to use new technology is based on the individual's intention, which is influenced by the attitude towards the technology**.** Therefore, it is hypothesized:

H2: Attitude will positively influence the usage of Web 2.0 tools in education.

3.2.3 Individual factors (IF)

Individual factors relates to the personal characteristics of academics. The constructs related to this factor in the study are *computer experience, barriers, effort and teaching style*. Thus, the following hypothesis is proposed:

H3: IF will positively influence the usage of Web 2.0 tools in education.

3.2.4 Organisational factors (OF)

Organisational factors are related to the higher education institution and in the study focuses on *institutional support* and *institutional barriers*. Facilitating conditions is a dimension of the Unified Theory of Use and Acceptance of Technology (Venkatesh et.al, 2003) which is similar to organisational factors in this study. Thus the study will determine if:

H4: OF will positively influence the usage of Web 2.0 tools in education.

3.2.5 Perceived usefulness (PU)

According to Davis, Bagozzi and Warshaw (1989), perceived usefulness is "The degree to which a person believes that using a particular system would enhance his or her job performance". Thus, perceived usefulness in this study is the degree to which an academic believes that using Web 2.0 tools will enhance teaching and learning. Perceived usefulness is a construct in the Technology Acceptance Model. TAM is a good theoretical tool to understand users' acceptance of e-learning and can assist the researcher to explain and predict the behaviour of usage of Web 2.0 tools and why a user may accept or reject this tool based on perceived usefulness. Thus, it is hypothesized:

H5: PU will positively influence the usage of Web 2.0 tools in education.

3.2.6 Pedagogical factors (PF)

This factor is related to academics' *pedagogical beliefs* and *characteristics* of Web 2.0 tools. Pedagogical beliefs is the understandings, premises or propositions about teaching that are thought to be true (Okello-Obura & Ssekitto, 2015). According to Exter, Rowe, Boyd and Lloyd (2012), Web 2.0 tools used in the higher education helps to engage students in their learning, provides a social platform where students can interact with their peers, develop a deep understanding of content and collaboratively learn by working in groups. These are examples of pedagogical beliefs. Pedagogical characteristics relates to the characteristics of the tool for learning such as interaction, communication and collaboration, knowledge creation, ease of use and flexibility, and writing and technology skills (An, Aworuwa, Ballard and Williams, 2009). The following hypothesis is proposed:

H6: PF will positively influence the usage of Web 2.0 tools in education.

3.2.7 Usage and user satisfaction

User satisfaction refers to the feeling that the user receives during and after the interaction. According to Delone and Mclean (1992), user satisfaction is one of the most important variables used in measuring the success of the system. Usage is suggested to influence a user's satisfaction, which, in turn, is suggested to influence usage intentions (Delone and Mclean, 1992). Therefore,

if satisfaction enhances the ability of the academic to improve their work performance then this influences the usage of Web 2.0 tools in education. Users are more inclined to use a technology if they are satisfied. Thus, the following hypothesis is proposed:
H7: user satisfaction will positively influence usage of Web 2.0 tools.

The next section provides a brief overview of the different research philosophies.

3.3 Research philosophy

A research philosophy relates to the way in which data about a phenomenon is gathered, investigated and used (Saunders, Lewis, & Thornhill, 2009). There are different research philosophies, which are discussed below:

- **Positivism**

In positivism studies, the researcher takes on an objective role and is indirectly involved in data collection and interpretation which is usually collected through observation (Wilson, 2010). In positivism, the research questions are created and the hypotheses are tested (Saunders et al., 2009).

Positivism research philosophy can be described by five main principles as outlined by Wilson (2010):

- There are no differences in the logic of inquiry across sciences.
- The research should aim to explain and predict.
- Research should be empirically observable via human senses and an inductive reasoning should be adopted when creating the hypothesis.
- Common sense should not be allowed to bias the research findings.
- Science must be value-free and it should be judged only by logic.

- **Interpretivism**

Interpretivism is an epistemology that advocates that it is necessary for the researcher to understand differences between humans in our role as social actors (Saunders et al., 2009), i.e. the difference between conducting research among people rather than objects.

In this research philosophy, the researcher takes on a relativist ontology approach in which a single phenomenon may result in multiple interpretations (Pham, 2018). This approach assists the researcher in gaining a deeper understanding of the phenomenon rather than generalising the target population (Creswell, 2007).

- **Realism**

Realism is a branch of epistemology, which is based on scientific enquiry. The ability to disclose the truth of reality (Saunders et al., 2009). Realism will help to come up with a reliable outcome. This research philosophy is based on a scientific approach to gather knowledge and is made up of two groups (Saunders et al., 2012):

- Direct realism is based on the findings gathered through personal human senses.
- Critical realism takes on the approach that images of the real world can be deceptive and they usually do not display the real world.

- **Pragmatism**

This is when both positivist and interpretivist philosophies are used. In pragmatism research philosophy, more than one research approach and research strategy within the same study can be adopted (Collis & Hussey, 2014). This approach focuses on the issues of interest and value by adopting qualitative and quantitative research approaches. According to Collis & Hussey (2014, p54), in pragmatism research philosophy "the research question is the most important determinant of the research philosophy."

The researcher used a mixed methods approach (pragmatic approach), combining quantitative and qualitative analysis. The mixed methods approach was used to get a better understanding of the research problem while offsetting the weaknesses inherent to using each approach by itself (Creswell, 2009). Quantitative approach was first conducted in this study and thereafter qualitative analysis in order to expand on the results obtained from the first approach. This assisted the researcher to accurately identify aspects of a phenomenon from different viewpoints, methods and techniques.

Quantitative and qualitative research was used in order to reveal the target audience's range of behaviour and the perceptions that drive it with reference to specific issues. The qualitative approach makes use of small groups of people where the results of qualitative research are descriptive rather than predictive.

Another reason that the mixed methods approach was beneficial was because the researcher was able to look at a research question from different angles (from a quantitative and qualitative perspective), thereby getting a better understanding of the usage of Web 2.0 tools. Thus, the mixed methods approach was ideal as the researcher could generalise findings from the quantitative research, thus providing a more holistic view of the study under investigation rather than if the quantitative and qualitative study was done in isolation.

According to Myers and Powers (2017), mixed methods research can offer greater insights on a phenomenon that each of these methods individually cannot offer. Venkatesh, Brown and Bala (2013), summarised seven purposes of the mixed methods approach. These purposes are complementarity, completeness, developmental, expansion, corroboration/confirmation, compensation, and diversity. The researcher used the mixed methods research purpose of completeness and complementarity. Completeness in order to make sure a complete picture of the phenomenon (factors influencing the usage of Web 2.0 tools) are obtained from the quantitative study (Bergman, 2008). The researcher conducted qualitative study (interview) to get an in-depth insight to compliment the findings from the quantitative study (questionnaire). Complementarity was used to gain complementary views (Soffer & Hader, 2007) about Web 2.0 tools in higher education i.e. qualitative study was conducted to gain a better understanding on the findings from the quantitative study. Based on the discussion of different research philosophies, this study chose to use the pragmatic approach.

3.4 Research approaches/paradigms

This section will discuss the different research approaches as well as which approaches were adopted in the research study.

3.4.1 Deductive Reasoning

The aim of deductive reasoning is to find the answer to the main research question. Deductive reasoning makes use of theories to help answer the research question by gathering data and then approving or disapproving the question (Saunders et al., 2009). Initially, deductive reasoning was used in this study. The approach used a conceptual model combing theories and concepts from the literature to study the factors influencing the usage of Web 2.0 tools in higher education.

3.4.2 Inductive reasoning

Inductive reasoning begins with a detailed observation of the world and then moves on to more abstract generalisations and ideas (Dudovskiy, 2018). Therefore, the researcher starts with a topic in mind, then develops empirical generalisations and ends off by identifying preliminary relationships. Inductive reasoning is adopted in this study where the qualitative data was collected in order to look for patterns/themes within the data based on feelings, context, experiences, problems related to usage of Web 2.0 tools.

The next section will provide details on data quality control.

3.5 Data Quality Control

The researcher ensured that the data-gathering instrument used measured what it is supposed to measure (reliability) in a consistent manner (validity) for the quantitative study and made use of trustworthiness and credibility for the qualitative study.

There are four tests relevant to case studies that are used to determine the quality of empirical research. The following section provides further details of each of these terms that can be used for the validity and reliability in case study research design:

a) Construct validity

Construct validity relates to establishing correct operational measures for the concepts being studied (Yin, 2003). Construct validity is one way to test the validity of a test, in this case, the validity of the phenomenon under investigation (Hamed, 2016). It checks if the research is actually measuring the construct, it claims it is measuring. Construct validity would measure if the research

is actually measuring the inferences made based on measurements, which are often test scores (Hamed, 2016). *Credibility* helps to establish if the study measures what it is supposed to test. In this study, the confirmation interviews were conducted to determine if the research is actually measuring the construct, it claims it is measuring.

b) Internal validity

Internal validity for explanatory or causal studies establishes a causal relationship where certain conditions leads to other conditions. This implies that results obtained are due to the independent variable and not some other reason to this degree. In this study, interviews were conducted to confirm that the results obtained from the quantitate research (questionnaires) were based on the usage of Web 2.0 tools and not any other reason.

c) External validity

External validity leads to a study's findings that can be generalised (Yin, 2003). The extent to which the results of a study can be generalised to and across other situations, people, stimuli, and times. The results of this study can be used among other people such as factors influencing students' usage of Web 2.0 tools or in other situations such as government higher education institutions.

d) Reliability

Reliability demonstrates that an aspect of a study such as the data collection procedures can be repeated with the same results (Yin, 2003). In the study, the same data collection procedure was repeated at the two higher education institutions using Cronbach Alpha.

According to Leung (2015), it is difficult to ensure that qualitative research is accurate or correct; therefore, the researcher focused on two aspects that needed to be taken into consideration when conducting qualitative research:

- *Dependability* in preference to reliability and confirmability is used to test the objectivity of the research. If the work were repeated in the same context, using the same methods and with the same participants, similar results would be obtained

- *Confirmability* is important in demonstrating that the findings obtained were a result of the experiences and ideas of the participants, rather than the characteristics and preferences of the researcher (Pandey & Patnaik, 2014). The use of an audit trail can be implemented to ensure that confirmability was maintained by having the researcher detailing the process of data collection, data analysis, and interpretation of the data. This helped in reporting the researcher's decisions and views. The researcher adopted reflexivity, an attitude when collecting and analysing the data so as not to lead the respondents to a certain answer that the researcher is looking for. The next section will discuss the sampling strategies.

3.6 Sampling strategies

According to Trochim (2007), sampling in this research is the process of selecting people (academics) from a population of interest so that by studying the sample, the researcher can fairly generalise the results back to the population from which they were chosen. There are two types of sampling strategies: non-probability and probability sampling.

3.6.1 Probability sampling

Probability sampling is a technique that gives all the individuals in the population equal chances of being selected (Alvi, 2016). The following are the different types of probability sampling:

- **Simple Random Sampling**

This is the easiest probability sampling technique which other methods are built upon. In simple random sampling, a researcher chooses subjects that are representative of the population and then randomly selects the desired number of subjects (Alvi, 2016). In simple random sampling each member of population is equally likely to be chosen as part of the sample.

This sampling is associated with the minimum amount of bias compared to other sampling methods. Also, because a large sample is available, creating a sample group is easy. The results of this sampling can be generalised due to representativeness of this sampling technique (Saunders, Lewis & Thornhill, 2009).

- **Stratified random sampling**

This sampling is also known as proportional random sampling, where the subjects are grouped into different classifications such as age, socioeconomic status or gender (Alvi, 2016).

There are three reasons why a researcher chooses a stratified random sample:
(1) to increase a sample's statistical efficiency,
(2) to provide adequate data for analysing the various subpopulations, and
(3) to enable different research methods and procedures to be used in different strata.

- **Systematic random sampling**

This random sampling is similar to an arithmetic progression wherein the difference between any two consecutive numbers is the same. This is simple random sampling but with a twist. There is a short cut for random selection. The researcher uses a list of random numbers to calculate a sampling interval. This interval becomes the researcher's own quasi-random selection method (Alvi, 2016).

- **Cluster Sampling**

The purpose of cluster sampling is to divide the population into separate groups called clusters (Onwuegbuzie & Leech, 2007). Cluster sampling is done when simple random sampling is almost impossible because of the size of the population.

Based on the above sampling techniques, the researcher used the probability sampling technique to select respondents to complete the questionnaire by means of stratified random sampling. The researcher divided the population into smaller groups (strata) based on the respondent's shared attributes or characteristics drawn within each subgroup. In the study, the shared characteristic was based on the higher education institution that the respondent belonged to, for example a stratum of academics from Pearson Institute of Higher Education and a second stratum of academics from Monash South Africa. A stratified random sampling was used when selecting academics in order to improve population representativeness in the study.

3.6.2 Non-probability sampling

Non-probability sampling can be broken up into:

- **Convenience Sampling**

This is the most common type of non-probability sampling technique. A sample is chosen because they are convenient and easily accessible to the researcher. This type of sampling is the easiest, cheapest and least time-consuming (Saunders et al., 2012).

- **Consecutive Sampling**

This sampling is very similar to convenience sampling except that it tries to include all accessible subjects as part of the sample (Saunders et al., 2012). This sampling technique is the most reliable as it includes all subjects. Thus, the sample best represents the entire population.

- **Quota Sampling**

Quota sampling is a technique wherein the researcher ensures equal representation of subjects (Saunders et al., 2012). Quota sampling is usually based on age, gender, education, race, etc.

- **Judgmental Sampling**

This sampling method is usually known as purposive sampling. In this technique, the subjects are chosen because of a specific purpose in mind. Some subjects are more suitable than others are, thus they are purposively chosen (Alvi, 2016).

- **Snowball Sampling**

This sampling is chosen when the population size is small. The researcher asks the chosen subjects to identify another potential subject who also matches the conditions of the research. This results in a highly unreliable set of results as snowball sampling is hardly representative of the population under study (Alvi, 2016).

The researcher made use of the non-probability sampling technique (purposive sampling) to select participants who will participate in the interviews. This type of sampling is used when one knows what they want, thus sampling with a purpose. This type of sampling is also known as judgmental sampling

where the sampling is based on the knowledge of a population (academics) and the purpose of the study. The subjects are selected because of some characteristic, in this study this refers to subjects (academics) from the two targeted private higher education institutions that use/have used Web 2.0 tools in their teaching.

3.6.3 Target population

The research was conducted among academics at two private higher education institutions. The target population was most appropriate for this study in order to get an insight on their current level of usage of Web 2.0 tools for academic purposes as well as what factors influence academics to use Web 2.0 tools in teaching and learning.

3.6.4 Sample size

The researcher conducted the research among 80 academics from Monash South Africa (MSA) and 93 academics from Pearson Institute of Higher Education (PIHE) who formed the sampling frame. The academics chosen were from different faculties and qualifications in order to ensure the data would not be biased and that credible and reliable data was collected. However, the response rate/sample that participated in the quantitative data collection were 57 academics from MSA and 70 academics from PIHE.

3.7 Research Strategies

A research strategy is a chosen approach to be used to gather information of the phenomena of the study that is being explored. Research strategies are an important aspect of conducting research. The chosen research strategy will help in answering the research questions that are being investigated. This section provides a brief overview of some of the most common research strategies.

3.7.1 Experiment

In this design, the researcher has control over the themes that will influence the study as the researcher can predict the results of the experiment. Experimental design allows a researcher to identify cause and effect relationships among the variables (Thompson, 2007).

3.7.2 Ethnography

Ethnography is the study of people's lives, focused on the social and cultural aspects of a community (Fetterman, 2010).

3.7.3 Grounded Theory

Grounded theory is an inductive methodology that adopts a set of rigorous research procedures that result in the emergence of conceptual categories (theories) from data (Holton, 2008).

3.7.4 Action research

Action research design is a collaborative design that follows a characteristic cycle whereby an understanding of a problem is developed and plans are made for some form of intervention (Creswell, 2009).

3.7.5 Phenomenology

Phenomenology is an inductive approach that focuses on experiences, events and occurrences from the perspective of the participants (Giorgi, 2012).

3.7.6 Case study

Case study methods allow a researcher to look beyond the quantitative statistical results. A case study helps explain both the process and outcome of a phenomenon of the cases under investigation (Harrison, Birks, Franklin & Mills, 2017). A case study research was adopted in this study in order to understand the social conditions of an academic's perspective of the usage of Web 2.0 tools in higher education.

3.8 Data collection

The collection of secondary and primary data was planned and conducted in phases where the findings of one phase was used as input to the following phase, as depicted in Figure 3.1 below.

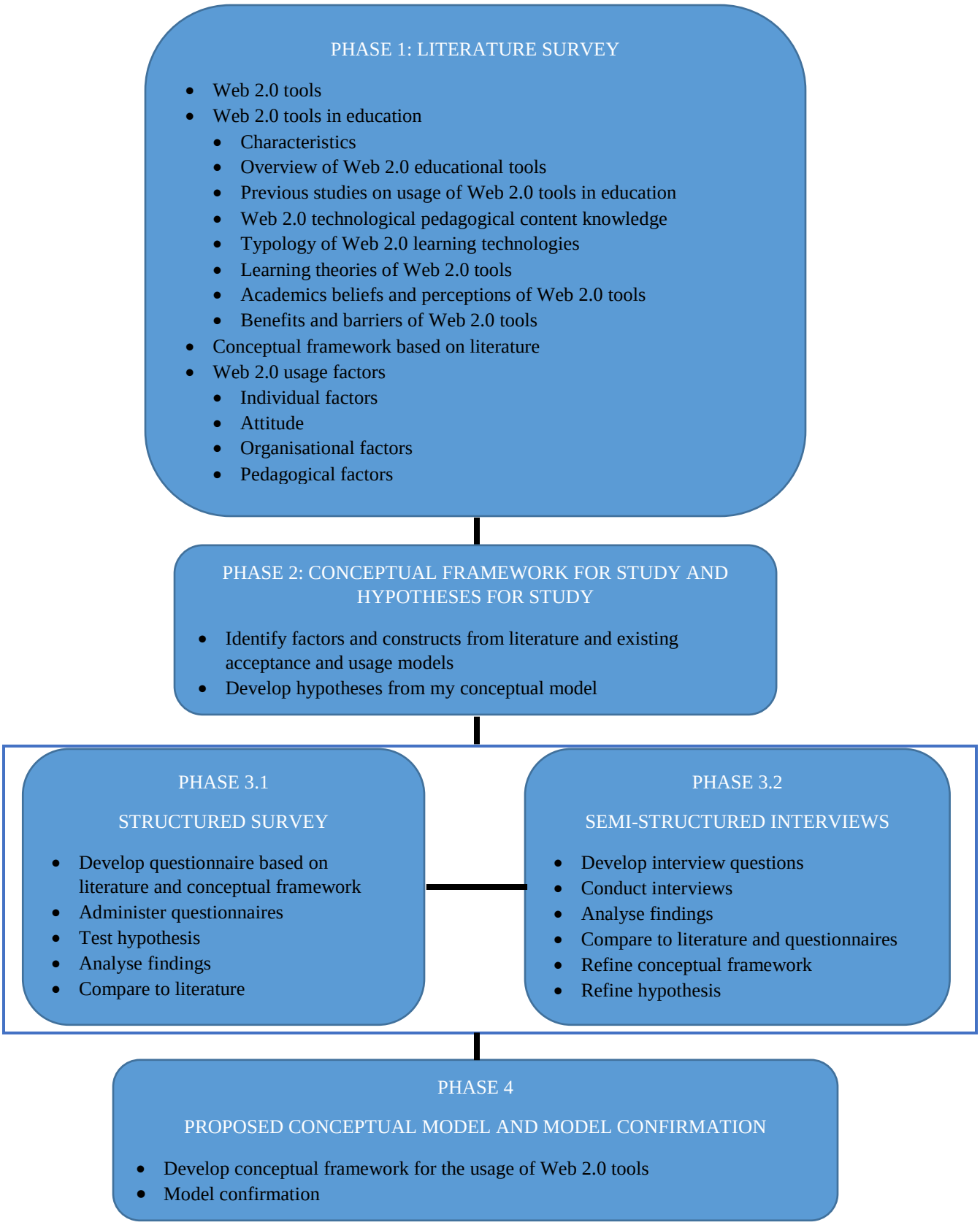


Figure 3.1 Phases of the research study

3.8.1 Phase 1: Literature Study

This phase involved the reading and understanding of secondary data from conducting a literature review of Web 2.0 toll usage in higher education by using a variety of published sources. Chapter 2 describes the body of literature regarding Web 2.0 tool usage as well as the factors that influence usage in higher education. The literature review confirmed the research questions and provided the foundation for the initial theoretical framework for this study.

3.8.2 Phase 2: Initial conceptual model and research propositions

The literature study undertaken in Phase 1 led to the creation of an initial conceptual model described in Chapter 2, section 2.8, and depicted in Figure 2.8. The initial conceptual model was used to identify themes and sub themes and to create relationships between the themes. This was linked to the research hypotheses in Chapter 3, section 3.2.

3.8.3 Phase 3.1: Primary data collection and analysis: questionnaires

The steps followed for this phase were as follows:

a. Develop questionnaire based on literature and conceptual framework

Questions were created based on literature as well as the research questions. The questionnaire can be found in Appendix 1.

b. Administer questionnaires

The questionnaires were administered amongst the academics at Pearson Institute of Higher Education (PIHE) and Monash South Africa (MSA).

c. Test hypothesis

The questionnaire findings were used to confirm/refute the initial conceptual model and research propositions and to answer the research questions outlined in Chapter 1, section 1.4.

d. Analyse findings

Descriptive statistics such as frequencies, charts, inferential and multivariate statistical procedures such as analysis of variance (ANOVA), t-tests, factor analysis, correlational analysis and reliability coefficient were used to analyse the quantitative data. The findings are discussed in Chapter 4.

e. Compare to literature

The interview findings were further analysed and compared to the literature to determine if they supported or refuted existing empirical studies of a similar nature.

3.10.4 Phase 3.2: Primary data collection and analysis: interviews

The steps followed for this phase were as follows:

a. Develop interview questions

The interview schedule is presented in Appendix 2. The design of the interview schedule and the objective for each question category were based on literature and the questionnaire findings.

b. Conduct interviews

The interviews were conducted among 15 academics from PIHE and MSA.

c. Analyse findings

The findings are discussed in Chapter 5.

d. Compare to literature and questionnaires

The interview findings were further analysed and compared to the literature to ascertain if they supported or refuted existing empirical studies of a similar nature. Thereafter, the findings were compared to the quantitative results.

e. Refine conceptual framework

Interview findings on themes and subthemes were used to refine the initial conceptual model.

f. Refine hypothesis

The research hypotheses were refined in accordance with the refined conceptual model.

3.8.5 Phase 4: Propose conceptual framework for usage of web 2.0 tools and confirm model

In phase 4, a Web 2.0 tool usage conceptual model was proposed representing the factors influencing Web 2.0 tool usage in higher education which is described in Chapter 6, section 6.3.

The steps followed for this phase were as follows:

a. Identify influential factors

The purpose of this step was to identify the the influential factors, namely, perceived usefulness (PU), pedagogic factors (PF), organisational factors (OF), individual factors (IF), perceived quality characteristics (PQC) and attitude.

b. Identify relationships between factors

The following relationship was examined:

- *PQC and usage of Web 2.0 tools in education.*
- *Attitude and the usage of Web 2.0 tools in education.*
- *IF and usage of Web 2.0 tools in education.*
- *OF and usage of Web 2.0 tools in education.*
- *PU and usage of Web 2.0 tools in education.*
- *PF and usage of Web 2.0 tools in education*

c. Confirm model for completeness/relevance

The steps followed for this phase were as follows:

- **Develop model confirmation instrument**

  The design of the interview schedule for the model confirmation (refer to Appendix 3) is described in Chapter 7.

- **Conduct interviews to confirm model for completeness, relevance and usefulness.**

  The WEBTUM was evaluated using interviews. The model was evaluated using representatives of the main stakeholder groups, namely academic managers, programme conveners, and academics from PIHE.

3.9 Data analysis

A mixed methods approach was adopted. The data were organised and interpreted as follows:

3.9.1 Qualitative data

There are various methods that can be used to analyse qualitative data. This is briefly discussed below:

- **Comparative analysis**

Comparative analysis is a theory driven approach, in that the choice of conditions being examined needs to be driven by a prior theory. In this method, data is compared and contrasted until the researcher is content that no new ideas have emerged (Theron, 2015). In comparative analysis, the causal contributions of different conditions are analysed to an outcome of interest (Legewie, 2013).

- **Discourse analysis**

Discourse analysis is the study of social life, through analysis of face-to-face talk, non-verbal interaction, images, symbols and documents (Shaw & Bailey, 2009). Discourse analysis, is a method that looks at the pattern of speech how particular words are used and how people take turns in conversation using a broad range of theories, topics and analytic approaches. (Mogashoa, 2014).

- **Narrative analysis**

Narrative analysis is comprised of transcribed experiences (Mogashoa, 2014). The narrative research approach is a method used to rely on the written or spoken words or visual representation of individuals as told through their own stories (Allen, 2017).

- **Content analysis**

Content analysis is used to determine the presence of certain words or concepts within texts and to make inferences about the words (Erlingsson & Brysiewicz, 2017). Content analysis is made up of two approaches: Inductive and deductive approach. Inductive approach is conducted when prior knowledge on the phenomenon is limited and deductive approach is based on codes or categories derived from prior research, theory or literature (Flick, 2002).

- **Thematic analysis**

According to Braun and Clarke (2006), thematic analysis allows the researcher to capture the complex meanings within a textual data set. Thematic analysis starts with the researcher familiarising themselves with the data in order to generate initial codes. This involves identifying themes/categories by defining and naming themes and then ending with a report (Braun & Clarke, 2006). Themes are the patterns in the data that are important and are used to address the research or provide information about the issue. Braun and Clarke (2006) provide a six-phase guide for conducting a successful thematic analysis:

Step 1: Become familiar with the data

Step 2: Generate initial codes

Step 3: Search for themes

Step 4: Review themes

Step 5: Define themes

Step 6: Write-up.

- **Cluster analysis**

According to Hill and Lewicki (2016), cluster analysis is an exploratory data analysis tool that aims at sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise. Cluster analysis is a technique that is used to display patterns in a project by grouping sources or nodes by similar words or attribute values. To interpret a cluster analysis, one looks at the way the nodes are spaced out. If a source or node is placed close together then the nodes are more similar than those that are far apart (QSRInternational, 2016.).

The qualitative data was analysed using thematic analysis i.e. a descriptive presentation of qualitative data. This analysis enabled the researcher to categorise the data according to themes. The approach helped the researcher to move the analysis from a broad reading of the data towards discovering patterns and developing themes (Onwuegbuzie, Dickinson, Leech & Zoran, 2009). Thus, a way of getting closer to the data and developing some deeper appreciation of the content. A cross sectional analysis of the data collected at the two organisations was analysed to determine

the similarities and differences between the results. Cluster analysis was also implemented in order to display patterns by grouping sources or nodes by similar words or attribute values.

3.9.2 Quantitative data

This data was analysed using descriptive or inferential statistics. Inferential statistics assisted the researcher to reach conclusion by trying to infer from the sample data, what the population might think (Trochim, 2006). Descriptive statistics such as frequencies, charts, inferential and multivariate statistical procedures such as analysis of variance (ANOVA), t-tests, factor analysis, correlational analysis and reliability coefficient were used to analyse the quantitative data. The different statistics used in the research are explained below:

Descriptive statistic was used to describe what was going on with the data by describing and summarising the data in a meaningful way (Roxy Peck & Devore, 2011).

- Descriptive statistics including means and standard deviations, where applicable. Frequencies were represented in tables or graphs. This was used to determine the perceived usefulness of Web 2.0 tools as well as individual factors (Section 4.5).

- *Chi-square goodness-of-fit-test*: A univariate test, used on a categorical variable to test whether any of the response options are selected significantly more/less often that the others. Under the null hypothesis, it is assumed that all responses are equally selected (Olivares & Cai, 2006). This test was used to analyse the usage of Web 2.0 tools, applications or service at the respective higher education institutions (Section 4.9).

- *Wilcoxon Signed Ranks test:* A non-parametric test used to test, in this study, whether the average value is significantly different from a value of three (the central score) (Nahm, 2016). This is applied to Likert scale questions. It is also used in the comparison of the distributions of two variables. This test was used to compare factors such as attitude and satisfaction against usage of Web 2.0 tools in education.

- *Chi-square test of independence:* Used on cross-tabulations to see whether a significant relationship exists between the two variables represented in the cross-tabulation. When

conditions are not met, Fisher's exact test is used (Singh, 2007). One example of this was examining if *Effort* has a significant relationship on the usage of Web 2.0 tools Section 4.11.7).

- *Regression analysis:* Linear Regression estimates the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variable (Schneider, Hommel, & Blettner, 2010). This analysis was used for system quality factors (Section 4.3). *Ease of use* and the *system in general* were used as independent variables in regression analyses with USAGE as the dependent variable. Individual factors was also used as independent variables in a regression analysis against USAGE (Section 4.5.4). A full set of results for this test is outlined in Section 4.11.

- *Kruskal Wallis Test:* non-parametric equivalent to ANOVA. A test for several independent samples that compares two or more groups of cases in one variable (McDonald, 2015). One example of when this test was used was when investigating organisational factors (Section 4.11.8) against USAGE.

- *Mann Whitney U Test:* non-parametric equivalent to the independent samples t-test (Milenovic, 2011). Perceived usefulness (Section 4.2) used this test to determine if there are significant agreements of using Web 2.0 tools in education.

- *Binomial test:* Tests whether a significant proportion of respondents select one of a possible two responses. This can be extended when data with more than two response options is split into two distinct groups (He, Meadows, & Black, 2018). This test was used to determine the preferred type of teaching style (Section 4.11.2.2). A binomial test was applied to test whether a significant proportion of respondents select one of the two teaching styles (traditional face-tot-face or blended learning).

- *Pearson's correlation:* Correlations measure how variables or rank orders are related. Pearson's correlation coefficient is a measure of linear association (Liu, Tang, Chen, Lu, Feng, & Tu, 2016). This test was used to identify the personal barriers to usage of Web 2.0 tools in education (Section 4.11.2.5).

- *One sample t-test:* Tests whether a mean score is significantly different from a scalar value (Jiang, Mai, & Yuan, 2017). This test was used for perceived usefulness (Section 4.2) to test whether the average agreement score differs significantly from a neutral score.

- *Independent samples t-test:* A test that compares two independent groups of cases (Singh, 2007) to determine significant relationships to usage of Web 2.0 tools such as the significant relationship between the traditional teaching style and the usage of Web 2.0 tools (social software applications).

3.10 Research methodology and design for this study

This section covers the research questions, research philosophy, research strategy/method and research design for this study.

3.10.1 Research questions

The research study was guided by three main research questions, namely:

1. What are the factors that influence the use of Web 2.0 technology tools among academics in higher education?

- What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the individual factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived usefulness influence in the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived quality characteristics in the use of Web 2.0 technology tools among academics in higher education?

2. How are Web 2.0 tools used by academics in higher education?

3. Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?

The findings are presented in Chapter 4 and Chapter 5. The combined qualitative and quantitative findings are discussed in Chapter 6 and a new conceptual model is proposed.

3.10.2 Research Design

A research design is used to link the data collected to the initial questions of a study. The data was collected using online questionnaires from a total population of 210 academics (from both institutions), which were distributed among Professors, Associate Professors, Senior Lecturers and Lecturers of different faculties and departments. A stratified random sampling approach was adopted. A total of 127 valid completed questionnaires were collected and analysed.

A Web-based questionnaire with the use of Google Forms was used to collect data for this study. The research instrument was broken up into different sections in order to get a better understanding of academics' usage of Web 2.0 tools in education. The sections comprised of *Section A: General usage of Web 2.0 tools, Section B: Usage of Web 2.0 tools for teaching and Section C: Academics perceptions on the usefulness and shortfalls of using Web 2.0 for educational purposes based on pedagogical* factors*, individual* factors*, Perceived quality characteristics, organisational* factors *and usage* factors.

The next section will discuss the research methods.

3.10.3 Research methods

There are two research approaches. This is discussed in more detail below.

3.10.3.1 Quantitative method

Quantitative research involves collecting and converting data into numerical form in order to draw conclusions from the data (Babbie, 2010). This analysis enables the researcher to determine to what extent there is a relationship between two or more variables (usage of Web 2.0 tools and factors). Quantitative research methods are used to study the natural phenomena.

3.10.3.2 Qualitative method

Qualitative research is usually associated with gathering a deeper meaning and interpretation of human behaviour, experience and attitude (Denzin & Lincoln, 2011). Data is collected in textual form whilst interacting with the participants through in-depth interviews, which is then, analysed using thematic analysis. To gather qualitative data, a researcher can make use of observation and interviews. Qualitative research is administered to create an understanding from data as the analysis proceeds.

Astalin (2013) describes qualitative research approaches as:

- Being grounded in an 'interpretivist' position i.e. they are concerned with how the phenomena of interest are interpreted, understood, experienced, produced or constituted
- Based on research methods which are flexible and sensitive to social context
- Based on analytic methods that take account of complexity, detail and context

3.11 Case Study Research Design

This section provides a brief explanation of the value and purpose of case study research in order to prepare the reader for the research methodology that will be laid out in the rest of the chapter. A case study is a research method that involves a detailed examination of a subject of study and its related contextual conditions in order to investigate a phenomenon within its real-life context (Yin, 2009). Case study research helped with understanding the complex issues and extended the experience or added strength to what was already known through previous research (Kumar, 2008). A pragmatic research paradigm was adopted as a case study was used and a naturalistic approach of data collection was executed by means of questionnaires and interviews.

According to Yin (2003), case studies explore and investigate contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships. Yin (1984) goes on to further explain that the case study research method "as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (p. 240).

According to Crowe, Cresswell, Robertson, Huby, Avery and Sheikh (2011), a careful design of a case study is very important because it must be able to prove that:

i. It is the only viable method to bring about implicit and explicit data from the subjects
ii. It is appropriate to the research question
iii. It follows the set of procedures with proper application
iv. The scientific conventions used in social sciences are strictly followed
v. A 'chain of evidence', either quantitatively or qualitatively, is systematically recorded and archived, particularly when interviews and direct observation by the researcher are the main sources of data
vi. The case study is linked to a theoretical framework

A case study approach was adopted to determine the current level of usage of Web 2.0 tools and the factors that influence academics in higher education to supplement traditional classroom teaching by performing a cross case study of the two organisations.

This research design helped to integrate the different components of the study in a coherent and logical way in order to assist the researcher to effectively address the research problem. The case study also focused on the academic staff at the two private higher education organisations in Gauteng, South Africa. Thus, the case study was the most appropriate research method considering the nature of the study (usage of Web 2.0 tools among academics).

The case study method enabled the researcher to closely examine the data within a specific context. In this research, the case study was related to a small geographical area, two private higher education institutions in Gauteng, South Africa. The case study research design consists of different categories. This is explained in the next section.

3.11.1 Category of case study

To gain a better understanding of case study research, the researcher will discuss the different types of case studies. There are several categories of case study. Yin (1984) notes three categories, namely exploratory, descriptive and explanatory case studies.

Exploratory case studies are used to explore any phenomenon by collecting data before the research questions and hypotheses are proposed. An example of an exploratory case study is a pilot study (Yin, 1984; & Zainal, 2007).

Descriptive case studies on the other hand, are used to describe the natural phenomena that occur within the data in question i.e. to describe the data as they occur. In case studies, descriptive theory is used to examine the depth and scope of the case under study (Zainal, 2007).

Lastly, *explanatory case studies* examine the data closely both at a surface and deep level in order to explain the phenomena in the data (Zainal, 2007). In explanatory cases, to investigate certain phenomena, pattern matching can be used in complex and multivariate cases (Yin & Moore, 1987). Yin and Moore (1987) further explain that these complex and multivariate cases can be explained by three rival theories: a knowledge-driven theory, a problem-solving theory, and a social-interaction theory.

According to Yin (2009), a case study design should be considered when:

(a) The focus of the study is to answer "how" and "why" questions, thus being most suitable for exploratory, descriptive or explanatory research
(b) You cannot manipulate the behaviour of those involved in the study
(c) You want to cover contextual conditions because you believe they are relevant to the phenomenon under study
(d) The boundaries are not clear between the phenomenon and context.

Based on this, the researcher used case study design to study *how are Web 2.0 tools used by academics in higher education* and *why do these factors influence the use of Web 2.0 technology amongst academics in higher education*. A researcher would choose the most suitable categorisation based on the boundaries of the case studies: its forms of research, the research subjects, the purposes of case studies, research methods and analytic levels of the studies' outcomes (Soy, 1997). After gaining insights on case studies and the different types/categories of case study research, the researcher can now go about designing a case study research strategy. This is discussed in more detail in the next section.

3.11.2 Procedure for conducting case studies

Case study researchers such as Stake (1995) and Yin (1984) have suggested techniques for organising and conducting the research successfully using a case study approach. The technique is similar with the qualitative research methods (Soy, 1997):

i. Case study research generally answers one or more questions that begin with "how" or "why."
ii. Both qualitative and quantitative research could be undertaken through case study.
iii. Case study is differentiated from other research strategies because the focus of the research is a case. A researcher needs to decide on selecting multiple or single cases but a case study can include more than one unit of embedded analysis.
iv. Case study research uses multiple sources and techniques in the data gathering process. Data gathering is normally largely qualitative, but it may also be quantitative and tools such as interviews can be used to collect data.

Based on these steps, the study adopted both quantitative and qualitative research methods by means of questionnaires and interviews.

Case study research can be very beneficial; however, there are downfalls to this research method. The downfall of case study research is explained in section 3.10.4.

3.11.3 Advantages of case study

The investigation and analysis of the data is usually conducted within the context of its use (Yin, 1984). Case studies allow for both quantitative and qualitative analyses of the data that is very helpful when a big sample population is difficult to obtain as more data can be obtained using case study research (Yin, 1984). The detailed qualitative accounts often produced in case studies help to explain the complexities of real life situations, which may not be reflected through other research methods and this in turn provides better insights into the behaviours of the subjects.

According to Gary (2011), the advantages of case study research are:

1) They can help us understand complex inter-relationships
2) Case studies are grounded in "lived reality"
3) Case studies facilitate the exploration of the unexpected and unusual
4) Multiple case studies can enable research to focus on the significance of the idiosyncratic
5) Case studies can show the processes involved in causal relationships
6) Case studies can facilitate rich conceptual/theoretical development

In this study, case study research enabled the researcher to get a better understanding of the usage of Web 2.0 tools in higher education as well as to use the data collected to develop a conceptual model on the factors that influences the usage of Web 2.0 tools.

3.11.4 Disadvantages of case studies

According to Yin (1984), case studies are often accused of lack of rigour and the presence of bias when researchers interpret and analyse the data. Case studies are focused on a small number of subjects and as a result this may result in bias i.e. an inability to generalise the results and this may affect the reliability of the data (Yin, 1984) as the researcher can influence results more than in different designs. However, in this study there was no bias as the researcher used triangulation. The researcher used both qualitative and quantitative methods to reduce bias and increase the reliability and validity of the study. The results from the questionnaires were confirmed with the findings from the interviews. Thus, the researcher was able to make inferences that aided in uncovering the phenomena in this study.

One method is to design a study that utilises triangulation. Triangulation incorporates multiple methodologies to study the same phenomenon (Jonsen & Jehn, 2009). It can utilise both quantitative and qualitative methods in the same study (Jonsen & Jehn, 2009). The primary purpose of triangulation is to "eliminate or reduce biases and increase the reliability and validity of the study" (Jonsen & Jehn, 2009, p. 126). For instances where a researcher was unable to acquire the estimated sample size, triangulation can be used to improve the overall study's validity by confirming the analysis results with other methods, such as open or structured interviews, observation, or any alternate research method.

Another risk of case studies is when the data is not managed and organised systematically. According to Kumar (2008), a common criticism of the case study method is its dependency on a single case exploration making it difficult to reach a generalising conclusion. The risk of data being mismanaged and disorganised was overcome by using NVivo software. Also, the adoption of triangulation assisted in ensuring that the findings were not influenced by a single set of information.

3.11.5 Collecting Case Study Evidence

Case study evidence can be gathered from a number of sources such as interviews, observation, artefacts, surveys and document reviews whilst still addressing the design challenges of construct validity, internal validity, external validity, and reliability (See Section 3.4). The different sources of evidence for case study research used in this study are discussed in more detail in the following sub sections:

3.11.5.1 Interviews

Interview is a data collection method used to collect valuable information from a small number of people about attitudes, behavior, preferences, feelings and opinions (Ali & Bhaskar, 2016). Interviews are most effective for qualitative research as it explains and provides a better understanding of the phenomena. According to Gill, Stewart, Treasure and Chadwick (2008) and Corbin and Morse (2003) there are three fundamental types of research interviews:

- **Structured interview**

This type of interview is a very rigid instrument that is defined as a "verbally administered questionnaire" (Gill et al., 2008). This interview allows for quick administration.

- **Unstructured interview**

According to Legard and Ward (2008), the unstructured interview is a "conversation with a purpose" (p.38) as it is intended to allow researchers to collect in-depth information. This approach brings together the researcher and the interviewee by creating a comfortable atmosphere. An unstructured interview is an interview in which there is no specific set of predetermined questions, although the interviewers usually have certain topics in mind that they wish to cover during the

interview. Unstructured interviews flow like everyday conversations and tend to be more informal and open-ended

There were some answers from the questionnaires that were not clear, thus the researcher used unstructured interviews to gain a better understanding of the feedback received. The sample that was chosen to participate in the interview were randomly chosen based on their experience in using Web 2.0 tools. A total of 15 academics (8 from Pearson Institute of Higher Education and 7 from Monash South Africa) had participated in the interviews. The interview lasted 20 minutes. The data collected from the interview transcripts were transformed into concise summary of key results (themes). A process of condensation was used in order to preserve the core meaning and codes were created to describe the condensed information. Thereafter, categories were formed by grouping related codes together through the content. This is displayed in Section 5.4.

- **Semi-structured interview**

Gill et al. (2008) defines this approach as an interview that has several key questions which help to investigate the areas to be explored and to bring about flexibility in order to gather more data in an aim to answer the problem under investigation. This approach was adopted when confirming the researcher's conceptual model (Section 7.2). The purpose of confirming the researcher's conceptual model was to confirm the usefulness and completeness of the proposed model for academics and academic managers who want to use Web 2.0 tools in higher education. A total of seven participants had taken part in the confirmation interview which lasted 40 minutes. The interviews were conducted at Pearson Institute of Higher Education with two academic managers, one Head of Programme and one Programme convener. In addition, three academics (lecturers) were approached to verify the model. The participants were different from the ones who had been given the questionnaires and the academics that were originally interviewed.

As mentioned above, the researcher used a mixed methods approach. This was facilitated by using two research instruments: questionnaires and interviews. Questionnaires were used as they allow for quick collection of data and can easily capture the patterns, expectations, perspectives and attitudes of the sample population (Jones, Baxter, & Khanduja, 2013). Interviews were conducted to generate more insightful responses regarding usage of Web 2.0 tools.

These two data collection methods are discussed in more detail below.

- *Structured questionnaire.* This was used to collect data. Questionnaires were designed in such a way that they collected data related to the phenomenon under study. The structured survey was administered to academics at the different departments/faculties at Monash South Africa and Pearson Institute of Higher Education. The academics were contacted via email and invited to participate in the online questionnaire administered through Google Docs. The questionnaire took approximately 10 minutes to complete. Completion of the questionnaire was voluntary and all responses were anonymous.

- *Semi-structured in-depth interviews* are characterised by topic guides where the major questions are used in the same way in every interview, however, the order in which the questions are asked may vary (Edwards & Holland, 2013). Semi-structured in-depth interviews were conducted with academics to gather in-depth insights on participant attitudes, thoughts, and actions with regard to the phenomenon under study.

The purpose of an interview was to explore the views, experiences and beliefs of individuals on a particular topic that is under investigation. Qualitative methods, such as interviews, help to provide a better and an in-depth understanding of the phenomena that would not have been easily gathered through any other research method/quantitative method. The researcher therefore adopted a mixed methods approach as it was the most appropriate where little was already known about Web 2.0 tools and where more insights were required from individual participants (academics).

The main method for collecting qualitative data was through interviews. The interviews were conducted amongst the academic staff at Monash South Africa and Pearson Institute of Higher Education. The Monash South Africa participants were interviewed at the campus in Roodepoort and the Pearson Institute of Higher Education academics were interviewed at the campus in Midrand. The interviews took about 20 minutes per participant and were recorded and transcribed. The findings were then analysed using NVivo software. The data collection protocol for the interviews was based on the findings from literature.

There are at least three types of interviews (Yin, 2009):

- **Focused interview**

  In this type of interview, a set of questions are derived from a case study protocol.

- **Formal survey interview**

  These are more structured type of questions.

- **In-depth interview**

  The set of interviews takes place over a period. The interviewee plays an important role in sharing their opinions/insights and using this as the basis for further inquiry. Semi-structured interview was adopted as the interview duration was only an average 20 minutes. Interviews were conducted in this study as academics shared their insights on the usage of Web 2.0 tools in education.

According to Yin (2003), case studies can be broken up into four types of designs. This is depicted in Figure 3.2 by means of a 2x2 matrix. The first pair is single-case and multiple-case design and the second pair can occur as a combination of the first pair and distinguishes between holistic and embedded design (Yin, 2003). The multiple-case design, can be adopted with real-life events like the use of Web 2.0 tools in higher education that shows numerous sources of evidence through the implementation of an interview and questionnaire rather than sampling logic. According to Yin (1994), generalisation of results from case studies, from either single or multiple designs, is derived from theory rather than from populations.

	Single-case design	**Multiple-case design**
Holistic (single unit of analysis)	**TYPE 1**	**TYPE 3**
Embedded (multiple units of analysis)	**TYPE 2**	**TYPE 4**

Figure 3.2 Four types of case study design

The matrix states that single- and multiple-case studies show different design situations and that, within these two types, there also can be a unitary or multiple units of analysis (Yin, 2003). As depicted in the matrix, the four types of designs are single-case (holistic) designs, single-case (embedded) designs, multiple-case (holistic) designs, and multiple-case (embedded) designs. A single-case design is adopted when determining a theory's propositions are correct or whether some alternative set of explanations might be more relevant. It is also used when a case represents an extreme or unique case. In a multiple-case design, the researcher is studying multiple cases in order to understand the differences and the similarities between the cases (Baxter & Jack, 2008, & Stake, 1995) and the researcher is able to analyse the data both within each situation and across situations (Yin, 2003).

The researcher has chosen to follow a holistic design approach (Type 3). This approach will assist the researcher to compare the findings from the two higher education institutions, thus, clarifying whether the findings are valuable or not (Bernard & Bernard, 2012). In addition, the adoption of a multiple-case study will allow wider exploring of research questions and theoretical evolution (Eisenhardt & Graebner, 2007). A holistic design approach was used to focus on academics' use and understanding of Web 2.0 tools in higher education. Therefore, the study will adopt a multiple-case, holistic design.

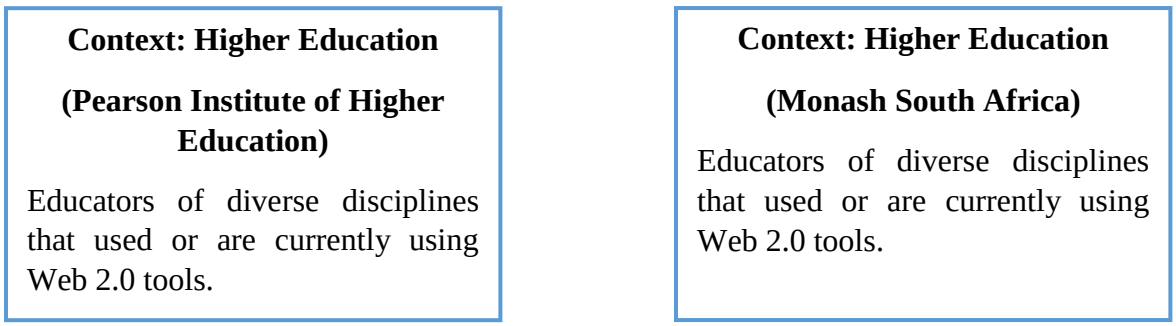


Figure 3.3 Case study design

3.11.5.2 Surveys

Survey research is used to collect information about a population of interest. The two key features of survey research are:

- **Questionnaires** - a set of questions used to collect information from individuals
- **Sampling** - a technique in which a subgroup of the population is selected to answer the survey questions (Check & Schutt, 2012).

Surveys by means of questionnaires was one of the methods that were adopted to collect information from the target population (academics). Questionnaires were conducted amongst academics at two private higher education institutions (Pearson Institute of Higher Education and Monash South Africa in Gauteng). Surveys were used to gather data on academics use and perception of Web 2.0 tools in education. Section 3.8.2 discusses questionnaires in more detail.

3.12 Triangulation

In this study, secondary data obtained from literature was triangulated with primary data obtained from in-depth interviews and structured surveys (questionnaires) in order to understand the research problem. In this study, interviews were conducted with academics to confirm the findings from the questionnaires.

3.13 Study Site

The study was conducted at two private higher education institutions; Monash South Africa and Pearson Institute of Higher Education.

Monash South Africa provides innovative and exceptional learning experiences to students by fostering a learning that is focused on engagement and critical thinking. Students are provided with the necessary skills and knowledge to meet real needs to advance the development of society.

Pearson Institute of Higher Education pride themselves on ensuring quality and accessibility to all students. Pearson Institute not only offers localised solutions based perspective to education, but also a world-view on global education. This places knowledge and expertise at student's fingerprints, making them employable.

This geographical area was most suitable to conduct the research, as the researcher was able to investigate Web 2.0 tools with academics at these two organisations since both of these institutions

currently use technology enhanced and traditional learning methods. Thus, it was appropriate to investigate the current level of usage of Web 2.0 tools at these two higher education institutions in South Africa. Additionally, these two institutions were the only higher education institutions that had given approval to the researcher to collect data from the academics.

3.14 Summary

This chapter explored the different types of research philosophies; research methods and discussed the case study research approach in detail. The data collection methods used in this research were described. Both qualitative and quantitative analysis techniques (research approaches) were also discussed as well as the research design and methodology for the study of the usage of Web 2.0 tools. The techniques for the analysing qualitative and quantitative data were also discussed. This chapter provided a detailed description of how the research design was implemented by taking into account credibility/trustworthiness, transferability, dependability and confirmability. The implementation of this research and the findings will be discussed in Chapter 5. Chapters 4 and 5 will discuss the quantitative and qualitative findings of the case study.

CHAPTER 4

Quantitative findings and analysis

4.1 Introduction

This chapter describes the findings and analysis of the data obtained from the questionnaire that was administered at two private higher education institutions: Pearson Institute of Higher Education and Monash South Africa. The quantitative data obtained from the questionnaire was analysed using SPSS (Statistical package for the Social Sciences). The statistical test that were used to analyse the data was discussed in Chapter 3 and is summarised below:

- Descriptive statistics including means and standard deviations;
- Chi-square goodness-of-fit-test;
- Wilcoxon Signed Ranks test;
- Chi-square test of independence;
- Regression analysis;
- Kruskal Wallis Test;
- Mann Whitney U Test;
- Binomial test;
- Pearson's correlation;
- One sample t-test and
- Independent samples t-test.
- Paired samples t-test: A test that compares the means of two variables for a single group.

Chapter 4 will provide insight on the quantitative analysis (descriptive statistics) and will end with a summary of the chapter.

4.2 Individual factors

Individual factor relates to the personal characteristics of academics. This section outlines the sub themes that were regarded as Individual factors. Based on Table 4.1 below, a total of 127

academics participated in the study. This was made up of 70 academics from Pearson Institute of Higher Education (55%) and 57 academics from Monash South Africa (45%).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pearson	70	55.1	55.1	55.1
	Monash	57	44.9	44.9	100.0
	Total	127	100.0	100.0	

Table 4.1 Number of participants per institution

The academics were further categorised according to sub themes. This was made up of the following sub themes:

- Rank,
- teaching style,
- personal barriers (*The lack of knowledge on how to use the tool effectively; The lack of instructional value or appropriateness; Using Web 2.0 tools requires more planning and effort than traditional face to face teaching*) and
- lack of motivation.

These sub themes will be discussed further in Sections 4.2.1-4.2.4.

4.2.1 Descriptive statistics of academics at Pearson Institute of Higher Education

4.2.1.1 Academic rank

The academic rank of the respondents at Pearson Institute of Higher Education was made up of 77% of lecturers, 13% senior lecturers, 9% of professors and 1% fell under the option of "Other"; this was the rank of Campus Director.

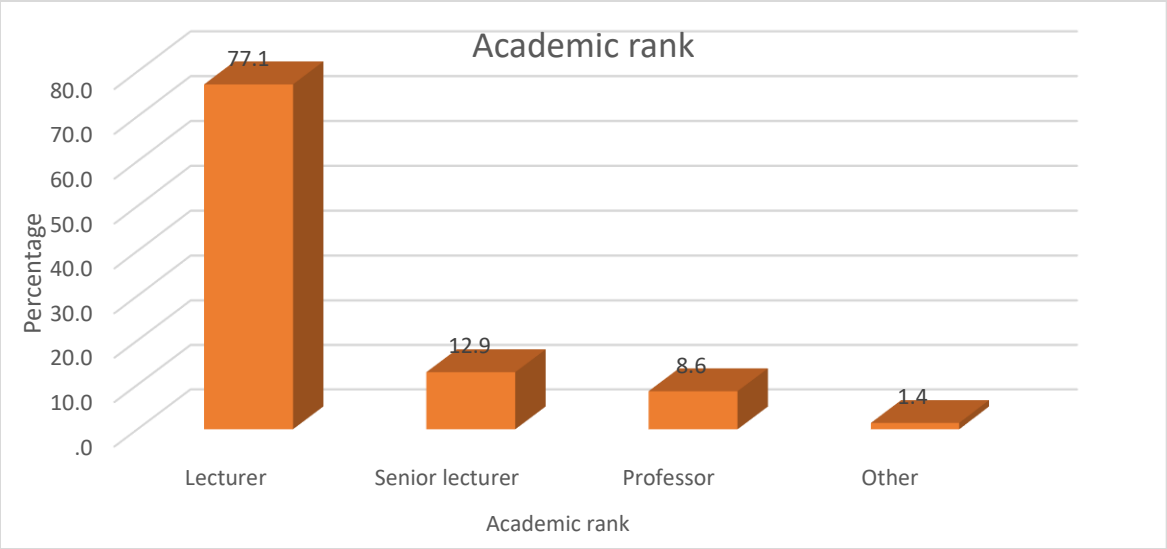


Figure 4.1 Academic rank of respondents at PIHE

4.2.1.2 Teaching style

The type of teaching style was asked in order to determine how many academics prefer the traditional face-to-face approach and how many academics prefer a blended approach. The findings revealed that at Pearson Institute of Higher Education, 67% of respondents prefer a blended approach, whereas 33% chose the traditional approach.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Blended	47	67.1	67.1	67.1
	Traditional	23	32.9	32.9	100.0
	Total	70	100.0	100.0	

Table 4.2 Preferred teaching style at PIHE

4.2.1.3 Awareness of Web 2.0 tools in education

The purpose of this question was to determine how many academics are actually aware of Web 2.0 tools that can be used in education. A total of 96% of the respondents were aware of these Web 2.0 tools and that they can be used in education. Thus, a significant proportion of the sample are *well aware of Wikipedia, YouTube, Facebook, Flickr or MySpace* (96%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	4.3	4.3	4.3
	Yes	67	95.7	95.7	100.0
	Total	70	100.0	100.0	

Table 4.3 Awareness of Web 2.0 tools at PIHE

4.2.1.4 Knowledge and understanding of Web 2.0 tools in education

This question aimed at identifying if academics have the knowledge and understanding of using Web 2.0 tools in education. A total of 89% of respondents at Pearson Institute of Higher Education are knowledgeable and understand the use of Web 2.0 tools in education. Thus, a significant proportion of the sample have *knowledge and understanding of Web 2.0 tools* that can be used in education (89%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	11.4	11.4	11.4
	Yes	62	88.6	88.6	100.0
	Total	70	100.0	100.0	

Table 4.4 Knowledge and understanding of Web 2.0 tools at PIHE

4.2.1.5 Familiarity with Web 2.0 tools

Familiarity was related to academics' being acquainted with Web 2.0 tools that can be used in education. A total of 60% of respondents at Pearson Institute of Higher Education are familiar with Web 2.0 tools that can be used in education.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	28	40.0	40.0	40.0
	Yes	42	60.0	60.0	100.0
	Total	70	100.0	100.0	

Table 4.5 Familiarity with Web 2.0 tools at PIHE

Section 4.2.2 will provide the findings related to Individual factors at Monash South Africa. These findings will then be combined to describe the overall findings of Individual factors.

4.2.2 Descriptive statistics of academics at Monash South Africa

4.2.2.1 Academic rank

The academic rank at Monash South Africa was made up of the following: 81% of lecturers, 14% senior lecturers, 2% of associate professors and 4% fell under the option of "Other"; this was the rank of Head of Programme, Sessional Lecturer and Administrator.

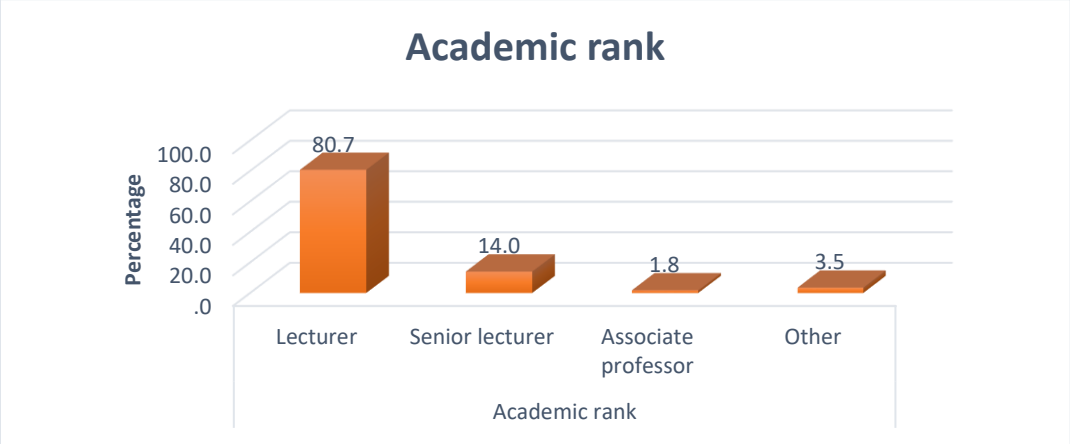


Figure 4.2 Academic rank of respondents at MSA

4.2.2.2 Teaching style

A total of 67% of respondents indicated that they prefer a blended approach, whereas 33% chose the traditional approach.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Blended	38	66.7	66.7	66.7
	Traditional	19	33.3	33.3	100.0
	Total	57	100.0	100.0	

Table 4.6 Preferred teaching style at MSA

4.2.2.3 Awareness of Web 2.0 tools in education

At Monash South Africa, a total of 93% of the respondents were aware of these Web 2.0 tools and that they can be used in education. Thus, a significant proportion of the sample are *well aware of Wikipedia, YouTube, Facebook, Flickr or MySpace* (93%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	7.0	7.0	7.0
	Yes	53	93.0	93.0	100.0
	Total	57	100.0	100.0	

Table 4.7 Awareness of Web 2.0 tools at MSA

4.2.2.4 Knowledge and understanding of Web 2.0 tools in education

The knowledge and understanding of Web 2.0 tools that can be used in education was made up of 88% of the respondents. Thus, a significant proportion of the sample have knowledge and understanding of Web 2.0 tools that can be used in education (88%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7	12.3	12.3	12.3
	Yes	50	87.7	87.7	100.0
	Total	57	100.0	100.0	

Table 4.8 Knowledge of Web 2.0 tools at MSA

4.2.2.5 Familiarity with Web 2.0 tools

A total of 86% of respondents are familiar with Web 2.0 tools that can be used in education. Thus, a significant proportion of the sample are familiar in general about Web 2.0 tools in education (86%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	14.0	14.0	14.0
	Yes	49	86.0	86.0	100.0
	Total	57	100.0	100.0	

Table 4.9 Familiarity with Web 2.0 tools at MSA

Section 4.2.3 will provide an overview of the combined results from both the higher education institutions in order to gauge as a whole the descriptive statistics of academics.

4.2.3 Combined results of descriptive statistics of academics

4.2.3.1 Academic rank

The academic rank of the respondents consisted of 100 lecturers, 17 senior lecturers, 1 associate professor, 6 professors and 3 who fell in the option "other" (Campus Director, Head of Programme and sessional lecturer). There was a larger frequency of lecturers compared to the other academic ranks. The lowest frequency was the academic rank of associate professor.

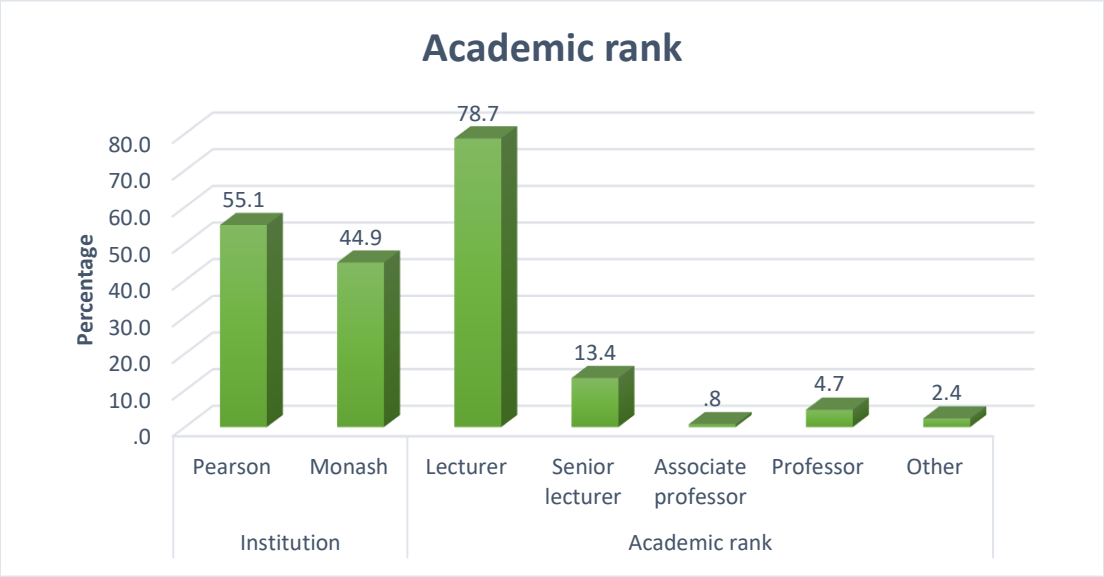


Figure 4.3 Overall academic ranking of the respondents

4.2.3.2 Teaching style

Based on the findings, 67% (85) of respondents used a blended approach and 33% (42) used the traditional teaching style. A blended approach is where learning is more flexible and is taught in an innovative way like the use of Web 2.0 tools and traditional teaching style is were face-to-face lecturing takes place which is usually disseminated in a lecture theatre.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Blended	85	66.9	66.9	66.9
	Traditional	42	33.1	33.1	100.0
	Total	127	100.0	100.0	

Table 4.10 Preferred teaching style

These results indicate that academics from both, Pearson Institute of Higher Education and Monash South Africa prefer a blended teaching approach instead of the traditional approach.

Based on the results, the average USAGE for Blended is significantly higher than for Traditional teaching style. The findings revealed that 67% of the respondents at Pearson Institute of Higher Education and Monash South Africa prefer a blended approach to teaching.

Blended learning can be very beneficial in education as described by the United States Department of Education (2010) who conducted a study focused on online learning in higher education. The findings revealed that students in an online learning environment performed modestly better, on average, than those learning the same material through traditional face-to-face instruction and that blended leaning combined with face-to-face elements was more beneficial than purely online instruction (Means, Toyama, Murphy, Bakia & Jones, 2010).

4.2.3.3 Awareness of Web 2.0 tools

Respondents were asked about their awareness (existence) of Web 2.0 tools that can be used in education, namely Wikipedia, YouTube, Facebook, Flickr or MySpace. A total of 95% (120) of the respondents were aware of these Web 2.0 tools and that they can be used in education. Thus, a significant proportion of the sample are *well aware of Wikipedia, YouTube, Facebook, Flickr or MySpace* (95%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	7	5.5	5.5	5.5
	Yes	120	94.5	94.5	100.0
	Total	127	100.0	100.0	

Table 4.11 Awareness of Web 2.0 tools

This finding is in agreement with the findings of Ajise and Fagbola (2013) who reported a high level of awareness of Web 2.0 by lecturers in tertiary institutions in Nigeria.

4.2.3.4 Knowledge and understanding of Web 2.0 tools in education

The results revealed that 88% of academics have knowledge and understanding of Web 2.0 tools that ca be used in education. Thus, a significant proportion of the sample have knowledge and understanding of Web 2.0 tools that can be used in education (88%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	11.8	11.8	11.8
	Yes	112	88.2	88.2	100.0
	Total	127	100.0	100.0	

Table 4.12 Knowledge of Web 2.0 tools

Based on the results from both of these institutions, the findings revealed a high level of awareness of Web 2.0 technologies among academics.

4.2.3.5 Familiarity with Web 2.0 tools

A total of 72% of the respondents are familiar with Web 2.0 tools. Thus, a significant proportion of the sample are *familiar in general about Web 2.0 tools in education* (72%, p<.0005).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	36	28.3	28.3	28.3
	Yes	91	71.7	71.7	100.0
	Total	127	100.0	100.0	

Table 4.13 Familiarity with Web 2.0 tools for education

In terms of familiarity of Web 2.0 tools, the findings showed that majority of the respondents are familiar with Web 2.0 tools in education. These findings were similar to a study conducted by Santosh (2017) where respondents were asked about their level of familiarity of Web 2.0 tools and

the findings showed that majority of the information professionals were familiar with Facebook (86.25%), Wikipedia (85%), YouTube (80%), and Blogs (79%).

A higher number of respondents at Monash South are familiar with Web 2.0 tools that can be used in education compared to Pearson Institute of Higher education. The next section will discuss the individual factors pertaining to the personal barriers to usage of Web 2.0 tools in education.

4.2.4 Individual factors to usage of Web 2.0 tools in education

The purpose of this section is to describe the academics' personal barriers to the usage of Web 2.0 tools. This will assist in an effort to eliminate these factors to ensure the successful implementation of Web 2.0 tools in education. Based on literature, respondents were asked to indicate their agreement that the following items are personal barriers to the usage of Web 2.0 tools:

4.2.4.1 Individual factors (personal barriers) at Pearson Institute of Higher Education

a. The lack of knowledge on how to use the tool effectively

The purpose of this question was to determine the level of knowledge that academics have to effectively use Web 2.0 tools in education. The findings revealed that 53% of respondents agreed and 23% strongly agreed that one factor limiting the adoption and use of Web 2.0 tools is the lack of knowledge on how to use the tool effectively. Only 1% of respondents strongly disagreed and 9% disagreed with this statement. The remaining respondents, 14% were neutral.

b. The lack of instructional value or appropriateness

The researcher wanted to establish if lack of instructional value or appropriateness is a barrier to the usage of Web 2.0 tools in education. A total of 44% of respondents agreed and 20% strongly agreed that the lack of instructional value or appropriateness is a barrier to the usage of Web 2.0 tools. Only 1% of respondents strongly disagreed and 16% disagreed with this statement. The remaining respondents, 19% were neutral.

c. Web 2.0 tools requires more planning and effort than traditional teaching style

Based on the findings in Section 4.2 regarding teaching style, the researcher wanted to investigate if blended learning/usage of Web 2.0 tools requires more planning and effort than the traditional face-to-face teaching style in an effort to determine if lack of usage of Web 2.0 tools is associated with time and effort. A total of 34% of respondents agreed and 24% strongly agreed that Web 2.0

tools requires more planning and effort than traditional teaching style. Only 14% of respondents disagreed with this statement. The remaining respondents, 27% were neutral.

d. Lack of motivation

Lack of motivation was another sub factor of personal barriers that was used to establish if it was a barrier to the usage of Web 2.0 tools in education. A total of 30% of respondents agreed and 31% strongly agreed that the lack of motivation was a contributing factor to the absence of the usage and adoption of Web 2.0 tools. Only 4% of respondents strongly disagreed and 6% disagreed with this statement. The remaining respondents, 29% were neutral.

Based on these results obtained at Pearson institute of Higher Education, it is evident that there is a significant agreement that the following factors are barriers to the use of Web 2.0 tools in education:

- *the lack of knowledge on how to use the tool effectively* (M=3.87, SD = .916), t (69) = 7.963, p<.0005;
- *the lack of instructional value or appropriateness* (M=3.66, SD = 1.020), t (69) = 5.391, p<.0005;
- *using Web 2.0 tools requires more planning* (M=3.69, SD = 1.001), t (69) = 5.734, p<.0005 *and effort than traditional face to face teaching and*
- *lack of motivation* (M=3.79, SD = 1.087), t (69) = 6.038, p<.0005.

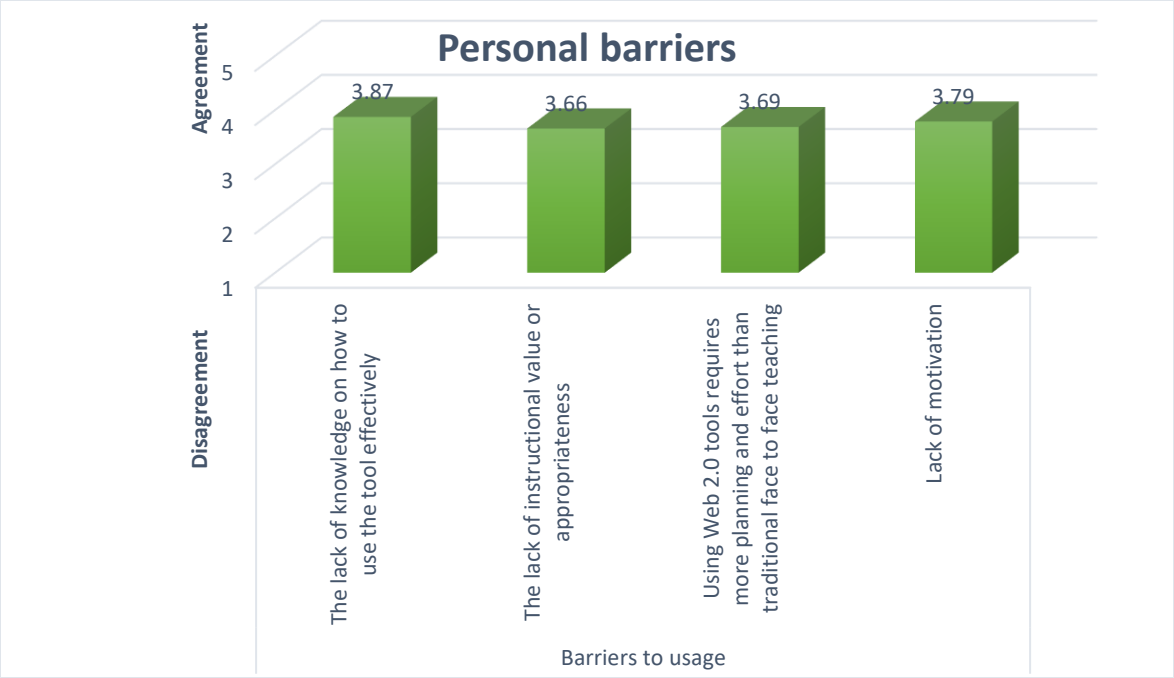


Figure 4.4 Personal barriers to the usage of Web 2.0 tools at PIHE

The next section provides the findings of academics' personal barriers to the usage of Web 2.0 tools in education at Monash South Africa.

4.2.4.2 Individual factors at Monash South Africa

The same set of personal barriers were investigated at Monash South Africa and the following were the results:

a. Lack of knowledge on how to use the tool effectively

A total of 86% of respondents agreed and 12% strongly agreed that one factor limiting the adoption and use of Web 2.0 tools is the lack of knowledge on how to use the tool effectively. The remaining respondents, 2% were neutral.

b. The lack of instructional value or appropriateness is a barrier to the usage of Web 2.0 tools

A significant amount of 81% of respondents agreed that the lack of instructional value or appropriateness is a barrier to the usage of Web 2.0 tools. Only 7% of respondents disagreed with this statement. The remaining 12% of respondents were neutral.

c. Web 2.0 tools requires more planning and effort than traditional teaching style.

A significant amount of 83% of respondents agreed and 12% strongly agreed that Web 2.0 tools requires more planning and effort than traditional teaching style. Only 5% of respondents were neutral. None of the respondents disagreed with the statement.

d. Lack of motivation

A total of 60% of respondents agreed that the lack of motivation was a contributing factor to the absence of the usage and adoption of Web 2.0 tools. Only 14% of respondents disagreed with this statement. The remaining 26% of respondents were neutral.

Based on these results obtained at Monash South Africa, it is evident that there is a significant agreement that the following factors are barriers to the use of Web 2.0 tools in education:

- *the lack of knowledge on how to use the tool effectively* (M=4.11, SD = .363), t (56) = 23.004, p<.0005;
- *the lack of instructional value or appropriateness* (M=3.74, SD = .583), t (56) = 9.537, p<.0005;
- *using Web 2.0 tools requires more planning* (M=4.07, SD = .417), t (56) = 19.394, p<.0005 *and effort than traditional face to face teaching and*
- *lack of motivation* (M=3.46, SD = .734), t (56) = 4.694, p<.0005.

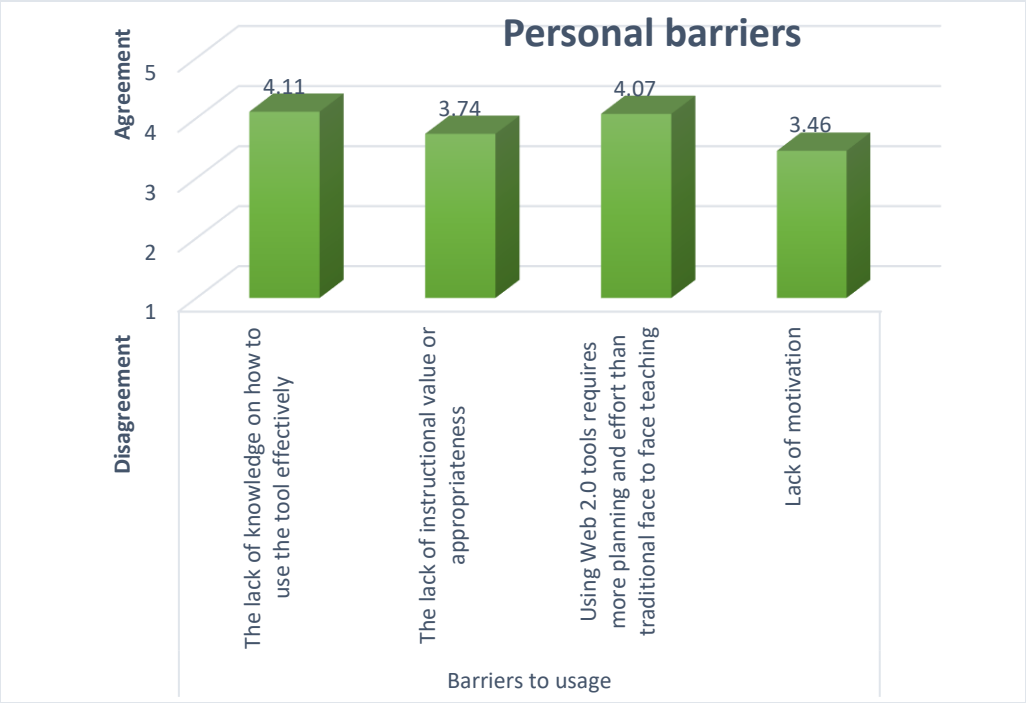


Figure 4.5 Personal barriers to the usage of Web 2.0 tools at MSA

The findings of both the higher education institutions in Sections 4.2.4.1 and 4.2.4.2 were combined to provide overall findings of academics' personal barriers to the usage of Web 2.0 tools in education. This is discussed in more details in Section 4.2.4.3 below.

4.2.4.3 Combined results for individual factors

The purpose of this section was to provide an overall perspective of academics' personal barriers that hinders the usage of Web 2.0 tools in education. These results can be very useful in understanding the barriers that exists in an effort to eliminate them to ensure the successful implementation of Web 2.0 tools in higher education in South Africa.

a. The lack of knowledge on how to use the tool effectively

A significant amount of 68% of respondents agreed and 18% strongly agreed that one factor limiting the adoption and use of Web 2.0 tools is the lack of knowledge on how to use the tool effectively. Only 0.8% of respondents strongly disagreed and 5% disagreed with this statement. The remaining respondents, 9% were neutral. A significantly higher number of respondents from Monash South Africa agreed that the lack of knowledge on how to use Web 2.0 tools effectively

is one barrier to the usage of Web 2.0 tools in education. In addition, none of the respondents from this organisation disagreed with the statement compared to the 9% of respondents that disagreed from Pearson Institute of Higher Education.

These findings are in line with Anunobi and Ogbonna (2012) and Echeng, Usoro and Majewski (2013) who explained that the adoption of Web 2.0 technologies is low for teaching and learning in higher education due to the lack of familiarity with the tool.

b. The lack of instructional value or appropriateness

A total of 61% of respondents agreed and 11% strongly agreed that the lack of instructional value or appropriateness is a barrier to the usage of Web 2.0 tools. 8% of the respondents disagreed and 12% of respondents strongly disagreed. The remaining 16% of respondents were neutral to this statement.

A higher number of respondents from Monash South Africa agreed that the lack of instructional value or appropriateness is a limiting factor to the usage of Web 2.0 tools. In addition, a lower rate of respondents from this organisation disagreed with the statement compared to the 17% of respondents that disagreed from Pearson Institute of Higher Education.

c. Using Web 2.0 tools requires more planning and effort than traditional face to face teaching

A significant amount of respondents, 56% agreed and 19% strongly agreed that Web 2.0 tools requires more planning and effort than traditional teaching style. Only a small percentage of 8% disagreed and 17% of the respondents were neutral.

A significantly higher number of respondents from Monash South Africa agreed that Web 2.0 tools requires more planning and effort than traditional teaching style. In addition, none of the respondents from this organisation disagreed with the statement compared to the 14% of respondents that disagreed from Pearson Institute of Higher Education.

d. Lack of motivation

A total of 44% of respondents felt that the lack of motivation was a contributing factor to the absence of the usage and adoption of Web 2.0 tools. A small total of 2% of respondents strongly

disagreed and 9% of respondents disagreed. The remaining 28% of respondents were neutral to this statement.

A study conducted by Sulaiman, Mohamed and Afendi (2011) identified lack of motivation among lecturers as one of the barriers in teaching and learning using online tools with a total of 65% of academic staff. These findings are similar to that of the researcher's where majority of the participants agreed that lack of motivation is a contributing factor to the absence of the usage of Web 2.0 tools in higher education.

Based on these results, it is evident that there is a significant agreement that the following factors are barriers to the use of Web 2.0 tools in education:

- *the lack of knowledge on how to use the tool effectively* (M=3.98, SD = .729), t (126) = 15.097, p<.0005;
- *the lack of instructional value or appropriateness* (M=3.69, SD = .850), t (126) = 9.187, p<.0005;
- *using Web 2.0 tools requires more planning* (M=3.86, SD = .814), t (126) = 11.885, p<.0005 *and*
- *effort than traditional face to face teaching and lack of motivation* (M=3.64, SD = .957), t (126) = 7.512, p<.0005.

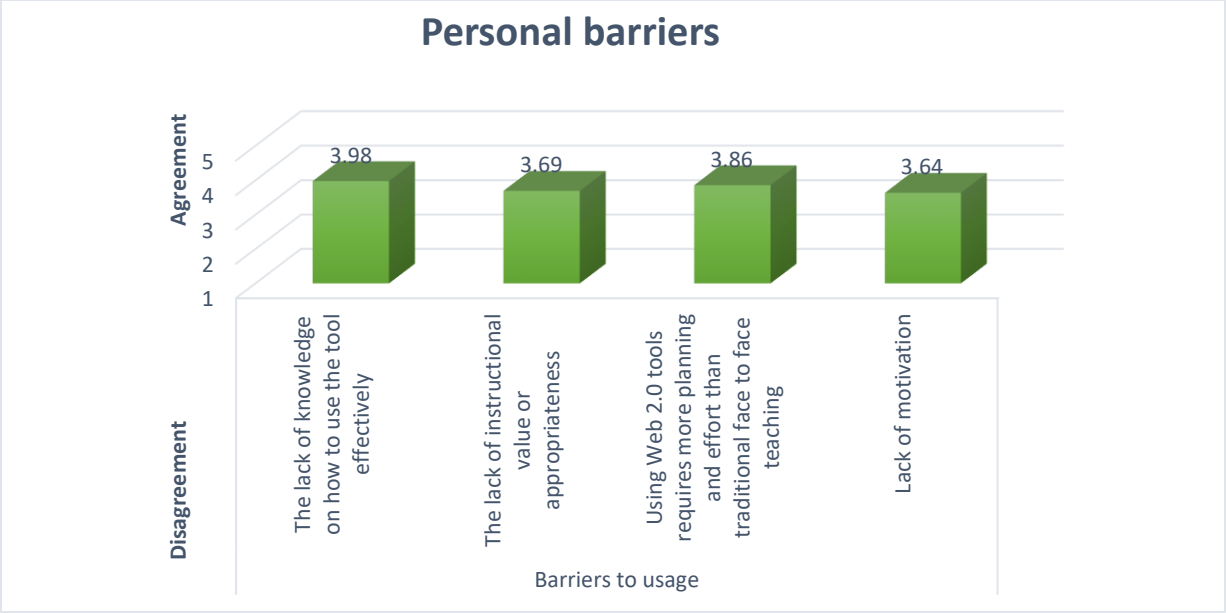


Figure 4.6 Individual barriers to the usage of Web 2.0 tools

Personal barriers were made up of independent variables, namely *The lack of knowledge on how to use the tool effectively; The lack of instructional value/appropriateness; Using Web 2.0 tools requires more planning and effort than traditional face to face teaching and Lack of motivation.*

The next section will provide an overview on the perceived usefulness factors that influences the usage of Web 2.0 tools in higher education.

4.3 Perceived usefulness (PU)

Perceived usefulness in this study is the degree to which an academic believes that using Web 2.0 tools will enhance their productivity (Davis, Bagozzi, & Warshaw, 1989). Perceived usefulness of Web 2.0 tools is measured in the context of teaching and learning in higher education institutions. Perceived usefulness and the ease of use (from the TAM model) have an influence on intention to use a system that ultimately affects the usage of Web 2.0 tools. Perceived ease of use is measured under the quality characteristics of Web 2.0 tools in this study. In this section, respondents were asked to indicate their agreement with statements regarding the usefulness/benefits of Web 2.0 tools in education. The Cronbach Alpha for perceived usefulness of Web 2.0 tools are displayed below in Table 4.1. This table was used to measure the perceived usefulness sub factors (shown in brackets) against usage of Web 2.0 tools in an effort to identify significant predictors of usage. The results are as follows:

Factor	Findings	Cronbach Alpha
Perceived usefulness (*teamwork; student-staff communication; student-staff connectivity; collaboration; content creators; use and reuse of material; active participant and online presence)*	*PU* is a significant predictor of usage of Web 2.0 tools.	CA = .919
Perceived usefulness (PIHE) (*teamwork; student-staff communication; student-staff connectivity; collaboration; content creators; use and reuse of*	*PU* is a significant predictor of usage of Web 2.0 tools.	= .912

material; active participant and online presence)		
Perceived usefulness (MSA) *(sense of belonging; communication and interaction; connectivity; content creator; use and reuse material and online presence)*	*PU* is a significant predictor of usage.	= .841

Table 4.14 Cronbach Alpha for perceived usefulness

4.3.1 Perceived usefulness at Pearson Institute of Higher Education

The following were the results for perceived usefulness:

4.3.1.1 Increased instructor- student communication and interaction

This sub factor was used to determine if the usage of Web 2.0 tools in education would increase communication and interaction between the instructor and student. A total of 44% of respondents agreed and 23% of respondents strongly agreed that Web 2.0 tools increases interaction and communication among the instructor and students. A small proportion, 7% of respondents disagreed with the statement. The remaining 26% of respondents were neutral.

4.3.1.2 Improved student-teacher connectivity

Based on literature, the usage of Web 2.0 tools can improve the connectivity between the student and the teacher. This statement was measured with the academics at PIHE and the findings revealed that 43% of respondents agreed and 23% of respondents strongly agreed that the usage of Web 2.0 tools helps develop a better sense of connectivity between students and teachers. 13% of respondents disagreed with the statement. The remaining 21% of respondents were neutral.

4.3.1.3 Increased opportunity to create content

Respondents were asked to state if they felt that the usage of Web 2.0 tools would provide them with more opportunities to create learning content. The results revealed that a total of 50% of

respondents agreed and 21% of respondents strongly agreed that Web 2.0 tools could give students the opportunity to create content themselves instead of just listening to lectures. 13% of respondents disagreed with the statement. The remaining 16% of respondents were neutral.

4.3.1.4 Creative use and reuse of material

Web 2.0 tools can be used as a creative tool and can enable academics to reuse material. Based on this, a total of 40% of respondents agreed and 26% of respondents strongly agreed that the adoption of Web 2.0 tools enables academics to creatively use and reuse material in novel ways because there is not one centralised power controlling the web. A total of 9% of respondent disagreed and 10% of respondents strongly disagreed with the statement. The remaining 26% of respondents were neutral.

4.3.1.5 Shift towards active information consumption

Web 2.0 tools provides academics with a teaching and learning environment that shifts the learning to a more active one. A total of 40% of respondents agreed and 21% of respondents strongly agreed that Web 2.0 tools could change academics from a passive to an active information consumer, allowing their online voice to be part of the conversation. A small proportion, 16% of respondents disagreed with the statement. The remaining 23% of respondents were neutral.

Based on the results obtained at Pearson Institute of Higher Education there is a significant agreement that the usage of Web 2.0 tools in education is very useful as it:

- *increases interaction and communication among the instructor and students* (M=3.83, SD = .868), t (69) = 7.990, p<.0005;
- *helps develop a better sense of connectivity between students and teachers* (M=3.76, SD = .955), t (69) = 6.636, p<.0005;
- *gives students the opportunity to create content themselves instead of just listening to lectures* (M=3.80, SD = .926), t (69) = 7.226, p<.0005;
- *allows me to creatively use and reuse material in novel ways because there is not one centralised power controlling the web* (M=3.83, SD = .916), t (69) = 7.565, p<.0005;
- *changes me from a passive to an active information consumer, allowing academics' online voice to be part of the conversation* (M=3.67, SD = .989), t (69) = 5.682, p<.0005.

The results are displayed below.

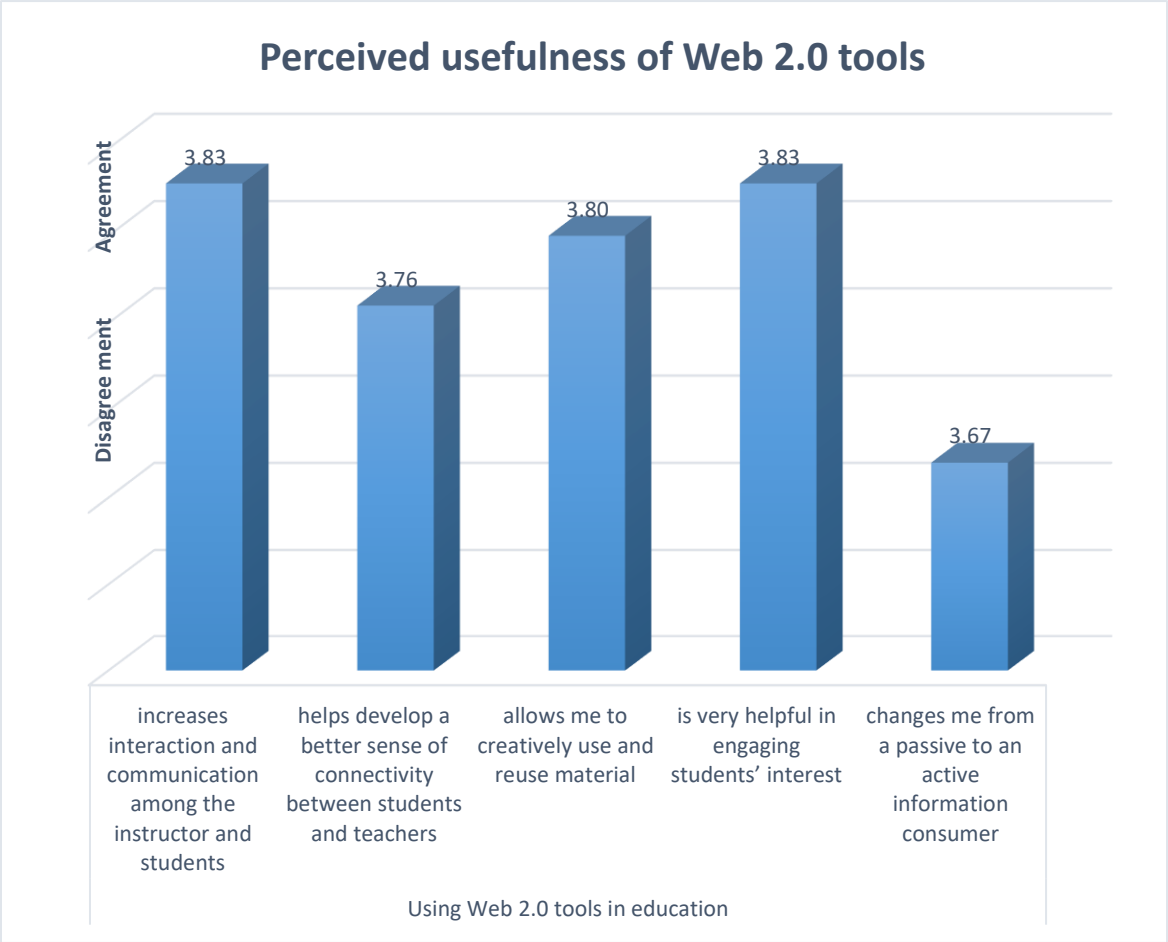


Figure 4.7 Perceived usefulness of using Web 2.0 tools at PIHE

The next section will discuss the findings regarding the benefits/usefulness of Web 2.0 tools at Monash South Africa.

4.3.2 Perceived usefulness at Monash South Africa

The following were the perceived usefulness results at MSA:

4.3.2.1 Increased instructor- student communication and interaction

A total of 51% of respondents agreed and 23% of respondents strongly agreed that Web 2.0 tools increases interaction and communication among the instructor and students. The remaining 26% of respondents were neutral. None of the respondents disagreed with the statement.

4.3.2.2 Improved student-teacher connectivity

A total of 83% of respondents agreed and 9% of respondents strongly agreed that the usage of Web 2.0 tools helps develop a better sense of connectivity between students and teachers. The remaining 9% of respondents were neutral. None of the respondents disagreed with the statement.

4.3.2.3 Increased opportunity to create content

A total of 67% of respondents agreed and 16% of respondents strongly agreed that Web 2.0 tools could give students the opportunity to create content themselves instead of just listening to lectures. A small proportion, 9% of respondent disagreed and 9% of respondents were neutral.

4.3.2.4 Creative use and reuse of material

A total of 49% of respondents agreed and 25% of respondents strongly agreed that the adoption of Web 2.0 tools enables academics to creatively use and reuse material in novel ways because there is not one centralised power controlling the web. A small proportion, 9% of respondent disagreed and 18% of respondents were neutral.

4.3.2.5 Shift towards active information consumption

A total of 61% of respondents agreed and 16% of respondents strongly agreed that Web 2.0 tools could change academics from a passive to an active information consumer, allowing their online voice to be part of the conversation. A small proportion, 16% of respondent disagreed and 7% of respondents were neutral.

Based on the results obtained at Monash South Africa there is a significant agreement that the usage of Web 2.0 tools in education is very useful by:

- *increases interaction and communication among the instructor and students* (M=3.96, SD = .706), t (56) = 10.315, p<.0005;

- *helps develop a better sense of connectivity between students and teachers* (M=4.00, SD = .423), t (56) = 17.866, p<.0005;
- *gives students the opportunity to create content themselves instead of just listening to lectures* (M=3.89, SD = .722), t (56) = 8.751, p<.0005;
- *allows me to creatively use and reuse material in novel ways because there is not one centralised power controlling the web* (M=3.89, SD = .880), t (56) = 7.676, p<.0005;
- *changes me from a passive to an active information consumer, allowing academics' online voice to be part of the conversation* (M=3.77, SD = .907), t (56) = 6.428, p<.0005.

This is displayed below.

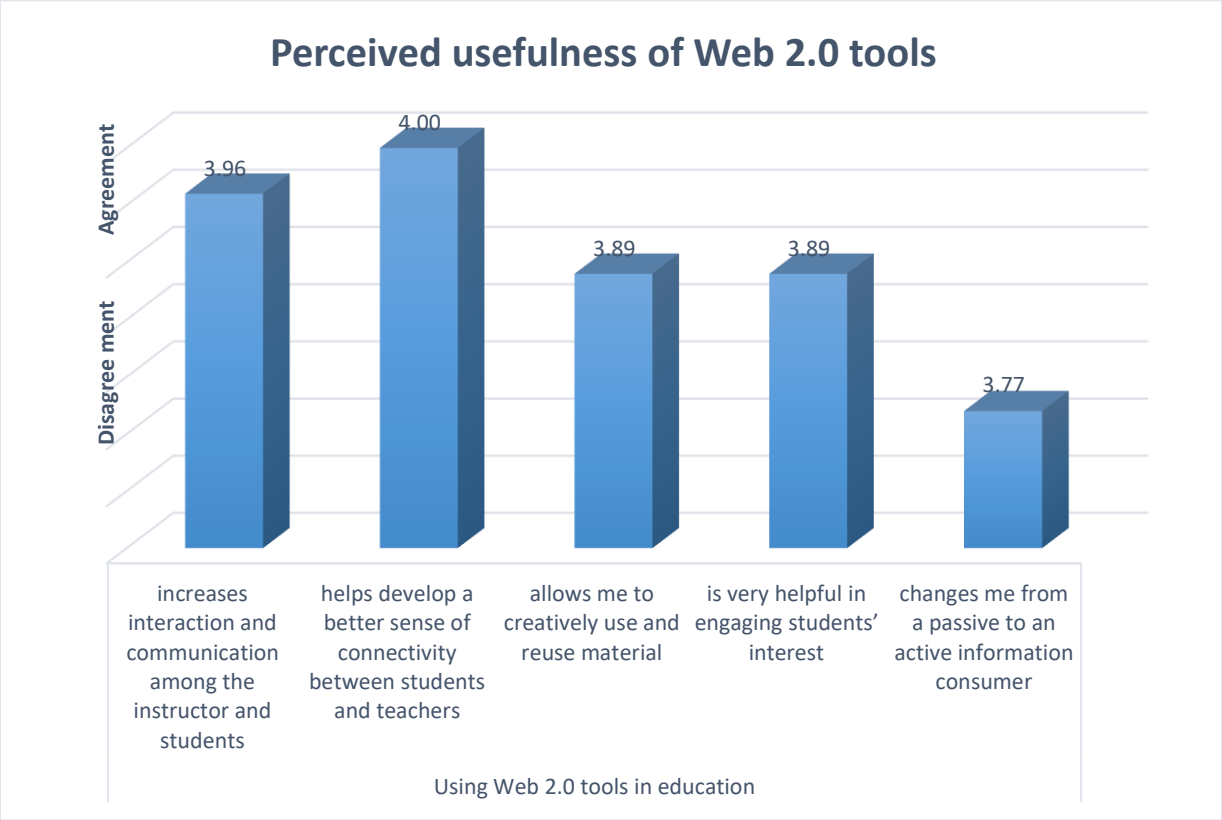


Figure 4.8 Perceived usefulness of using Web 2.0 tools at MSA

The next section provides the overall findings of the usefulness of Web 2.0 tools from both the higher education institutions.

4.3.3 Combined Results from both institutions

The following are the combined perceived usefulness results obtained from PIHE and MSA:

4.3.3.1 Increased instructor- student communication and interaction

A total of 47% of respondents agreed and 23% strongly agreed that Web 2.0 tools increases interaction and communication among the instructor and students. Only 4% of the respondents disagreed and 26% of respondents were neutral.

According to the results, Monash South Africa had a higher rate of agreement with regard to the use of Web 2.0 tools to increase interaction and communication among the instructor and students. In addition, none of the respondents from Monash South Africa disagreed with the statement compared to Pearson Institute of Higher Education who had 7% of respondents disagreeing.

4.3.3.2 Improved student-teacher connectivity

A significant amount of 61% of respondents agreed and 17% strongly agreed. The small percentage of 7% of respondents disagreed and 16% were neutral.

A significantly higher number of respondents at Monash South Africa had a higher rate of agreement with regard to the use of Web 2.0 tools to develop a better sense of connectivity between students and teachers. In addition, none of the respondents from Monash South Africa disagreed with the statement compared to Pearson Institute of Higher Education who had 13% of respondents disagreeing

4.3.3.3 Increased opportunity to create content

A significant amount of 58% of respondents agreed and 19% strongly agreed. 11% of respondents disagreed and 13% were neutral.

After comparing the results, it was revealed that a higher proportion of respondents from Monash South Africa agreed that the use of Web 2.0 tools could give students the opportunity to create content themselves instead of just listening to lectures. In addition, fewer respondents from this organisation disagreed with the statement.

4.3.3.4 Creative use and reuse of material

This statement was agreed by 44% of the respondents and 25% strongly agreed. A small percentage, 9% disagreed and the remaining 22% were neutral.

According to the results, Pearson Institute of Higher Education had a higher rate of agreement that the use of Web 2.0 tools enables academics to creatively use and reuse material in novel ways because there is not one centralised power controlling the web.

4.3.3.5 Shift towards active information consumption

A significant amount of 50% of the respondents agreed and 19% strongly agreed. A total of 16% of respondents disagreed. In addition, an amount of 16% of respondents were neutral.

Based on the results there is a significant agreement that the usage of Web 2.0 tools in education is very useful as it:

- *increases interaction and communication among the instructor and students* (M=3.89, SD = .799), t (126) = 12.548, p<.0005;
- *helps develop a better sense of connectivity between students and teachers* (M=3.87, SD = .770), t (126) = 12.675, p<.0005;
- *gives students the opportunity to create content themselves instead of just listening to lectures* (M=3.84, SD = .858), t (126) = 11.061, p<.0005;
- *allows me to creatively use and reuse material in novel ways because there is not one centralised power controlling the web* (M=3.86, SD = .897), t (126) = 10.779, p<.0005;
- *changes me from a passive to an active information consumer, allowing academics' online voice to be part of the conversation* (M=3.72, SD = .950), t (126) = 8.497, p<.0005.Thus, these findings are one of the reasons that influences academics to use Web 2.0 tools in education. This answers research question 3, "Why do these factors influence the use of Web 2.0 technology amongst academics in higher education?"

The results are displayed in Figure 4.3, below.

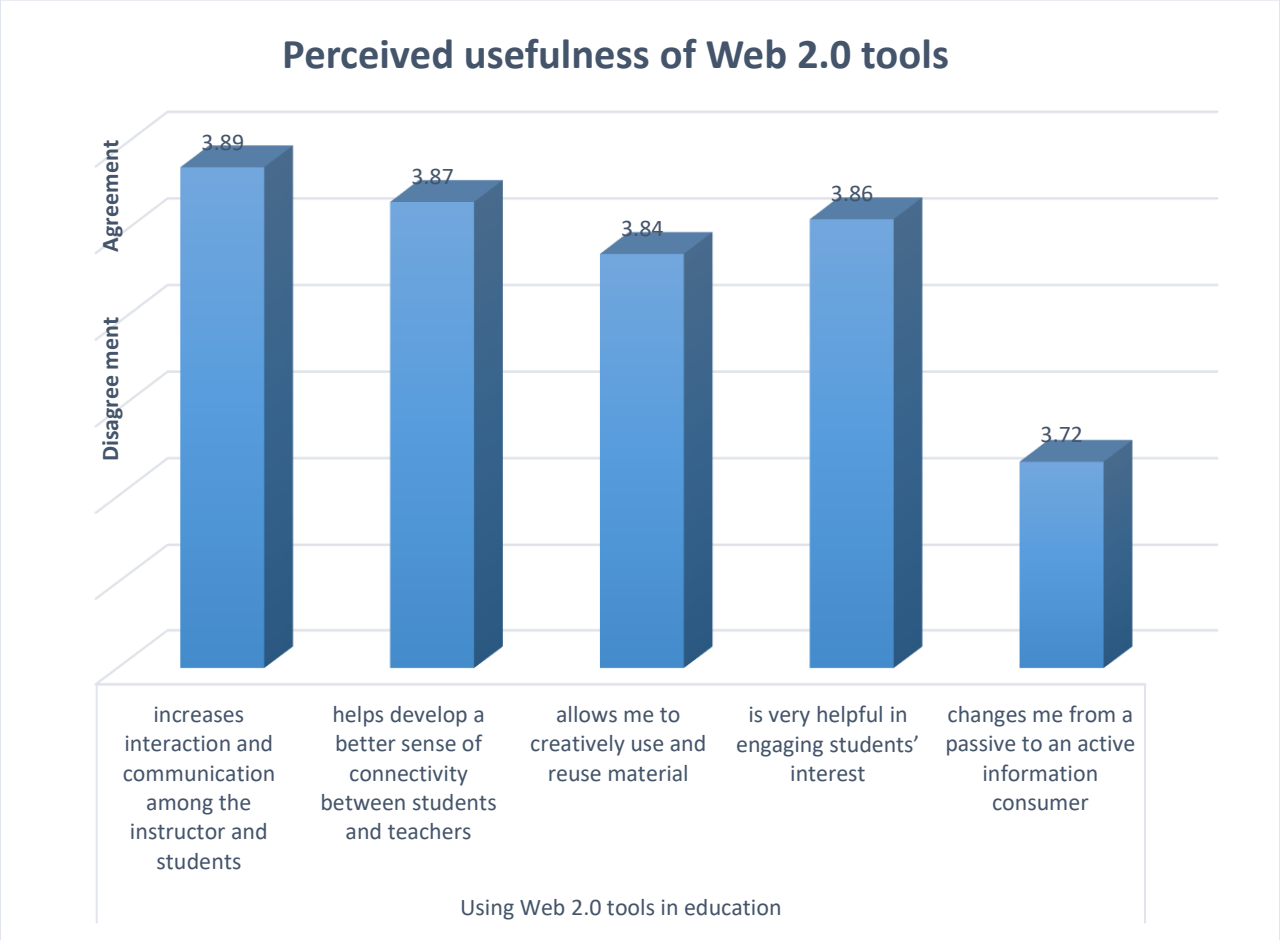


Figure 4.9 Perceived usefulness of Web 2.0 tools in education

Based on the results obtained at both Pearson Institute of Higher education and Monash South Africa, it is evident that *perceived usefulness* is a significant predictor of usage of Web 2.0 tools in education. PU has a positive B value, which means the independent variable is associated with higher usage. Thus, the larger B, the higher the usage.

A study conducted by Echeng, Usoro and Majewski (2013) is in line with these results. The study was conducted in Nigeria to determine the acceptance of Web 2.0 as a social networking tool in teaching and learning and one of the main contributory factors that emerged was perceived usefulness in the acceptance of Web 2.0 tools. The results revealed that there is a relationship

between acceptance and usefulness in the case of Web 2.0 technologies. Thus, there is a strong correlation between *perceived usefulness* and usage of Web 2.0 tools in education.

According to a study conducted by An and Williams (2010), the major benefits (perceived usefulness) of using Web 2.0 technologies in teaching include:

- interaction;
- communication, and collaboration;
- knowledge creation, and
- ease of use and flexibility.

Web 2.0 tools provides academics with the opportunity to create more interactive and powerful learning environments in which learners become knowledge creators, producers, editors, and evaluators (Richardson, 2009). These findings are in line with the results obtained at PIHE and MSA. The next section provides an overview of perceived quality characteristics of Web 2.0 tools in education.

4.4 Perceived Quality Characteristics of Web 2.0 Tools

The researcher's model is linked with a characteristic (system quality) of the Information Systems (IS) success model of Delone and McLean (1992), and its extended model (Delone and Mclean, 2003, 2004) to better explain the usage of Web 2.0 tools in education. The system quality measures the desired characteristics of the technological tool. This is measured by means of responsiveness, usability, availability, reliability, and adaptability (Delone and Mclean, 2004). Thus, the more reliable the tool is, easy to use and understand, the more the academic will want to engage and embrace this technology. Therefore, there is a relationship between perceived quality characteristics (*ease of use*) and *ATTITUDE.*

The Cronbach Alpha for perceived quality characteristics of Web 2.0 tools are displayed below. This table shows the significant predictors of usage of Web 2.0 tools against perceived quality characteristics sub factors (ease of use and system quality in general). The researcher uses the term system which throughout the study refers to Web 2.0 tools.

Factor	Findings	Cronbach Alpha
Perceived quality characteristics *System quality (ease of use)*)	*EOU* is a significant predictor of usage of Web 2.0 tools	= .941
Perceived quality characteristics *System quality (SYS_general)*	*SYS_general* is not a significant predictor of usage of Web 2.0 tools.	= .818
Perceived quality characteristics (PIHE) *SYS_EOU (Ease of use)*	*EOU* is a significant predictor of usage of Web 2.0 tools	= .961
Perceived quality characteristics (PIHE) *(SYS_general_P)*	*SYS_general_P* is not a significant predictor of usage of Web 2.0 tools.	= .884
Perceived quality characteristics (MSA) *SYS_EOU (Ease of use)*	*EOU* is a significant predictor of usage of Web 2.0 tools	= .941
Perceived quality characteristics (MSA) *(SYS_general_M)*	*SYS_general_M* is not a significant predictor of usage of Web 2.0 tools.	= .782

Table 4.15 Cronbach Alpha for perceived quality characteristics of Web 2.0 tools

4.4.1 Perceived Quality Characteristics of Web 2.0 tools at Pearson Institute of Higher Education

System quality items were analysed with Factor Analysis to extract factors and two emerged: *Ease of use* and *general systems (Web 2.0 tool) quality characteristics*. Factor analysis was used to describe variability among the correlated variables.

Ease of use was made up of two sub components:

- *The system (Web 2.0 tool) is easy to use* and
- *The system (Web 2.0 tool) is easy to understand*.

General systems quality characteristics was made up of the following sub components:

- *The system (Web 2.0 tool) is reliable;*
- *The system (Web 2.0 tool) is efficient and effective;*
- *The system (Web 2.0 tool) allows for rich and responsive interaction and*
- *The system (Web 2.0 tool) is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.*

Descriptive Statistics

	Mean	Std. Deviation	N
USAGE	10.7795	4.41662	127
SYS_EOU	3.6457	.63655	127
SYS_general	3.0835	.68565	127

Table 4.16 System quality at PIHE

The above results were based on the following perceived quality characteristics findings:

4.4.1.1 The system is reliable

In this study, system refers to the Web 2.0 tool. The findings revealed that 9% of respondents agreed that the system is reliable. A total of 13% of respondents strongly disagreed and 49% of respondents disagreed that the system is reliable. The remaining 30% of respondents neither agreed nor disagreed with the statement. The high disagreement amounts indicate that this is one of the reasons for the low adoption and usage rates of Web 2.0 tools in higher education at Pearson Institute of Higher education.

4.4.1.2 The system is easy to use

The findings revealed that 56% of respondents agreed and 11% of respondents strongly agreed that the system is easy to use. A small proportion of 7% of respondents disagreed with the statement. The remaining 26% of respondents neither agreed nor disagreed that the system is easy to use.

4.4.1.3 The system is easy to understand

The findings revealed that 61% of respondents agreed and 4% of respondents strongly agreed that the system is easy to understand. A small proportion of 7% of respondents disagreed with the statement. The remaining 27% of respondents were neutral that the system is easy to understand.

4.4.1.4 The system is efficient and effective

A total of 14% of respondents agreed that the system is efficient and effective. A total of 17% of respondents strongly disagreed and 33% of respondents disagreed with the statement. The remaining 36% of respondents were neutral that the system is efficient and effective.

4.4.1.5. The system allows for rich and responsive interactions

A total of 26% of respondents agreed and 6% of respondents strongly agreed that the system allows for rich and responsive interactions. A total of 14% of respondents strongly disagreed and 31% of respondents disagreed with the statement. The remaining 23% of respondents were neutral that the system allows for rich and responsive interactions.

4.4.1.6 The system is easily adapted as a learning tool

A total of 26% of respondents agreed and 6% of respondents strongly agreed that that the system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc. A total of 13% of respondents strongly disagreed and 16% of respondents disagreed with the statement. The remaining 40% of respondents were neutral that the system allows for rich and responsive interactions.

Based on these results, there are significant agreements with the following statements regarding perceived quality characteristic:

- *the system is easy to use* (M=3.71, SD = .764), t (69) = 7.821, p<.0005 *and*
- *the system is easy to understand* (M=3.63, SD = .685), t (69) = 7.681, p<.0005.

There are two significant disagreements with the statement that:

- *the system is reliable*: (M=2.34, SD = .814), t (69) = -6.751, p<.0005 and

- *the system is efficient and effective* (M=2.47, SD = .944), t (69) = -4.686, p<.0005.

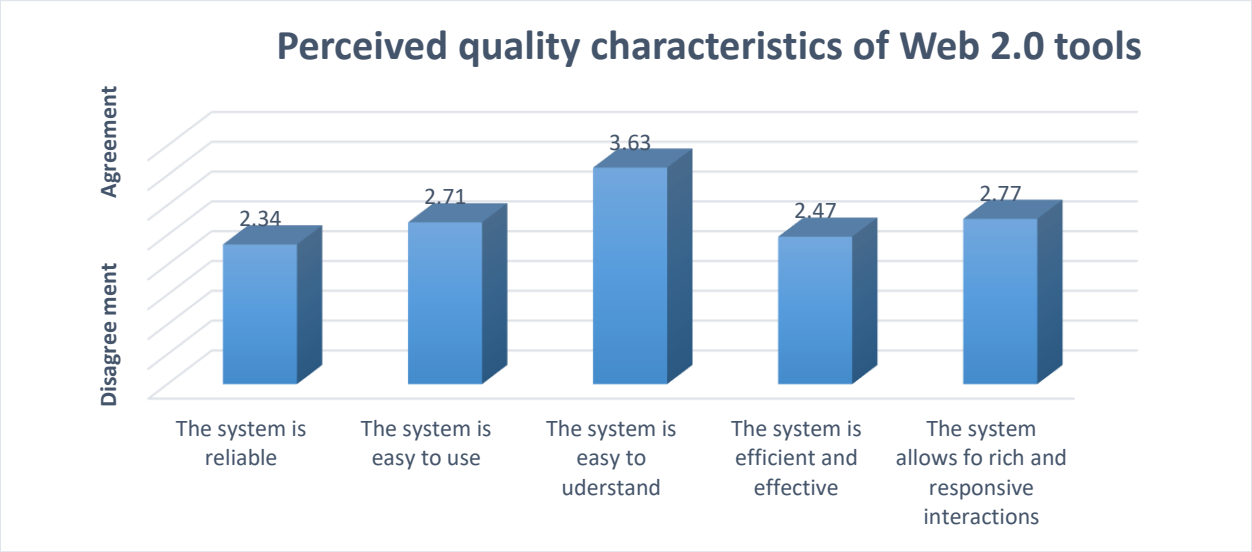


Figure 4.10 perceived quality characteristics towards the usage of Web 2.0 tools at PIHE

The next section introduces the reader to the perceived quality characteristics of Web 2.0 tools at Monash South Africa.

4.4.2 Perceived Quality Characteristics of Web 2.0 tools at Monash South Africa

Perceived Quality Characteristics were analysed with Factor Analysis to extract factors and two emerged:

Ease of use and system in general (general Web 2.0 quality factors)

Ease of use was made up of the following items:

- *The system is easy to use* and
- *The system is easy to understand*.

	Mean	Std. Deviation	N
USAGE	11.7193	4.44311	57
SYS_EOU	3.6140	.53467	57
SYS_general_M	3.4503	.59924	57

Table 4.17 System quality factors at MSA

The above results were based on the following perceived quality characteristics findings:

4.4.2.1 The system is reliable

A total of 32% of respondents agreed that the system is reliable, whilst 28% of respondents disagreed that the system is reliable. The remaining 40% of respondents neither agreed nor disagreed with the statement.

4.4.2.2 The system is easy to use

A total of 63% of respondents stated that the system is easy to use. A small proportion of 7% of respondents disagreed with the statement. The remaining 30% of respondents neither agreed nor disagreed that the system is easy to use.

4.4.2.3 The system is easy to understand

A significant amount of 67% of respondents agreed that the system is easy to understand. The remaining 33% of respondents were neutral that the system is easy to understand. None of the respondents disagreed with the statement.

4.4.2.4 The system is efficient and effective

A significant amount of 56% of respondents agreed that the system is efficient and effective. A total of 23% of respondents disagreed with the statement and a small proportion of m 21% of respondents were neutral that the system is efficient and effective.

4.4.3.5 The system allows for rich and responsive interactions

A significant amount of 60% of respondents agreed that the system allows for rich and responsive interactions. A small amount of 16% of respondents strongly disagreed with the statement. The remaining 25% of respondents were neutral that the system allows for rich and responsive interactions.

4.4.3.6 The system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.

A significant amount of 60% of respondents agreed that that the system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc. Only 2% of respondents disagreed with the statement. The remaining 39% of respondents were neutral that the system allows for rich and responsive interactions.

Based on these results, there are significant agreements with the following statements regarding system quality:

- *The system is easy to use* (M=3.56, SD = .627), t (56) = 6.757, p<.0005*;*
- *The system is easy to understand* (M=3.67, SD = .476), t (56) = 10.583, p<.0005*;*
- *The system is efficient and effective* (M=3.33, SD = .831), t (56) = 3.029, p=.004;
- *The system allows for rich and responsive interactions* (M=3.44, SD = .756), t (56) = 4.378, p<.0005 *and*
- *The system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.* (M=3.58, SD = .533), t (56) = 8.204, p<.0005.

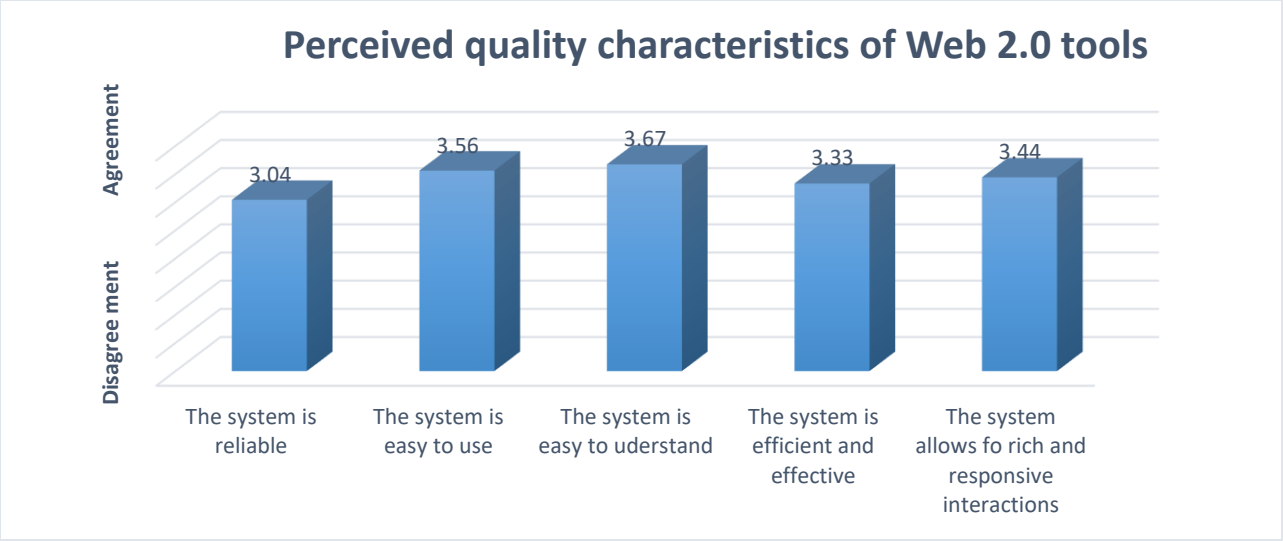


Figure 4.11 Quality characteristics of usage of Web 2.0 tools at MSA

The next section provides a brief overview of the overall combined results of perceived quality characteristics from both of the higher education institutions.

4.4.3 Combined results from both institutions

The combined perceived quality findings of Web 2.0 tools were as follows:

4.4.3.1 The system is reliable

Majority of the respondents, 39% disagreed and 7% of the respondents strongly disagreed that the system is reliable. A small proportion of the respondents, 19% agreed that the system is reliable. The remaining 35% of respondents neither agreed nor disagreed.

4.4.3.2 The system is easy to use

A significant amount of 59% of the respondents agreed and 6% strongly agreed that the system is easy to use. Only 7% of respondents were in disagreement to this statement. 28% of respondents were neutral.

A significantly higher number of respondents at Monash South Africa agreed that the system is reliable as compared to the responses from Pearson Institute of Higher Education. In addition, a lower number of respondents from this organisation disagreed with the statement.

4.4.3.3 The system is easy to understand

A total of 64% of respondents agreed and 2% of respondents strongly agreed that the system is easy to understand. Only 4% of respondents disagreed with the statement. The remaining 30% of respondents were neutral.

From the above results, both of the organisations had similar results with regard to the level of agreement that the system is easy to understand.

4.4.3.4 The system is efficient and effective

The findings revealed that 33% of respondents agreed that the system is efficient and effective. A total of 9% of respondents strongly disagreed and 28% of respondents disagreed with the statement. The remaining 29% of respondents neither agreed nor disagreed.

A significantly higher number of respondents from Monash South Africa agreed that the system is efficient and effective as compared to the responses from Pearson Institute of Higher Education.

4.4.3.5 The system allows for rich and responsive interactions

A significant amount of 41% of respondents agreed and 3% of respondents strongly agreed that the system allows for rich and responsive interactions. A total of 8% of respondents strongly agreed and 24% of respondents disagreed with the statement. The remaining 24% of respondents were neutral.

The system allows for rich and responsive interactions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	7.9	7.9	7.9
	Disagree	31	24.4	24.4	32.3
	Neutral	30	23.6	23.6	55.9
	Agree	52	40.9	40.9	96.9
	Strongly agree	4	3.1	3.1	100.0
	Total	127	100.0	100.0	

Table 4.18 Rich and responsive interactions

A significantly higher number of respondents from Monash South Africa agreed that the system allows for rich and responsive interactions as compared to the responses from Pearson Institute of Higher Education.

4.3.3.6 The system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.

A total of 41% of respondents agreed and 3% strongly agreed that the system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc. A small proportion of 7% of respondents strongly agreed and 9% of respondents disagreed with the statement. The remaining 39% of respondents neither agreed nor disagreed.

Based on these results, there is a significant agreement with the following statements regarding system quality:

- *The system is easy to use* (M=3.65, SD = .707), t (126) = 10.286, p<.0005*;*
- *The system is easy to understand* (M=3.65, SD = .598), t (126) = 12.168, p<.0005*;*
- *The system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.* (M=3.24, SD = .930), t (126) = 2.863, p=.005.

There was a significant disagreement with the statement that *the system is reliable*: (M=2.65, SD = .867), t (126) = -4502, p<.0005.

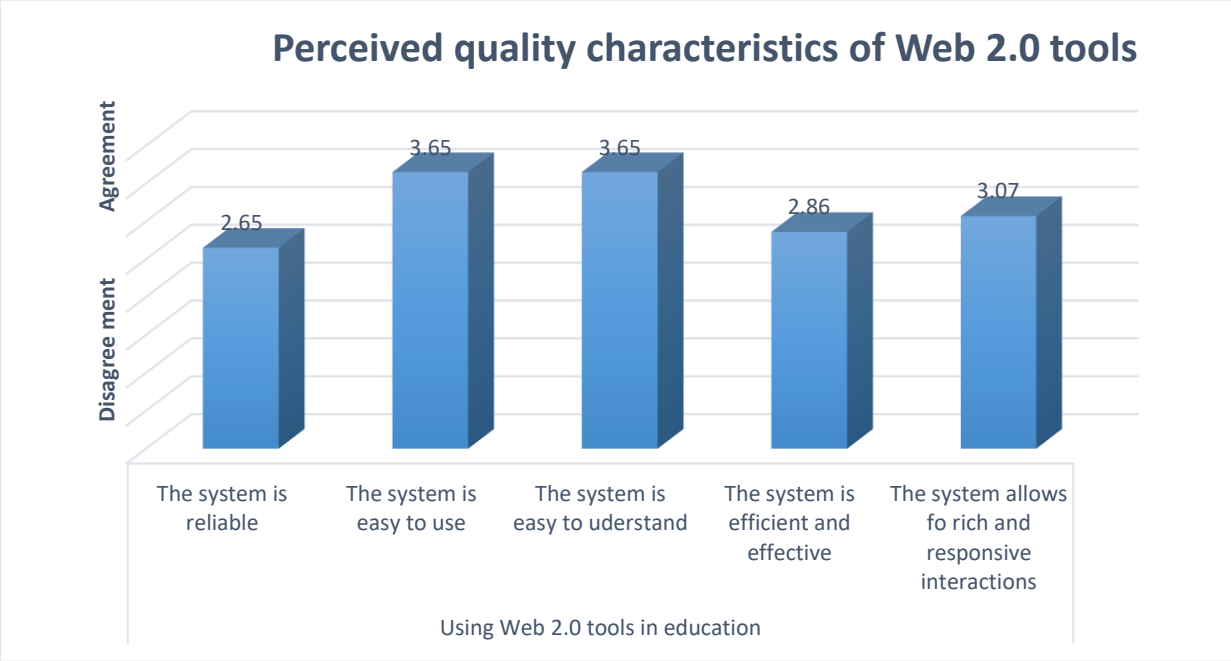


Figure 4.12 Sub factors relating to perceived quality characteristics

These findings are in line with a study by Ajan and Hartshorne (2008) who highlighted that ease of use, usefulness and compatibility of Web 2.0 technologies with students' academic activities contributed significantly to the usage of Web 2.0 tools. The next section will discuss the pedagogical factors of Web 2.0 tools in an effort to identify any significant factors that contributes to the usage of Web 2.0 tools in higher education.

4.5 Pedagogical Factors

Pedagogical factors was broken up into *pedagogical characteristics of Web 2.0 tools* and *pedagogical beliefs*. Respondents were asked to indicate their agreement that the following pedagogic statements should be supported with the usage of Web 2.0 tools:

4.5.1 Pedagogical characteristics of Web 2.0 tools

Pedagogical characteristics of Web 2.0 tools provides an overview of the sub factors related to usage of Web 2.0 tools in education. These are the characteristics of the tool for learning.

The Cronbach Alpha for pedagogical characteristics of Web 2.0 tool is displayed below.

Factor	Findings	Cronbach Alpha
Pedagogical factor *Pedagogical characteristics of Web 2.0 tool (PC)*	*PC of Web 2.0 tool* is not a significant predictor of usage of Web 2.0 tools.	CA = .784
Pedagogical factors (PIHE) *Pedagogical characteristics of Web 2.0 tool*	*PC of Web 2.0 tool* is not a significant predictor of usage of Web 2.0 tools.	= .872
Pedagogical factor (MSA) *Pedagogical characteristics of Web 2.0 tool*	*PC of Web 2.0 tool* is not a significant predictor of usage	= .639

Table 4.19 Cronbach Alpha for pedagogical characteristics of Web 2.0 tool

4.5.1.1 Pedagogical characteristics of Web 2.0 tools at Pearson Institute of Higher Education

Based on Table 4.38, the pedagogical characteristics were further analysed at each higher education institution. The following are the results at PIHE:

a. More flexible than traditional teaching

Based on literature, the usage of Web 2.0 tools is more flexible than traditional face-to-face approach as the learning takes place outside of the classroom. A total of 53% of respondents agreed and 26% of respondents strongly agreed that Web 2.0 tools are more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time. A small proportion, 6% of respondents disagreed with the statement. The remaining 16% of respondents were neutral.

b. Build a sense of community

The usage of Web 2.0 tools in education is able to build a sense of community. The findings revealed that 49% of respondents agreed and 11% of respondents strongly agreed that Web 2.0 tools help build a sense of community. Only 11% of respondent disagreed with the statement. The remaining 29% of respondents were neutral.

c. Flexible learning environment

The usage of Web 2.0 tools in education provides a flexible learning environment. The findings revealed that 43% of respondents agreed and 36% of respondents strongly agreed that Web 2.0 tools helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls. A small proportion, 7% of respondent disagreed with the statement. The remaining 14% of respondents were neutral.

d. Student engagement

The usage of Web 2.0 tools can assist by providing a more engaging learning experience. The findings revealed that 41% of respondents agreed and 31% of respondents strongly agreed that the usage of Web 2.0 tools can be very helpful in engaging students' interest. A small proportion, 1% of respondent disagreed and 6% of respondents strongly disagreed with the statement. The remaining 20% of respondents were neutral.

... is very helpful in engaging students' interest

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	5.7	5.7	5.7
	Disagree	1	1.4	1.4	7.1
	Neutral	14	20.0	20.0	27.1
	Agree	29	41.4	41.4	68.6
	Strongly agree	22	31.4	31.4	100.0
	Total	70	100.0	100.0	

Table 4.20 Pedagogical characteristics of Web 2.0 tools at PIHE for student engagement

e. Web 2.0 tools are helpful in terms of storing information online and resource sharing

The usage of Web 2.0 tools can assist in storing information online and enables resource sharing. A significant amount of respondents was in agreement with this statement (60%) and 19% strongly agreed. The remaining respondents, 21% were neutral. This statement was not disagreed by any of the respondents. This indicates that majority of the respondents felt Web 2.0 tools are helpful in terms of storing information online and for resource sharing.

The findings of pedagogical characteristics of Web 2.0 tools are summarised below:

- *is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time* (M=3.99, SD = .807), t (69) = 10.214, p<.0005;
- *helps build a sense of community* (M=3.60, SD = .841), t (69) = 5.969, p<.0005;
- *helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls* (M=4.07, SD = .890), t (69) = 10.073, p<.0005;
- *is very helpful in engaging students' interest* (M=3.91, SD = 1.046), t (69) = 7.313, p<.0005;
- *is helpful in terms of storing information online and resource sharing* (M=4.03, SD = .722), t (69) = 11.923, p<.0005.

These results are displayed in Figure 4.13.

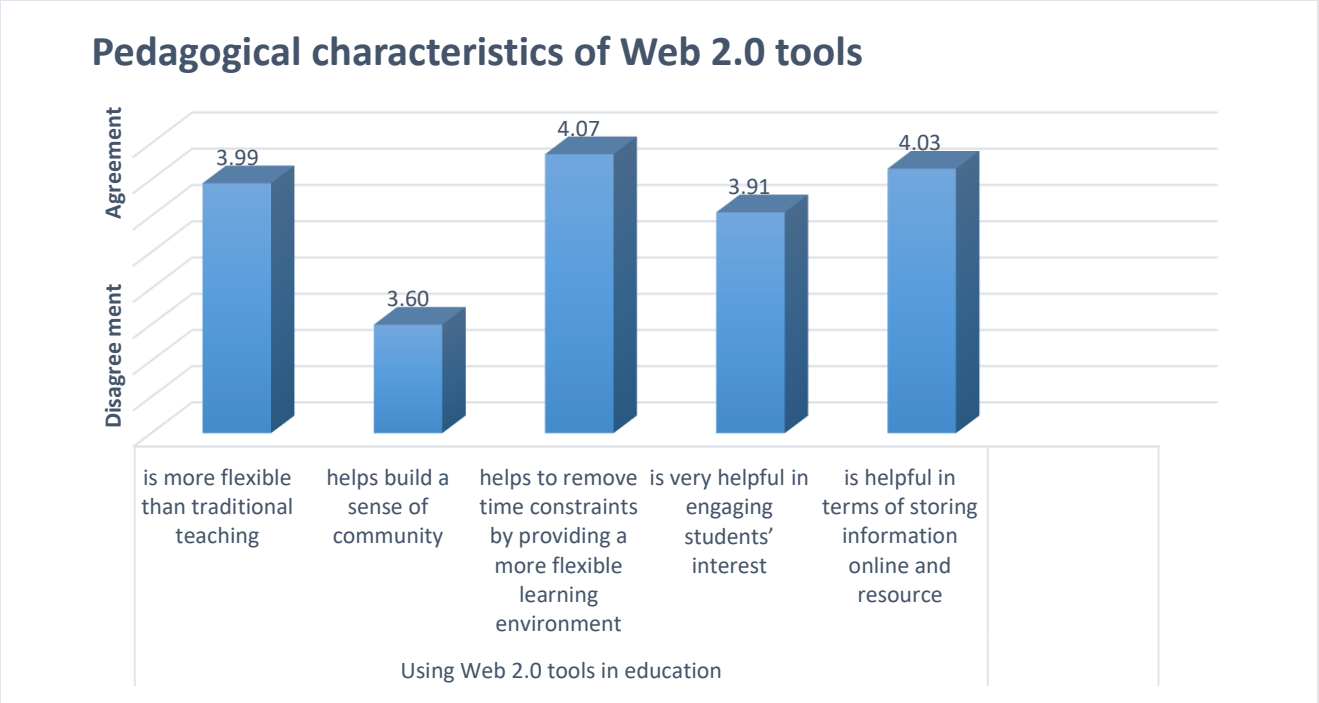


Figure 4.13 Pedagogical characteristics of Web 2.0 tools at PIHE

The next section discusses the pedagogical characteristics of Web 2.0 tools at Monash South Africa.

4.5.1.2 Pedagogical characteristics of Web 2.0 tools at Monash South Africa

The results pertaining to the pedagogical characteristics of Web 2.0 tools is discussed below:

a. More flexible than traditional teaching

A total of 79% of respondents agreed and 5% of respondents strongly agreed that Web 2.0 tools are more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time. A small proportion, 7% of respondents disagreed and 9% of respondents were neutral.

b. Building a sense of community

A total of 67% of respondents agreed and 7% of respondents strongly agreed that Web 2.0 tools help build a sense of community. A small proportion, 14% of respondent disagreed and the remaining 12% of respondents were neutral.

c. Flexible learning environment

A total of 56% of respondents agreed and 28% of respondents strongly agreed that Web 2.0 tools helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls. The remaining 16% of respondents were neutral.

d. Student engagement

A total of 65% of respondents agreed and 9% of respondents strongly agreed that the usage of Web 2.0 tools can be very helpful in engaging students' interest. A small proportion, 2% of respondent disagreed and 14% of respondents strongly disagreed with the statement. The remaining 11% of respondents were neutral.

e. Storing information online and resource sharing

A total of 74% of respondents agreed and 9% of respondents strongly agreed that Web 2.0 tools are helpful in terms of storing information online and resource sharing. The remaining 18% of respondents were neutral. None of the respondents disagreed with the statement.

The findings of pedagogical characteristics of Web 2.0 tools at MSA are summarised below:

- *is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time* (M=3.82, SD = .630), t (56) = 9.877, p<.0005;
- *helps build a sense of community* (M=3.67, SD = .809), t (56) = 6.220, p<.0005;
- *helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls* (M=4.12, SD = .657), t (56) = 12.911, p<.0005;
- *is very helpful in engaging students' interest* (M=3.53, SD = 1.151), t (56) = 3.452, p<.0005;
- *is helpful in terms of storing information online and resource sharing* (M=3.91, SD = .510), t (56) = 13.507, p<.0005.

The results are displayed in Figure 4.14.

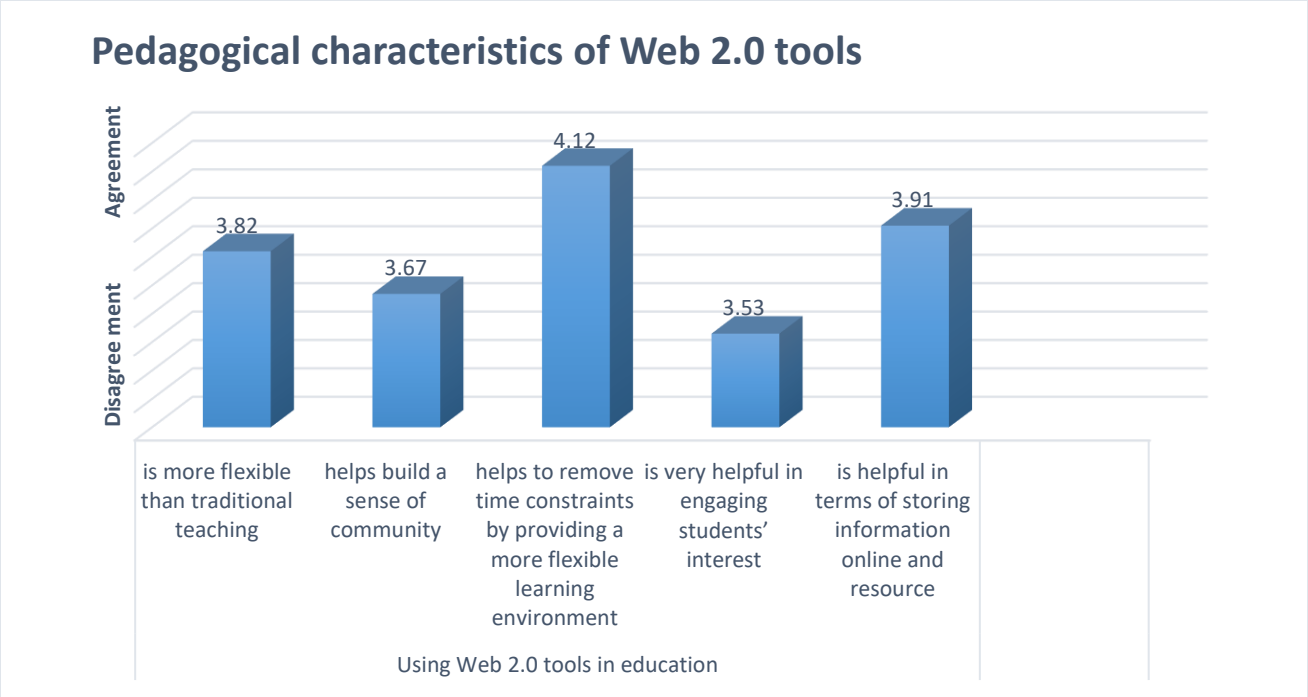


Figure 4.14 Pedagogical characteristics of Web 2.0 tools at MSA

The next section provides the overall pedagogical characteristics results from both of the higher education institutions.

4.5.1.3 Combined results from both institutions

The overall pedagogical characteristics of Web 2.0 tools is outlined below:

a. More flexible than traditional teaching

A significant amount of 65% of the respondents agreed and 17% strongly agreed. Only a small percentage of 6% disagreed and 13% of respondents were neutral.

b. Building a sense of community

This statement was agreed by 57% of the respondents and 9% strongly agreed. The remaining 13% disagreed and 21% were neutral.

Based on these results, Monash South Africa had a higher rate of agreement with regard to the use of Web 2.0 tools to build a sense of community.

c. Flexible learning environment

A total of 49% of respondents agreed and 32% strongly agreed that Web 2.0 tools help to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls. Only 4% of the respondents disagreed and the remaining 15% of the respondents were neutral.

d. Student engagement

A total of 52% of respondents agreed and 21% strongly agreed. A small percentage, 9% disagreed and 2% strongly disagreed. The remaining 16% of respondents were neutral.

e. Storing information online and resource sharing

A significant amount of respondents was in agreement with this statement (60%) and 19% strongly agreed. The remaining respondents, 21% were neutral. This statement was not disagreed by any of the respondents. This indicates that majority of the respondents felt Web 2.0 tools are helpful in terms of storing information online and for resource sharing.

Based on the above information, the findings of pedagogical characteristics of Web 2.0 tools are summarised as:

- *is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time* (M=3.91, SD = .735), t (126) = 14.007, p<.0005;
- *helps build a sense of community* (M=3.63, SD = .824), t (126) = 8.612, p<.0005;
- *helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls* (M=4.09, SD = .791), t (126) = 15.590, p<.0005;
- *is very helpful in engaging students' interest* (M=3.74, SD = 1.107), t (126) = 7.534, p<.0005;
- *is helpful in terms of storing information online and resource sharing* (M=3.98, SD = .636), t (126) = 17.307, p<.0005.

The results are displayed in Figure 4.15.

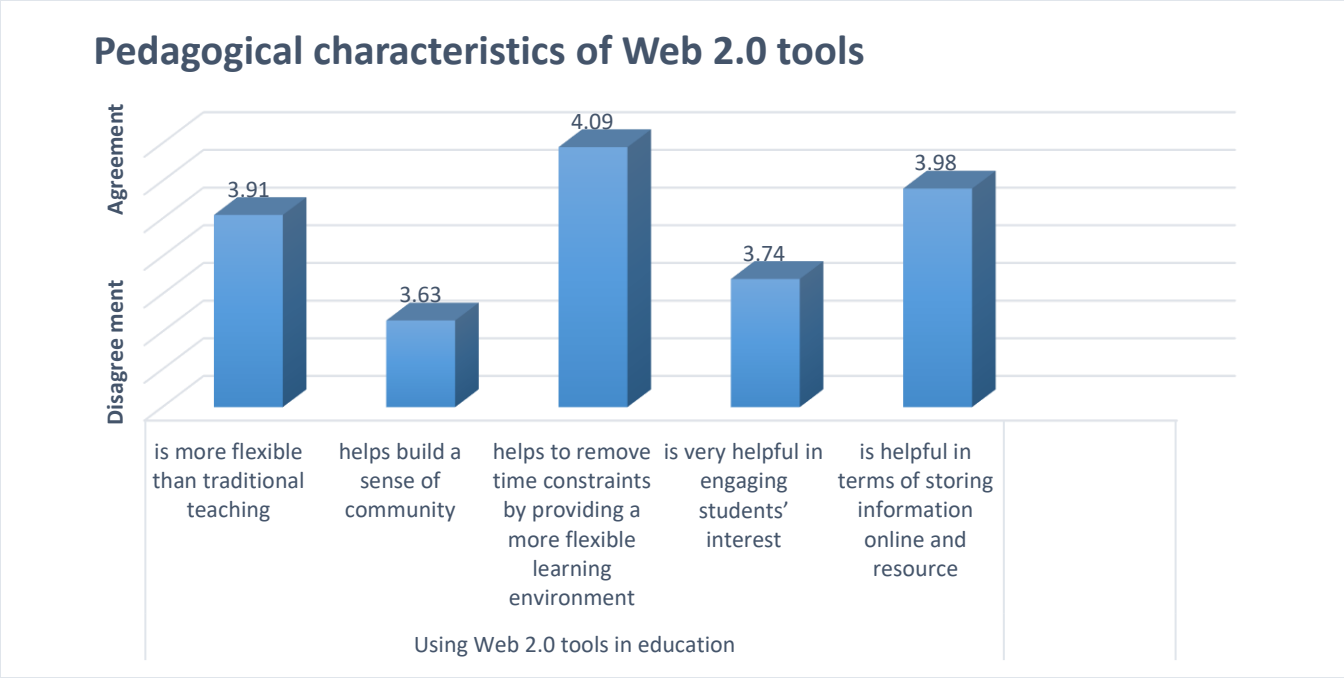


Figure 4.15 Pedagogical characteristics of Web 2.0 tools

Monash South Africa had a slightly higher rate of agreement with regard to the use of Web 2.0 tools for storing information online for resource sharing, with regard to the use of Web 2.0 tools being more flexible than traditional teaching in terms of delivery of content and agreement that the use of Web 2.0 tools helps to remove time constraints by providing a more flexible learning environment.

Both of the organisations had similar results with regard to the level of agreement that the use of Web 2.0 tools can be very helpful in engaging students' interest.

The results are similar to a study conducted by An, Aworuwa, Ballard and Williams (2009), who identified the characteristics of using Web 2.0 technologies in teaching include interaction, communication and collaboration, knowledge creation, ease of use and flexibility, and writing and technology skills. The next section discusses the pedagogical beliefs of usage of Web 2.0 tools in education.

4.5.2 Pedagogical beliefs

This section discusses academics' beliefs in terms of Web 2.0 usage in higher education.

4.5.2.1 Pedagogical beliefs at Pearson Institute of Higher education

a. Student support

Web 2.0 tools brings about student support. This statement was assessed by academics at PIHE and the results revealed that a total of 50% of respondents agreed and 37% strongly agreed that Web 2.0 tools allows individual students to support one another by working in groups, participating in forums, blogs, etc. The remaining 13% of respondents were neutral.

b. Expression through blogs

Web 2.0 tools enhances learning and creativity. A total of 50% of respondents agreed and 14% strongly agreed that Web 2.0 tools enhances learning and creativity by encouraging creative expression through blogs, etc. 6% of respondents disagreed and the remaining 30% of respondents were neutral to the statement.

c. Informal learning

Web 2.0 tools encourages the use of social media in education. A total of 33% of respondents agreed and 7% strongly agreed that social networking for educational purposes enable students to build their knowledge, share material and grasp issues in class. A small proportion, 6% of respondents disagreed and 6% strongly disagreed with the statement. The remaining 49% of respondents were neutral.

d. Team work

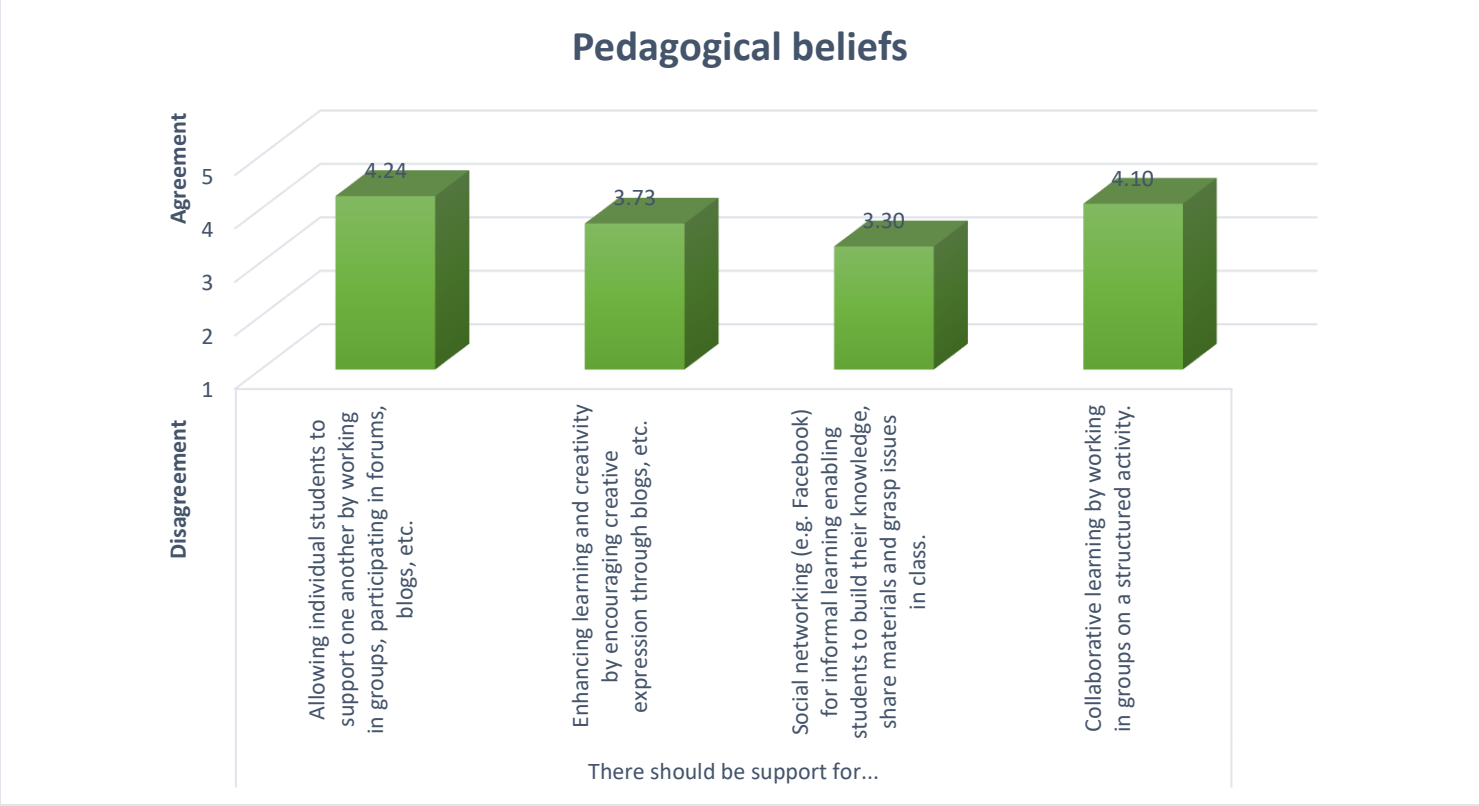
The usage of Web 2.0 tools in education enables collaborative learning. A total of 47% of respondents agreed and 34% strongly agreed that Web 2.0 tools can encourage collaborative learning by working in groups. A small proportion, 6% of respondents disagreed and 13% of respondents were neutral.

Based on these results, it is evident that there is a significant agreement on pedagogical beliefs pertaining to Web 2.0 tools:

- *allows individual students to support one another by working in groups, participating in forums, blogs, etc.* (M=4.24, SD = .669), t (69) = 15.546, p<.0005;

- *enhance learning and creativity by encouraging creative expression through blogs, etc.* (M=3.73, SD = .779), t (69) = 7.828, p<.0005;
- *social networking (e.g. Facebook) for informal learning enabling students to build their knowledge, share materials and grasp issues in class* (M=3.30, SD = .906), t (69) = 2.769, p=.007 *and*
- *collaborative learning by working in groups on a structured activity* (M=4.10, SD = .837), t (69) = 11.000, p<.0005.

Figure 4.16 Pedagogical beliefs at PIHE



The above statements will be assessed at Monash South Africa. The findings are discussed in the next section.

4.5.2.2 Pedagogical beliefs at Monash South Africa

The findings below are the academics' beliefs regarding the usage of Web 2.0 tools in education.

a. Student support

A total of 49% of respondents agreed and 9% strongly agreed that Web 2.0 tools allows individual students to support one another by working in groups, participating in forums, blogs, etc. A total of 5% of respondents strongly disagree with the statement and the remaining 37% of respondents were neutral.

b. Expression through blogs

A total of 81% of respondents agreed that Web 2.0 tools enhances learning and creativity by encouraging creative expression through blogs, etc. The remaining 19% of respondents were neutral to the statement. None of the respondents disagreed with the statement.

c. Informal learning

A total of 68% of respondents agreed that social networking for educational purposes enable students to build their knowledge, share material and grasp issues in class. The remaining 32% of respondents were neutral. None of the respondents disagreed with the statement.

d. Team work

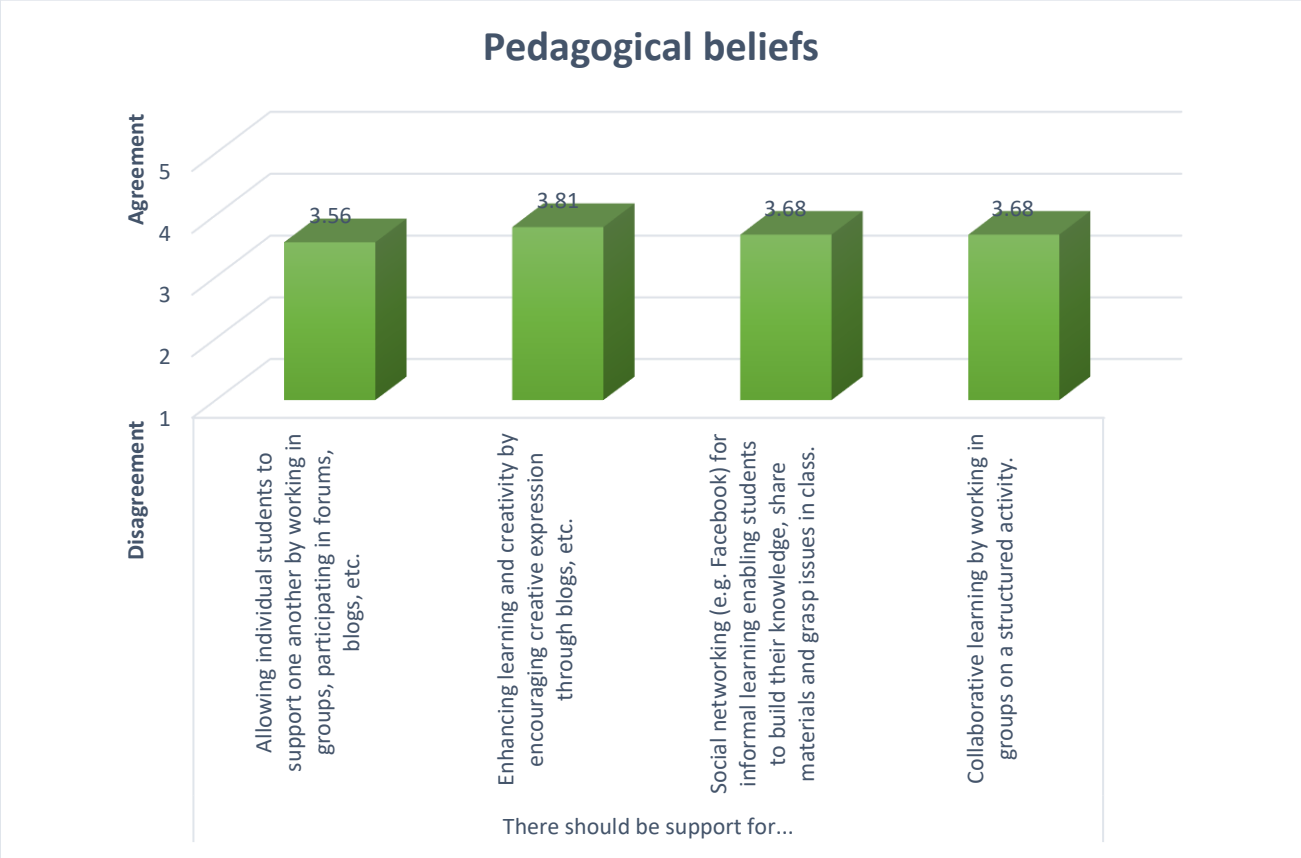
A total of 7% of respondents agreed and 7% strongly agreed that Web 2.0 tools can encourage collaborative learning by working in groups. A small proportion, 16% of respondents disagreed and 7% of respondents were neutral.

Based on these results, it is evident that there is a significant agreement on pedagogical beliefs pertaining to Web 2.0 tools:

- *allows individual students to support one another by working in groups, participating in forums, blogs, etc.* (M=3.56, SD = .866), t (56) = 4.892, p<.0005;
- *enhance learning and creativity by encouraging creative expression through blogs, etc.* (M=3.81, SD = .398), t (56) = 15.303, p<.0005;
- *social networking (e.g. Facebook) for informal learning enabling students to build their knowledge, share materials and grasp issues in class* (M=3.68, SD = .469), t (56) = 11.015, p=.007 *and*
- *collaborative learning by working in groups on a structured activity* (M=3.68, SD = .827), t (56) = 6.245, p<.0005.

Figure 4.17 Pedagogical beliefs at MSA

The next section discusses the overall findings regarding pedagogical beliefs from both of the higher education institutions.



4.5.2.3 Combined results

The combined pedagogical beliefs from both of the higher education institutions is discussed below:

a. Student support

A significant amount of 50% of respondents agreed that Web 2.0 tools allows individual students to support one another by working in groups, participating in forums, blogs, etc. Only 2% of the respondents strongly disagreed and the remaining 24% of respondents were neutral.

Based on these results, Pearson Institute of Higher Education had a higher rate of agreement that the use of Web 2.0 tools allows individual students to support one another by working in groups, participating in forums, blogs, etc. In addition, none of the respondents from this organisation disagreed with the statement.

b. Expression through blogs

A total of 64% of respondents agreed with this statement and 8% strongly agreed. A small percentage of respondents, 3% disagreed and 25% were neutral.

A significant number of respondents from Monash South Africa agreed that Web 2.0 tools enhances learning and creativity by encouraging creative expression through blogs, etc. In addition, none of the respondents from this organisation disagreed with the statement.

c. Informal learning

A total of 49% of respondents agreed and 4% strongly agreed that social networking for educational purposes enable students to build their knowledge, share material and grasp issues in class. A total of 3% of respondents strongly disagreed and 3% of respondents disagreed. A significant amount of 41% of respondents were neutral to this statement.

A significantly higher number of respondents from Monash South Africa agreed that social networking for educational purposes enable students to build their knowledge, share material and grasp issues in class. In addition, none of the respondents from this organisation disagreed with the statement.

d. Team work

A significant amount of 58% of respondents agreed and 22% strongly agreed that Web 2.0 tools can encourage collaborative learning by working in groups. Only 10% of respondents disagreed and the remaining 10% of respondents were neutral.

Based on these results, it is evident that there is a significant agreement on pedagogical beliefs pertaining to Web 2.0 tools:

- *allows individual students to support one another by working in groups, participating in forums, blogs, etc.* (M=3.94, SD = .833), t (126) = 12.672, p<.0005;
- *enhance learning and creativity by encouraging creative expression through blogs, etc.* (M=3.76, SD = .636), t (126) = 13.541, p<.0005;
- *social networking (e.g. Facebook) for informal learning enabling students to build their knowledge, share materials and grasp issues in class* (M=3.47, SD = .765), t (126) = 6.964, p<.0005 *and*
- *collaborative learning by working in groups on a structured activity* (M=3.91, SD = .855), t (126) = 12.043, p<.0005.

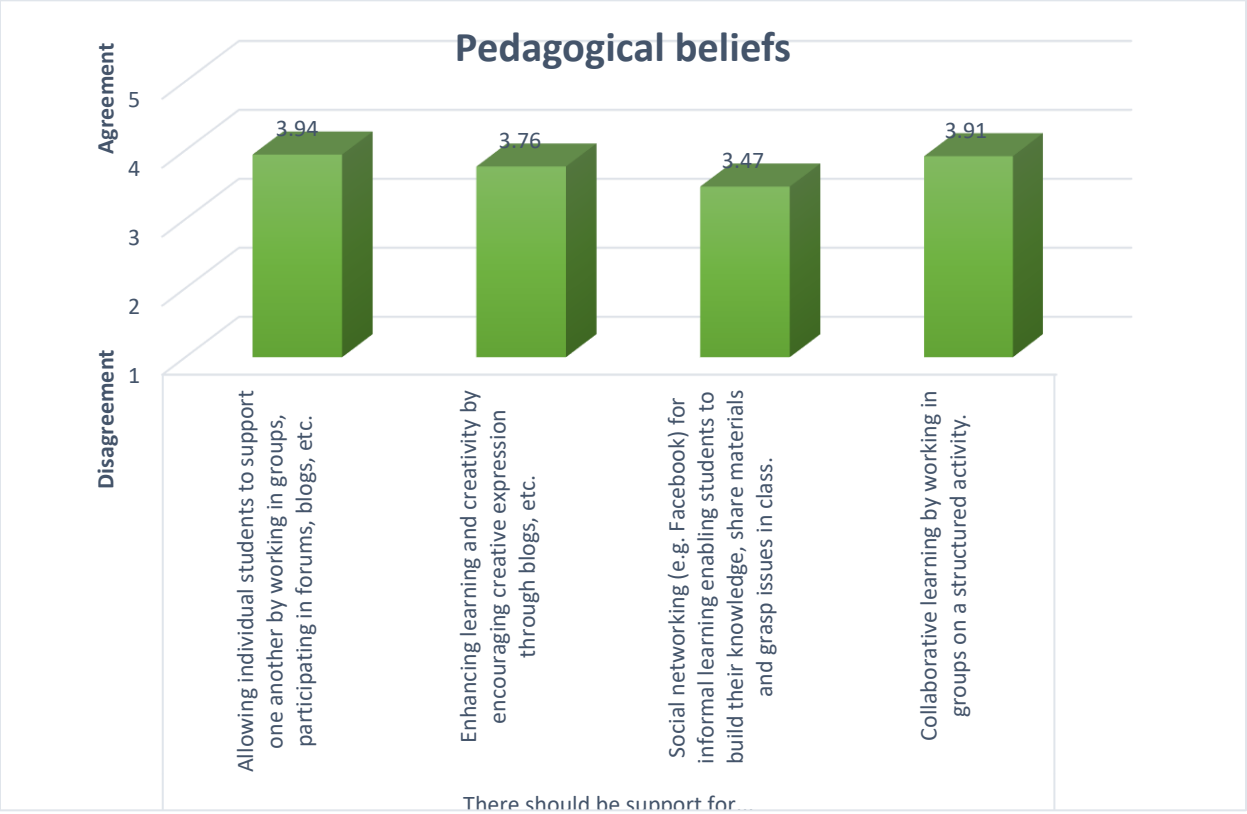


Figure 4.18 Pedagogical beliefs

Based on the results from both the higher education institutions, pedagogical factors are not significant predictors of usage of Web 2.0 tools. Bubas, Coric and Orehovacki (2011) suggests

following a set of pedagogical strategies for the usage of Web 2.0 tools. These strategies could help by assisting to enhance the teaching and learning process. The strategies are made up of:

(a) The suitable Web 2.0 tools should be selected based on their potential effectiveness to attract interest, engage students and better illustrate the course content;

(b) Use of Web 2.0 tools and related pedagogical activities should be evaluated with the intention of improvement of instructional design

(c) Web 2.0 tools can be utilised to facilitate collaboration and peer-to-peer learning; more than one generation of students can participate in the development of course related online content that can be used as support for the students currently enrolled in a course and informal learning and

(d) Even though the use of Web 2.0 tools may be time consuming positive effects regarding retention and higher order cognitive learning may be more important.

These strategies could assist in enhancing the teaching and learning process. According to Exter, Rowe, Boyd and Lloyd (2012), Web 2.0 tools used in the higher education helps to engage students in their learning, provides a social platform where students can interact with their peers, develop a deep understanding of content and collaboratively learn by working in groups. These findings are differs to the results that emerged in this study. The next section will discuss the factors related to *Effort* that influences the usage of Web 2.0 tools in higher education.

4.6 *Effort* involved towards the use of Web 2.0 tools in education

Effort is linked to the Unified Theory of Use and Acceptance of Technology model (UTAUT). In UTAUT, effort expectancy is an important factor in determining the degree of ease associated with the use of the technology. Effort in this study means involving more work in teaching with the use of Web 2.0 tools, and not with ease of use in using Web 2.0 tools. Therefore, Effort results in a significant relationship of lower usage of Web 2.0 tools.

The following sections explains the findings relating to effort involved with the usage of Web 2.0 tools in more detail. In this section, respondents were asked to indicate their agreement with the following statements regarding effort involved towards the use of Web 2.0 tools in education opposed to traditional face to face teaching in a blended environment.

The Cronbach Alpha for EFFORT is displayed below.

Factor	Findings	Cronbach Alpha
EFFORT	*EFFORT* is not a significant predictor of higher usage. High effort is associated with lower usage.	= .776
EFFORT (PIHE)	*EFFORT* is a significant predictor of lower usage of Web 2.0 tools.	= .827
EFFORT (MSA)	*EFFORT* is a significant predictor of lower usage of Web 2.0 tools.	= .717

Table 4.21 Cronbach Alpha for EFFORT

Section 4.6.1 and 4.6.2 describes the efforts involved in using Web 2.0 tools at each respective higher education institution.

4.6.1 Effort involved towards the usage of Web 2.0 tools at Pearson Institute of Higher Education

The findings regarding the amount of effort involved in using Web 2.0 tools in education at PIHE is discussed below:

a. Web 2.0 tools involves more work than in traditional face to face education

In order to determine if the usage of Web 2.0 tools involves more time, the researcher assessed this statement with the academics at PIHE. The findings revealed that 50% of respondents agreed and 6% of respondents strongly agreed that Web 2.0 tools involves more work than in traditional face to face education. An amount of 14% of respondents disagreed with the statement. The remaining 30% of respondents were neutral to this statement.

b. Web 2.0 tools requires careful wording because of the absence of audio/visual cues

Web 2.0 tools might require careful wording. Academics at PIHE revealed that 34% of respondents agreed that Web 2.0 tools requires careful wording because of the absence of audio/visual cues. An amount of 1% of respondents strongly disagreed and 33% of respondents disagreed with the statement. The remaining 31% of respondents were neutral to this statement.

c. Web 2.0 tools requires more communication

Web 2.0 tools may require more communication than the traditional approach. Based on this statement, a total of 34% of respondents agreed and 6% of respondents strongly agreed that Web 2.0 tools requires more communication. An amount of 40% of respondents disagreed with the statement. The remaining 20% of respondents were neutral to this statement.

d. Web 2.0 tools requires more planning and effort than traditional face to face teaching

The use of Web 2.0 tools may require more planning and effort than the traditional face-to-face approach. A total of 57% of respondents agreed and 6% of respondents strongly agreed that Web 2.0 tools requires more planning and effort than traditional face to face teaching. An amount of 26% of respondents disagreed with the statement. The remaining 11% of respondents were neutral to this statement.

e. Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching

The use of Web 2.0 tools in education may require more student support. A total of 37% of respondents agreed and 9% of respondents strongly agreed that Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching. An amount of 6% of respondents strongly disagreed and 26% of respondents disagreed with the statement. The remaining 23% of respondents were neutral to this statement.

Based on the results obtained at Pearson Institute of Higher Education, there is a significant agreement with the following statements regarding effort involved towards the use of Web 2.0 tools in education opposed to traditional face to face teaching in a blended environment:

Web 2.0 tools involves more work than in traditional face to face education ($M=3.47$, $SD = .812$), $t(69) = 4.860$, $p<.0005$ *and Web 2.0 tools requires more planning and effort than traditional face to face teaching* ($M=3.43$, $SD = .941$), $t(69) = 3.809$, $p<.0005$.

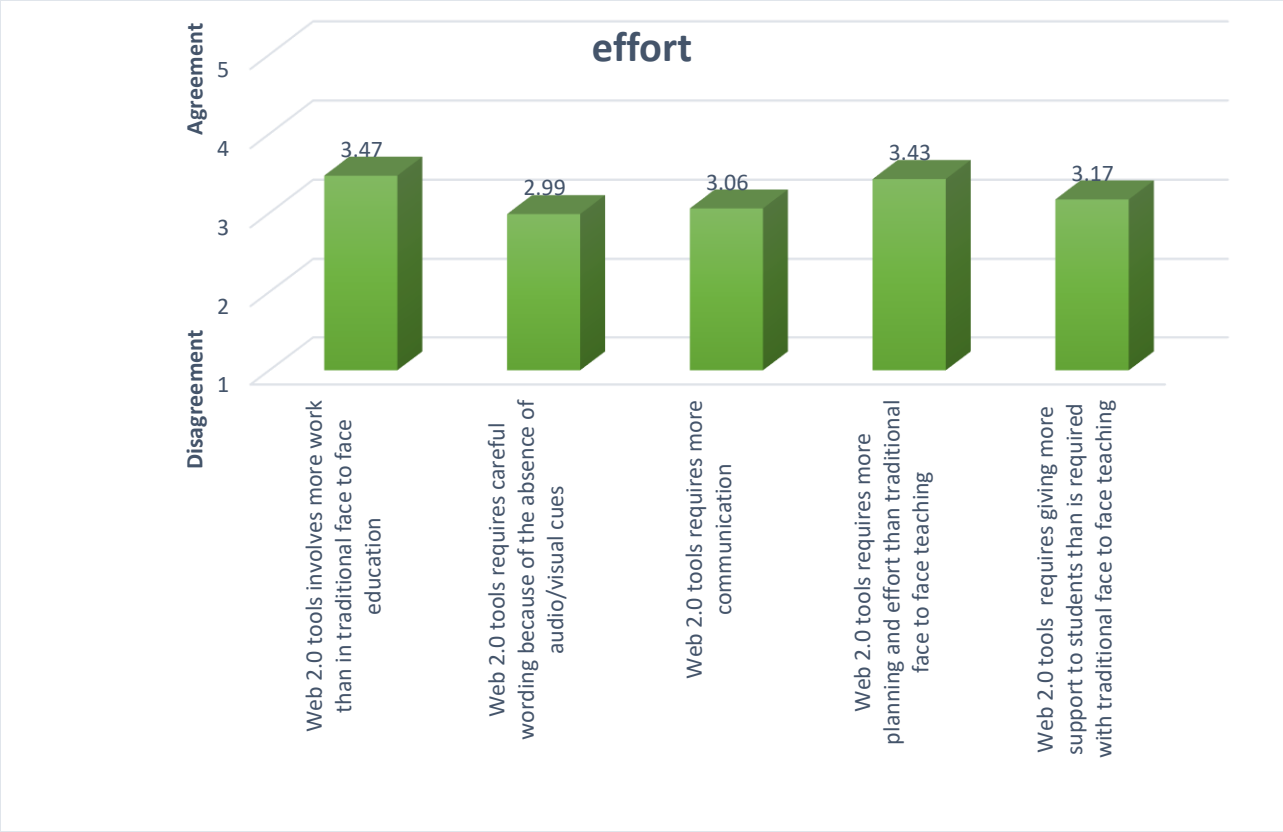


Figure 4.19 level of agreement regarding effort involved towards the use of Web 2.0 tools at PIHE

The next section discusses the effort involved in using Web 2.0 tools at Monash South Africa.

4.6.2 Effort involved towards the usage of Web 2.0 tools at Monash South Africa

The following are the results relating to the effort involved in using Web 2.0 tools in education opposed to the traditional face-to-face approach:

a. Web 2.0 tools involves more work than in traditional face to face education

A total of 65% of respondents agreed and 18% of respondents strongly agreed that Web 2.0 tools involves more work than in traditional face to face education. An amount of 18% of respondents were neutral to this statement. None of the respondents disagreed with the statement.

b. Web 2.0 tools requires careful wording because of the absence of audio/visual cues.

A total of 60% of respondents agreed and 7% of respondents strongly agreed that Web 2.0 tools requires careful wording because of the absence of audio/visual cues. The remaining 33% of respondents were neutral to this statement. None of the respondents disagreed with the statement.

c. Web 2.0 tools requires more communication

A significant amount of 88% of respondents agreed that Web 2.0 tools requires more communication. An amount of 5% of respondents disagreed with the statement. The remaining 7% of respondents were neutral to this statement.

d. Web 2.0 tools requires more planning and effort than traditional face to face teaching

A total of 49% of respondents agreed and 7% of respondents strongly agreed that Web 2.0 tools requires more planning and effort than traditional face to face teaching. An amount of 23% of respondents disagreed with the statement. The remaining 21% of respondents were neutral to this statement.

e. Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching

A total of 65% of respondents agreed that Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching. An amount of 9% of respondents disagreed with the statement. The remaining 26% of respondents were neutral to this statement.

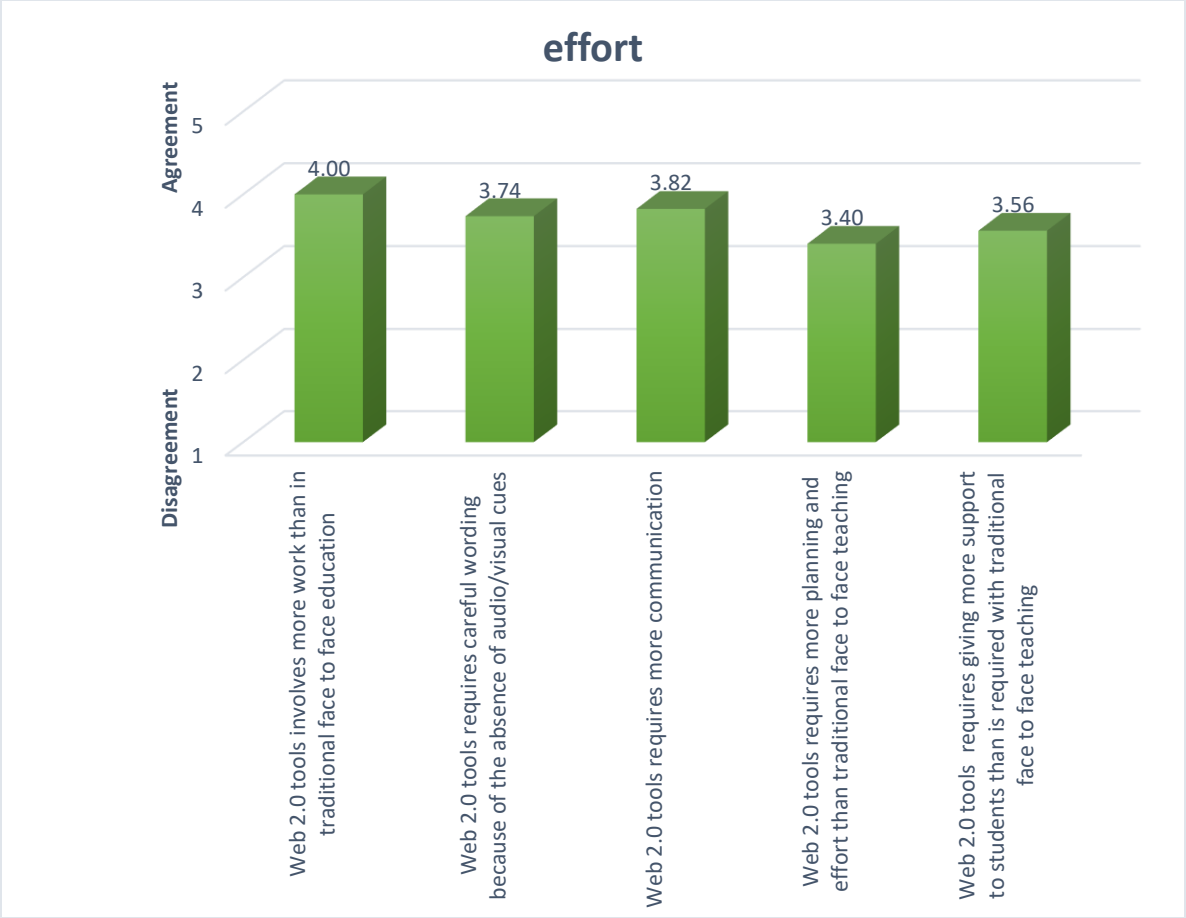
Based on the results obtained at Monash South Africa, there is a significant agreement with the following statements regarding effort involved towards the use of Web 2.0 tools in education opposed to traditional face to face teaching in a blended environment:

- *Web 2.0 tools involves more work than in traditional face to face education* (M=4.00, SD = .598), t (56) = 12.633, p<.0005*;*
- *Web 2.0 tools requires careful wording because of the absence of audio/visual cues* (M=3.74, SD = .583), t (56) = 9.537, p<.0005;
- *Web 2.0 tools requires more communication* (M=3.82, SD = .504), t (56) = 12.343, p<.0005*;*

- *Web 2.0 tools requires more planning and effort than traditional face to face teaching* (M=3.40, SD = .923), t (56) = 3.300, p<.0005 *and*
- *Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching* (M=3.56, SD = .655), t (56) = 6.470, p<.0005.

Figure 4.20 Level of agreement regarding effort involved towards the use of Web 2.0 tools at MSA

The next section discusses the overall combined results from both the higher education institutions



regarding *effort*.

4.6.3 Combined results for EFFORT

The following were the overall findings from both the higher education institutions:

a. Web 2.0 tools involves more work than in traditional face to face education

A total of 57% of respondents agreed and 11% of respondents strongly agreed that Web 2.0 tools involves more work than in traditional face to face education. Only 8% of respondents disagreed with this statement and 24% of respondents neither agreed nor disagreed.

Based on these results, a higher number of respondents from Monash South Africa agreed that Web 2.0 tools involves more work than in traditional face to face education. In addition, none of the respondents from this organisation disagreed with the statement as compared to the 14% of respondents that disagreed from Pearson Institute of Higher Education.

b. Web 2.0 tools requires careful wording because of the absence of audio/visual cues

A significant amount of respondents, 46% agreed and 3% strongly agreed that Web 2.0 tools requires careful wording because of the absence of the audio/visual cues. 0.8% of respondents strongly disagreed and 18% disagreed with the statement. The remaining 32% of respondents were neutral.

A higher number of respondents from Monash South Africa agreed that Web 2.0 tools requires careful wording because of the absence of audio/visual cues compared to the respondents from Pearson Institute of Higher Education. In addition, none of the respondents from this organisation disagreed with the statement as compared to the 34% of respondents that disagreed from Pearson Institute of Higher Education.

c. Web 2.0 tools requires more communication

A total of 54% of respondents agreed and 6% strongly agreed that Web 2.0 tools requires more communication. A total of 24% disagreed with the statement and 16% of respondents neither agreed nor disagreed.

A higher number of respondents from Monash South Africa agreed that Web 2.0 tools requires more communication. In addition, a significantly lower number of the respondents from this organisation disagreed with the statement as compared to the 40% of respondents that disagreed from Pearson Institute of Higher Education.

d. Web 2.0 tools requires more planning and effort than traditional face to face teaching

A significant amount of 54% of respondents agreed and 6% of respondents strongly agreed that Web 2.0 tools require more planning and effort than traditional face to face teaching. Only 24% of respondents disagreed with the statement. The remaining 16% of respondents were neutral.

A higher number of respondents from Pearson Institute of Higher Education agreed that Web 2.0 tools requires more planning and effort than traditional face to face teaching.

e. Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching

A significant total of 50% of respondents agreed and 5% of respondents strongly agreed that Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching. A small proportion of respondents, 3%, strongly disagreed and 18% of respondents disagreed with the statement. The remaining 24% were neutral.

Based on the results, there is a significant agreement with the following statements regarding effort involved towards the use of Web 2.0 tools in education opposed to traditional face to face teaching in a blended environment:

- *Web 2.0 tools involves more work than in traditional face to face education* (M=3.71, SD = .767), t (126) = 10.406, p<.0005*;*
- *Web 2.0 tools requires careful wording because of the absence of audio/visual cues* (M=3.32, SD = .835), t (126) = 4.359, p<.0005*;*
- *Web 2.0 tools requires more communication* (M=3.40, SD = .893), t (126) = 5.067, p<.0005*;*
- *Web 2.0 tools requires more planning and effort than traditional face to face teaching* (M=3.42, SD = .930), t (126) = 5.059, p<.0005 *and*
- *Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching* (M=3.35, SD = .938), t (126) = 4.164, p<.0005.

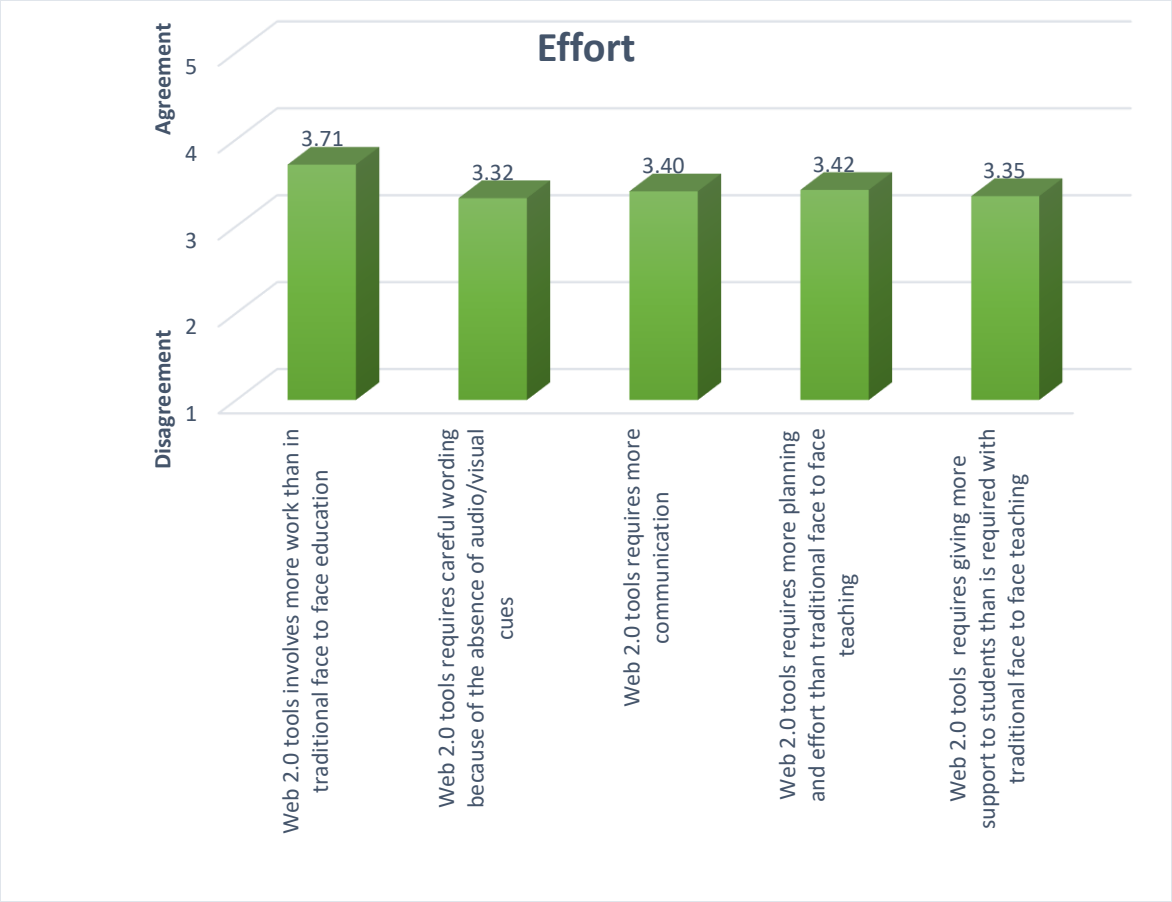


Figure 4.21 level of agreement regarding effort involved towards the use of Web 2.0 tools in education

In order to determine if Effort was a significant predictor of usage of Web 2.0 tools in education, a factor analysis followed by Cronbach's alpha was used. These statistical measures were used to test reliability and the findings indicated that *Web 2.0 tools involves more work than in traditional face to face education, Web 2.0 tools requires more communication and Web 2.0 tools requires more planning and effort than traditional face to face teaching.*

Based on the results, EFFORT has a negative influence on usage of Web 2.0 tools. High effort is associated with lower usage. The next section discusses the organisational factors of the usage of Web 2.0 tools in education.

4.7 Organisational factors

4.7.1 Organisational barriers

This section will provide an overview of the organisational factor results as well as the sub factors (Organisational barriers and support) that were used for this analysis

- **Barriers**

Factor analysis and Cronbach's alpha were applied to Organisational barriers and two factors emerged (Technological barriers and skill barriers). Factor analysis was used to describe variability among the correlated variables.

Descriptive Statistics

	Mean	Std. Deviation	N
USAGE	10.7795	4.41662	127
ORG_BAR_tech	3.7001	.88959	127
ORG_BAR_skills	3.8307	.68493	127

Table 4.22 Organisational barriers

Technological barriers (*Low bandwidth, lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools*)

Skills barrier (*Shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications*)

The Cronbach Alpha for organisational factors (technological and skill barriers) are displayed below.

Factor	Findings	Cronbach Alpha

Organisational factor *(Technological barriers*: *Low bandwidth, lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools*)	*Technological barriers* are not a significant predictor of usage.	= .826
Organisational factor *(Skills barrier*: *Shortage of adequately trained teaching staff and Inadequate training in the usage of ICT applications*)	*Skills barrier*s are not a significant predictor of usage.	= .596.
Organisational factors (PIHE) ***(****TECH_barriers_P*: *Low bandwidth, lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools*)	*Technological barriers* are not a significant predictor of usage.	= .760
Organisational factors (PIHE) *(SKILLS_barrier_P*: *Shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications*)	*Skills barrier*s are not a significant predictor of usage.	= .757

Organisational factors (MSA) *(TECH_barriers_M: Low bandwidth; Lack of security and privacy in social networked learning and Inadequate student ICT facilities to use Web 2.0 tools)*	*Technological barriers* are not a significant predictor of usage.	=.868

Table 4.23 Cronbach's Alpha for organisational factors (technological and skills barriers)

Respondents were asked to indicate their level of agreement that the following items are organisational barriers to the usage of Web 2.0 tools in education:

4.7.1.1 Organisational barriers towards usage of Web 2.0 tools at Pearson Institute of Higher Education

Factor analysis and Cronbach's alpha were applied to Organisational barriers and two factors emerged:

Descriptive Statistics[a]

	Mean	Std. Deviation	N
USAGE	10.0143	4.27495	70
TECH_barriers_P	3.9536	.80566	70
SKILLS_barriers_P	3.8857	.83045	70

Table 4.24 Organisational factors at PIHE

TECH_barriers_P (*Low bandwidth, lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools*)

SKILLS_barrier_P (*Shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications*)

4.6.1.1 Low bandwidth

The findings revealed that 29% of respondents agreed and 57% of respondents strongly agreed that low bandwidth is an organisational barrier to the use of Web 2.0 tools in education. An amount of 1% of respondents strongly disagreed with the statement. The remaining 13% of respondents were neutral to this statement.

4.6.1.2 Lack of security and privacy in social networked learning

The findings revealed that 30% of respondents agreed and 30% of respondents strongly agreed that the lack of security and privacy in social networked learning is a barrier to the use of Web 2.0 tools in education. An amount of 1% of respondents strongly disagreed and 19% of respondents disagreed with the statement. The remaining 20% of respondents were neutral to this statement.

4.6.1.3 Lack of University support

The findings revealed that 24% of respondents agreed and 40% of respondents strongly agreed that there is a lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools. An amount of 19% of respondents disagreed with the statement. The remaining 17% of respondents were neutral to this statement.

4.6.1.4 Inadequate student ICT facilities

The findings revealed that 46% of respondents agreed and 31% of respondents strongly agreed that inadequate student ICT facilities is a barrier to the use of Web 2.0 tools in education. An amount of 21% of respondents disagreed with the statement. The remaining 1% of respondents were neutral to this statement.

4.6.1.5 Shortage of adequately trained teaching staff

A total of 39% of respondents agreed and 26% of respondents strongly agreed that a shortage of adequately trained teaching staff is a barrier to the use of We 2.0 tools. An amount of 1% of

respondents strongly disagreed and 10% of respondents disagreed with the statement. The remaining 24% of respondents were neutral to this statement.

4.6.1.6 Inadequate training in the usage of ICT applications

A total of 59% of respondents agreed and 26% of respondents strongly agreed that inadequate training in the usage of ICT applications is a barrier to the use of Web 2.0 tools in education. An amount of 10% of respondents disagreed with the statement. The remaining 5% of respondents were neutral to this statement.

Based on these results, it is evident that there is a significant agreement that the following are barriers to the use of Web 20 tools in education:

- *low bandwidth teaching* (M=4.40, SD = .824), t (69) = 14.223, p<.0005*;*
- *Lack of security and privacy in social networked learning teaching* (M=3.69, SD = 1.136), t (69) = 5.049, p<.0005*;*
- *lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools teaching* (M=3.86, SD = 1.146), t (69) = 6.259, p<.0005*;*
- *inadequate student ICT facilities to use Web 2.0 tools teaching* (M=3.87, SD = 1.089), t (69) = 6.694, p<.0005*;*
- *shortage of adequately trained teaching staff teaching* (M=3.77, SD = .995), t (69) = 6.485, p<.0005 *and*
- *inadequate training in the usage of ICT applications teaching* (M=4.00, SD = .851), t (69) = 9.829, p<.0005.

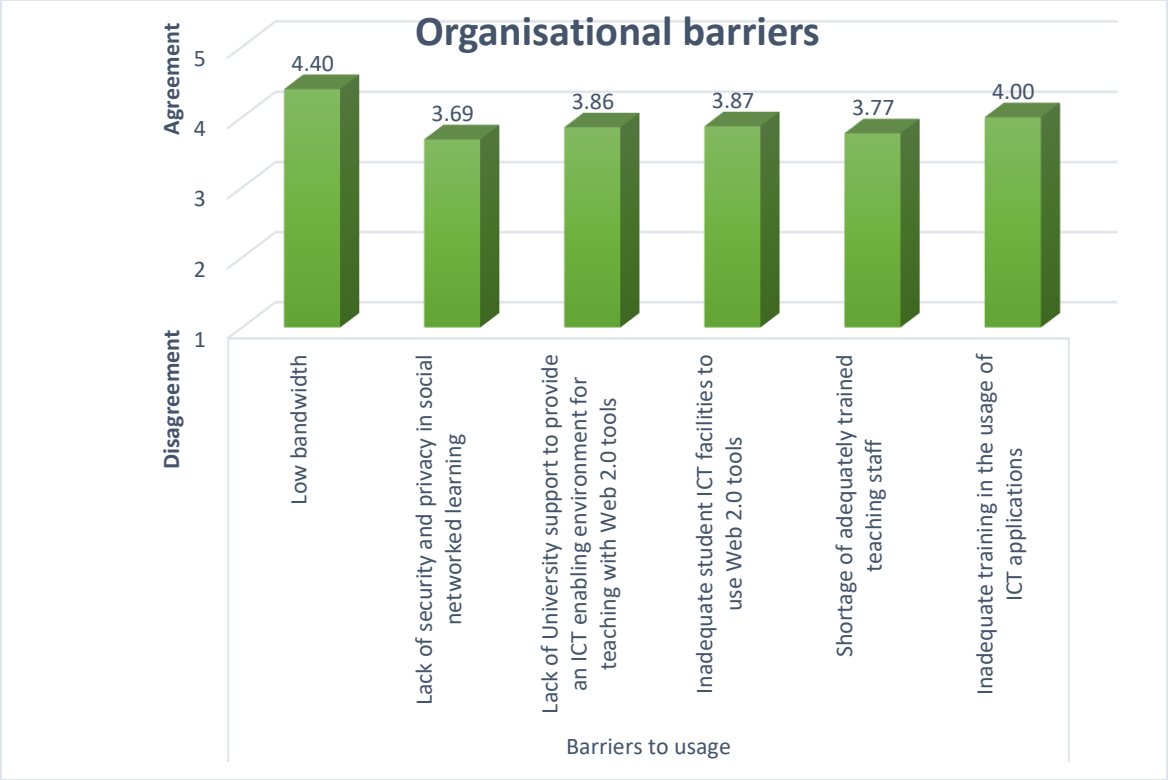


Figure 4.22 Barriers to usage of Web 2.0 tools at PIHE

4.7.1.2 Organisational barriers towards the usage of Web 2.0 tools at Monash South Africa

The organisational factors were analysed and the results comprised of two sub factors: *Barriers and support.*

- **Barriers**

Factor Analysis and Cronbach's alpha were applied to these questions (Organisational barriers) and one reasonably reliable factor emerged.

TECH_barriers_M (Low bandwidth; Lack of security and privacy in social networked learning and inadequate student ICT facilities to use Web 2.0 tools.

4.6.2.1 Low bandwidth

A total of 33% of respondents agreed and 28% of respondents strongly agreed that low bandwidth is an organisational barrier to the use of Web 2.0 tools in education. An amount of 9% of respondents strongly disagreed and 23% of respondents disagreed with the statement. The remaining 7% of respondents were neutral to this statement.

A significantly higher number of respondents from Pearson Institute of Higher Education agreed that low bandwidth is an organisational barrier to the use of Web 2.0 tools in education compared to Monash South Africa.

4.6.2.2 Lack of security and privacy in social networked learning

A total of 67% of respondents agreed that the lack of security and privacy in social networked learning is a barrier to the use of Web 2.0 tools in education. An amount of 18% of disagreed with the statement. The remaining 16% of respondents were neutral to this statement.

Based on the results, Monash South Africa had a slightly higher number of respondents that agreed the lack of privacy in social networked learning is a barrier to the use of Web 2.0 tools in education.

4.6.2.3 Lack of University support

A total of 46% of respondents agreed and 7% of respondents strongly agreed that there is a lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools. An amount of 9% of respondents strongly disagreed and 16% disagreed with the statement. The remaining 23% of respondents were neutral to this statement.

4.6.2.4 Inadequate student ICT facilities

A total of 56% of respondents agreed that inadequate student ICT facilities is a barrier to the use of Web 2.0 tools in education. An amount of 28% of respondents disagreed with the statement. The remaining 15% of respondents were neutral to this statement.

Based on the results, Pearson Institute of Higher Education had a significantly higher number of respondents that agreed that inadequate student ICT facilities is a barrier to the use of Web 2.0 tools in education**.**

4.6.2.5 Shortage of adequately trained teaching staff

A significant amount of 79% of respondents agreed that a shortage of adequately trained teaching staff is a barrier to the use of We 2.0 tools. An amount of 7% of respondents disagreed with the statement. The remaining 14% of respondents were neutral to this statement.

Based on the results, Monash South Africa had a higher number of respondents agreed that a shortage of adequately trained teaching staff is a barrier to the use of We 2.0 tools compared to Pearson Institute of Higher Education.

4.6.2.6 Inadequate training in the usage of ICT applications

A total of 75% of respondents agreed and 7% of respondents strongly agreed that inadequate training in the usage of ICT applications is a barrier to the use of Web 2.0 tools in education. An amount of 9% of respondents disagreed with the statement. The remaining 9% of respondents were neutral to this statement.

Based on these results, it is evident that there is a significant agreement that the following are barriers to the use of Web 20 tools in education:

- *low bandwidth teaching* (M=3.49, SD = 1.351), t (56) = 2.745, p=.008*; Lack of security and privacy in social networked learning teaching* (M=3.49, SD = .782), t (56) = 4.743, p<.0005*;*
- *inadequate student ICT facilities to use Web 2.0 tools teaching* (M=3.29, SD = .889), t (56) = 2.406, p=.020*;*
- *shortage of adequately trained teaching staff teaching* (M=3.72, SD = .590), t (56) = 9.201, p<.0005 *and*
- *Inadequate training in the usage of ICT applications teaching* (M=3.81, SD = .693), t (56) = 8.795, p<.0005.

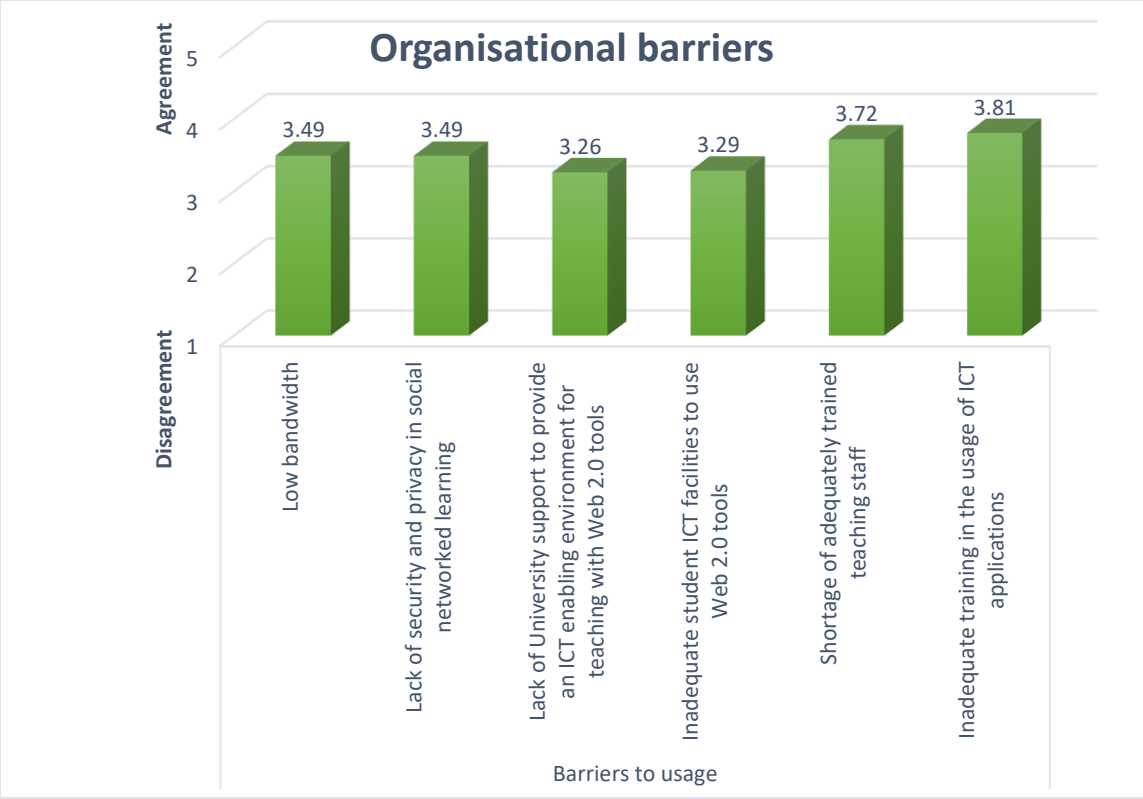


Figure 4.23 Barriers to the usage of Web 2.0 tools at MSA

4.7.1.3 Combined results for organisational factors

4.7.1.3.1 Low bandwidth

A total of 31% of respondents agreed and 44% of respondents strongly agreed that low bandwidth is an organisational barrier to the use of Web 2.0 tools in education. A total of 5% of respondents strongly disagreed and 10% of respondents disagreed with the statement. A total of 10% of respondents were neutral.

4.7.1.3.2 Lack of security and privacy in social networked learning

A significant amount of 47% of respondents agreed and 17% of respondents strongly agreed that the lack of privacy in social networked learning is a barrier to the use of Web 2.0 tools in education. A small amount of 0.8% of the respondents strongly disagreed and 18% of the respondents disagreed with the statement. The remaining 18% of respondents neither agreed nor disagreed.

According to Prensky (2010), security and privacy in social networked learning is a barrier, as issues of ownership and control will arise since content is freely shared and re-used worldwide.

4.7.1.3.3 Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools

A total of 34% of respondents agreed and 25% of respondents strongly agreed that there is a lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools. A small proportion made up of 4% of respondents who strongly disagreed and 17% disagreed with the statement. A total of 20 % of the respondents were neutral.

4.7.1.3.4. Inadequate student ICT facilities to use Web 2.0 tools

A significant amount of 50% of respondents agreed and 17% of respondents strongly agreed that inadequate student ICT facilities is a barrier to the use of Web 2.0 tools in education. A total of 24% of respondents disagreed with the statement and 7% of respondents were neutral.

4.7.1.3.5 Shortage of adequately trained teaching staff

A total of 57% of respondents agreed and 14% of respondents strongly agreed that a shortage of adequately trained teaching staff is a barrier to the use of We 2.0 tools. Only 0.8% of respondents strongly disagreed and 9% of respondents disagreed with the statement. A remaining of 20% neither agreed nor disagreed.

4.7.1.3.6 Inadequate training in the usage of ICT applications

A significant amount of 66% of respondents agreed and 17% of respondents strongly agreed that inadequate training in the usage of ICT applications is a barrier to the use of Web 2.0 tools in education. A small proportion of respondents, 9% disagreed with this statement and 7% of respondents were neutral. According to Daher & Lazarevic (2014), one challenge of Web 2.0 technologies by academics is the lack of training.

Based on these results, it is evident that there is a significant agreement that the following are barriers to the use of Web 20 tools in education:

- *low bandwidth teaching* (M=3.99, SD = 1.178), t (126) = 9.487, p<.0005*;*

- *Lack of security and privacy in social networked learning teaching* (M=3.60, SD = .994), t (126) = 6.784, p<.0005*;*
- *lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools teaching* (M=3.59, SD = 1.157), t (126) = 5.751, p<.0005*;*
- *inadequate student ICT facilities to use Web 2.0 tools teaching* (M=3.61, SD = 1.043), t (126) = 6.578, p<.0005*;*
- *shortage of adequately trained teaching staff teaching* (M=3.75, SD = .835), t (126) = 10.091, p<.0005 *and*
- *inadequate training in the usage of ICT applications teaching* (M=3.91, SD = .787), t (126) = 13.079, p<.0005.

Figure 4.24 Barriers to the use of Web 2.0

Based on the findings, there is inadequate training in the usage of Web 2.0 tools. The ACRL Research Planning and Review Committee (2010) suggests a solution to this organizational barrier. According to the ACRL Research Planning and Review Committee (2010), since higher education institutions are undergoing technological changes, academics have to ensure that their knowledge and skills are still relevant. Thus, higher education institutions need to provide continuous formal training to ensure that academics are able to use Web 2.0 tools. A study by An and Reigeluth (2011) reported that lack of technology, lack of time and lack of training are leading barriers to creating technology enhanced classrooms.

The table below provides an overview of some of the challenges academics have experienced in terms of elearning in South Africa (Pritchett, Pritchett & Wohleb, 2013). These findings were in line with the organisational barriers that were experienced/identified in this study.

Author(s)	Challenges
Jaffer et al. (2007)	varying learner academic preparedness; large classes; multilingualism in 1st language context; inadequate curriculum design; diversity in (school) background; and academic ability
MacGregor (2008)	low bandwidth and unequal access
Brown et al. (2008)	range of organisational contexts; practices and cultures; infrastructural constraints — proportion of internet users to PCs, bandwidth, slow and internet costs; demographic divides, cell phone subscription LMS instability; lack of use of interactive web potential; access inequality; negative eLearning perceptions; no management support; lack of time and resources; and oversubscribed internet systems that limit applications use
Mlitwa & Van Belle (2011)	inadequate technical support; limited infrastructure capacity; network capacity; inadequate coordination and limited technological support; technology instability; resistance to change; tedious administrator processes; access issues; literacy limitations; institutions users with troubled network systems; and poor user support
Venter et al. (2012)	scarce resources; educational inequalities; technology access shortage; low throughput rates; technological cost; satisfaction & infrastructure; lecturer efforts; graduate competencies; business strategy shortages; learners' frustration with e-Learning; underutilised systems; bandwidth cost of high speed internet; and user penetration
Isabirye & Dlodlo (2014)	no institutional support; non-integration of eLearning business strategy; no eLearning culture; exclusion of academia from eLearning development programmes; instructor attitudes; technological challenges; lack of pedagogical strategies; cost and quality; lack of university policy, training, motivation, incentive; under preparedness; no facilitating conditions; logistical issues, lack of management; and ICT support
OERAfrica (2014)	weak ICT skills; lack of resources; low computer and internet access

Table 4.25 Challenges of elearning in South Africa

The next section discusses the organisational support factors that influences the usage of Web 2.0 tools in education at the respective higher education institution.

4.7.2 Organisational support

Respondents were asked to indicate their agreement that the following support is provided by their higher education institution when using Web 2.0 tools in education:

- **Support**

In terms of organisational support, the findings are displayed in Table 4.127.

Descriptive Statistics

	Mean	Std. Deviation	N
USAGE	10.7795	4.41662	127
ORG_support	3.0268	.70884	127

Table 4.26 The organisational support findings

Based on the above results, organisational support was made up of the following:

- *Development support in terms of staff training and workshop;*
- *Monitoring of the appropriate use of online social networks;*
- *there is adequate technical assistance for students and staff;*
- *there are adequate resources and*
- *there is an institutional policy that encourages lecturers to use new Web tools in the faculty to share their teaching experience and knowledge*

The Cronbach Alpha for organisational factor (*support*) is displayed Table 4.27.

Factor	Findings	Cronbach Alpha
Organisational factor *(Organisational support)*	*Organisational support* is associated with higher usage, therefore the more support there is,	= .726

	the higher the usage. Thus, support is a significant predictor of usage.	
Organisational factors (PIHE) *(SUPPORT_P)*	*Organisational support* is a significant predictor of usage.	= .815
Organisational factors (MSA) *(SUPPORT_M)*	*Organisational support* is a significant predictor of usage.	= .680

Table 4.27 Cronbach Alpha of organisational factor (support)

Each of the sub factors of organisational support identified in Section 4.7.4 above, are further analysed in the following sections.

4.7.2.1 Organisational support towards the usage of Web 2.0 tools at Pearson Institute of Higher Education

To determine the organisational support at PIHE, the findings were as follows:

a. Development support in terms of staff training and workshops

The findings revealed that 44% of respondents agreed and 9% of respondents strongly agreed that their higher education institutions provide development support in terms of staff training and workshops when it comes to the use of Web 2.0 tools in education. An amount of 4% of respondents strongly disagreed and 26% of respondents disagreed with the statement. The remaining 17% of respondents were neutral to this statement.

b. Monitoring of the appropriate use of online social networks

The findings revealed that 44% of respondents agreed and 1% of respondents strongly agreed that their higher education institution performs monitoring of the appropriate use of online social networks. An amount of 6% of respondents strongly disagreed and 20% of respondents disagreed with the statement. The remaining 29% of respondents were neutral to this statement.

c. There is adequate technical assistance for students and staff

The findings revealed that 11% of respondents agreed and 3% of respondents strongly agreed that there is adequate technical assistance for students and staff when using Web 2.0 tools in education. An amount of 19% of respondents strongly disagreed and 33% of respondents disagreed with the statement. The remaining 34% of respondents were neutral to this statement.

d. There are adequate resources

The findings revealed that 30% of respondents agreed that there are adequate resources when using Web 2.0 tools. An amount of 27% of respondents strongly disagreed and 17% of respondents disagreed with the statement. The remaining 26% of respondents were neutral to this statement.

e. There is an institutional policy

Having an institutional policy with regard to Web 2.0 usage in higher education is important. The findings revealed that 13% of respondents agreed and 4% of respondents strongly agreed that there is an institutional policy that encourages lecturers to use new Web tools to share their teaching experience and knowledge. An amount of 16% of respondents strongly disagreed and 17% of respondents disagreed with the statement. The remaining 50% of respondents were neutral to this statement.

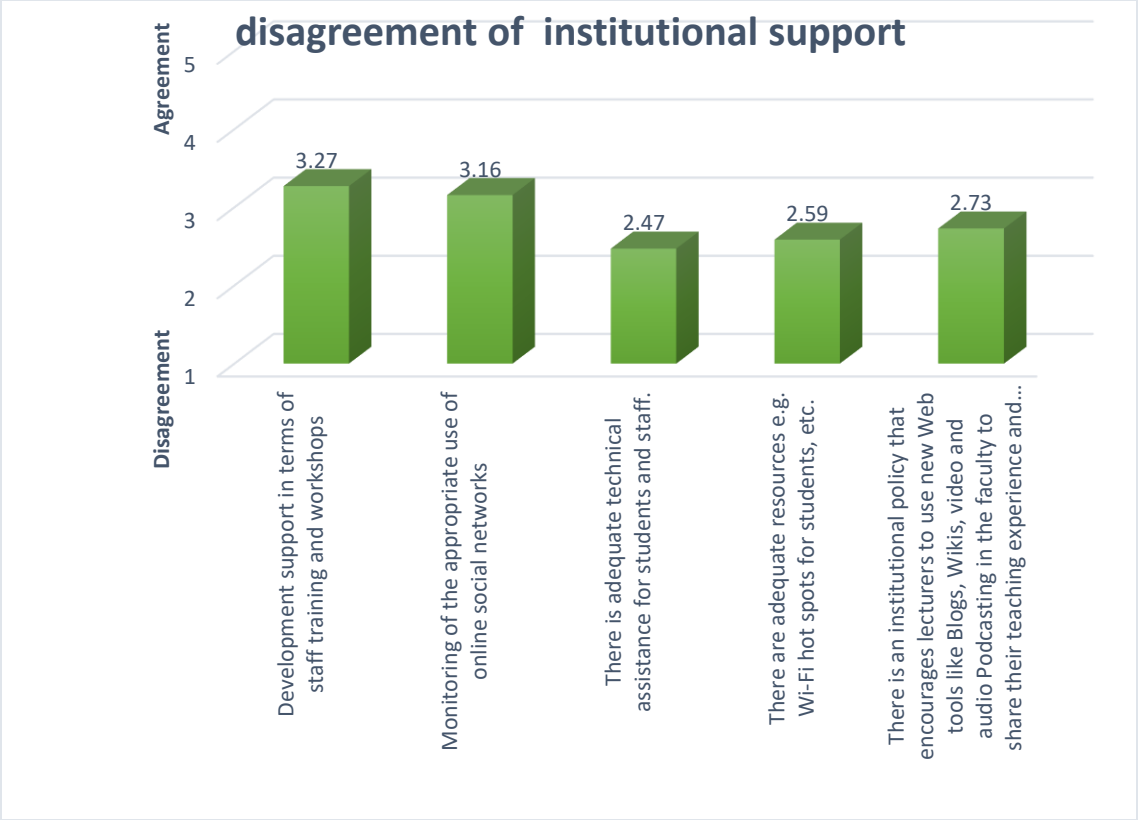


Figure 4.25 Disagreement level of institutional support at PIHE

The next section provides the findings regarding organisational support at Monash South Africa.

4.7.2.2 Organisational support towards the usage of Web 2.0 tools at Monash South Africa

Regarding Organisational support, the only items combined to give a reliable measure for support at MSA were:

- *Development support in terms of staff training and workshops* and
- *There is an institutional policy that encourages lecturers to use new Web tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge)*

a. Development support in terms of staff training and workshops

A total of 37% of respondents agreed and 9% of respondents strongly agreed that their higher education institutions provide development support in terms of staff training and workshops when it comes to the use of Web 2.0 tools in education. An amount of 26% of respondents disagreed with the statement. The remaining 28% of respondents were neutral to this statement.

From the above results, it is evident that a higher number of respondents at Pearson Institute of Higher Education agreed that their organisation provides development support in terms of staff training and workshops when it comes to the use of Web 2.0 tools in education. Academics from both the institutions showed interest in gaining further skills and understanding of Web 2.0 tools in order to more effectively integrate these tools in their teaching.

b. Monitoring of the appropriate use of online social networks

A total of 53% of respondents agreed that their higher education institution performs monitoring of the appropriate use of online social networks. An amount of 9% of respondents strongly disagreed and 16% of respondents disagreed with the statement. The remaining 23% of respondents were neutral to this statement.

Based on the results, a higher number of respondents at Monash South Africa agreed that their higher education institution performs monitoring of the appropriate use of online social networks.

c. There is adequate technical assistance for students and staff

A total of 33% of respondents agreed that there is adequate technical assistance for students and staff when using Web 2.0 tools in education. An amount of 5% of respondents strongly disagreed and 32% of respondents disagreed with the statement. The remaining 30% of respondents were neutral to this statement.

A significantly higher number of respondents at Monash South Africa agreed that there is adequate technical assistance for students and staff when using Web 2.0 tools in education as compared to the responses from Pearson Institute of Higher Education.

d. There are adequate resources

A total of 56% of respondents agreed and 9% of respondents strongly agreed that there are adequate resources when using Web 2.0 tools. An amount of 12% of respondents disagreed with the statement. The remaining 23% of respondents were neutral to this statement.

A significantly higher number of respondents at Monash South Africa agreed that there are adequate resources when using Web 2.0 tools.

e. There is an institutional policy

A total of 23% of respondents agreed and 9% of respondents strongly agreed that there is an institutional policy that encourages lecturers to use new Web tools to share their teaching experience and knowledge. An amount of 14% of respondents disagreed with the statement. The remaining 54% of respondents were neutral to this statement.

Based on these results, there are significant agreements with regard to support provided by higher education institutions when using Web 2.0 tools in education:

- *Development support in terms of staff training and workshops* (M=3.28, SD = .959), t (56) = 2.210, p=.031*;*
- *There are adequate resources e.g. Wi-Fi hot spots for students, etc.* (M=3.61, SD = .818), t (56) = 5.664, p<.0005;
- *There is an institutional policy that encourages lecturers to use new Web tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge* (M=3.26, SD = .813), t (56) = 2.443, p=.018.

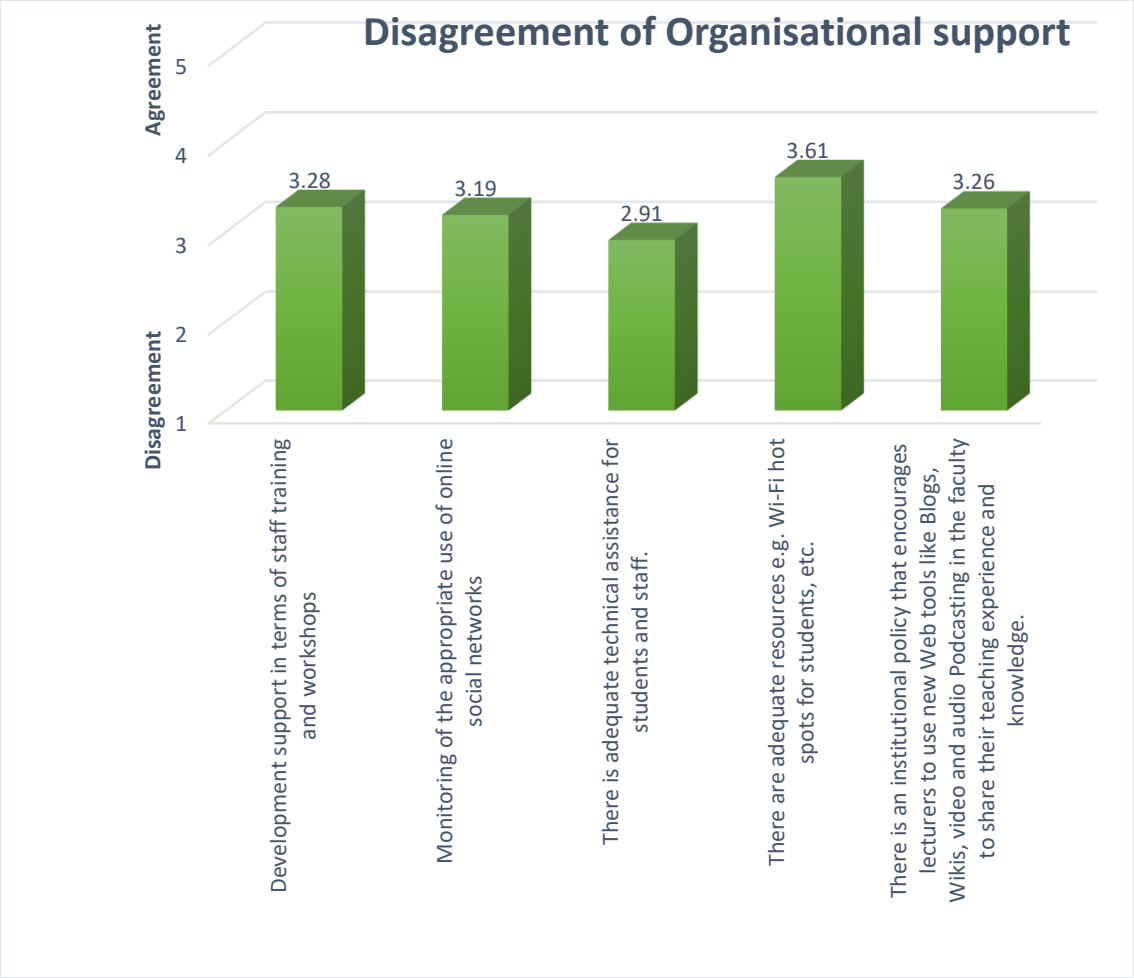


Figure 4.26 Disagreement level of institutional support at Monash South Africa

The next section discusses the overall findings regarding organisational support at both the higher education institution.

4.7.2.3 Combined results for organisational support

The following are the overall findings for organisational support:

a. Development support in terms of staff training and workshops

A total of 41% of respondents agreed and 9% of respondents strongly agreed that their higher education institutions provide development support in terms of staff training and workshops when it comes to the use of Web 2.0 tools in education. A total of 2% of respondents disagreed and 26%

of respondents strongly disagreed that their higher education institution provides developmental support. The remaining 22% of respondents neither agreed nor disagreed.

According to Prensky (2007), academics have little or no experience with Web 2.0 tools and require further training and support. Thus, in order for Web 2.0 tools to be a success in higher education, staff and students require technical support. Technical support for academics who are unfamiliar with Web 2.0 tools as well as assisting academics to develop new ways of teaching by using these tools rather than simply teaching them how to use the tools.

b. Monitoring of the appropriate use of online social networks

A significant amount of 48% of respondents agreed and 0.8% of the respondents strongly agreed that their higher education institution performs monitoring of the appropriate use of online social networks. A total of 7% of respondents strongly disagreed and 18% of respondents disagreed with the statement. The remaining 26% of respondents were neutral.

Based on research by Munuatosha, Muyinda and Lubega (2011) and Prensky (2010), there is lack of security and privacy in social networked learning, however higher education institutions must filter and apply security measures against all content sent and received online.

c. There is adequate technical assistance for students and staff

A total of 21% of respondents agreed and 2% strongly agreed that there is adequate technical assistance for students and staff when using Web 2.0 tools. A total of 13% of respondents and 32% of respondents disagreed that there is adequate technical assistance. The remaining 32% of respondents neither agreed nor disagreed with this statement.

d. There are adequate resources e.g. Wi-Fi hot spots for students, etc.

A significant amount of 42% of respondents agreed and 4% of respondents strongly agreed that there are adequate resources when using Web 2.0 tools. A total of 15% of respondents strongly

disagreed and 15% of respondents disagreed with this statement. A total of 24% of respondents were in neither agreement nor disagreement.

e. There is an institutional policy that encourages lecturers to use new Web tools

A total of 17% of respondents agreed and 6% of respondents strongly agreed that there is an institutional policy that encourages lecturers to use new Web 2.0 tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge. A total of 9% of respondents strongly disagreed and 16% of respondents disagreed that there is an institutional policy in place for new Web tools. A significant amount of 52% of respondents were neutral. Perhaps a reason could be that they are not aware if such a policy exists.

Based on these results, there were two significant agreements that the following support is provided by higher education institutions when using Web 2.0 tools in education:

- *Development support in terms of staff training and workshops* (M=3.28, SD = 1.021), t (126) = 3.042, p=.003 *and*
- *monitoring of the appropriate use of online social networks* (M=3.17, SD = .977), t (126) = 1.999, p=.048.
- There was a significant disagreement *that there is adequate technical assistance for students and staff when using Web 2.0 tools* (M=2.67, SD = 1000), t (126) = -3.725, p<.0005.

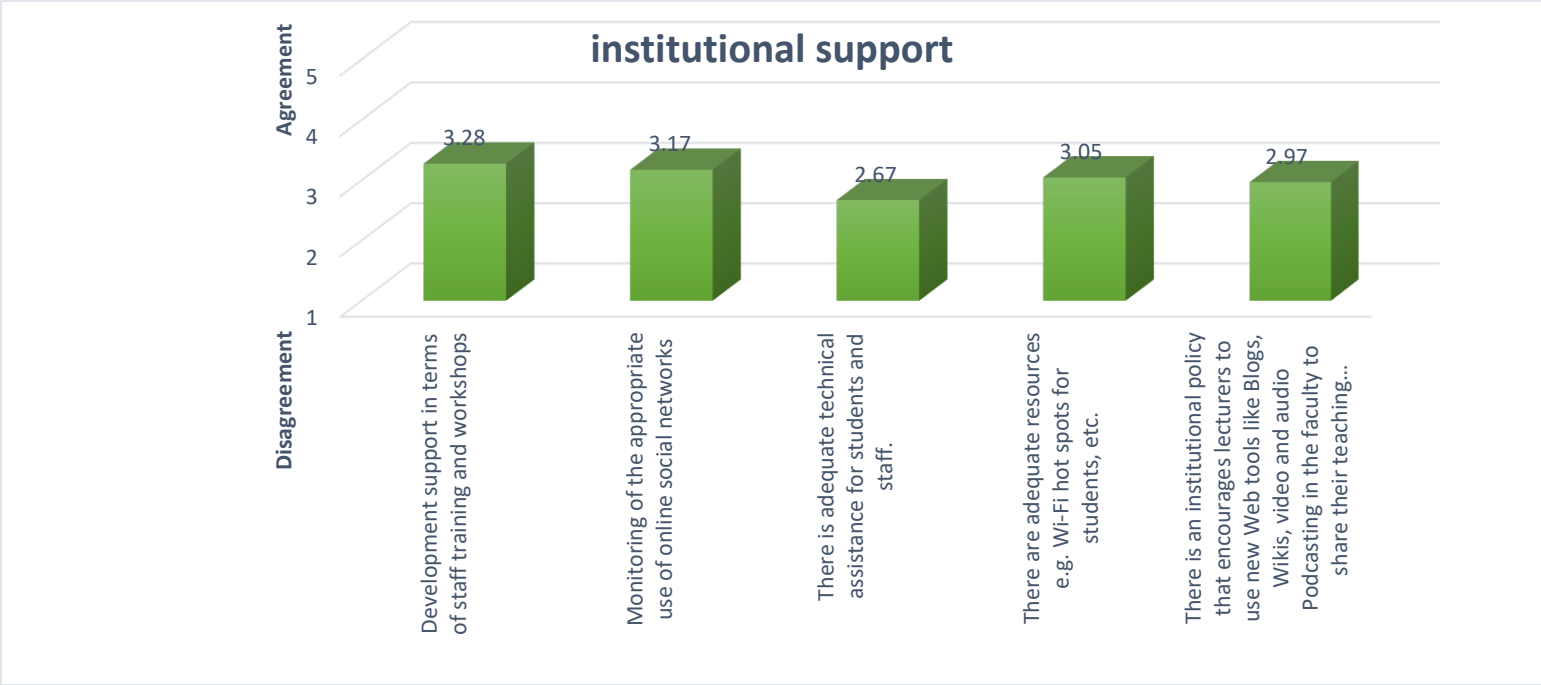


Figure 4.27 Level of institutional support

Based on these results, there is one significant agreement with regard to support provided by higher education institutions when using Web 2.0 tools in education: *Development support in terms of staff training and workshops* (M=3.27, SD = 1.076), t (69) = 2.111, p=.038.

There are three significant disagreements:

- *there is adequate technical assistance for students and staff when using Web 2.0 tools* (M=2.47, SD = 1.018), t (69) = -4.346, p<.0005;
- *There are adequate resources e.g. Wi-Fi hot spots for students, etc.* (M=2.59, SD = 1.186),
- t (69) = -2.924, p=.005 *and*
- *There is an institutional policy that encourages lecturers to use new Web tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge* (M=2.73, SD = 1.020), t (69) = -2.226, p=.029.

Based on the results relating to institutional policy, an adoption and utilisation environment needs to be created by the higher education institution in order to make academics more aware of the usage and adoption of Web 2.0 tools as well as necessary training needs to be provided for the application of Web 2.0 tools in teaching. All of these needs to be part of the current teaching and

learning policy. Policies are crucial in guiding the usage and adoption of technology in teaching and learning such as the usage of Web 2.0 tools in Higher education institutions. However, the results of this study revealed that the implementation and use of We 2.0 technology tools was mostly initiated by academics rather than by management.

These findings are similar to a study conducted by Munuatosha, Muyinda and Lubega (2011) who identified the factors that hinder the usage of new learning media are security and privacy in social networked learning, technical support and infrastructure (lack of reliable power supply and internet connection, and limited supply of computers, lack of competent technical staff, poor communication, irrelevant ICT policies, lack of professional training for staff) and administrative support. The next section discusses if attitude is an influential factor to the usage of Web 2.0 tools in higher education.

4.8 *Attitude* towards the use of Web 2.0 tools in education

This section required respondents to indicate their agreement with the following statements regarding their attitude towards the use of Web 2.0 tools in education.

4.8.1 Attitude towards the usage of Web 2.0 tools at Pearson Institute of Higher Education

The following are the findings regarding attitude towards the usage of Web 2.0 tools:

4.8.1.1 Confident and comfort

Academics' attitude of being confident and comfortable using Web 2.0 tools was investigated. The findings revealed that 31% of respondents agreed and 10% of respondents strongly agreed that they are confident and comfortable in using Web 2.0 tools as a delivery method when teaching compared to traditional face to face communication. A small amount of 7% of respondents strongly disagreed, however 21% of respondents disagreed that they were confident or comfortable in using Web 2.0 tools as a delivery method. The remaining 30% were neutral to this statement.

4.8.1.2 Supplement lectures

Web 2.0 tools can be helpful by supplementing lectures. A total of 50% of respondents agreed and 1% of respondents strongly agreed that supplementing lectures more effectively and efficiently

with the use of Web 2.0 tools. A small amount of 19% of respondents disagreed with using Web 2.0 tools as a delivery method. The remaining 30% were neutral to this statement.

4.8.1.3 Web 2.0 tools are very time consuming

Academics attitude regarding the amount of time spent using Web 2.0 tools were investigated. A total of 43% of respondents agreed and 13% of respondents strongly agreed that Web 2.0 tools a very time consuming as more preparation is involved. A small amount of 3% of respondents strongly disagreed, however 14% of respondents disagreed that they were confident or comfortable in using Web 2.0 tools as a delivery method. The remaining 27% were neutral to this statement.

4.8.1.4 Not appropriate for teaching

In this question, the researcher wanted to gauge academics' attitude regarding the appropriateness of using Web 2.0 tools in education. Only 7% of respondents agreed that Web 2.0 tools are not appropriate for teaching. An amount of 14% of respondents strongly disagreed and 46% of respondents disagreed with the statement. The remaining 33% of respondents were neutral to this statement.

Based on these results obtained at Pearson Institute of Higher Education, there were significant agreements with the following:

- *I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses* (M=3.34, SD = .946), t (69) = 3.032, p=.003;
- *I can supplement my lectures more effectively and efficiently with the use of Web 2.0 tools* (M=3.34, SD = .796), t (69) = 3.602, p=.001) and
- *I find using Web 2.0 tools to be very time consuming as more preparation is involved* (M=3.49, SD = .989), t (69) = 4.109, p<.0005.

There was one significant disagreement: *Web 2.0 tools are not appropriate for teaching* (M=2.33, SD = .812, t (69) = -6.922, p<.0005.

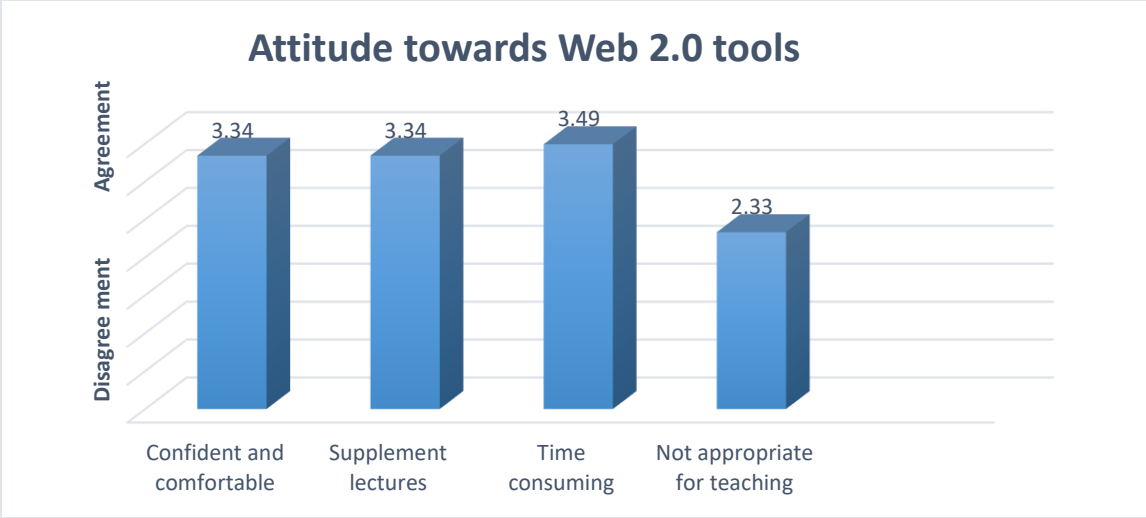


Figure 4.28 Attitude towards the use of Web 2.0 tools in education at PIHE

The above were the findings at PIHE, the following section will discuss the findings regarding attitude at MSA.

4.8.2 Attitude towards the usage of Web 2.0 tools at Monash South Africa

The findings at MSA were as follows:

4.8.2.1 Confident and comfortable

A total of 18% of respondents agreed and 9% of respondents strongly agreed that they are confident and comfortable in using Web 2.0 tools as a delivery method when teaching compared to traditional face to face communication. A total of 47% of respondents disagreed that they were confident or comfortable in using Web 2.0 tools as a delivery method. The remaining 26% were neutral to this statement.

Based on the results, a higher number of respondents from Pearson Institute of Higher Education agreed that they are confident and comfortable in using Web 2.0 tools as a delivery method when teaching compared to traditional face to face communication.

4.8.2.2 Supplement lectures

A significant amount of 70% of respondents agreed that lectures can be supplemented more effectively and efficiently with the use of Web 2.0 tools. The remaining 30% of respondents were neutral to this statement.

Based on the results, a higher number of respondents from Monash South Africa agreed that lectures can be supplemented more effectively and efficiently with the use of Web 2.0 tools. In addition, none of the respondents from this organisation disagreed with the statement compared to the 14% of respondents that disagreed from Pearson Institute of Higher Education.

4.8.2.3 Web 2.0 tools are very time consuming

A significant amount of 58% of respondents agreed and 18% of respondents strongly agreed that Web 2.0 tools are very time consuming as more preparation is involved. The remaining 25% were neutral to this statement. None of the respondents disagreed with the statement.

According to the results, a higher number of respondents from Monash South Africa agreed that Web 2.0 tools are very time consuming as more preparation is involved. In addition, none of the respondents disagreed with the statement as compared to the 17% of respondents from Pearson Institute of Higher Education.

4.8.2.4 Web 2.0 tools are not appropriate for teaching

A total of 16% of respondents agreed and 7% of respondents strongly agreed that Web 2.0 tools are not appropriate for teaching. An amount of 5% of respondents strongly disagreed and 60% of respondents disagreed with the statement. The remaining 12% of respondents were neutral to this statement.

Based on the results, a higher number of respondents from Monash South Africa agreed that Web 2.0 tools are not appropriate for teaching. There was also a similar amount of respondents from both of the organisations that disagreed with the statement.

Based on these results obtained at Monash South Africa, there were significant agreements with the following:

- *I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses* (M=3.58, SD = .925), t (56) = 4.726 p<.0005;
- *I can supplement my lectures more effectively and efficiently with the use of Web 2.0 tools* (M=3.70, SD = .462), t (56) = 11.479 p<.0005) and
- *I find using Web 2.0 tools to be very time consuming as more preparation is involved* (M=3.93, SD = .651), t (56) = 10.787, p<.0005.

There was one significant disagreement: *Web 2.0 tools are not appropriate for teaching* (M=2.60, SD = 1.050), t (56) = -2.902, p=.005.

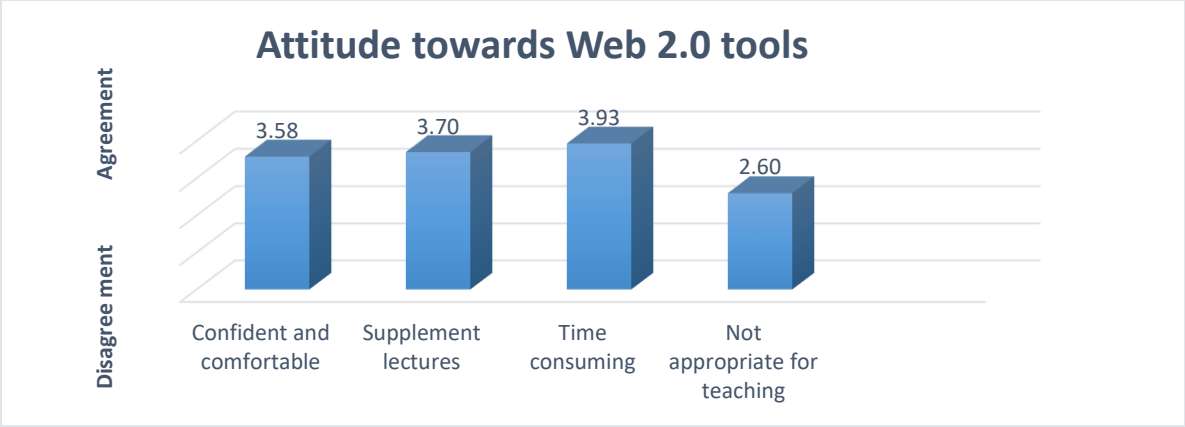


Figure 4.29 Attitude towards the use of Web 2.0 tools in education at MSA

The findings at PIHE and MSA were combined to provide the overall *attitude* results which are discussed in Section 4.8.3.

4.8.3 Combined results for Attitude

The following are the overall findings regarding *attitude* from both the higher education institutions:

4.8.3.1 Confident and comfortable

A significant amount of 58% of respondents agreed and 6% of respondents strongly agreed that they are confident and comfortable in using Web 2.0 tools as a delivery method when teaching. A

small amount of 2% of respondents strongly disagreed, however 19% of respondents disagreed that they were confident or comfortable in using Web 2.0 tools as a delivery method. The remaining 16% were neutral to this statement.

These results differ from that of The ETNA survey (2012) which indicated that only 3% of academics are confident with emerging technologies such as Twitter and 14% are confident with Wikis (McLaughlin, Robertson & Nelson, 2012).

4.8.3.2 Web 2.0 tools are very time consuming

Majority of the respondents, 50% agreed and 15% of respondents strongly agreed that Web 2.0 tools are very time consuming as more preparation is involved. A small proportion of respondents, 2% strongly disagreed and 8% of respondents disagreed with the statement. The remaining 26% of respondents were neutral.

4.8.3.3 Supplement lectures

Majority of the respondents, 59% agreed and 0.8% of respondents strongly agreed that Web 2.0 tools can be used to supplement lectures more effectively and efficiently. A total of 10% of respondents disagreed with the statement. The remaining 30% of respondents were neutral.

4.8.3.4 Web 2.0 tools are not appropriate for teaching

A significant amount of 52% of the respondents disagreed and 10% of the respondents strongly disagreed to the statement that Web 2.0 tools are not appropriate for teaching. Only 11% of the respondents agreed and 3% strongly agreed that Web 2.0 tools are not appropriate for teaching. The remaining 24% of respondents neither agreed nor disagreed with the statement.

Based on these results, there were significant agreements with the following:

- *I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses* ($M=3.45$, $SD = .940$), $t(126) = 5.379$, $p<.0005$;
- *I can supplement my lectures more effectively and efficiently with the use of Web 2.0 tools* ($M=3.50$, $SD = .689$), $t(126) = 8.247$, $p<.0005$;

- *I find using Web 2.0 tools to be very time consuming as more preparation is involved* (M=3.69, SD = .879), t (126) = 8.781, p<.0005;

There was one significant disagreement: *Web 2.0 tools are not appropriate for teaching* (M=2.45, SD = .932), t (126) = -6.666, p<.0005.

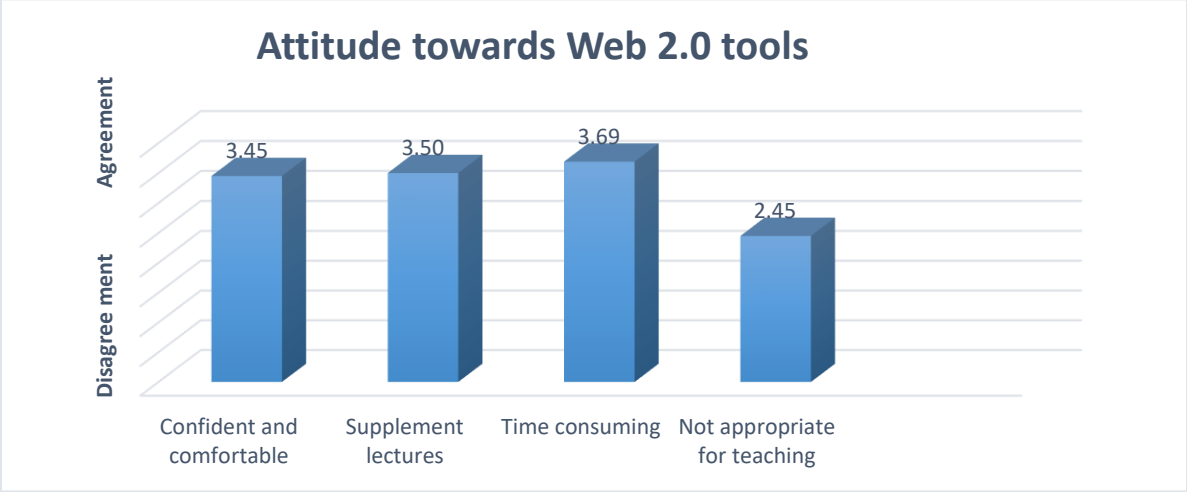


Figure 4.30 Attitude towards the use of Web 2.0 tools in education

In order to get a better understanding of Web 2.0 tools in education, the researcher investigated what Web 2.0 tools, applications or services are currently being used at PIHE and MSA. Section 4.9 discusses the findings.

4.9 Usage of Web 2.0 tools, applications or services

Academics were asked if they make use of Web 2.0 tools, applications or services. A total of 97% said they do use Web 2.0 tools. This result is discussed further by analysing each higher education institution in Sections 4.9.1 and 4.9.2. Thereafter, their combined results are discussed in Section 4.9.3

4.9.1 Pearson Institute of Higher Education

The following are the individual findings regarding the usage of Web 2.0 tools, applications or services:

4.9.1.1 Usage of social software applications

Social media is one form of using Web 2. 0 tools in education. A total of 54% of respondents make use of social software applications, whilst 46% of respondents do not.

4.9.1.2 Wikis

Wikis are another Web 2.0 tool that is used to enhance the traditional face-to-face approach of teaching. The findings revealed that 34% of respondents make use of Wiki sites.

4.9.1.3 Blogging websites

Blogging websites can be used as a Web 2.0 tools to create blogs. A total of 17% of respondents make use of blogging websites.

4.9.1.4 Podcasting sites

The creation of podcasts can provide students with useful learning material. A total of 14% of respondents make use of podcasting sites.

4.9.1.5 Usage of other Web 2.0 tools

Besides the specific Web 2.0 tools mentioned above, the researcher wanted to gather data about other Web 2.0 tools that may be used by academics. A total of 34% of respondents stated that they use other Web 2.0 tools for educational purposes. This comprised of MyLabsPlus Pearson, Easely for assignments and virtual labs like Amrita, YouTube, and Google.

A significant proportion of the sample do not make use of certain Web 2.0 tools, applications or services. This is made up of wiki sites (66%, p=.012); *blogging websites* (83%, p<.0005); *Podcasting* (86%, p<.0005) as well as *other Web 2.0 tools* which made up 66%, p=.012.
Figure 4.31 below, illustrates the findings that were discussed above.

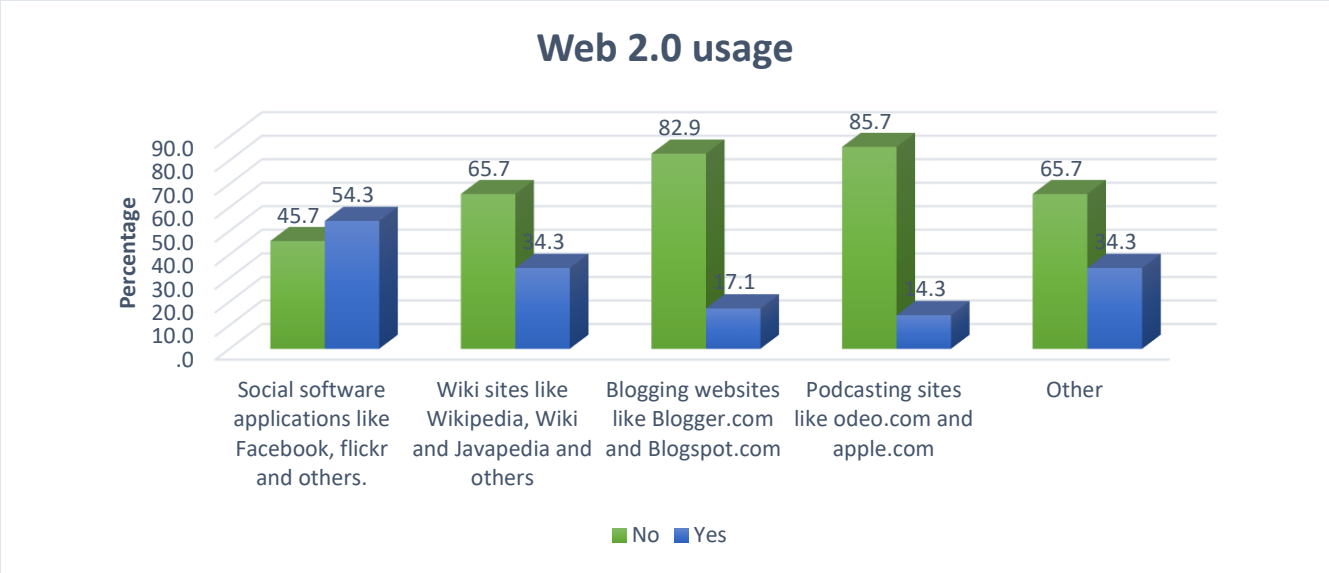


Figure 4.31 Web 2.0 usage at PIHE

4.9.1.6 Usage of Web 2.0 tools for teaching and/or for faculty use

Web 2.0 tools can be used by academics for teaching and/or faculty use. This question was asked to determine the activity most commonly used academics with Web 2.0 tools. A total of 7% of respondents stated that they use Web 2.0 tools only for teaching purposes; 9% use Web 2.0 tools only for Faculty work and the reminder 51% use Web 2.0 tools for both teaching and faculty work. A total of 33% (23 respondents out of 70) of respondents mentioned that they do not use Web 2.0 tools.

The results of the Chi-square goodness of fit test: a significant number of the respondents indicated that they use Web 2.0 tools for teaching and for faculty use and significant number of respondents also stated they do not use Web 2.0 tools (χ^2 (3) = 37.771, p<.0005). This an analysis on the reasons for non-usage needed to be explored. These findings are discussed in more details in Section 4.9.1.7.

4.9.1.7 Reasons for not using Web 2.0 tools for teaching

Based on the above results, a further analysis needed to be investigated regarding the reasons for not using Web 2.0 tools in education. The findings revealed that a total of 39% of respondents stated that they do not know how to use Web 2.0 tools as an educational tool (27 respondents out

of 70) and 70% stated they do not have the time to use Web 2.0 tools (49 respondents out of 70). A significant amount of 86% of respondents mentioned that their institution does not support them in learning how to use Web 2.0 tools (60 respondents out of 70) and a total of 94% of respondents prefer to use textbooks rather than Web 2.0 tools (66 respondents out of 70). Besides the above factors, other factors (4%) that contributed to the lack of usage of Web 2.0 tools were:

- *Internet connectivity issues;*
- *The Study Guide and Module Outline for the courses taught do not call for the use of certain applications and working through specific practical exercises running in those applications;*
- *teaching scheduled contact time is limited that there simply is no time to explore Web 2.0 tools, applications, or services to extend my teaching and lack of resources.*

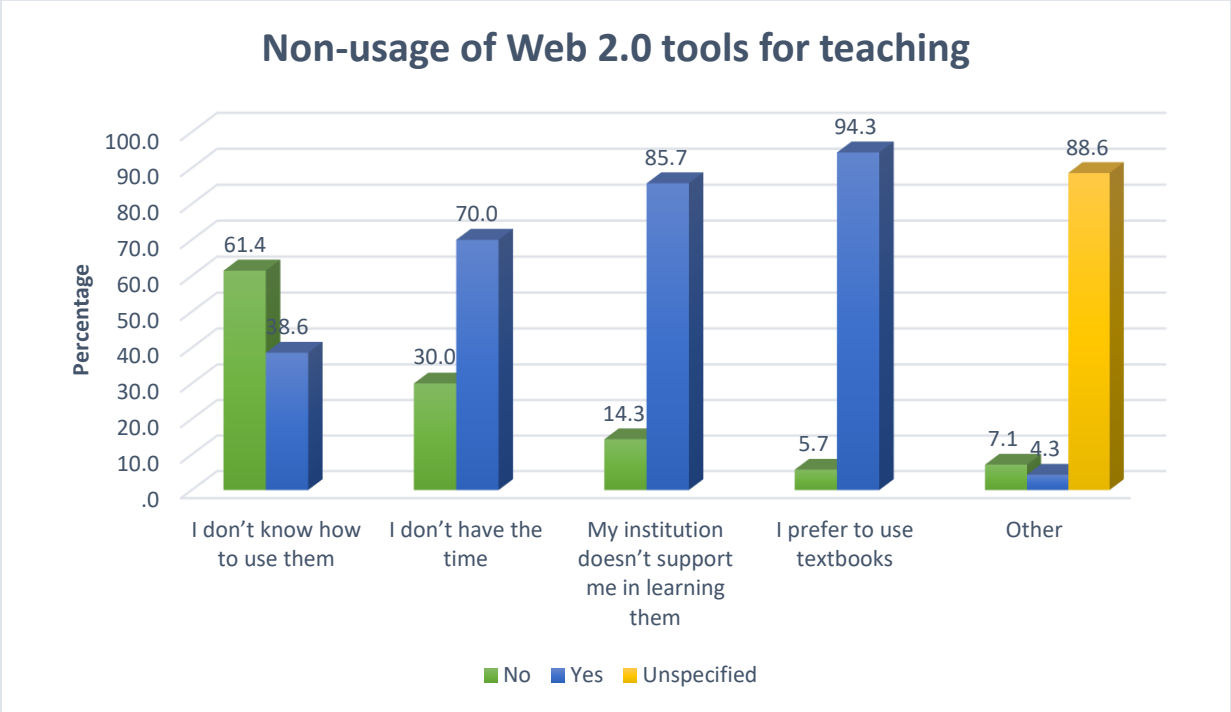


Figure 4.32 Non-usage of Web 2.0 tools for teaching at PIHE

The following were the results based on factors that hinder the use of Web 2.0 tools: A significant proportion of the sample *do not have the time to use Web 2.0 tools* (70%, p=.001); a significant proportion of 86%, p<.0005 stated that they *do not get the support that they need from their*

institution. Another reason as stated above was that many *respondents prefer to use textbooks*. This was made up of a significant proportion of 94%, p<.0005. The next section will discuss the usage of Web 2.0 tools at MSA.

4.9.2 Monash South Africa

The following were the results regarding the usage of Web 2.0 tools:

4.9.2.1 Usage of social software applications

A total of 53% of respondents make use of social software applications, whilst 47% of respondents do not. Thus, academics from both organisations make use of social software applications.

4.9.2.2 Wikis

The findings revealed that 61% of respondents make use of Wiki sites. A higher proportion of academics from Monash South Africa make use of Wiki sites compared to Pearson Institute of Higher Education.

4.9.2.3 Blogging websites

The findings revealed that 42% of respondents make use of blogging websites. A higher number of academics from Monash South Africa make use of blogging websites compared to academics from Pearson Institute of Higher education.

4.9.2.4 Podcasting sites

A total of 16% of respondents make use of podcasting sites. Based on these two results, it is evident that there is a similarity from both the organisations regarding the use of podcasting sites i.e. both Pearson Institute of Higher Education and Monash South Africa have a low usage level when it comes to podcasting sites.

4.9.2.5 Usage of other Web 2.0 tools

The findings revealed that 12% of respondents stated that they use other Web 2.0 tools for educational purposes. This comprised of Moodle, YouTube and online quizzes.

The following diagram shows the results from Monash South Africa regarding use of Web 2.0 tools and applications.

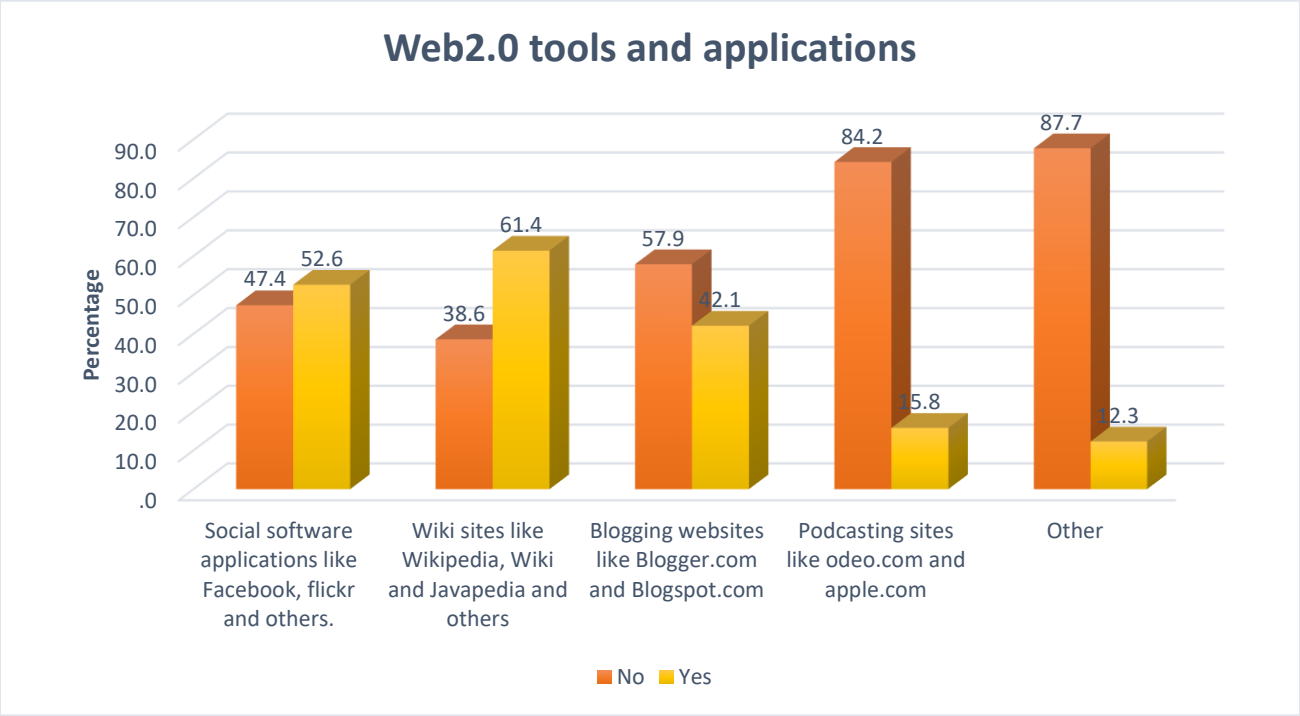


Figure 4.33 Web 2.0 tools and applications at MSA

A significant proportion of the sample do not make use of certain Web 2.0 tools, applications or services. This is made up of *Podcasting* (84%, p<.0005) as well as *other Web 2.0 tools* which made up 89%, p<.0005.

4.9.2.6 Usage of Web 2.0 tools for teaching and/or for faculty use

The findings revealed that 12% of respondents stated that they use Web 2.0 tools only for teaching purposes and the reminder 19% use Web 2.0 tools for both teaching and faculty work. A total of 42% of respondents mentioned that they do not use Web 2.0 tools.

The results of the Chi-square goodness of fit test: a significant number of the respondents *do not use Web 2.0 tools* (χ^2 (3) = 11.286, p=.004).

4.9.2.7 Reasons for not using Web 2.0 tools for teaching

A total of 26% (15 respondents out of 57) of respondents stated that they do not know how to use Web 2.0 tools as an educational tool and 35% (20 respondents out of 57) stated they do not have the time to use Web 2.0 tools. A significant amount of 77% (44 respondents out of 57) of respondents mentioned that their institution does not support them in learning how to use Web 2.0 tools and a total of 79% (45 respondents out of 57) of respondents prefer to use textbooks rather than Web 2.0 tools. Besides the above factors, there are other factors (19% (11 respondents out of 57) that contributed to the lack of usage of Web2.0 tools were:

- *'being a new to lecturer';*
- *'not having the freedom to explore mediums beyond what has been standardised for the course';*
- *'Web 2.0 tools are used as a supportive tool and not as the main teaching/learning aid';*
- *'lack of resources and support';*
- *'may not be relevant to the course and only used to better explain concepts'.*

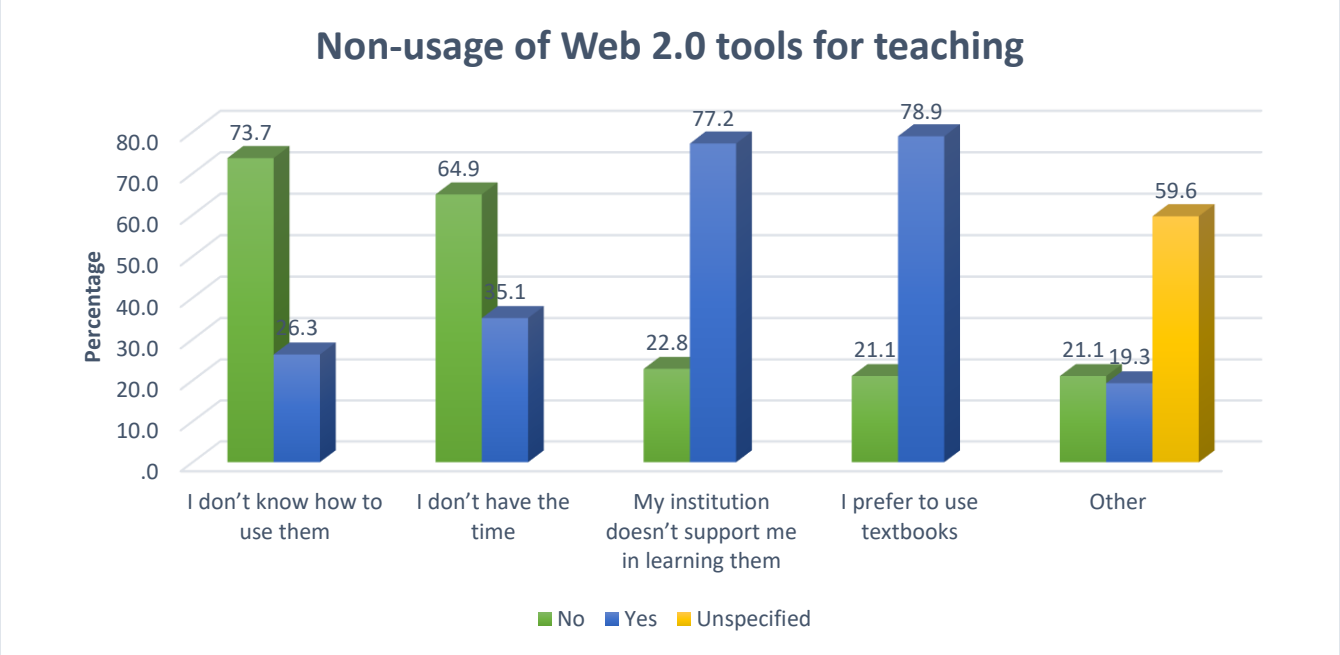


Figure 4.34 Non-usage of Web 2.0 tools for teaching at MSA

The following were the results based on factors that hinder the use of Web 2.0 tools: A significant proportion of the sample stated that they *do not get the support that they need from their institution* (77%, p<.0005*).* Another reason as stated above was that many *respondents prefer to use textbooks*. This was made up of a significant proportion of 79%, p<.0005.

Further to this, a significant proportion of respondents stated that they do not agree with *not having time to use Web 2.0 tools* (65%, p = 0.33) and they do not agree with *not knowing how to use Web 2.0 tools* (74%, p<.0005). The next section discusses the overall combined results regarding usage of Web 2.0 tolls from both the higher education institutions.

4.9.3 Combined results for USAGE

The following are the overall findings from both the academics institutions:

4.9.3.1 Usage of social software applications

Respondents were asked about their use of social software applications like Facebook, flickr, etc. A total of 53.5% of respondents make use of social software applications, whilst 46.5% of respondents stated they do make use of social software applications.

4.9.3.2 Wiki sites

A total of 47% of respondents make use of Wiki sites like Wikipedia, Wiki, Javapedia, etc.

4.9.3.3 Blogging websites

The use of blogging websites like Blogger.com and Blogspot.com is used by only 28% of the respondents. Thus, the use of blogging websites is not a common activity as compared to the use of Wiki sites and social software applications.

4.9.3.4 Podcasting sites

The use of podcasts is only utilised by only 15% of the respondents. Thus, respondents prefer to use social software applications, wiki sites and blogging websites rather than podcasts in their teachings.

4.9.3.5 Other Web 2.0 tools

Respondents were asked to identify other Web 2.0 tools that they may use for educational purposes. A total of 24% of respondents make use of other Web 2.0 tools, applications or services such as Moodle, online quizzes, MyLabs Plus Pearson, Virtual Labs, YouTube and Google.

A significant proportion of the sample do not make use of certain Web 2.0 tools, applications or services. *This is made up of blogging websites* (72%, p<.0005), *Podcasting* (85%, p<.0005) as well as *other Web 2.0 tools* which made up 76%, p<.0005.

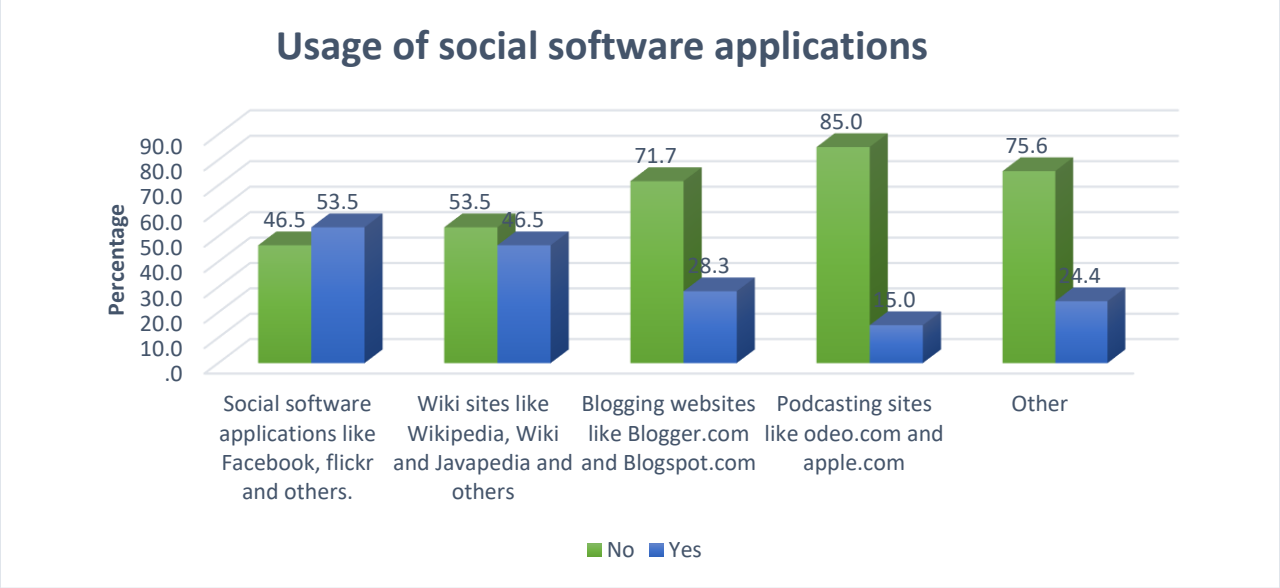


Figure 4.35 Usage of Web 2.0 tools, applications or services

Significant number of respondents either do not use Web 2.0 tools or use Web 2.0 tools for both teaching and for Faculty work. However, also a large number of respondents did not respond to this question.

4.9.3.6 Usage of Web 2.0 tools for teaching and/or for faculty use

Respondents thereafter were asked to state their usage of Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for teaching and/or for faculty use. The combined results from both the institutions revealed that a total of 11% of respondents stated that they use Web 2.0 tools

only for teaching purposes; 5% use Web 2.0 tools only for Faculty work and the reminder 42% use Web 2.0 tools for both teaching and faculty work.

The results of the Chi-square goodness of fit test: a significant number of the respondents indicated that they use Web 2.0 tools for teaching and for faculty use and significant number of respondents also stated they do not use Web 2.0 tools (χ^2 (3) = 52.214, p<.0005).
However, also a large number of respondents did not respond to this question.

4.9.3.7 Reasons for not using Web 2.0 tools for teaching

Based on the combined institutional results, 33% of respondents stated that they do not know how to use Web 2.0 tools as an educational tool and 54% stated they do not have the time to use Web 2.0 tools. A significant amount of 82% of respondents mentioned that their institution does not support them in learning how to use Web 2.0 tools and a total of 87% of respondents prefer to use textbooks rather than Web 2.0 tools. Higher education institution support and personal preference are two huge contributing factors against the adoption of Web 2.0 tools in higher education.

A total of 45% of the respondents stated that other factors besides the ones mentioned above also contributed to the lack of use of Web 2.0 tools. These comprised of respondents who stated that:

- *they are new to lecturing;*
- *others mentioned that the higher education institution does not allow them the freedom to explore mediums beyond what has been standardised for the course;*
- *Web 2.0 tools are used as a supportive tool and not as the main teaching and learning aid, for example they only use Web 2.0 tools if they need to better explain concepts or to supplement their teaching;*
- *Internet connectivity issues is another reason for the lack of adoption of Web 2.0 tools;*
- *some respondents stated that the use of Web 2.0 tools may not be relevant to their course and*
- *scheduled contact time is limited (in fact, it has been cut short due to changes in the Year Planner) which has resulted in some academics not having time to explore Web 2.0 tools, applications, or services to extend their teaching.*

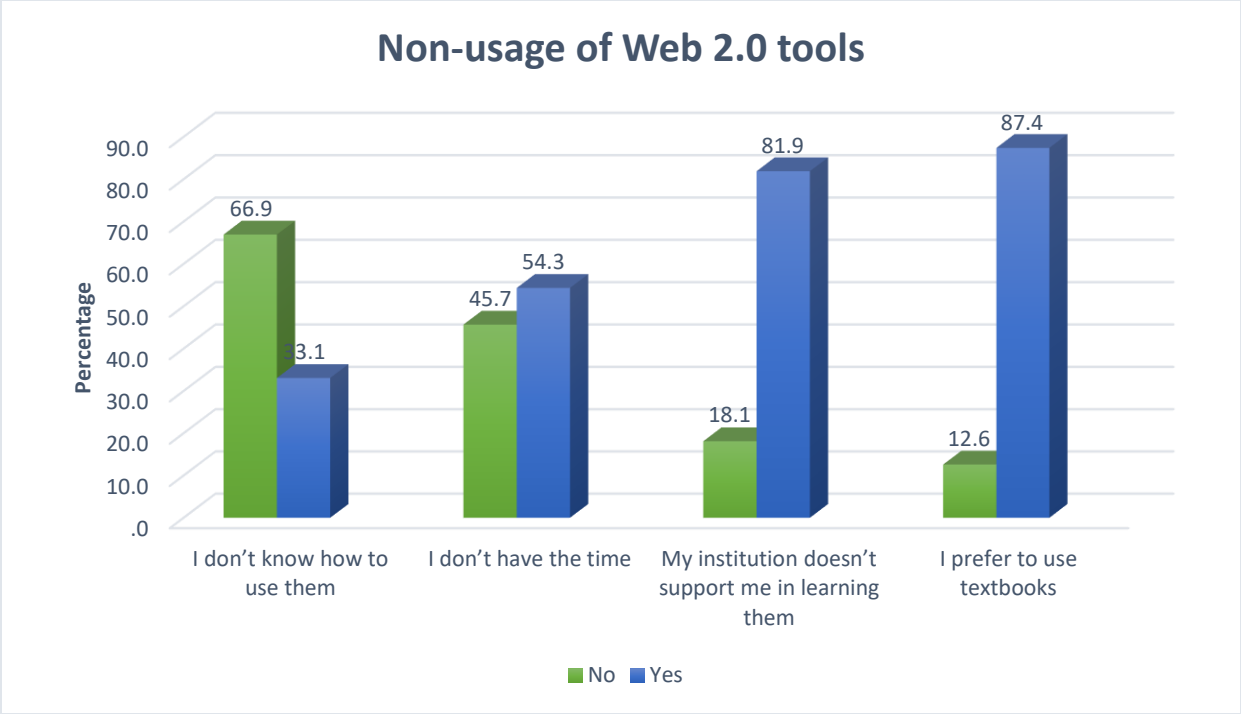


Figure 4.36 Non-usage of Web 2.0 tools

A significant proportion of the sample *know how to use Web 2.0 tools, applications or services*. This is made up of 67%, p<0005. Respondents were asked if their *higher education institution supports them in learning how to use Web 2.0 tools*, a significant proportion of 82%, p<0005 stated that they *do not get the support that they need*. Another reason as stated above was that many *respondents prefer to use textbooks*. This was made up of a significant proportion of 87%, p<0005.

A study by Kelly (2008) revealed that the most popular Web 2.0 tool-application areas are blogs, wikis, RSS, podcast, vidcasts, social sharing services, communication tools, social networks, folksonomies and tagging, and virtual worlds. According to Bell (2009), Web 2.0 tools enhance classroom management with tools like Really Simple Syndication by providing students with access to course materials. The next section will discuss the satisfaction level with the usage of Web 2.0 tools in education.

4.10 Satisfaction level with the usage of Web 2.0 tools

This section discusses the satisfaction level of using Web 2.0 tools in education. The discussion starts off with the findings at PIHE, then at MSA and lastly a combined analysis of both the higher education institutions. The following are the findings at PIHE:

4.10.1 Pearson Institute of Higher Education

A total of 19% of respondents were moderately satisfied and 11% of respondents were highly satisfied with the use of Web 2.0 tools. 11% of respondents were highly dissatisfied and 9% of respondents were moderately dissatisfied. The remainder 51% of respondents were neutral. According to the Chi-square test, there is no significant satisfaction or dissatisfaction. These results are shown in Figure 4.37, below.

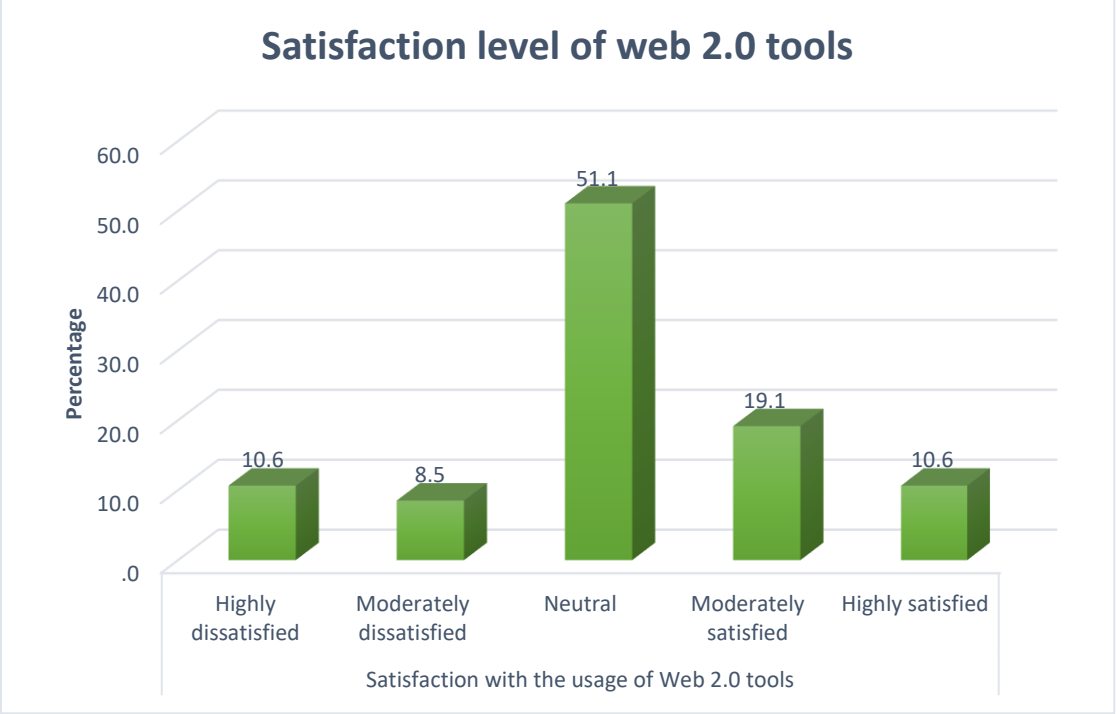


Figure 4.37 Satisfaction level of Web 2.0 tools at PIHE

The next section discusses the analysis of the satisfaction level of using Web 2.0 tools at MSA.

4.10.2 Monash South Africa

A significant total of 100% of respondents were moderately satisfied with the use of Web 2.0 tools.

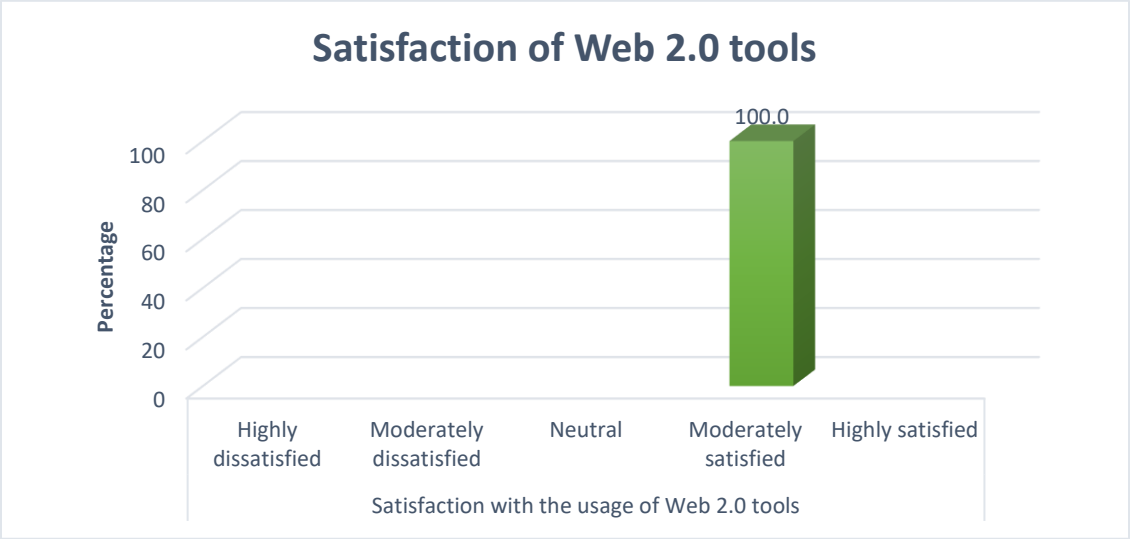


Figure 4.38 Satisfaction of Web 2.0 tools at MSA

The next section discusses the overall combined satisfaction levels from both the higher education institutions.

4.10.3 Combined results for Satisfaction

The results revealed that 42% of respondents are highly satisfied and 8% are moderately satisfied with the usage of Web 2.0 tools as an educational medium. On the other hand, 8% were highly dissatisfied and 6% were moderately dissatisfied with the remainder 37% of respondents being neutral.

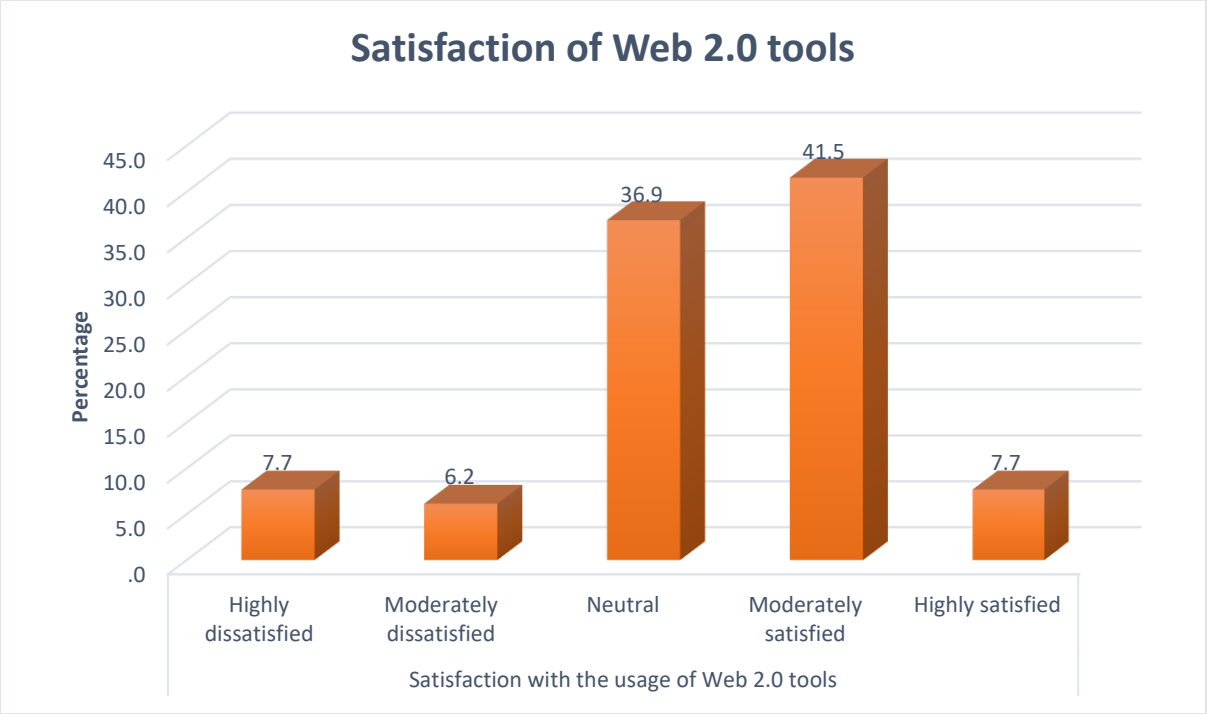


Figure 4.39 Satisfaction of usage of Web 2.0 tools

Based on the results there is a significant satisfaction of *usage of Web 2.0 tools*: (M=3.35, SD = .991), t (64) = 2.879, p=.005.

If satisfaction will enhance the ability of the academic to improve their work performance then this influences the usage of Web 2.0 tools in education. Users are more inclined to use a technology if they are satisfied. The more useful academics find a technology, the more satisfied they are with it which then leads to continual usage of Web 2.0 tools. These satisfaction levels match the results of a study conducted by Shihab (2008). In this study, the findings revealed that teachers were satisfied with the usage of Web 2.0 tools in education as it made them more efficient and improved learning experiences. The next section will provide a discussion of the regression analysis results.

4.11 Discussion of results

The purpose of this section is to present a discussion of the findings in relation to the research questions and hypotheses:

1. What are the factors that influence the use of Web 2.0 technology tools among academics in higher education?

- What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the individual factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived usefulness influence in the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived quality characteristics in the use of Web 2.0 technology tools among academics in higher education?

2. How are Web 2.0 tools used by academics in higher education?

3. Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?

Regression analysis was used to provide insight on the relationship between a response variable (USAGE of Web 2.0 tools) and one or more predictor variables. The following information outlined in this section summaries the variables that were a significant predictor of the usage of Web 2.0 tools in education and the reasons as to how and why (answers research question two and three) these factors influences the usage of Web 2.0 tools in higher education:

4.11.1 Perceived usefulness (PU)

Perceived Usefulness (PU) was made up of the following sub factors: *student-staff communication; student-staff connectivity; collaboration; content creators; use and reuse of material; active participant and online presence.* Thus, these sub factors (benefits) are the reason why academics are influenced to use Web 2.0 tools in education.

The alpha coefficient for PU is .919, suggesting that the sub factors have relatively high internal consistency. Thus, the sub factors mentioned under PU are closely related (consistent) to the usage of Web 2.0 tools in education based on the data collected.

The results revealed that PU is a significant predictor of usage. PU has a positive B value (Beta, the regression coefficients), which means the independent variable is associated with higher usage. Thus, the larger B, the higher the usage.

4.11.2 Individual factors

Chi-square test of independence was used to determine if there was a relationship between the demographic variables (academic rank, teaching style, computer experience, familiarity of Web 2.0 tools, personal barriers, attitude and effort) and usage of Web 2.0 tools. Only significant cross tabulations are shown where there were significant associations/relationships.

4.11.2.1 Academic rank

Based on the findings, it was revealed that there is a significant relationship between the academic ranks of lecturer and associative professor and the usage of Web 2.0 tools (blogging websites).

4.11.2.2 Teaching style

The findings revealed that there is a significant relationship between the traditional teaching style and the usage of Web 2.0 tools (social software applications).

4.11.2.3 Computer experience

Computer experience had a significant relationship with:

- Familiarity of Web 2.0 tools and usage of social software applications;
- Familiarity of Web 2.0 tools and usage of Wiki sites and
- Familiarity of Web 2.0 tools and usage of blogging websites.

4.11.2.4 Familiarity

Based on the findings, there is a significant relationship between familiarity of Web 2.0 tools and usage of Web 2.0 tools to extend teaching. Thus, if academics are familiar with Web 2.0 tools then this is how they are influenced in using the tool in education.

4.11.2.5 Personal barriers

Personal barriers were made up of independent variables: This is made up of *The lack of knowledge on how to use the tool effectively; The lack of instructional value/appropriateness; Using Web 2.0 tools requires more planning and effort than traditional face to face teaching and Lack of motivation.*

These four independent variables, which represent personal barriers to usage, account for 13.4% of the variability in usage, $F(4, 122) = 4.728$, $p=.001$). Lack of knowledge ($\beta = -1.876$, $p=.002$) and lack of motivation ($\beta = -1.254$, $p=.003$) are both significant predictors of lower usage. Thus, if these sub factors are present then they will influence academics use (lower usage) of Web 2.0 tools in education.

4.11.6 Attitude towards the usage of Web 2.0 tools

Attitude towards the usage of Web 2.0 tools in education was to examine academics' perceptions about educational technologies, their attitude, usage frequencies of Web 2.0 technologies, and awareness of these technologies in education. The results indicate that academics' attitude and their perceived behaviour are strong predictors to usage of Web 2.0 technological tools. This is another example of how these factors influence the use of Web 2.0 tools in education.

Attitude comprised of the following sub factors:

- *Level of confidence and comfort in using Web 2.0 tools as a delivery method when teaching compared to traditional face to face communication;*
- *Supplementing lectures more effectively and efficiently with the use of Web 2.0 tools;*
- *Web 2.0 tools are very time consuming as more preparation is involved;*
- *Web 2.0 tools are not appropriate for teaching;*
- *Non-usage of Web 2.0 tools in teaching and learning can still get the same results;*
- *Modern teaching cannot do without Web 2.0 tools;*
- *I can deliver as effectively with Web 2.0 tools compared to traditional face to face instruction*

The above mentioned sub factors for attitude do not combine into any sort of reliable measure.

Additionally, the following items had a positive B value (Beta, the regression coefficients), thus Web 2.0 tool is associated with higher usage:

- I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses;
- I find the use of Web 2.0 tools to be easier than traditional face to face communication;
- I can do without Web 2.0 tools in teaching and learning and still get the same results.

Lower usage (negative statement) was associated with the statement: *Web 2.0 tools are not appropriate for teaching and modern teaching cannot do without Web 2.0 tools*.

4.11.7 Effort

Based on the results, EFFORT is had a negative influence on the usage of Web 2.0 tools. EFFORT resulted in a significant relationship of lower usage of Web 2.0 tools. Thus, if academics find the usage of Web 2.0 tools to be more effort than the traditional face-to-face approach then this is how the usage of the Web 2.0 tools are influenced negatively.

4.11.8 Organisational factors

The following were the findings regarding organisational factors:

4.11.8.1 Higher education institution

After analysing both the higher education institutions, it was found that Monash South Africa showed a higher usage of Web 2.0 tools compared to Pearson Institute of Higher Education.

4.11.8.2 Organisational barriers

The sub factors that were used for this analysis were made up of:

- **Technological barriers** (*Low bandwidth, lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools*)
- **Skills barrier** (*Shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications*)

Technological barriers Cronbach's alpha = .826 and *Skills barrier* Cronbach's alpha = .596. Although *Skills barrier* is lower than the accepted value of .7, the fact that there are only two items

in the construct influences this and the alpha value is therefore acceptable. Based on the results, neither of these independent variables are significant predictors of usage.

4.11.8.3 Organisational support

A positive B value means the independent variable is associated with higher usage, therefore the more support there is, the higher the usage. Thus, support is a significant predictor of usage. Thus, support is another example of how the factors influences the usage of Web 2.0 tools in education. If organisational support is present such as training then this will result in a higher usage of the tool. Several respondents mentioned that the higher education institution does not provide enough technical support for academics who are unfamiliar with Web 2.0 technologies.

4.11.9 Perceived quality characteristic

The results revealed that ease of use is a significant predictor of usage. A positive B (SYS_EOU) value means the independent variable is associated with higher usage, therefore the more system quality there is, the higher the usage. Thus, SYS_EOU is a significant predictor of usage. Consequently, ease of use is how such a factor influences the usage of Web 2.0 tools in education.

4.12 Conclusion

This chapter focused on the results of the quantitative data collected from the questionnaire administered at Pearson Institute of Higher Education and Monash South Africa.

The results of the quantitative analysis indicated that the usage of Web 2.0 technologies is still in its infancy stages at Pearson Institute of Higher Education and Monash South Africa as the usage of Web 2.0 tools in education is not being used by all academics. However, there was much enthusiasm amongst academics for developing the potential of Web 2.0 tools at the respective higher education institutions.

This chapter demonstrated an increase in the level of awareness and use of the technologies among academics for teaching and learning purposes and touched on the different factors emerged from the data collected from the conceptual framework that was discussed in Chapter 2. The findings of this chapter confirm that Web 2.0 tools are beneficial in higher education but barriers exist. There needs to be strong organisational support in order to remove these barriers.

Factors that influence the usage of Web 2.0 tools are individual factors, perceived quality characteristics (PEOU), PU and Support, sub factor of organisational factors. The results of the study suggest that the level of usage of Web 2.0 technologies in higher education is not satisfactory, as only a few academics have used RSS feeds, podcasts, blogs, etc. in their teaching. In the next chapter, Chapter 5, the researcher will present the findings of the interviews by means of qualitative analysis.

CHAPTER 5

Interview findings and qualitative data analysis

5.1 Introduction

The aim of this chapter is to present the findings and analyses from the qualitative analysis by means of the interviews. This chapter forms the second part to the mixed methods approach. The mixed methods approach is beneficial in this study because the researcher would be able to look at a research question from different angles, thereby getting a better understanding of the usage of Web 2.0 tools. The mixed methods approach is also ideal as the researcher can generalise findings from the qualitative research. Thus, the purpose of the interviews was to get a better understanding of the current level of usage of Web 2.0 services among academics in higher education. In addition, to determine the themes and subthemes associated with the use Web 2.0 tools in higher education to supplement traditional classroom teaching.

Chapter 5 will discuss the interview data collection in Section 5.2, Section 5.3 will provide an overview of the interviewees, followed by the results in Section 5.4 and the analysis of overall findings in Section 5.5. Section 5.6 will end with a summary of this chapter.

5.2 Interview data collection and analysis

In this section, the researcher will discuss the approach used to create categories and themes.

5.2.1 Method

The interviews were used to confirm categories/themes that were created based on the research questions. Thus, the data was analysed using thematic analysis i.e. a descriptive presentation of qualitative data. This analysis enabled the researcher to categorise the data according to themes. This approach helped the researcher to move the analysis from a broad reading of the data towards discovering patterns and developing themes (Boyatzis, 1998). This approach provided a way of getting closer to the data and developing some deeper appreciation of the content by allowing patterns to be identified and commonalities, differences and relationships to be highlighted.

The qualitative data was collected by means of semi-structured in-depth interviews with academics with the purpose of gathering in-depth insights on participant attitudes, thoughts, and actions with regard to the phenomenon under study. Once the data was collected, the interview transcripts were loaded into the NVivo analysis tool in order to establish categories and themes. The researcher started by taking each research question and creating categories. These categories were then used to create nodes to establish a relationship among the data. The data used was collected from the two academic higher education institutions: Pearson Institute of Higher Education and Monash South Africa. Thus, a cross sectional analysis of the data collected at the two organisations were analysed to determine the similarities and differences between the results.

5.2.2 The interviews

A total of fifteen interviews were conducted, eight from Pearson Institute of Higher Education and seven from Monash South Africa. The interviews were about 10 minutes in length. NVivo was used to analyse the data by coding the text from the interviews.

5.3 Overview of the interviewees

The study was based on two private higher education institutions in South Africa (Gauteng), Pearson Institute of Higher Education and Monash South Africa. The sample consisted of academics who were representative of the population of academics that use/aware of Web 2.0 tools.

5.3.1 Pearson Institute of Higher Education

Pearson Institute of Higher Education is a private higher education institution that use technology enhanced and traditional learning methods, as well as practical application, to prepare students for the technology driven and fast changing work environment of the 21st century (Pearson Institute of Higher Education, 2018).

A total of eight academics participated in the interview. This is displayed in Table 5.1, below.

	Disciplines	Number	Participants
PIHE	IT	3	A,B,C
	Science	3	D, E, F
	Commerce	2	G,H

Table 5.1 Interview participants at PIHE

5.3.2 Monash South Africa

Monash South Africa provides innovative and exceptional learning experiences to students that promotes intellectual engagement and critical thinking. Students are empowered to maximise their potential and equipped to meet the challenges of the real world (Monash South Africa, 2018).

Seven academics were interviewed from this higher education institution. This is further broken down in Table 5.2, below.

	Disciplines	Number	Participants
MSA	Mathematics	3	I, J, K
	IT	2	L, M
	Economics	2	N, O

Table 5.2 Interview participants at MSA

5.4 Results of the thematic analysis

Thematic analysis was adopted so that the researcher could make valid inferences by interpreting and coding textual material. Categories and themes were created to represent the data collected from the two higher education institutions. Subthemes were grouped and identified as A1, A2, A3, etc. These themes and subthemes can be found in Table 5.4 to Table 5.19. The information outlined in this section summaries the variables that were a significant predictor of the usage of Web 2.0 tools in education and the reasons as to why and how these factors influences the usage of Web 2.0 tools in higher education.

5.4.1 Overview of categories and themes

The themes that were created from the data collected from the two higher education institutions: Pearson Institute of Higher Education and Monash South Africa is displayed in Table 5.4 to Table 5.19. This information was derived from the interview transcripts by transforming the text into concise summary of key results (themes). A process of condensation was used in order to preserve the core meaning and codes were created to describe the condensed information. Thereafter, categories were formed by grouping related codes together through the content.

The list of tables used in this chapter to display the content analysis is summarised in Table 5.3, below:

PIHE	MSA
Table 5.4 content categories or themes	Table 5.5 content categories/themes
Table 5.6 perceived usefulness themes	Table 5.7 perceived usefulness themes
Table 5.8 perceived quality characteristics themes	Table 5.9 perceived quality characteristics
Table 5.10 individual themes	Table 5.11 individual themes
Table 5.12 organisational themes	Table 5.13 organisational themes
Table 5.14 pedagogical characteristics of Web 2.0 tools	Table 5.15 pedagogical characteristics of Web 2.0 tools
Table 5.16 pedagogical beliefs	Table 5.17 pedagogical beliefs
Table 5.18 usage themes	Table 5.19 usage themes

Table 5.3 overview of themes

5.4.1.1 Content categories or themes for Pearson Institute of Higher Education

Table 5.4 shows the content categories or themes relating to the usage of Web 2.0 tools at Pearson Institute of Higher Education.

The Pearson Institute of Higher Education count of individual occurrences of key themes are shown in the references column. Themes that has an impact on the usage of Web 2.0 tools in higher education were *Individual user, Perceived quality characteristics, Perceived usefulness, Pedagogical themes and Organisational themes.* Sources column refers to the number of participants that had identified these themes in the interview.

	Themes	**Sources**	**References**
A	Perceived usefulness	8	25
B	Perceived quality characteristics	8	14
C	Individual	8	16
D	Organisational	8	35
E	Pedagogical	5	26
F	Usage	8	15

Table 5.4 Pearson Institute of Higher Education: Content categories or themes

5.4.1.2 Content categories of themes for Monash South Africa

Table 5.5 shows the content categories or themes relating to the usage of Web 2.0 tools at Monash South Africa. Monash South Africa's count of individual occurrences of key themes are shown in the references column.

	Themes	Sources	References
A	Perceived usefulness	8	23
B	Perceived quality characteristics	7	24
C	Individual	7	25
D	Organisational	7	31
E	Pedagogical	7	23
F	Usage	7	24

Table 5.5 Monash South Africa: Content categories or themes

Based on the results shown in Table 5.4 and Table 5.5, the highest individual occurrence of key themes for Pearson Institute of Higher Education was 35 for *organisational themes* and for Monash South Africa, it was 31 also for *organisational themes.*

The lowest individual occurrence of key themes for Pearson Institute of Higher Education was 14 for *perceived quality characteristics* and for Monash South Africa; it was 23 for *pedagogical themes*.

5.4.2. Content category/theme A: Perceived usefulness

Theme A represents perceived usefulness. This theme is aimed at understanding educator perceptions on the usefulness/ benefits of web 2.0 tools in higher education, Tables 5.6 and 5.7 will establish themes and sub themes relating to Research Question 1 *(What is the influence of perceived quality characteristics in the use of Web 2.0 technology tools among academics in higher education?)* and Research Question 3 *(Why do these factors influence the use of Web 2.0 technology amongst academics in higher education?),* which was mentioned in Chapter 1.

5.4.2.1 Pearson Institute of Higher Education: perceived usefulness theme

The count of individual occurrences of the subthemes within the perceived usefulness category/theme for Pearson Institute of Higher Education is displayed in Table 5.6 below. In this table, academics provided possible advantages of using Web 2.0 tools for learning when compared to the traditional lecture-based education system.

Organising theme	Subthemes	Sources	References
Perceived Usefulness of Web 2.0 tools	Promotes student engagement	4	5
	Flexible teaching and learning	6	6
	Facilitates content creation	2	2
	Access to educational resources	3	3
	Improved communication and sharing	1	1

Table 5.6 Pearson Institute of Higher Education: perceived usefulness theme

The following were the findings related to academics' perceptions on the usefulness of Web 2.0 tools:

a) Promotes student engagement

The data extract supporting this theme was: "Videos and online tutorials enables me to adopt a flipped classroom approach" (B2). "Students are familiar with Web 2.0 tools which encourages them to participate in class discussion" (A1); "When I use these tools, students are more eager to contribute" (G1). Students can participate in online class discussions such as blogs and forums" (D1); "Web 2.0 tools allows students to participate in online assessments and test their knowledge on the concept taught in class" (A1).

b) Flexible teaching and learning

The data extract relating to this theme were: "Students have access to learning material outside of the classroom" (A1); "Web 2.0 tools allows students to be in control of the teaching and learning process beyond the walls of the classroom" (F3); "Teaching continues even after the student has left the class" (E2), "I use Web 2.0 tools to assist students to recap what was taught in class" (B2),"I can send learning material to my students at any time" (C3) and "the use of Web 2.0 tools provides fun ways of teaching" (G1).

c) Facilitates content creation

Data extracts that confirmed this theme were: "Web 2.0 tools allows me to create audio and video content which helps to relay information to students" (C3) and "students can create content themselves with the use of Web 2.0 tools" (A1).

d) Access to educational resources

Data extracts relating to his theme were: "with the use of Web 2.0 tools, students have access to a wide variety of online resources" (F3); "Web 2.0 tools allows students to gain access to online assessments and tutorials" (H2) and "students can watch video tutorials when experiencing difficulties with the content taught" (B2).

e) Improved communication and sharing

The data extracts relating to this theme was: "I can communicate and easily share information online after class with students using Web 2.0 tools" (D1).

5.4.2.2 Monash South Africa: perceived usefulness theme

The count of individual occurrences of the subthemes within the perceived usefulness category/theme for Monash South Africa is displayed in Table 5.7 below.

Organising theme	Subthemes	Sources	References
Pedagogical Usefulness of Web 2.0 tools	Promotes student engagement	4	4
	Improved communication and sharing	4	4
	Access to educational resources	7	7
	Flexible teaching and learning	2	2

Table 5.7 Monash South Africa: perceived usefulness theme

The following were the findings related to how academics' find the use of Web 2.0 tools in education:

a) Promotes student engagement

Data extracts supporting this theme were: "When I use Web 2.0 tools in class, I find students are more engaged" (K3); "I use Web 2.0 tools to get students to participate in class discussions" (L1). "Students can use Web 2.0 resources to easily engage in online assessments" (M2) and "students can participate in online discussions and tutorials" (I1).

b) Improved communication and sharing

Data extracts relating to this theme were: “I can easily convey a message to my students with the use of Web 2.0 tools” (M2); “I find that I can communicate more effectively with the use of Web 2.0 tools” (N1); “Web 2. 0 tools allow for effortless means of communication” (O2); “If students are not in class, they are still able to get my announcements through the use of Web 2.0 tools” (K3).

c) Access to educational resources

These findings were very similar to that of the academics at Pearson Institute of Higher Education. Data extracts supporting this theme were: “I provide links for my students to supplementary resources” (J2); “my students have access to my material anytime and anywhere” (K3); “students have easy access to the course content” (O2); “Web 2.0 tools allows students to access material whenever they want to” (N1); “course material is easily accessible to all students with the use of Web 2.0 tools” (M2); “I can post material online and know all of my students would have access to the resources whenever they want to refer back to what was taught in class” (L1); “Web 2.0 tools enables flexibility in terms of accessing class material” (I1).

d) Flexible teaching and learning

Data extracts supporting this theme was “Students can use Web 2.0 tools to assess their understanding of the content taught in class” (K3) and “students are already using Web 2.0 tools and when integrated in education, it makes the teaching and learning process more fun and interesting” (I1).

The perceived usefulness results from both the higher education institutions indicated that the use of Web 2.0 tools in higher education is beneficial in teaching and learning. The majority of the academics in this study had something positive to say about Web 2.0 tools in education. Just one academic from Pearson Institute of Higher Education stated that she does not use Web 2.0 tools in her teaching, as she prefers the traditional way of teaching. These results are linked to literature that stated Web 2.0 offers many benefits such as facilitating technology enhanced learning through self-guided learning (Chatti et al., 2008), provides collaborative tools such as wikis, blogs and

podcasts which improve information literacy (Harinarayana and Raju, 2010; Linh, 2008) and Web 2.0 tools also assists users to create content (Mahmood and Selvadurai, 2006).

5.4.3 Content category/theme B: Perceived Quality Characteristics

This content category will focus on the Perceived quality characteristics themes, which comprise of the following subthemes:

- Adaptability
- Efficient and effective
- Responsive interaction
- Reliable
- Ease of use and easy to understand

Perceived quality characteristics measured the desired characteristics of Web 2.0 tools. Thus, if the teaching tool is the adaptable, efficient and effective, provides responsive interaction, is easy to use and understand and is reliable, the more the academic will want to engage and embrace Web 2.0 technological tools.

Perceived quality characteristics theme addresses Research Question 1, listed in Chapter 1. This theme is depicted in Table 5.8 and Table 5.9 together with the frequency counts. This theme is discussed in more detail in sub-sections 5.4.3.1 and 5.4.3.2.

5.4.3.1 Pearson Institute of Higher Education: Perceived quality characteristics theme

The count of individual occurrences of the subthemes within the Perceived quality characteristic category/theme for Pearson Institute of Higher Education is displayed in Table 5.8 below.

Organising Theme	Subthemes	Sources	References
Perceived quality characteristics	Adaptability	6	9
	Efficient and effective	5	5
	Responsive interaction	6	11
	Reliable	5	7
	Easy to use and understand	8	8

Table 5.8 Pearson Institute of Higher Education: Perceived quality characteristics theme

a) Adaptability

This relates to how flexible Web 2.0 tools are when implemented together with traditional teaching styles i.e. how easily adaptable is the system as a learning tool to create interaction, enable knowledge sharing, etc. Based on the results obtained from the interviews, it is evident that Web 2.0 tools are adaptable to course content and when administered with traditional teaching and learning styles. Data extracts supporting this theme were: "Web 2.0 tools are very flexible as students can access the content at any time" (A1), "I can easily incorporate Web 2.0 tools with traditional learning styles" (D1), "I can easily align Web 2.0 tools to course content" (B2); "Web 2.0 tools are very flexible, allowing students to access my content whenever they need to" (F3); Í can easily incorporate Web 2.0 tools in my teachings" (B1); "The variety of Web 2.0 tools makes it easy to adapt to the learning content" (A3); "Web 2.0 tools are very versatile" (D1); "Easy to implement with my current teaching material" (B2); "Web 2.0 tools helps to easily transfer knowledge" (F3). One academic did mention that Web 2.0 tools may not work in all modules, for example, computer skills does not allow for the use of Web 2.0 tools as the content is related to teaching practically the MS Office suite (A1).

b) Efficient and effective

This relates to the system being able to do what it is supposed to do i.e. provide a tool that can be easily used in higher education with the least amount of time and effort. Based on the results obtained from the interviews, respondents from Pearson Institute of Higher Education disagreed that Web 2.0 tools are efficient and effective. Data extracts supporting this theme were: "I find Web 2.0 tools to be time consuming" (C3); "I do not have the time to learn how to use these tools"

(G1); “I can teach without Web 2.0 tools and still get the results I want” (H2); “I prefer to use textbooks than Web 2.0 tools” (E2); “Web 2.0 tools does not work in all modules” (B1). These results differed from academics from Monash South Africa.

c) Responsive interaction

Web 2.0 tools allows students to gain access to a wealth of knowledge at any time and place. It is so versatile that students are able to assess themselves and engage in tutorials to determine their level of understanding of the content taught in class. Data extracts supporting this theme were “Web 2.0 tools provides audio format of the content taught to allow students to listen to the content” (B2), “Students have a wider option of information, tutorials and videos”, “students get exposed to more material” (D1), “Web 2.0 tools allows me to focus on more than one type of user” (B2), “The use of these tools teaches students life skills” (B1); “Web 2.0 tools provides students with a lot of resources” (H2); “Students have different mediums to communicate with academics and their classmates” (E2); “I am not restricted to only share content in the class as I can now communicate and share material online” (A1); “Student have access to course material all the time” (B1); “Students can receive feedback when the need arises” (D1); “Students are more engaging” (H2); “I can post assessments and students can easily submit their work” (E2).

d) Reliable

This relates to the system being trustworthy in delivering a Web 2.0 experience that is error free and without any problems. Majority of the respondents stated that the system is not reliable. Data extracts supporting this characteristic were “I feel the system is not reliable as Internet connectivity is very weak” (C3), “There is slow connectivity when I try to use Web 2.0 tools” (E2), “The system is not reliable as I find it difficult to work with large files into manageable sizes” (G1), “When using Web 2.0 tools I have issues with accessibility and connecting to the Internet” (H2), “When using videos, I experience connectivity problems with the Internet, such as buffering of videos” (F3).

e) Easy to use and understand

This relates to how simple it is to use and understand Web 2.0 tools in higher education that it is easily adopted and used. Based on the results obtained from the interviews, the respondents agreed

that Web 2.0 tools are very easy to use. Data extracts supporting this theme were "I find Web 2.0 tools easy to interact with" (A1), "These tools are simple to figure out on how to use" (F3), "I am very comfortable using the tool" (D1); "Web 2.0 tools are easy and helpful to store information" (B2); "Web 2.0 tools are easy to use that I can easily share additional resources with students" (H2); "I can easily create content and have access to a variety of resources"(E2). "Web 2.0 tools are easy to use that it wouldn't take more than an hour to figure out" (G1) and "I find the use of Web 2.0 tools easy to comprehend" (C3).

Two academics did mention that they are only comfortable with the tool being used for communication and for social media but not so much for teaching purposes.

5.4.3.2 Monash South Africa: Perceived quality characteristics theme

The count of individual occurrences of the subthemes within the Perceived quality characteristics category/theme for Monash South Africa is displayed in Table 5.9 below.

Organising Theme	Subthemes	Sources	References
Perceived quality characteristics	Adaptability	7	10
	Efficient and effective	7	11
	Responsive interaction	3	3
	Reliable	7	7
	Easy to use and understand	6	11

Table 5.9 Monash South Africa: Perceived quality characteristics

a) Adaptability

Based on the results obtained from the interviews, it was agreed that Web 2.0 tools are adaptable to course content and when administered with traditional teaching and learning styles. Data extracts supporting this theme were: "Web 2.0 tools is easily accessible from anywhere" (I1), "Web 2.0 tools allows me to supplement traditional learning styles" (J2), "I can easily align Web

2.0 tools to the course content" (M2); "Web 2.0 tools are very adaptable to my teaching content" (O2); "I can use Web 2.0 tools with my teaching material" (N1); "Easily aligned to classes" (L1); "I can easily adapt my learning outcomes to Web 2.0 tools" (J2); "Web 2.0 tools are flexible to my tutorials" (I1); "Easy to integrate with my modules" (M2); "Can be used to supplement my teaching" (J2).

b) Efficient and effective

Based on the results obtained from the interviews, the respondents agreed that Web 2.0 tools are very efficient and effective. Data extracts supporting this theme were: "Web 2.0 tools are easily accessible" (O2), "I can easily share information with my students in less time compared to traditional teaching" (L1), "Web 2.0 tools is an ideal tool in reiterating what was taught in class" (N1); "The use of Web 2.0 tools makes learning more fun and interactive" (K3); "Web 2.0 tools does not take much time to interact and use" (J2), "Web 2.0 tools makes the teaching and learning experience more fun" (I1); "Allows me to form groups to easily communicate and share information with my students"(M2); "Very useful" (O2); "Helps to reinforce the course content" (N1); "Students complete work with more resources" (K3); "Web 2.0 tools are useful in assessing students" (J2).

c) Responsive interaction

Based on the data extracts supporting this theme were "Students and academics have access to more resources, information, tutorials and videos" (K3), "I have more exposure to supplementary material relating to the content taught" (M2), "I can provide students with instant feedback regarding assessments done online" (O2).

d) Reliable

Data extracts supporting this characteristic were "The Internet connectivity is very weak which makes the tool very unreliable" (N1), "There is slow connectivity to the Internet" (I1), "Web 2.0 tools used for videos takes too long to load which makes the system unpredictable" (K3); "Some resources are blocked" (M2); "Weak internet connectivity" (O2); "Some videos do not download properly" (J2); "Slow Internet connectivity" (L1).

e) Ease to use and understand

Data extracts supporting this theme were "Web 2.0 tools are easy to interact with" (O2), "These tools are simple to use" (L1), "I am very comfortable using Web 2.0 tools" (J2); "Simple to integrate in my class activities" (K3); "Simple to interact with" (N1); "Easy to incorporate in my modules" (N1) "Yes, easy to use" (J2); "Effortless to use" (L1); "I find Web 2.0 tools are user friendly" (K3); "Web 2.0 tools are easily reinforced in my teachings" (O2); "I enjoy using Web 2.0 tools" (M2).

The above findings tie in with prior studies that show that perceived quality characteristics is a significant predictor of perceived usefulness (Chen, 2010; Cheng, 2012) as well as an important factors of user satisfaction of technology adoption in various studies (Chen, 2010; Ramayaha & Leeb, 2012). Thus, the more reliable the system is, efficient and effective, provides responsive interaction and is easy to use and understand, the more the academic will want to engage and embrace this technology. This relates to Research Question 3.

5.4.4 Content category/theme C: Individual User Theme

This content category will focus on the individual user themes, which comprise of the following subthemes:

- *Rank*
- *Teaching style*
- *Attitude*
- *Barriers*

The individual theme addresses Research Question 1, listed in Chapter 1. This theme is depicted in Table 5.10 and Table 5.11 together with the frequency counts. This theme is discussed in more detail in sub-sections 5.4.4.1 and 5.4.4.2.

5.4.4.1 Pearson Institute of Higher Education: Individual theme

The count of specific occurrences of the subthemes within the Individual category/theme for Pearson Institute of Higher Education is displayed in Table 5.10 below.

Organising Theme	Subthemes	Sources	References
Individual	Rank	8	8
	Teaching style	8	8
	Attitude	5	5
	Barriers	6	6

Table 5.10 Pearson Institute of Higher Education: Individual theme

a) Rank

Academics were asked to rank themselves according to their academic position at the higher education institution. Based on the data extracts supporting this theme were "lecturer", "junior lecturer", "Head of programme".

b) Teaching style

This is the technique/style that academics adopt when teaching. The purpose of this theme is to determine which teaching style academics prefer between traditional teaching style (face-to-face interaction) and the use of Web 2.0 tools. The combination of both of these styles brings about a blended teaching approach.

Based on the data extracts supporting this theme were "I prefer a blended approach" (A1), "I am for face to face discussion" (E2), "Web 2.0 tools enables a flipped classroom approach" (D1), "Web 2.0 tools supplements what is taught when traditional teaching methods are used" (B2), "Web 2.0 tools engages students" (F3), "I like interacting with people so prefer face to face" (G1); "Blended approach with the use of flipped classroom" (C3); "A blended approach to teaching and learning" (H2). The findings revealed that majority of the respondents prefer a blended approach, however a few (three) of the respondents were in favour of the traditional (face to face) approach.

c) Attitude

This theme is related to academics' attitude towards the use of Web 2.0 tools in higher education. Data extracts supporting this theme were "I am not familiar with technology" (H2), "I am very

confident and comfortable using Web 2.0 tools" (A1), "I find Web 2.0 tools to be very time consuming as more preparation is involved" (F3), "I feel that I can do without Web 2.0 tools in teaching and learning and still get the same results" (G1), "I have not looked at the possibilities of using Web 2.0 in my teaching as time is an issue" (B2).

d) Personal Barriers

Personal barriers theme is related to personal issues that academics' face when interacting with Web 2.0 tools. Data extracts supporting this theme were "I do not know how to use Web 2.0 tools as an educational tool" (C3), "I do not have the time to use Web 2.0 tools" (E2), "I prefer to use textbooks rather than Web 2.0 tools" (H2), "Web 2.0 tools are not relevant to my course" (A1), "I have a lack of interest in the technology" (D1), "Web 2.0 tools are difficult to use in Physiology" (G1). Based on these results, majority of the respondents have personal barriers to the usage of Web 2.0 tools in education.

5.4.4.2 Monash South Africa: Individual theme

The count of specific occurrences of the subthemes within the Individual category/theme for Monash South Africa is displayed in Table 5.11 below.

Organising Theme	Subthemes	Sources	References
Individual	Ranking	7	7
	Teaching style	6	9
	Attitude	4	4
	Barriers	6	6

Table 5.11 Monash South Africa: Individual theme

a) Rank

Academics were asked to rank themselves according to their academic position at the higher education institution. Based on the data extracts supporting this theme were "lecturer", "junior lecturer", "assistant lecturer".

b) Teaching style

Based on the data extracts supporting this theme were "I prefer a blended approach by using both the traditional approach with Web 2.0 tools" (L1), "I like using Web 2.0 tools as it enables a flipped classroom approach" (O2), "I use Web 2.0 tools as a supplementary teaching tool" (I1), "I enjoy using Web 2.0 tools because it increases collaboration and engages students" (M2); "I like using Web 2.0 tools" (K3); "I use a blended approach" (J2); "I use a blended teaching approach" (N1). Thus, majority of the respondents preferred using Web 2.0 tools in education based on the benefits.

c) Attitude

Data extracts supporting this theme were "I find it easy to use this technology" (J2), "I am confident and comfortable in using Web 2.0 tools" (K3), "I find Web 2.0 tools to be very time consuming so I prefer to not use Web 2.0 tools" (N1), "I would use Web 2.0 tools more often if training was provided" (I1).

d) Personal Barriers

Data extracts supporting this theme were "I do not know how to use Web 2.0 tools as an educational tool but rather as a social tool" (I1), "I do not have the time to use Web 2.0 tools" (O2), "I prefer using the traditional way of teaching with textbooks and projector rather than Web 2.0 tools" (N1), "Web 2.0 tools are not relevant to my course" (N1), "Web 2.0 tools involves more effort and work" (L1); "Web 2.0 tools are not easily adaptable to my module" (K3). Based on these findings, majority of the respondents prefer using the traditional approach as less work, time and effort is involved.

The analysis of the individual themes at both Pearson Institute of Higher Education and Monash South Africa was varied as based on the scope and frequency. Academics from both institutions did mention that they try to incorporate Web 2.0 tools in their courses but time, lack of training and Internet connectivity are barriers to the Individual theme. Thus, these sub themes influences why academics use Web 2.0 tools in education (Research Question 3). Based on prior studies, Web 2.0 tools used in education can engage students in meaningful learning as well as social interactions (Atkinson & Swaggerty, 2011). These tools also have the ability to provide effective and efficient feedback to students (Hartshone & Ajjan, 2009).

5.4.5 Content category/theme D: Organisational Theme

This content category will focus on the Organisational theme, which comprise of the following subthemes:

- *Institutional culture*
- *Policy framework*
- *Support*
- *Barriers*

The policy sub theme includes specific organisational policies; the culture sub theme comprises themes such as collaboration within organisations, personal motivation and characteristics of the organisation such as staff rewards, teaching and learning models and attitudes (Phillips, 2000). The sub theme of support represents the range of organisational infrastructure designed to assist and help with the use of technology. This can include the information technology services, professional development of staff, support and IT literacy support for staff (Phillips, 2000). The barriers sub theme relates to lack of security and privacy in social networked learning, Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools and inadequate student ICT facilities to use Web 2.0 tools. Thus, if an organisation addresses these themes then they will most likely be able to achieve high usage rates of any educational tool.

5.4.5.1 Pearson Institute of Higher Education: Organisational theme

The count of individual occurrences of the sub themes within the organisational category/theme for Pearson Institute of Higher Education is displayed in Table 5.12 below.

Organising Theme	Subthemes	Sources	References
Organisational	Institutional culture	6	6
	Policy framework	5	6
	Support	7	9
	Barriers	5	6

Table 5.12 Pearson Institute of Higher Education: Organisational theme

a) Institutional culture

As mentioned above, institutional culture relates to personal motivation and characteristics of the organisation as well as attitudes from the organisation's perspective towards the use of Web 2.0 tools. Data extracts supporting this theme were "Pearson Institute of Higher education are all for it, they encourage the use of Web 2.0 tools" (B2), "Pearson Institute is moving towards teaching with social media tools" (E2), "The use of Web 2.0 tools are encouraged by Pearson with the introduction of mobile devices" (A1), "Pearson is very technologically focused, they like it. They for it" (D1), "Pearson looks does not use books to saves costs, they are open to new way to reach students"(H2), "The institution would like us to use the tools more" (G1).

Thus, Pearson Institute of Higher Education's attitude towards the use of Web 2.0 tools is a positive one. They encourage academics to make use of these tools as they are all for new and innovative ways of teaching.

b) Policy framework

This theme relates to the organisational institution's policy that they have in place regarding the use of technology whether it is for teaching by academics or usage by students. One policy mentioned by academics is the monitoring of the appropriate use of online social networks and the existence of an institutional policy that encourages lecturers to use new Web tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge. Data extracts supporting this theme were "there is a policy in place for the usage of technology" (C3), "Pearson Institute promotes usage of technology within the policy framework of the institution" (D1), "academics and students need to abide by the technology usage guidelines" (G1); "I am unaware of such policy" (A1); "There are policies in place but not for usage of Web 2.0 tools" (B2); "Not sure if there is a policy on Web 2.0 usage" (D1).

c) Support

Institutional support theme relates to the higher education institution providing support in terms of staff training and workshops; technical assistance for students and staff; adequate resources are

available e.g. Wi-Fi hot spots for students, etc. Data extracts supporting this theme were “There is support from ICT and Pearson does provide training but nothing specific for using Web 2.0 tools in education” (A1), “There is no training or workshops provided for the use of Web 2.0 tools” (C3), “Lack of training from Pearson Institute of Higher Education regarding the use of Web 2.0 tools” (D1), “There’s more training that can be done to encourage the use of Web 2.0 tools” (F3), “ICT is very supportive” (G1), “Adequate resources are available” (H2); “I have never been trained on the usage of Web 2.0 tools in education” (B2); “There is a policy in place for the usage of technology but not specifically for the use of Web 2.0 tools” (B2), “Pearson Institute of Higher Education has a policy in place for the use of resources such as Wi-Fi but not for Web 2.0 tools, however, technological usage is monitored and controlled by ICT” (H2).

These results differ from the quantitative analysis as the findings from the questionnaires indicated that almost half of the participants agreed that there is support from the higher education institution in terms of training. However, the above findings indicate that there is lack of training from the higher education institution.

d. Barriers

Institutional barriers sub theme relates to the themes that restricts academic from using Web 2.0 tools in education. Data extracts supporting this sub theme were “Low bandwidth” (A1), “Lack of security when using social media for teaching” (C3), “Lack of training from Pearson Institute of Higher Education regarding the use of Web 2.0 tools” (D1), “Lack of privacy on social networks” (E2), “In terms of ICT, we do not have enough capacity for support” (E2) and “Absence of Web 2.0 workshop” (F3).

5.4.5.2 Monash South Africa: Organisational theme

The count of individual occurrences of the subthemes within the organisational themes category/theme for Monash South Africa is displayed in Table 5.13 below.

Organising Theme	Subthemes	Sources	References
Organisational	Institutional culture	5	5
	Policy framework	3	3
	Support	4	4
	Barriers	4	4

Table 5.13 Monash South Africa: Organisational theme

a) Institutional culture

Data extracts supporting this theme were "Monash encourages the use of Web 2.0 tools in teaching and learning", "The institution is very aligned to these tools" (J2), "The institution is very positive about using Web 2.0 tools in education" (K3), "Monash is very supportive by allowing us to experiment and use the tools that we want to get the work done" (L1), "The institution would like us to use the tools more" (M2), "The institution are not prescriptive of what tools we can use" (N1).

Thus, Monash South Africa's attitude towards the use of Web 2.0 tools is a positive one. They encourage academics to make use of these tools as they are all for new and innovative ways of teaching.

b) Policy framework

There is a policy framework in place at Monash South Africa relating to the use of technology. Data extracts supporting this theme were "A policy does exist but is related to the general use of technology" (I1), "I am not aware of a policy for the usage of Web 2.0 tools" (M2); "Monash does have a policy framework for technology usage" (N1).

c) Support

Data extracts supporting this theme were “There is support from ICT” (J2), “Highly skilled staff” (K3), “ICT is very supportive, however training is required for the use of Web 2.0 tools” (O2); “There is support for students and academics” (N1).

d) Barriers

Data extracts supporting this sub theme were “Poor quality bandwidth” (A1), “Inadequate training and workshops” (C3), “Lack of training on how to use Web 2.0 tools in education” (D1), “Slow Internet connectivity” (M2).

The organisational theme addresses Research Question 1 (*What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?*) and Research Question 3 (*Why do these factors influence the use of Web 2.0 technology amongst academics in higher education?*) which are listed in Chapter 1. This theme is depicted in Table 5.12 and Table 5.13 together with the frequency counts. This theme was discussed in more detail in sub-sections 5.4.5.1 and 5.4.5.2.

Based on the results relating to institutional policy, an adoption and utilisation environment needs to be created by the higher education institution in order to make academics more aware of the usage and adoption of Web 2.0 tools as well as necessary training needs to be provided for the application of Web 2.0 tools in teaching. These findings are similar to a study conducted by Munuatosha, Muyinda and Lubega (2011) who identified the factors that hinder the usage of new learning media are security and privacy in social networked learning, technical support and infrastructure (lack of reliable power supply and internet connection, and limited supply of computers, lack of competent technical staff, poor communication, irrelevant ICT policies, lack of professional training for staff) and administrative support. The next section discusses the pedagogical theme.

5.4.6 Content category/theme E: Pedagogical Themes

This theme relates to the Pedagogical beliefs and Perceived characteristics of Web 2.0 tools.

This theme is related to Research Question 1 (*What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?*), discussed in Chapter 1.

The count of individual occurrences of the subthemes within the pedagogical category/theme for Pearson Institute of Higher Education is discussed in Section 5.4.6.1.

5.4.6.1 Pearson Institute of Higher Education: Pedagogical theme

The count of individual occurrences of the sub themes within the pedagogical category/theme for Pearson Institute of Higher Education is displayed in Table 5.14 below.

Organising Theme	Subthemes	Sources	References
Pedagogical characteristics of Web 2.0 tools	Engaging students	5	5
	Flexible learning	1	1
	Build a sense of community	1	1

Table 5.14 Pedagogical characteristics of Web 2.0 tools – PIHE

a) Engaging students

This sub theme is helpful in engaging students' interest by using Web 2.0 tools. Data extracts supporting this sub theme were "Students are more involved" (A1); "Participation level increases with the use of Web 2.0 tools" (B2); "Learning is more fun and interactive" (D3); "Students are eager to learn with Web 2.0 tools" (E1); "Web 2.0 tools helps promote student engagement" (F2).

b) Flexible learning

Flexible learning relates to Web 2.0 tools being more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time. Data extract supporting this sub theme was "Web 2.0 tools allows the learning to continue outside of the classroom" (B2).

c) Build a sense of community

Web 2.0 tools helps build a sense of community. Data extracts supporting this sub theme is "Students feel a part of a group when communicating with the use of Web 2.0 tools" (A1).

Table 5.15, below, discusses the findings of perceived pedagogical beliefs at Pearson Institute of Higher Education.

Organising Theme	Subthemes	Sources	References
Perceived pedagogical beliefs	Collaborative learning	2	2
	Informal learning	1	1
	Sharing material	2	2
	Student support	4	4

Table 5.15 Perceived pedagogical beliefs –PIHE

a) Collaborative learning

This relates to allowing individual students to support one another by working in groups, participating in forums, blogs and wikis. Data extracts supporting this sub theme are "Students can work in groups" (B2) and "Web 2.0 tools helps students to express themselves in a group" (D1).

b) Informal learning

Web 2.0 tool, social networking (e.g. Facebook) promotes informal learning by enabling students to build their knowledge. Data extracts supporting this sub theme is "Web 2.0 tools encourages students to contribute to the class discussion" (C3).

c) Sharing material

Web 2.0 tools allows academics to share materials and grasp issues in class. Data extracts supporting this sub theme were "I can easily share resources with my students" (A1); "Students have access to online resources" (B2).

d) Student support

Web 2.0 tools support students' learning. Data extracts supporting this sub theme were "Web 2.0 tools allows me to provide assistance to students even after class" (E2); "Web 2.0 tools allows me to monitor students' progress" (G1); "Web 2.0 tools provides students with easy to use tools" (B2), "learning can be reinforced with Web 2.0 tools" (C3).

5.4.6.2 Monash South Africa: Pedagogical theme

The count of individual occurrences of the sub themes within the pedagogical category/theme for Monash South Africa is displayed in Table 5.16 below.

Organising Theme	Subthemes	Sources	References
Pedagogical characteristics of Web 2.0 tools	Engaging students	2	3
	Flexible learning	2	2
	Build a sense of community	2	2

Table 5.16 Pedagogical characteristics of Web 2.0 tools – MSA

a) Engaging students

Web 2.0 tools is helpful in engaging students' interest. Data extracts supporting this sub theme were "Students are interested and excited to study using Web 2.0 tools" (N1); "Students are more participative in the subject area being taught" (I1); "Web 2.0 tools encourages learning" (J2).

b) Flexible learning

Web 2.0 tools being more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time. Data extracts supporting this sub theme were "Web 2.0 tools are more interactive than traditional teaching" (J2); "I can easily send material to my students using Web 2.0 tools" (N1).

c) Build a sense of community

Web 2.0 tools helps build a sense of community. Data extracts supporting this sub theme were "Students can become part of a group when using Web 2.0 tools" (N1); "Students feel a part of the class with Web 2.0 tools (K3).

Table 5.17, below, discusses the findings of perceived pedagogical beliefs at Pearson Institute of Higher Education.

Organising Theme	Subthemes	Sources	References
Perceived pedagogical beliefs	Collaborative learning	2	3
	Informal learning	2	3
	Sharing material	4	4
	Student support	1	1

Table 5.17 Pedagogical beliefs – MSA

a) Collaborative learning

This relates to allowing individual students to support one another by working in groups with the usage of Web 2.0 tools. Data extracts this sub theme were "Web 2.0 tools encourages students to work in groups" (J2); "Web 2.0 tools helps students to work with their peers" (K3); "Students are able to easily collaborate with one another" (K3).

b) Informal learning

Informal learning can take place with the use of social networking (e.g. Facebook) by enabling students to build their knowledge. Data extracts this sub theme were "Learning takes place after class" (I1). Students have access to a range of learning materials" (K3); "Learning can take place outside of the classroom" (I1).

c) Sharing material

Web 2.0 tools allows academics to share materials with students. Data extracts supporting this sub theme were "Web 2.0 tools allows me to share resources with my students" (N1); "Students can

access my learning resources using Web 2.0 tools" (K3); "Students can access resources using Web 2.0 tools" (M2); "I can easily share material with my students" (I1).

d) Student support

Web 2.0 tools support students' learning. Data extracts supporting this sub theme is "Web 2.0 tools provides learning resources which supports students' learning" (M2).

Bases on the results, both of the organisations had similar results with regard to the level of agreement that the use of Web 2.0 tools can be very helpful in engaging students' interest. The results are similar to a study conducted by An, Aworuwa, Ballard and Williams (2009), who identified the characteristics of using Web 2.0 technologies in teaching include interaction, communication and collaboration, knowledge creation, ease of use and flexibility, and writing and technology skills. The next section discusses the usage theme.

5.4.7 Content category/theme F: Usage Themes

This theme relates to the types of Web 2.0 tools that are currently being used at Pearson Institute of Higher Education and Monash South Africa. These themes are related to Research Question 2 (*How are Web 2.0 tools used by academics in higher education?*), discussed in Chapter 1. Usage is the dependent variable in this research. The count of individual occurrences of the subthemes within the usage category/theme for Pearson Institute of Higher Education is displayed in Table 5.18 below and is discussed in section 5.4.7.1.

5.4.7.1 Pearson Institute of Higher Education: Usage Theme

Table 5.18 displays the overall findings of the usage themes, which relates to the different Web 2.0 tools that are used by academics at Pearson Institute of Higher Education.

Organising Theme	Subthemes	Sources	References
Usage	YouTube	5	7
	Quizzes	3	5
	Khan Academy	1	1
	Wikis	2	4
	Blogs	4	8
	Forums	5	8

Table 5.18 Pearson Institute of Higher Education: Usage theme

Additional tools used by academics at Pearson Institute of Higher Education:

- E-mail
- Microsoft Excel
- Turnitin (Plagiarism software)
- Microsoft Excel (To capture student marks)
- Microsoft Word (To develop assessments and course material)
- Microsoft PowerPoint (To present lecture content)
- Google Drive (Share online material with students)
- MyLMS (Student learning management system)
- eVision (Upload student marks)

5.4.7.2 Monash South Africa: Usage theme

Table 5.19 displays the overall findings of the usage themes, which relates to the different Web 2.0 tools that are used by academics at Monash South Africa. Usage themes were discussed in Chapter 2 and is related to Research Question 2.

Organising Theme	Subthemes	Sources	References
Usage	YouTube	4	5
	Quizzes	5	6
	Wikis	1	2
	Blogs	3	5
	Forums	4	6

Table 5.19 Monash South Africa: Usage theme

Additional tools used by academics at Monash South Africa:

- E-mail
- Microsoft Excel
- Turnitin (Plagiarism software)
- Microsoft Excel (To capture student marks)
- Microsoft Word (To develop assessments and course material)
- Microsoft PowerPoint (To present lecture content)
- Moodle (Student learning management system)

5.4.7.3 Analysis of the usage of Web 2.0 tools at Pearson Institute of Higher Education and Monash South Africa

Based on the individual user results from both institutions, the most commonly used Web 2.0 tools are YouTube, wikis and blogs/discussion forums. The following were the feedback from academics regarding the use of these tools:

YouTube is used by academics as a supplementary tool when teaching. The use of video helps to enhance the lecture and for students to better understand a concept. One academic during the interview stated that encouraging students to watch video tutorials on how to code helps students

to have a better understanding of programming concepts and applications. Another academic mentioned in the interview that in some courses Web 2.0 tools cannot be used, for example in Computer skills where the Microsoft Office suite is taught.

Facebook is used by academics as informal learning, such as communicating with students about course content. This allows for quick and easy communication between the lecturer and student. Facebook encourages learning as students can discuss the module content long after the lecture has ended. It is a platform that students are already familiar with and that they use all the time, thus ease of use is an added benefit.

Khan Academy is used by academics as it provides videos and tutorials based on the content taught in class. This helps to reinforce what was learnt in class and gives students the opportunity to practice what they were taught by using the online tutorials. It is a great tool that allows students to learn at a pace that they are comfortable with.

Wikis are used by academics at both the institutions as a medium to effectively communicate with students. Wikis are used to post assessment dates, course schedule, references for material taught, etc. This tool encourages student interactions and collaborations as students use this medium to create groups, post updates and provide feedback.

Blogs/discussion forums promotes critical and analytical thinking which is encouraged in higher education. In the interview academics made mention that, they prefer to use this Web 2.0 tool as it allows students to take control of their learning. Student plays a more interactive role by engaging in discussions and they have increased access to content.

The similarity in the usage patterns of Web 2.0 tools between the two institutions was mainly for communication (to inform students about important assessment dates, to share information, etc.), to reiterate what was taught in class with the use of videos and online tutorials and to provide a medium for students to discuss and voice their opinions about the learning content. The tools that were less commonly used were Quizlet, Qwizdom and screencast.

Based on previous studies on usage of Web 2.0 tools in higher education, Web 2.0 technologies inspire active and social learning by providing effective and efficient feedback to students as well as opportunities for social interactions and collaboration among students and academics

(Hartshorne & Ajjan, 2009). Web 2.0 tools also enables students to become active participants in the learning process by creating and sharing content rather than passively receiving information from academics (Eison, 2010). A number of studies shows that Web 2.0 tools can be used as a means to promote more student-centered learning (Almeshal, 2015; Asma, 2012, & Chen, 2012). Thus, the usage of Web 2.0 tools can offer new opportunities for flexibility in learning, with potential for new markets such as distant and part-time students.

5.5 Relationships between categories/themes

This section provides the overall research findings with the use of cluster analysis. This is discussed in Sections 5.5.1 and 5.5.2. Cluster analysis was used to visualise patterns in the study by grouping sources or nodes that share similar words, attribute values, or are coded similarly by nodes. Cluster analysis helped in providing a graphical representation of sources or nodes in order to identify similarities and differences. Section 5.5.1 and 5.5.2 highlights the nodes that share similar words at the respective higher education institutions by using a horizontal dendrogram. A horizontal dendrogram is a branching diagram that displays the items that are clustered together on the same branch as well as the items that are far apart (QSRInternational, 2016). This section answers the third research question "*Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?"*

5.5.1 Pearson Institute of Higher Education Cluster Analysis

Figure 5.1 presents the findings of a cluster analysis of the following themes: System quality, pedagogical, organisational, individual and perceived usefulness based on word similarity.

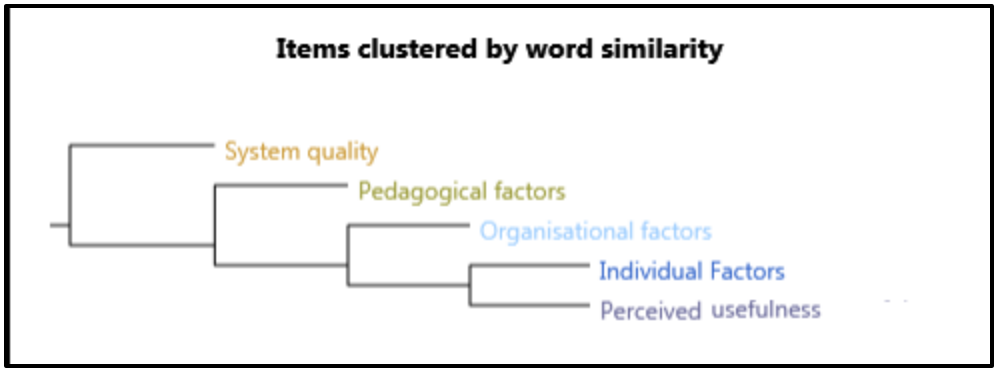


Figure 5.1 Cluster analysis diagram for Pearson Institute of Higher Education content categories or themes

The Pearson correlation coefficient similarity metric was also used to analyse the nodes. A similarity metric is a statistical method that helps in calculating the correlation between items (QSRInternational, 2016). From the Pearson correlation coefficient values listed in Table 1 in the Appendix 8 and the cluster analysis diagram in Figure 5.1, it is evident that there is a strong correlation between:

- Individual theme and Perceived usefulness theme. If an academic sees the usefulness of Web 2.0 tools in education then they will use this tool in their teaching. Therefore, the *usefulness* of Web 2.0 tools is why academics make use of these tools in education. The nodes of *Individual theme* and *Perceived usefulness theme* in Figure 5.1 appear close together, thus these two themes (nodes) have a higher degree of similarity based on occurrence and frequency of words are shown clustered together.

5.5.2 Monash South Africa Cluster Analysis

Figure 5.2, below presents the findings of a cluster analysis of the following themes: System quality, pedagogical, organisational, individual and perceived usefulness based on word similarity.

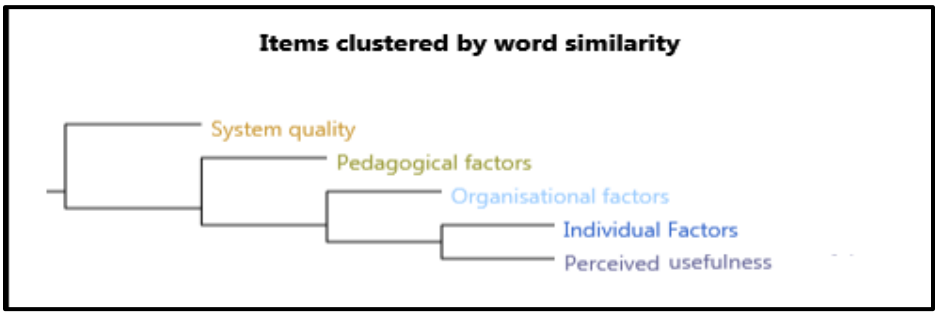


Figure 5.2 Cluster analysis diagram for Monash South Africa content categories or themes

From the Pearson correlation coefficient values listed in Table 2 in the Appendix 8 and the cluster analysis diagram in Figure 5.2, it is evident that there is a strong correlation between:

- Individual themes and perceived usefulness themes in terms of individual characteristics and the usefulness of the usage of Web 2.0 tools in teaching and learning. Thus, if an academic is aware of the usefulness of Web 2.0 tools then they

will use the tool in higher education. Therefore, the *usefulness* of Web 2.0 tools is why academics make use of these tools in education. These findings were the same for the academics at Pearson Institute of Higher Education thus indicating that *Individual theme* and *Perceived Usefulness theme* are significant factors of usage of Web 2.0 tools in higher education. The nodes of *Individual theme* and *Perceived usefulness theme* in Figure 5.2 appear close together, thus these two themes (nodes) have a higher degree of similarity based on occurrence and frequency of words are shown clustered together.

5.6 Summary

This chapter carried out the research methodology laid out in Chapter 3. It described and explained how content analysis was used to analyse concepts and themes that emanated from the case study data. This chapter presented the results and analysis of the data collected from interviews that were conducted at Pearson Institute of Higher Education and Monash South Africa. The data was organised into categories/themes where the themes were further segmented into subthemes. Thereafter, cluster analysis and thematic analysis was performed. These results were compared to the findings from the quantitative analysis. The qualitative results do tie up with the quantitative results. The results from this chapter correlates with the findings from the questionnaire i.e. the potential of Web 2.0 in higher education has not been optimally explored and utilised as well as more training is required to fully apply the use of Web 2.0 tools in higher education.

The next chapter will show how the research questions were answered and present a summary of conclusions supported by this study with the use of a conceptual model.

CHAPTER 6

Proposed model

6.1 Introduction

This chapter integrates the findings of the data obtained from the quantitative analysis (questionnaires) discussed in Chapter 4 and qualitative analysis (interviews) that was discussed in Chapter 5. This chapter also ties in with the literature review that was discussed in Chapter 2 to substantiate the proposed conceptual model. The initial conceptual model discussed in Chapter 2 was based as a basis to propose a model representing the factors influencing the usage of Web 2.0 tools in higher education.

This research study was guided by three main research question, namely:

1. What are the factors that influence the use of Web 2.0 technology tools among academics in higher education?

- What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the individual factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived usefulness influence in the use of Web 2.0 technology tools among academics in higher education?
- What is the influence of perceived quality characteristics in the use of Web 2.0 technology tools among academics in higher education?

2. How are Web 2.0 tools used by academics in higher education?

3. Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?

These research questions and sub-questions were discussed in Chapter 5 together with the results from the interviews. The outcomes pertaining to the research questions are summarised in the next section.

6.2 Review of the quantitative and qualitative findings

The following sections will focus on the findings from the quantitative and qualitative analysis. This section discusses the factors discussed in Chapter 2, Section 2.8 against the research questions listed in Chapter 3, Section 3.6.1.

6.2.1 How are Web 2.0 tools used among academics in higher education?

6.2.1.1 Tool use extent

The second research question is discussed in this section i.e. "How are Web 2.0 tools used by academics in higher education?" The aim of this question was to determine academics' current level of usage of Web 2.0 tools in education. The quantitative findings revealed that the respondents make use of the following tools in education namely, wiki sites, blogging websites and podcasts.

Based on the questionnaire findings, a total of 47% of respondents make use of wiki sites like Wikipedia, Wiki, Javapedia, etc. Blogging websites like Blogger.com and Blogspot.com are used by only 28% of the respondents. Thus, the use of blogging websites is not a common activity as compared to the use of wiki sites and social software applications. The use of podcasts is only utilised by 15% of the respondents. Thus, respondents prefer to use social software applications, wiki sites and blogging websites rather than use podcasts in their teachings.

Respondents were asked to identify other Web 2.0 tools that they may use for educational purposes. A total of 24% of respondents make use of other Web 2.0 tools, applications or services such as Moodle, online quizzes, MyLabs Plus Pearson, Virtual Labs, YouTube and Google.

Based on the qualitative data discussed in Chapter 5, the usage factor in the proposed model can be expanded into the learning activity of academics. The learning activity is broken up into two constructs: *frequently used tool and benefits of tool*. These findings from PIHE and MSA were combined to give the following results:

6.2.1.2 Tool use frequency

Relates to the Web 2.0 tool most frequently used in higher education. The most frequently used Web 2.0 tools were *YouTube, social media applications, online educational applications, wikis, quizzes and blogs/discussion forums.*

6.2.1.3. Tool use in learning

Relates to the nature of usage of Web 2.0 tools and how Web 2.0 tools are integrated in higher education for teaching and learning. *YouTube* helps to enhance the teaching and learning process for students to better understand a concept. Videos assist students to fathom difficult concepts and are very helpful in courses like programming to assist students to visually understand the outcomes of the coding.

Social media applications like *Facebook* are used by academics as informal learning, such as communicating with students about course content. This medium allows for quick and easy communication between the lecturer and student.

Online educational applications such as *Khan Academy* provide content specific videos and tutorials. This helps to reinforce what is learnt in class and gives students the opportunity to practice what they were taught by using the online tutorials. It is a great tool that allows students to learn at a pace with which they are comfortable.

Wikis are used to effectively communicate with students. Wikis are used to post assessment dates, course schedule, references for material taught, etc. This tool encourages student interactions and collaborations as students use this medium to create groups, post updates and provide feedback.

Blogs/discussion forums promote critical and analytical thinking. Blogs/discussion forums allows students to take control of their learning. Students play a more interactive role by engaging in discussions and they have increased access to content.

The similarity in the usage patterns of Web 2.0 tools between the two institutions was mainly for communication (to inform students about important assessment dates, to share information, etc.),

to reiterate what was taught in class with the use of videos and online tutorials and to provide a medium for students to discuss and voice their opinions about the learning content.

Therefore, USAGE component in the researcher's proposed conceptual framework (Section 6.3) provides new information from extant models based on the learning activity of Web 2.0 tools i.e. Web 2.0 Tool use extent; Tool use in learning activity and Tool use frequency.

6.2.2 The *organisational factors* that influence the use of Web 2.0 technology tools among academics in higher education.

In this section, the first research sub-question is answered, namely, "What are the organisational factors that influence the use of Web 2.0 technology tools among academics in higher education?"

Academics confirmed from the questionnaires and interviews that there is a strong correlation between organisational support and the usage of Web 2.0 tools. Thus, support is a significant predictor of usage of Web 2.0 tools. Based on the results of this study, academics agreed that support needs to be provided in terms of *development support (staff training and workshop); monitoring of the appropriate use of online social networks; adequate technical assistance for students and staff as well as adequate resources.*

Based on the quantitative findings, there is inadequate training in the usage of Web 2.0 tools. The findings also revealed that there is a significant agreement that the following are barriers to the use of Web 20 tools in education:

- *Low bandwidth teaching*
- *Lack of security and privacy in social networked learning teaching*
- *Lack of university support to provide an ICT enabling environment for teaching with Web 2.0 tools teaching*
- *Inadequate student ICT facilities to use Web 2.0 tools teaching*
- *Shortage of adequately trained teaching staff teaching*

Academics stated in the interview that if training on the usage of Web 2.0 tools was available and if there were no Internet connectivity issues, then they would make use of Web 2.0 tools more

often when teaching. However, the qualitative results at Pearson Institute of Higher Education differs from the findings of the quantitative analysis on support from the higher education institution in terms of training. Thus, the findings indicate that there is lack of training from Pearson Institute of Higher Education.

Based on the results from the interviews, it is evident that there is a significant agreement that the following are barriers to the usage of Web 2.0 tools in education: *low bandwidth; lack of security and privacy in social networked; lack of university support to provide an ICT enabling environment for teaching with Web 2.0 tools; inadequate student ICT facilities to use Web 2.0 tools; shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications.* Thus, if these barriers were resolved there would be a greater usage of Web 2.0 tools in higher education at both institutions (Pearson Institute of Higher Education and Monash South Africa).

6.2.3 The *individual user factors* that influence the use of Web 2.0 technology tools among academics in higher education.

In this section, the second research sub-question is answered, namely, "What are the individual factors that influence the use of Web 2.0 technology tools among academics in higher education?" The interview findings identified the following subthemes comprising the individual user theme: academic rank, teaching style, familiarity, computer experience, effort and personal barriers of Web 2.0 tools. The cluster analysis of interviews showed that *individual user themes* were positively correlated with the theme *perceived usefulness.* The individual factor is linked to the perceived usefulness in the sense that the usage of Web 2.0 tools is based on benefits experienced when using the tool in higher education.

However, based on the quantitative analysis, individual user factors (personal barriers) have a significant relationship with organisational factors in terms of support.

6.2.4 The *pedagogical factors* that influence the use of Web 2.0 technology tools among academics in higher education.

In this section, the third research sub-question is answered, namely, "What are the pedagogical factors that influence the use of Web 2.0 technology tools among academics in higher education?" Based on the findings from the interviews, the analysis of the pedagogical factors at both Pearson Institute of Higher Education and Monash South Africa was varied as based on the scope and frequency. Academics from both institutions did mention that they try to incorporate Web 2.0 tools in their courses.

Based on the quantitative results, it is evident that there was a significant agreement on pedagogical beliefs pertaining to Web 2.0 tools:

- *They allow individual students to support one another by working in groups, participating in forums, blogs, etc.*
- *They enhance learning and creativity by encouraging creative expression through blogs, etc.*
- *Social networking (e.g. Facebook) for informal learning enables students to build their knowledge, share materials and grasp issues in class*.
- *It provides opportunities for collaborative learning by working in groups on structured activities*

There was also a significant agreement on pedagogical characteristics of Web 2.0 tools:

- *It is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time*.
- *It helps build a sense of community*.
- *It helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls*.
- *Itis very helpful in engaging students' interest*
- *It is helpful in terms of storing information online and resource sharing.*

The quantitative and qualitative results revealed that pedagogical factors are not a significant predictor for the usage of Web 2.0 tools in education. This is discussed in more detail in Chapter 7.

6.2.5 The *perceived usefulness* that influences the use of Web 2.0 technology tools among academics in higher education.

In this section, the fourth research sub-question is answered, namely, "What are the perceived usefulness factors that influence the use of Web 2.0 technology tools among academics in higher education?" Based on the results from the quantitative and qualitative study, there was a significant agreement that the usage of Web 2.0 tools in education is influenced by *perceived usefulness*. The perceived usefulness that influenced the usage of Web 2.0 tools was that they:

- *Increase interaction and communication among the instructor and students*
- *Help develop a better sense of connectivity between students and teachers*
- *Give students the opportunity to create content themselves instead of just listening to lectures*
- *Allow one to creatively use and reuse material in novel ways because there is not one centralised power controlling the web*
- *Change one from a passive to an active information consumer, allowing academics' online voice to be part of the conversation.*

Based on the findings from the quantitative results, perceived usefulness is a significant predictor of usage of Web 2.0 tools. The qualitative results indicated that the use of Web 2.0 tools in higher education is beneficial in teaching and learning. The majority of the academics in this study had something positive to say about Web 2.0 tools in education.

6.2.6 The *perceived quality characteristics* that influence the use of Web 2.0 technology tools among academics in higher education.

In this section, the fifth research sub-question is answered, namely, "What are the perceived quality characteristic that influence the use of Web 2.0 technology tools among academics in higher education?"

The perceived quality characteristics measures the desired characteristics of the teaching tools, in this case Web 2.0 tools. Based on the quantitative results, there was a significant agreement with measuring perceived quality characteristics of Web 2.0 tools: *The tool is easy to use; the tool is*

easy to understand and the tool is easily adapted as a learning device to create interaction, enable knowledge sharing, etc.

The questionnaire findings revealed that ease of use is a significant predictor of usage. A positive factor analysis value means high agreement with perceived quality characteristics and usage of Web 2.0 tools. Thus, system ease of use is a significant predictor of usage.

Based on the results obtained from the interviews, it was agreed that Web 2.0 tools are adaptable, efficient and effective, reliable, easy to use and understand and allow for rich and responsive interaction. The quantitative findings indicate that perceived quality characteristics are a significant predictor of perceived usefulness of Web 2.0 tools as well as an important factor of usage of Web 2.0 tools. Thus, the higher the level of agreement, the more the academic will want to use this technology.

Thus, after analysing the data from the qualitative and quantitative studies, the results reveal that there is a correlation between *individual factors, organisational factors, perceived usefulness and perceived quality characteristics with USAGE* of Web 2.0 tools. These factors are discussed in more detail in Section 6.3.

6.2.7 Reasons why these factors influence the use of Web 2.0 technology amongst academics in higher education

In this section, the third research question is answered, namely, "*Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?"* Based on the quantitative results, the reason as to why these factors influences the usage of Web 2.0 tools in education is based on the following:

Individual factors comprise of individual characteristics that are important for academics when using Web 2.0 tools. The construct within individual factors that influences the usage of Web 2.0 tools is teaching style. Based on the quantitative findings, 67% of respondents used a blended approach and 33% used the traditional teaching style. A blended approach provides a more flexible and innovative way of teaching with the use of Web 2.0 tools and traditional teaching style is where face-to-face lecturing takes place, which is usually disseminated in a lecture theatre.

Therefore, the teaching approach that is adopted is the reason why individual factors influence the use of Web 2.0 tools in higher education.

Organisational factors influence usage of Web 2.0 tools because the higher education institution is involved in change management and technology infrastructure strategies to implement e-learning through the usage of Web 2.0 tools. Based on the results relating to institutional policy, an adoption and utilisation environment needs to be created by the higher education institution in order to make academics more aware of the usage of Web 2.0 tools. This needs to be part of the current teaching and learning policy. Policies are crucial in guiding the usage and adoption of technology in teaching and learning such as the usage of Web 2.0 tools in higher education institutions. Institutional support such as technical support, adequacy of ICT facilities and training are also important constructs that need to be present. Therefore, institutional policy, training, ICT facilities and technical support are the reasons why organisational factors influence the usage of Web 2.0 tools in higher education.

Perceived usefulness factors influence usage because they provides many benefits to academics in terms of new approaches to teaching and learning and *perceived quality characteristics* influence usage because Web 2.0 tools are easy to use.

6.3 Proposed model

Chapters 4 and 5 described the results from the quantitative and qualitative studies. These results were combined and discussed in section 6.2. The quantitative and qualitative results together with the literature review aimed to answer the three main research questions:

1. What are the factors that influence the use of Web 2.0 technology tools among academics in higher education?
2. How are Web 2.0 tools used by academics in higher education?
3. Why is the usage of the Web 2.0 tools by academics influenced by these factors/the way it is?

The information that has been discussed thus far is integrated to create a conceptual model that represents the factors influencing the usage of Web 2.0 tools in higher education. The conceptual framework for the usage of Web 2.0 tools was developed using a combination of different

acceptance and usage models, namely Technology Acceptance Model (TAM) and some characteristics of the Information Systems (IS) success model of Delone and McLean (1992). The researcher developed a new conceptual model that is relevant to the usage of Web 2.0 tools in higher education that examines different factors that will influence the usage of Web 2.0 technology tools in education as most of these models mentioned above are relevant to e-learning rather than the usage of Web 2.0 tools in higher education.

TAM is a good theoretical tool to understand users' acceptance of e-learning and can assist in explaining and predicting this behaviour of usage and why a user may accept or reject e-learning tools. However, in the TAM model the usage of e-learning innovation and not Web 2.0 is explained by the perceived usefulness and the ease of use of the system. The usage of Web 2.0 tools also depends on individual characteristics, institutional culture, policy, framework and support as well as the teaching methods and learning styles which are missing in TAM. This indicates the need for a new conceptual model based on usage of Web 2.0 tools.

Additionally, UTAUT did not address pedagogical factors which is a construct when investigating in the usage of Web 2.0 tool in higher education. The Innovation Diffusion Theory also does not consider pedagogical factors and the construct of organisational factors.

Organisational factors include themes such as institutional culture, the policy framework and the support infrastructure. The policy theme includes specific organisational policies; the culture theme comprises factors such as collaboration within organisations, personal motivation and characteristics of the organisation such as staff rewards, teaching and learning models and attitudes towards e-learning (Phillips, 2000). The theme of support represents the range of organisational infrastructure designed to assist and help with the use of technology. This can include the information technology services, professional development of staff, support and IT literacy support for staff (Phillips, 2000). Thus, if an organisation addresses these themes then they will most likely be able to achieve high usage rates of any educational tool. Pedagogical factors are the different learning styles and teaching methods such as social media, wikis, blogs, etc.

The researcher emphasises that pedagogical factors and organisational factors are constructs that are need to be present to investigate the usage of Web 2.0 tools in higher education. These factors were missing in extant models mentioned above and forms a part of this research. For this reason, the researcher developed a new conceptual model that is most suitable in this study. Thus, the researcher has blended extant models and theories to provide an even stronger model than if they stood alone. This proposed conceptual model integrates key constructs involved in the usage of Web 2.0 tools in higher education.

After taking into consideration the initial conceptual framework and the empirical results of this study, the researcher concluded that user characteristics (individual user factors), perceived ease of use (perceived quality characteristic) and support (organisational factors) as well as perceived usefulness are predictors of usage of Web 2.0 tools. Thus, the four main distinguishing contributory factors of the researcher's conceptual framework are the INDIVIDUAL FACTORS, PERCEIVED QUALITY CHARACTERISTIC FACTORS, ORGANISATIONAL FACTORS and PERCEIVED USEFULNESS FACTORS.

Based on the results of the questionnaires and interviews, *Pedagogical factors* was a component but this did not result in any significant relationship to usage of Web 2.0 tools.

- The INDIVIDUAL FACTORS that influence the usage of Web 2.0 tools in higher education as illustrated in Figure 6.1, comprise the following:
  - *Academic rank*
  - *Teaching style*
  - *Familiarity*
  - *Computer experience*

- The ORGANISATIONAL FACTORS that influence the usage of Web 2.0 tools in higher education as illustrated in Figure 6.1, comprise the following:
  - *Support*

- The PERCEIVED QUALITY FACTORS that influencs the usage of Web 2.0 tools in higher education as illustrated in Figure 6.1, comprise the following:
  - *Perceived ease of use*

- The PERCEIVED USEFULNESS that influences the usage of Web 2.0 tools in higher education as illustrated in Figure 6.1 is comprised of *benefits* attained by academics with the usage of Web 2.0 tools in education.

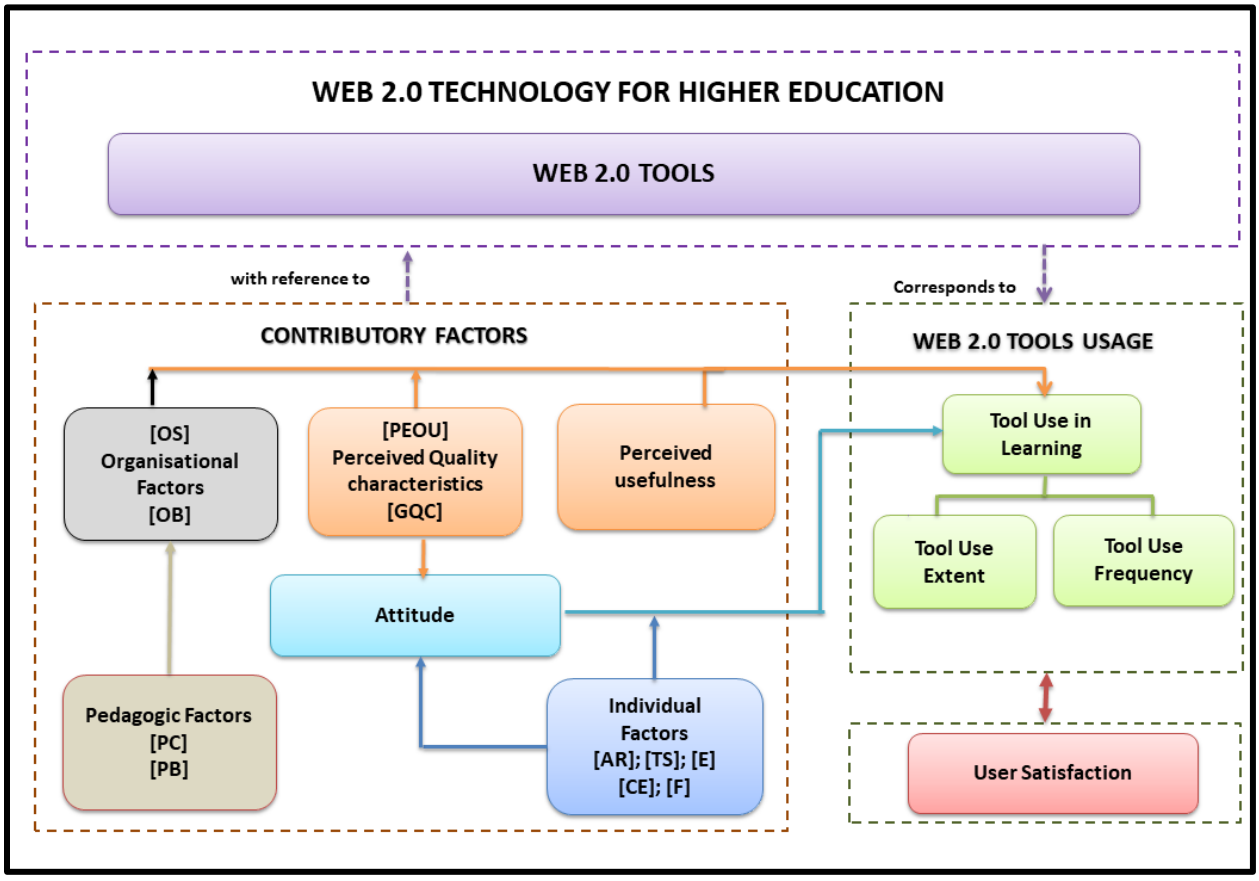


Figure 6.1 Web 2.0 Tools usage model (WEBTUM)

The constructs in italics in Table 6.1 below, signifies the constructs that are significant predictors of usage of Web 2.0 tools in higher education. The constructs in italics are influential to the usage of WEB 2.0 tools in higher education and the constructs in bold are the new constructs that were identified after the qualitative analysis (confirmation interviews).

Factor	Construct
Individual	• *Teaching style (TS)* • *Computer experience (CE)* • *Familiarity (F)* • *Academic rank (AR)* • Barriers (B) • Effort (E) • **Age** • **Motivation**
Organisational	• *Organisational support (OS)* • Organisational Barriers (OB) • **Institutional policy and procedures** • **Incentives**
Perceived quality characteristics	• *Perceived ease of use (PEOU)* • General Web 2.0 quality characteristics (GQC)
Pedagogical	• Pedagogical characteristics of Web 2.0 tools (PC) • Pedagogical beliefs (PB)
Perceived Usefulness	• *Perceived usefulness*
Attitude	• Attitude
Usage	• Web 2.0 tool usage • Purpose of usage • Usage frequency
Satisfaction	• Degree of satisfaction

Table 6.1 constructs influencing the usage of Web 2.0 tools in higher education

Based on the above table the following new constructs were identified after the confirmation interview:

Individual factors

- *Age:* one academic and the two academic managers stated that *academic rank* would not necessarily influence the usage of Web 2.0 tools but rather *age* would as this sub factors is more likely to influence a change in teaching style or the willingness to use Web 2.0 tools in teaching. Therefore, *age* could be a potential sub factor that is missing from the composition of *Individual factors* that could influence the USAGE of Web 2.0 tools in education.

- *Motivation:* In the confirmation interview an academic manager mentioned that using Web 2.0 tools is not compulsory and that there are no repercussions to not using the tool. Thus, there is nothing motivating academics to use Web 2.0 tools in higher education. If the usage of Web 2.0 tools was attached to performance reviews then this would influence usage. This ties in with the construct of incentives, discussed below. Therefore, motivation to use Web 2.0 tools in education is likely to influence attitude of the academics, and it should influence behavioural intention. Behavioural intention to use Web 2.0 technology tools can influence actual use which in turn has an impact on motivation. It would be useful in future research to investigate motivation as a factor in influencing the usage of Web 2.0 tools in higher education.

Based on the quantitative results, lack of motivation ($\beta = -1.254$, $p=.003$) is a significant predictor of lower usage. Thus, if incentives, performance reviews and repercussion are present then they will influence academics to use Web 2.0 tools in higher education.

Organisational factors

- *Incentives:* If the higher education institution awarded incentives for usage of Web 2.0 tools this would influence usage. Thus, incentives is a significant predictor of USAGE of Web 2.0 tools in higher education.

- *Institutional policy and procedures:* One academic manager commented that the higher education institution has adopted the policy of Bring Your Own Device (BYOD). This falls under the construct of organisational support. This policy makes it very difficult for part time academics using their own personal device to use Web 2.0 tools in class, as they do not have

adequate resources (WIFI) to be able to use these tools in the teaching and learning process. Thus, higher education institutions need to ensure they provide the necessary resources such as WIFI if they want academics to adopt a blended learning approach.

The remainder of this chapter will focus on the following:
In Section 6.3.1, the perceived quality characteristic of the proposed model is described in more detail followed by a detailed description of organisational factors in Section 6.3.2. In Section 6.3.3 the perceived usefulness is described followed by a discussion of the individual factors in Section 6.3.4. The relationships between these contributory factors are discussed Section 6.4 and Section 6.5 describes the steps for using the researcher's conceptual framework.

6.3.1 PERCEIVED QUALITY CHARACTERISTIC FACTORS contributory factors

The PERCEIVED QUALITY CHARACTERISTIC as depicted in Figure 6.1 consists of the following factors, namely, *general quality characteristics* and *perceived ease of use*. The PERCEIVED QUALITY CHARACTERISTIC FACTORS (perceived ease of use) is linked to the *ATTITUDE*. Based on the quantitative and qualitative results, *perceived ease of use* was the main element that influenced the usage of Web 2.0 tools.

The **general quality characteristics** sub factors include the following:

- *The system is reliable*
- *The system is easily adapted as a learning tool to create interaction, enable knowledge sharing*
- *The system is efficient and effective*
- *The system allows for rich and responsive interactions*

Perceived ease of use comprised of:

- *The system being easy to use and easy to understand*

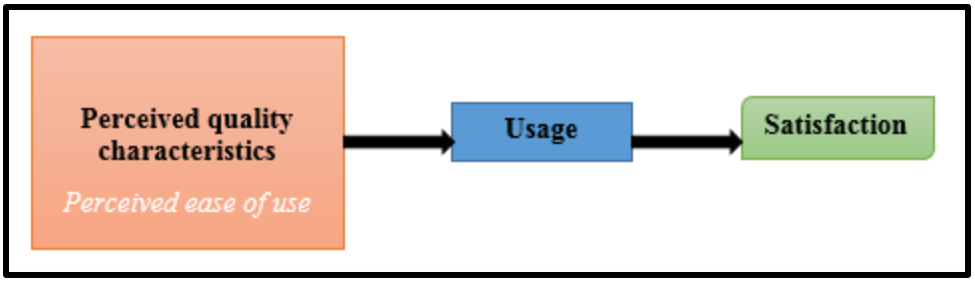


Figure 6.2 Perceived quality characteristic contributory factors

6.3.2 ORGANISATIONAL FACTORS contributory factors

These comprised of sub factors relating to *organisational_barriers and organisational_support.*

6.3.2.1 The ORGANISATIONAL FACTOR_*barriers* include the following:

- *Internet connectivity*
- *Lack of ICT support*
- *Lack of Training*

From the Pearson correlation coefficient values listed in Table 5.16, it is evident that there is a strong correlation between organisational factors and individual factors in terms of the barriers to the usage of Web 2.0 tools.

6.3.2.2. The ORGANISATIONAL FACTORS_*support* includes the following:

- *Institutional policy*
- *Training*
- *Adequate resources*
- *Adequate technical assistance*
- *Monitoring of online social networks*
-

Based on the qualitative and quantitative results in Chapter 4 and 5, *organisational_support* only had a strong correlation with USAGE of Web 2.0 tools in education.

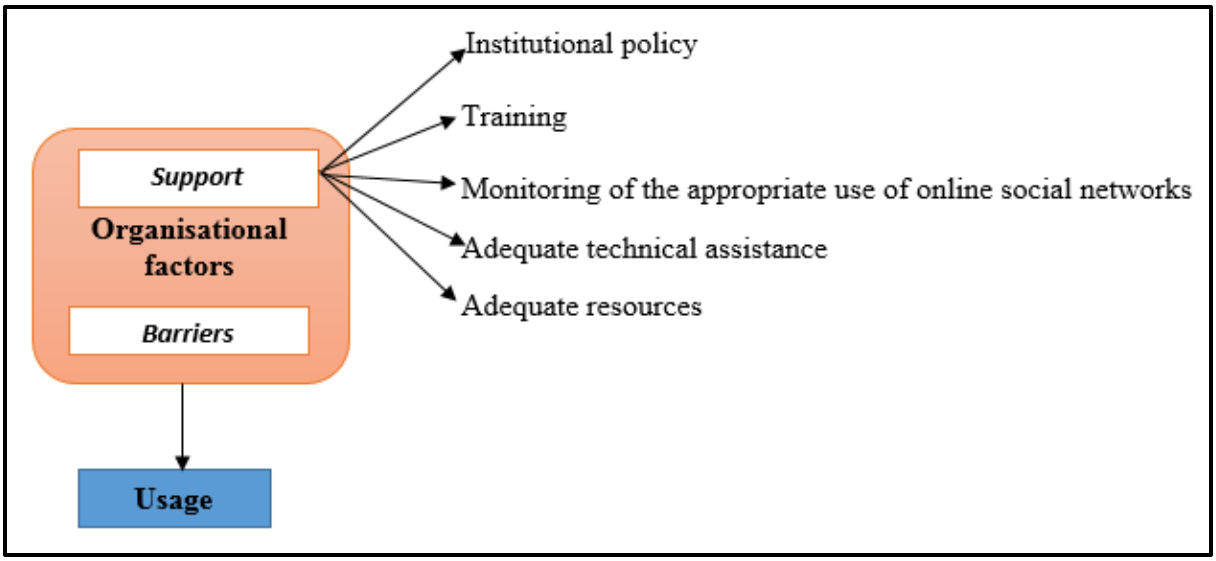


Figure 6.3 Organisational factors contributory factors

6.3.3 PERCEIVED USEFULNESS FACTOR contributory factors

The composition of PERCEIVED PEDAGOGICAL USEFULNESS FACTORS was made up of the following benefits regarding perceived usefulness of Web 2.0 tools:

- *Increase interaction and communication among the instructor and students*
- *Help develop a better sense of connectivity between students and teachers*
- *Give students the opportunity to create content themselves instead of just listening to lectures,*
- *Allow one to creatively use and reuse material in novel ways because there is not one centralised power controlling the web*
- *Change one from a passive to an active information consumer, allowing academics' online voice to be part of the conversation.*

Figure 6.4 Perceived usefulness contributory factors

6.3.4 INDIVIDUAL FACTORS contributory factors

Individual factors are the characteristics of the academics (rank, teaching style, effort, barriers to the use of Web 2.0 tools, familiarity and computer experience).

The composition of the INDIVIDUAL FACTORS included:

- *Academic rank*
- *Teaching style*
- *Familiarity*
- *Computer experience*
- *Effort*
- *Barriers*

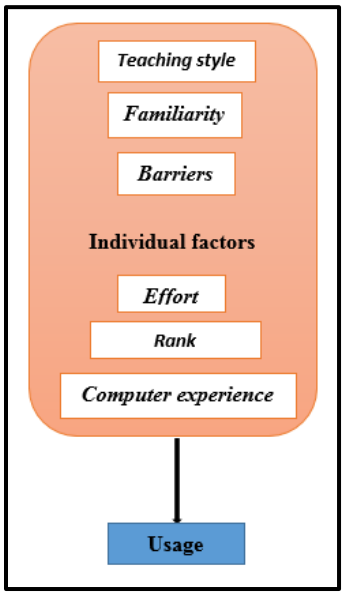


Figure 6.5 Individual factors

Based on the results of the qualitative and quantitative analysis in Chapter 4 and 5, only *teaching style, academic rank, familiarity and computer experience* had a strong correlation with USAGE of Web 2.0 tools in education.

Table 6.2 below illustrates the Web 2.0 contributory factors with supporting evidence.

Contributory Themes	**Composition**	**Support evidence**
1. Individual themes	• Teaching Style • Familiarity of Web 2.0 tool	Learning styles and teaching strategies in higher education (Tulburne, 2012).

		• Academic rank • Computer experience	
2.	*Perceived usefulness*	• Usefulness of Web 2.0 tools	Teaching with Web 2.0 Technologies: Benefits, Barriers and Best Practices (An, Aworuwa, Ballard, & Williams, 2010).
3.	*Organisational themes*	• Support o User-support o Resources o Policy/guidelines	Organisational Adoption of Web 2.0 Technologies: An Empirical Analysis (Saldanha & Krishnan, 2010).
4.	*Perceived Quality Characteristics*	• Perceived ease of use	Web 2.0 tools and processes in higher education: quality perspectives (Collis & Moonen, 2008)
5.	*Web 2.0 tools usage*	• Purpose of usage • Tool most frequently used	Usage of Facebook: The future impact of curriculum implementation on students in Malaysia (Nurulrabihah, Hajar, Norlidah, Saedah, Mohd Ridhuan & Zaharah, 2013) Usage, Barriers, and Training of Web 2.0 Technology Applications (Pritchett, Pritchett & Wohleb, 2013)

Table 6.2 Web 2.0 contributory factors with supporting evidence

6.4 Relationships between contributory factors of the conceptual framework

The relationships described in this section refer to the conceptual framework depicted in Figure 6.1. This section will describe the relationship between usage of Web 2.0 tools and the contributory factors.

6.4.1 Relationships between Usage of Web 2.0 tools and CONTRIBUTORY FACTORS component

Confirmation survey findings indicated the following relationships between the usage of Web 2.0 tools and the different contributory themes as depicted in Figure 6.1:

- *Individual factors* (barriers) had a negative relationship (lower usage) with the *usage of Web 2.0 tools.*
- *Organisational factors* (barriers) had no significant relationship with the *usage of Web 2.0 tools.*
- Correlational results: There is a positive correlation between *Perceived Quality Characteristic and usage of Web 2.0 tools* (perceived ease of use).
- There is a positive correlation between *Perceived usefulness and usage of Web 2.0 tools.*
- Correlational result: There is a positive correlation between *organisational factors* (support) *and usage of Web 2.0 tools* (institutional support results in higher usage of Web 2.0 tools).
- There is a positive correlation between *individual factors and usage of Web 2.0 tools (academic rank, teaching style, familiarity and computer experience)*
- *EFFORT* is not a significant predictor of usage, however, for this sample; high effort is associated with lower usage.
- There is no significant relationship between *Pedagogical factors and usage of Web 2.0 tools.*

Based on these results, the next section will discuss the steps for using the conceptual model. Thus, the creation of this model offers a contribution to knowledge in the area of implementing Web 2.0 tools in education because it provides both academics and academic managers with a set of steps in using the conceptual model.

6.5 Steps for using the conceptual model

What is a Conceptual Framework?

A conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). It is linked with the concepts, empirical research and important theories used in promoting and systemising the knowledge espoused by the researcher (Peshkin, 1993). It is the researcher's explanation of how the research problem would be explored. The conceptual framework presents an integrated way of looking at a

problem under study (Liehr & Smith, 1999). In a statistical perspective, the conceptual framework describes the relationship between the main concepts of a study. It is arranged in a logical structure to aid provide a picture or visual display of how ideas in a study relate to one another (Grant & Osanloo, 2014). Interestingly, it shows the series of actions the researcher intends to carry out in a research study (Dixon, Gulliver & Gibbon, 2001). The framework makes it easier for the researcher to easily specify and define the concepts within the problem of the study (Luse, Mennecke & Townsend, 2012). Miles and Huberman (1994, p.18) opine that conceptual frameworks can be 'graphical or in a narrative form showing the key variables or constructs to be studied and the presumed relationships between them.

The Importance of Conceptual Framework in Research

The conceptual framework offers many benefits to research. For instance, it assists the researcher in identifying and constructing his/her worldview on the phenomenon to be investigated (Grant & Osanloo, 2014). It is the simplest way through which a researcher presents his/her asserted remedies to the problem s/he has defined (Liehr & Smith, 1999; Akintoye, 2015). It accentuates the reasons why a research topic is worth studying, the assumptions of a researcher, the scholars s/he agrees with and disagrees with and how s/he conceptually grounds his/her approach (Evans, 2007). Akintoye (2015) posits that the conceptual framework is mostly used by researchers when existing theories are not applicable or sufficient in creating a firm structure for the study.

The purpose of this section is to provide details of using the researcher's conceptual model in the usage of Web 2.0 tools in education. The researcher designed a conceptual model for the usage of Web 2.0 tools based on five factors: INDIVIDUAL FACTORS, ORGANISATIONAL FACTORS, PERCEIVED USEFULNESS, PERCEIVED QUALITY CHARACTERISTICS and PEDAGOGICAL FACTORS.

To effectively use Web 2.0 tools in higher education, a good conceptual model needs to be implemented. However, there is not much research on what constitutes best practice in the implementation of Web 2.0 in higher education, thus the researcher proposed a new conceptual model in the study. This was achieved by seeking the views of academics from PIHE and MSA on the usage of Web 2.0 social tools in higher education. An interview was conducted amongst

academics and academic managers at Pearson Institute of Higher Education in order to confirm the researcher's conceptual model. The following steps describe the procedure that academics and academic managers need to follow in order to use Web 2.0 tools in higher education:

1. Go through each of the major contributing themes of Web 2.0 usage and carefully analyse this against your institution.
2. Start with the INDIVIDUAL FACTORS.
3. Review the relationship between INDIVIDUAL FACTORS and USAGE of Web 2.0 tools.
    a. INDIVIDUAL FACTORS comprised of personal barriers, effort, familiarity, academic rank, teaching style and computer experience. However, there was only a positive correlation between *familiarity, academic rank, teaching style and computer experience* with the USAGE of Web 2.0 tools. The higher education institution would need to review the composition of INDIVIDUAL FACTORS and the relationships.
    b. *Familiarity* related to the academics' awareness and knowledge of Web 2.0 tools that can be used in education. *Familiarity* will assist academic managers to identify if academics have the knowledge, awareness and understanding of the different Web 2.0 tools (wikis, blogs, etc.) that can be used in education. This will help in determining if the higher education institution needs to provide the necessary training and workshops to help academics and academic managers to become more familiar with Web 2.0 tools.
    c. *Academic rank* will assist academic managers to identify which rank of academics are unfamiliar with Web 2.0 tools thereby providing training/workshops for these academics.
    d. *Teaching style* comprised of traditional teaching (face-to face teaching only) and a blended approach (using face-to-face and online teaching). *Teaching style* will help academic managers to identify which teaching style, traditional or blended learning, has an influence on the usage of Web 2.0 tools. In addition, academic managers can ensure the necessary technology and resources are available when using Web 2.0 tools.
    e. *Computer experience* will assist academic managers to identify academics' level of comfort in using computer applications. This will assist academics and academic managers to determine the level of ease to the usage of Web 2.0 tools in education.

f. Thus, the knowledge on each contributory sub factors will help academics and academic managers to gather knowledge in terms of the INDIVIDUAL FACTORS that will influence the usage of Web 2.0 tools.

4. Thereafter, examine the relationship between ORGANISATIONAL FACTORS and the USAGE of Web 2.0 tools.
   a. ORGANISATIONAL FACTORS comprised of *organisational support* and *organisational barriers.*
   b. O*rganisational support* will enable academics and academic managers to understand the importance of the institution's support in terms of development support such as staff training and workshops; monitoring of the appropriate use of online social networks; providing adequate technical assistance for students and staff and ensuring that there are adequate resources e.g. Wi-Fi hot spots for students, etc.
   c. *Organisational support* will also ensure that higher education institutions have an institutional policy that motivates student and academics to use Web 2.0 tools like blogs, wikis, video and audio podcasting in the faculty to share their teaching experience and knowledge.
   d. Academics institutions can use the element of *organisational support* to ensure that barriers such as low bandwidth; lack of security and privacy in social networked learning, etc. are eliminated by providing an ICT enabling environment for teaching with Web 2.0 tools; ensuring there are adequate student ICT facilities to use Web 2.0 tools; adequately trained teaching staff and adequate training in the usage of ICT applications for both students and academics.
5. Then review the relationship between the PERCEIVED QUALITY CHARACTERISTICS and USAGE of Web 2.0 tools. This comprised of *general quality characteristics and perceived ease of use*.
   a. *General quality characteristics* will assist academics and academic managers to identify and measure *general quality characteristics of Web 2.0 tools* and how these characteristics (elements) influence the usage of Web 2.0 tools in education. Thus, academics and academic managers will be able to measure if Web 2.0 tools are reliable, easy to use and understand**,** how efficient and effective the tool is if the Web

2.0 tool allows for rich and responsive interactions and if the technology is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.

6. Next, the relationship between the PERCEIVED USEFULNESS and USAGE of Web 2.0 tools can be assessed.
   a. PERCEIVED USEFULNESS will assist academics and academic managers to confirm the benefits of usage of Web 2.0 tools.
7. Lastly, examine the relationship between the PEDAGOGICAL FACTORS and USAGE of Web 2.0 tools.
   a. The composition of Pedagogical factors are *pedagogical characteristics of Web 2.0 tools and pedagogical beliefs.*
   b. Thus, *pedagogical characteristics of Web 2.0 tools* will help academics and academic managers to determine whether there is agreement on these characteristics and how this influences Web 2.0 usage.
   c. *Pedagogical beliefs* will enable academics and academic managers to ascertain the pedagogical beliefs of academics in relation to Web 2.0 usage.
   d. Thus, the knowledge on each contributory factor will assist academics and academic managers to do some practical intervention at the end of the analysis of each contributing factor thereby getting a better understanding of the elements that will influence the usage of Web 2.0 tools. However, based on the results discussed in Chapter 5, there was no significant relationship between *pedagogical factors* and usage of Web 2.0 tools in education.

6.6 Summary

This chapter presented the empirical findings with supporting evidence from the literature in order to answer the main research question and research sub-questions. The research question and sub-questions are presented in Chapters 1 and 5. From the combined qualitative and quantitative findings of the study, one can draw the following conclusions:

- There is a significant relationship between *Attitude, Perceived quality characteristics* (ease of use of Web 2.0 tools) and *Individual factors* (computer experience).
  An academics willingness to use Web 2.0 tools will depend on a characteristic of the tool (*easy to use*) as well as their *experience* in using a computer and computer applications.

- *Pedagogical factors* in terms of *pedagogical beliefs and Pedagogical characteristics of Web 2.0 tools* had no significant relationship with *usage of Web 2.0 tools.*

The proposed conceptual model was presented together with a discussion of the contributory factors and its relationships. In addition, the framework was compared to other acceptance and system usage models. Based on extant conceptual frameworks/theories there is a lack of a good general model of predicting user acceptance of the use of Web 2.0 tools in higher education. Thus, this research investigated factors that could influence the usage of Web 2.0 tools in higher education by using a conceptual model. The empirical work using this model examined perceptions of academics in order to predict their acceptance of Web 2.0 tools in higher education. The next chapter will discuss the confirmation of the conceptual model.

CHAPTER 7

Conceptual framework confirmation

7.1 Introduction

The aim of this chapter is to discuss the evaluation of the conceptual framework proposed in Chapter 6 and to discuss the findings of the evaluation. This model adds to existent studies by identifying the factors that promotes the usage of Web 2.0 tools by academics and academic managers in a higher education context. This is further explained in Section 7.3.

The conceptual framework was evaluated using qualitative analysis (interviews). Thereafter, confirmation of the conceptual framework is discussed which involved approving the framework contributory factors and relationships for relevance and completeness. Section 7.2 of the chapter describes the framework confirmation approach adopted, followed by section 7.3, which presents the results of the confirmation process. Thereafter, section 7.4 presents a summary of the chapter.

7.2 Model confirmation approach

This section discusses the approach followed to confirm the relevance and usefulness of the conceptual framework discussed in Chapter 6. The steps followed for this phase were as follows:

7.2.1 Design of the model verification instrument

A conceptual framework verification instrument interview schedule (refer to Appendix 3) was designed in order to conduct the conceptual framework confirmation process. The structure of the confirmation interview schedule and the objectives to be achieved are presented in Table 7.1 below.

Question category	**Objective**
Conceptual framework components	Establish the relevance of contributory factors and relationships to stakeholders.
Contributory factors: Perceived quality characteristic factors	Check the relevance of relationships and usefulness of information/knowledge of

	Perceived quality characteristic factors to stakeholders.
Contributory factors: Perceived usefulness	Check the relevance of relationships and usefulness of information/knowledge of *Perceived usefulness factors* to stakeholders.
Contributory factors: Organisational factors	Check the relevance of relationships and usefulness of information/knowledge of *Organisational factors* to stakeholders.
Contributory factors: Individual factors	Check the relevance of relationships and usefulness of information/knowledge of *Individual factors* to stakeholders.

Table 7.1 Model confirmation design

7.2.2 Conducting interviews to confirm the model

The researcher used qualitative analysis (interviews) to confirm the proposed conceptual model proposed in Chapter 6. This proposed conceptual model is useful for academics and academic managers who want to use Web 2.0 tools in higher education. The interviews were conducted at Pearson Institute of Higher Education with two academic managers, one Head of Programme and one Programme convener. In addition, three academics (lecturers) were approached to verify the model. The participants comprised of two males and three females from the Applied Science and Computer Science faculties.

To confirm the model, the researcher presented the interviewees with a document that illustrated the proposed conceptual model together with information relating to the proposed conceptual model's contributory factors. This can be found in *Appendix 3*. This assisted interviewees to get a better understanding of the contributory factors as well as the sub factors to the usage of Web 2.0 tools in education.

The interview took twenty minutes per interviewee and the findings were recorded. The questions started with each interviewee confirming the relationship of each contributory factor and the applicability of these factors against usage of Web 2.0 tools. Lastly, interviewees were asked to state the completeness of the model by identifying if there are any missing elements.

7.3 Results of confirmation model

The following sub-sections highlights the findings of the conceptual model.

7.3.1 Confirmation on the relevance of CONTRIBUTORY FACTORS towards the USAGE of Web 2.0 tools in education.

All of the participants confirmed that the *Individual factors*; *Perceived quality characteristics*; *Perceived usefulness* and *Organisational factors* are relevant to the USAGE of Web 2.0 tools in education.

These factors were identified and discussed in Chapters 4, 5 and 6.

7.3.2 Confirmation on the relevance of *Organisational factors* towards the USAGE of Web 2.0 tools in education.

All of the participants confirmed the relevance and importance of the higher education institution's support for the successful usage of Web 2.0 tools in education namely, *institutional policy, training, monitoring of the appropriate use of online social networks; adequate technical assistance and adequate resources.* All participants confirmed that if the above support were present then this would lead to a higher usage of Web 2.0 tools.

Three of the participants did confirm that they were unaware of the higher education institution's policy in terms of the USAGE of Web 2.0 tools in education or if the higher education institution even had a policy in place.

One academic manager mentioned that the element of *promoting* the USAGE of Web 2.0 tools is missing from O*rganisational support (See Appendix 6)*. An higher education institution needs to play a more active role in promoting the usage of Web 2.0 tools and put certain measures in place to ensure that academics are using Web 2.0 tools to teach. The academic manager said if there are no repercussions to not using the tool then academics will continue teaching using the traditional

teaching style, however if the usage of Web 2.0 tools is linked to the academics' performance review then this will influence the USAGE of Web 2.0 tools. Thus, even if *institutional policy, training, monitoring of the appropriate use of online social networks, adequate technical assistance and adequate resources* are made available there could still be a lower usage of Web 2.0 tools and there are no incentives if the tools are not used.

One academic manager commented that the higher education institution has adopted the policy of Bring Your Own Device (BYOD). With regard to the *Organisational sub factor of support*, this policy makes it very difficult for part time academics using their own personal device to use Web 2.0 tools in class, as they do not have *adequate resources* (WIFI) to be able to use these tools in the teaching and learning process. Part time academics have to log onto the student Wi-Fi if they want to make use of activities like online quizzes, blogs, etc. Thus, higher education institutions need to ensure they provide the necessary resources such as WIFI if they want academics to adopt a blended learning approach.
Organisational factors were identified and described in Chapters 4, 5, and 6.

7.3.3 Confirmation on the relevance of *Individual user factors* towards the USAGE of Web 2.0 tools in education.

All participants confirmed that there is a strong correlation between *teaching style, computer experience and familiarity* towards the USAGE of Web 2.0 tools. Academics stated that if a blended approach (teaching style) is adopted and if they also make use of computer applications (such Microsoft Visual Studio) in their teaching then this means that they have the knowledge and understanding of using Web 2.0 tools in education. Thus, this will influence the USAGE of Web 2.0 tools in higher education by incorporating a blended approach (Web 2.0 tools) with the traditional approach (Microsoft Visual Studio) where a computer application is used.

With regard to *academic rank*, only two participants (academics) confirmed the relevance of *academic rank* as having a positive correlation with the USAGE of Web 2.0 tools. The remainder of the participants, one academic and the two academic managers stated that *academic rank* would not necessarily influence the usage of Web 2.0 tools but rather *age* would as this sub factors is more likely to influence a change in teaching style or the willingness to use Web 2.0 tools in

teaching. Therefore, *age* could be a potential sub factor that is missing from the composition of *Individual factors* that could influence the USAGE of Web 2.0 tools in education.

However, the researcher did not record the *age* of the participants in the quantitative analysis, thus this sub factor could not be measured against the USAGE of Web 2.0 tools to determine if there is a strong correlation between *age* and USAGE of Web 2.0 tools.

Based on the quantitative and qualitative results discussed in Chapter 4 and 5 and the model discussed in Chapter 6, there is a significant relationship between the *Individual sub factors of computer experience* and *attitude* (confidence and comfort). The participants confirmed that if they are confident and comfortable in using computer applications then they are most likely to use Web 2.0 tools in education.

7.3.4 Confirmation on the relevance of *Individual factors and Organisational factors towards the* USAGE of Web 2.0 tools in education.

All participants confirmed that the USAGE of Web 2.0 tools in education are directly related to the *Organisational factors* and *Individual factors* in terms of the *barriers* that exist/experienced. Thus, the *Organisational sub factor of barriers* (*Low bandwidth; lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools; inadequate student ICT facilities to use Web 2.0 tools and inadequate training in the usage of ICT applications)* and *Individual barriers* (*The lack of knowledge on how to use the tool effectively; the lack of instructional value or appropriateness; using Web 2.0 tools requires more planning and effort than traditional face to face teaching and lack of motivation)* does have a negative effect on the usage of USAGE of Web 2.0 tools in education.

The Individual sub factors of barriers and the Organisational sub factor of barriers were identified and described in Chapters 5, 6, and 7.

7.3.5 Confirmation on the relevance of *Perceived quality characteristics* towards the USAGE of Web 2.0 tools in education.

All participants confirmed that if Web 2.0 tools were *perceived easy to use* then this would influence the USAGE of Web 2.0 tools. Thus, there is a strong correlation between *Perceived quality characteristics* against USAGE of Web 2.0 tools in education.

Based on the quantitative and qualitative results discussed in Chapters 4 and 5 and the model discussed in Chapter 7, there is a significant relationship between the *Individual sub factor of computer experience* and *attitude* (confidence and comfort). The participants also confirmed that there is a strong correlation between *Perceived quality characteristics* and *attitude*. If academics perceive Web 2.0 tools to be easy to use then they are more likely to use the tool in education. *Perceived quality characteristics* were identified and described in Chapters 4, 5, and 6.

7.3.6 Confirmation on the relevance of *Perceived usefulness* towards the USAGE of Web 2.0 tools in education.

All participants confirmed the relevance of *Perceived usefulness* towards the USAGE of Web 2.0 tools in education. Thus, if academics can see the benefits/value in using Web 2.0 tools then they are more likely to use Web 2.0 tools in education. *Perceived usefulness* comprised of the following benefits:

- *increases interaction and communication among the instructor and students,*
- *helps develop a better sense of connectivity between students and teachers,*
- *gives students the opportunity to create content themselves instead of just listening to lectures,*
- *allows me to creatively use and reuse material in novel ways because there is not one centralised power controlling the web* and
- *changes me from a passive to an active information consumer, allowing academics' online voice to be part of the conversation.*

Perceived usefulness were identified and discussed in Chapters 4, 5 and 6.

7.3.7 Confirmation on the usefulness of information/knowledge on *Organisational factors, Perceived usefulness factors, perceived quality characteristic factors* and *Individual factors.*

All of the participants agreed that information/knowledge on Individual factors *(Familiarity, computer experience and teaching style),* Organisational factors *(support),* Perceived quality characteristics *(Perceived ease of use) and* Perceived usefulness has a strong correlation with the USAGE of Web 2.0 tools. Thus, these factors do influence the USAGE of Web 2.0 tools in education.

The Individual sub factor academic rank was the only sub factor, which was identified, as not having a strong correlation with the USAGE of Web 2.0 tools, but rather *age* is a determining factor. Thus, the use of additional studies to confirm whether 'Academic rank' is a determinant of Web 2.0 tools usage should be further investigated. These factors were identified and described in Chapters 4, 5, and 6.

7.4 Practicality of the conceptual model

Based on the interview findings, it was revealed that the conceptual model is practical in terms of testing the usage of Web 2.0 tools in higher education. The academics confirmed that the contributory factors: individual factors, perceived quality characteristics, perceived usefulness and organisational factors are significant contributors of the usage of Web 2.0 tools in education.

7.5 Summary

The purpose of this chapter was to confirm the factors that influences the USAGE of Web 2.0 tools in education. Section 7.2 discussed the process followed for confirmation of the *Web 2.0 tools Contributory factors model*. The results of the model were confirmed in Section 7.3.

The conceptual model was created to accommodate the factors that a higher education institution must reflect on and address in order to successfully introduce Web 2.0 tools in education. Secondly, the model illustrated in this study can be used as a starting point for research into this area, to allow both academics and academic managers to expand, test and enhance the model based on future real-life case studies that tackle the problem area of implementing of Web 2.0 tools in education. The next chapter discusses the contribution of the study.

CHAPTER 8

Summary, recommendations and conclusions

8.1 Introduction

The purpose of this study was to determine the factors that influence the usage of Web 2.0 tools in higher education in South Africa. The main contribution of the study was the development of a conceptual model representing the factors.

This study contributed to the general area of technology integration in education. It provided insights on the usage of Web 2.0 tools in higher education to supplement traditional teaching approach. The study described and demonstrated a research approach for investigating the usage of Web 2.0 tools in higher education in South Africa. In addition, the study provided valuable information to higher education institutions on how to enhance teaching and learning in higher education in South Africa with the use of Web 2.0 tools.

8.2 Summary

The second research question aimed to investigate the current level of usage of Web 2.0 tools among academics in higher education. This findings was useful as it helped to establish the factors that need to be present to influence the usage of Web 2.0 tools in education. Many of the academics responded that they would use Web 2.0 tools if certain factors were present such as organisational support (training). This is linked to research question one, sub question one.

Research question one, sub question one identified the organisational factors that influence the use of Web 2.0 tools. The results showed that organisational sub factor of *support* is a significant predictor of usage of Web 2.0 tools in education.

Research question one, sub question two identified the individual factors that influence the use of Web 2.0 tools in education. The individual factors that were significant predictors of usage of Web 2.0 tools were *academic rank, teaching style and computer experience*.

Research question one, sub question three identified the pedagogical factors that influence the use of Web 2.0 tools. The results revealed that pedagogical factors (pedagogical characteristics of Web 2.0 tools and pedagogical beliefs) are not significant predictors of usage of Web 2.0 tools.

Research question one, sub question four identified the perceived usefulness as a significant predictor of usage of Web 2.0 technology.

Research question one, sub question five identified the perceived quality characteristic that influence the use of Web 2.0 tools. *Ease of use* sub factor was identified as a significant predictor of usage of Web 2.0 tools in education.

Research question three provided the reasons as to *why* these factors influences the usage of Web 2.0 tools in higher education.

Based on the research findings, the following conclusions were drawn: the use of Web 2.0 technologies at Pearson Institute of Higher Education and Monash South Africa is low and that, personal barriers was the major factor that influenced the low usage of Web 2.0 by academics.

A summary of the results of the study was that:

- A significant proportion of the sample prefer a blended teaching style (76%, $p<.0005$); and use computer applications when teaching students (94%, $p<.0005$);
- Teaching style accounts for 20.8% of the variance in USAGE ($R^2 = .208$)), $F(1, 125) = 32.733$, $p<.0005$. It is a significant predictor of usage with usage for 'blended' lecturers ($M=12.1882$) being significantly higher than for 'traditional' lecturers ($M=7.9286$);
- Organisational sub factor of *support* is a significant predictor of usage;
- Perceived quality characteristics sub factor of *ease of use* is a significant predictor of usage of Web 2.0 tools;
- Perceived usefulness is a significant predictor of usage.

The results revealed a significant satisfaction with the use of Web 2.0 tools.

8.3 Recommendations

8.3.1 Recommendations for integrating Web 2.0 tools in higher education

Based on the findings from the evaluation of the model it was revealed that one of the higher education institution does not have a policy regarding usage of Web 2.0 tools in teaching and learning.

It was found that Web 2.0 tools are still in its infancy stages (Tyagi, 2012). To ensure the successful implementation of Web 2.0 tools in South Africa, the higher education institutions should:

- develop institutional policies and guidelines on ICT and Web 2.0 usage; improve Internet connectivity/bandwidth;
- provide technical support for academics and students for the use of Web 2.0 tools;
- the formal adoption of Web 2.0 tools into the higher education institution's curriculum;
- provide incentives to academics to motivate the usage of Web 2.0 tools;
- provide professional development in learning theories and
- provide academics with training on the usage of Web 2.0 tools in teaching.

In terms of organisational sub factor of *support*, the higher education institutions should provide training to equip academics with the knowledge and skills needed to make effective use of Web 2.0 tools. Learning theories can assist academics to choose the right Web 2.0 learning technology to enhance teaching and learning by making the process more engaging and meaningful for students. Thus, based on an academic's awareness of Web 2.0 learning technologies, these technologies can be linked to a specific learning theory. Additionally, it is important to make use a model to guide the usage of Web 2.0 tools for teaching and learning.

8.3.2 Contribution (scientific and practical) of study

This study contributes to the general area of technology integration in education by providing insight into the factors influencing the usage of Web 2.0 tools in higher education to supplement traditional teaching approach.

The main scientific contribution of the study is the development of a conceptual model for Web 2.0 usage in higher education. The model extends existing models of usage by assisting academics

and academic managers to identify the individual factors (age and motivation), organisational factors (incentives and institutional policy and procedures such as BYOD), perceived quality characteristic, perceived usefulness and pedagogical factors that influences the usage of Web 2.0 tools to enhance the teaching and learning process. In addition, the study provided valuable information to higher education institutions on how to enhance teaching and learning in higher education in South Africa with the use of Web 2.0 tools. Thus, this model provides practical guidance to academics and academics managers who might find introducing Web 2.0 tools in higher education a challenge and provides insights to stakeholders in higher education institutions on integrating Web 2.0 tools in the traditional teaching and learning environment.

8.3.3 Recommendations for future research

Based on the findings of this study related to the usage of Web 2.0 tools in higher education, the following are suggestions for future research:

The study focused on factors influencing academics' usage of Web 2.0 tools from the perspective of educators and not from a student's perspective. Therefore, it would be interesting to further study factors that influences students' usage of Web 2.0 tools in education. The findings could then be compared with the academics' expectations of Web 2.0 use in an attempt to understand whether there is a gap in understanding among the students and the academics and whether or not the same factors influence student and academic use.

A future study can be conducted with educators in other universities (both private and public institutions) in different provinces of the country to examine whether differences in factors predicting Web 2.0 technologies intention and usage exist. It would also be beneficial to further study factors in place to support the integration of technology into courses, as well as the effectiveness of these support factors.

The study was based on specific types of tools (wikis, blogs, YouTube) that were identified as being used by academics at both the higher education institutions, thus a study on tools like content syndication and AJAX which were not explored can be further investigated. Also the comparative studies of the varied tools with reference to their pedagogical relevance could be studied. There is a wide scope of further research in different areas of higher education institutions. Future studies

could control for the type of Web 2.0 application and examine differences in their impact on the learning environment and student achievement.

In the confirmation interview an academic manager mentioned that using Web 2.0 tools is not compulsory and that there are no repercussions to not using the tool. Thus, even if institutional policy, training, monitoring of the appropriate use of online social networks, adequate technical assistance and adequate resources are made available there could still be a lower usage of Web 2.0 tools as there are no incentives or linkage to performance reviews to motivate academics to use Web 2.0 tools in higher education. Therefore, motivation to use Web 2.0 tools in education is likely to influence attitude of the academics, and it should influence behavioural intention. Behavioural intention to use Web 2.0 technology tools can influence actual use which in turn has an impact on motivation. It would be useful in future research to investigate motivation as a factor in influencing the usage of Web 2.0 tools in higher education.

Additionally, one academic and the two academic managers stated that *age* is likely to influence a change in teaching style or the willingness to use Web 2.0 tools in teaching. Therefore, *age* could be a potential sub factor that is missing from the composition of *Individual factors* that could influence the USAGE of Web 2.0 tools in education. The researcher did not record the *age* of the participants in the quantitative analysis, thus this sub factor could not be measured against the USAGE of Web 2.0 tools. There is a need in future research to determine if there is a strong correlation between *age* and USAGE of Web 2.0 tools.

In this study the focus was on factors that influence the usage of Web 2.0 tools in education based on academics perspectives of Web 2.0 usage in teaching and learning. Future research can be conducted to identify the most effective methods of using Web 2.0 technologies to improve teaching and learning and to support more active learning environments.

8.4 Limitations of this Study

One limitation of this study was that the research was only conducted among academics at two private higher education institutions. Future studies should collect data from public higher education institutions and this can be compared with the findings at the two private higher education institutions. This will help to establish if Web 2.0 technologies intention and usage are the same or not.

8.5 Conclusion

The study was conducted at two private higher education institutions in South Africa, Gauteng. The results identified the current level of usage of Web 2.0 tools in education as well as the factors that influences the usage of Web 2.0 tools. Based on the findings, Web 2.0 tools has great potential in education however it is not being fully utilised in higher education. The study did however reveal that academics' attitude towards Web 2.0 tools are favorable. The findings also revealed that there is a gap between the technological knowledge and skills of the academics and that organisational support in terms of training and workshops are extremely important. Hence attention must be paid on the recommendations given for the successful and effective implementation of Web 2.0 tools in higher education.

Every higher education institution has a fully established Directorate of ICT that supports the University functions by ensuring that there is Internet services that are available to academics and students. This is very helpful when using new teaching tools like Web 2.0 tools. With the presence of these services together with students who are digital natives, one would expect academic staff to adopt the use of Web 2.0 technologies in their teachings; however, this is not the case as based on the literature regarding the usage of Web 2.0 tools at South African higher education institutions.

My personal reflection on this research is an unforgettable experience together with the joys of accomplishing such a huge chapter in my life. My research journey was not an easy one and at times I wanted to give up. I had experienced many challenges along the way and a lot of tears went into writing this dissertation. However, I would never have been able to complete this study without the assistance of my supervisor and the support of my family and friends.

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Appendix 1: Questionnaire

Section A: General Usage of Web 2.0 tools

The purpose of this section is to get a general understanding of the usage of Web 2.0 tools within your organisation.

1. What is the name of the University/Institution at which you are currently employed?

_____

2. What is your current academic rank?

☐ Lecturer

☐ Senior Lecturer

☐ Associate Professor

☐ Professor

☐ Other

If you chose the option 'Other', please specify.

_____

3. What kind of teaching style do you prefer? **Select ONE option only**

☐ A blended approach using face to face and online teaching

☐ Traditional face-to face teaching only

☐ Online teaching only

4. Do you use any computer applications when you teach students?

Yes	No

5. As a lecturer, indicate whether you use the following applications in your teaching:

Application	Yes	No
5.1 MS PowerPoint		
5.2 MS Word		
5.3 MS Excel		
5.4 MS Access		
5.5 Email		
5.6 Other		

If you chose the option 'Other', please specify.

_____

6. I am comfortable with the following: (Tick all that apply)

Ease of Use	Yes	No
6.1 Creating spreadsheets		
6.2 Using word processing software to create/edit documents and reports		
6.3 Using PowerPoint for presentations		
6.4 Writing simple software programs		

7. Are you aware of <u>any of the following</u> Web 2.0 tools - "Wikipedia", "YouTube", "Facebook", "Flickr" or "MySpace" - that can be used for education ?

Yes	No

8. Indicate whether you have ever used any of the following tools in the classroom to extend your teaching and how often did you use these tools?

Tools	Yes	No	Average number of hours in a day			
			Less than 2	From 2 to less than 4	From 4 to less than 6	6 hours or more
8.1 Twitter						
8.2 YouTube						
8.3 Google search						
8.4 Google Docs						
8.5 Dropbox						
8.6 Facebook						

9. Do you know, or have you heard of, any of the following Web 2.0 tools - "Wikis", "Blogs", "RSS", "Podcasting", "AJAX", or "Mashups" - that can be used for education?

Yes	No

10. Are you familiar with "Web 2.0" tools that can be used for education?

Yes	No

11. Do you use any Web 2.0 tools, applications, or services like YouTube, Wikipedia, Facebook, MySpace, or Flickr either for fun or for extending teaching? Select **ONE** option

- ☐ I interact with them both for extending teaching and for fun
- ☐ I only interact with them for fun
- ☐ I only interact with them for extending teaching
- ☐ I do not interact with them at all

12. Indicate which of the following Web 2.0 tools, services or applications you use to extend your teaching

Application	Yes	No
12.1 Social software applications like Facebook, Flickr and others.		
12.2 Wiki sites like Wikipedia, Wiki and Javapedia and others		
12.3 Blogging websites like Blogger.com and Blogspot.com		
12.4 Podcasting sites like odeo.com and apple.com		
12.5 Other		

If you chose "Other", please specify.

_____

_____

13. **<u>If you do not use Web 2.0 tools</u>** indicate whether the following items are reasons why you do not use these tools:

Reason for not using Web 2.0 tools	Yes	No
13.1 I don't know how to use them		
13.2 I don't have the time		
13.3 My institution doesn't support me in learning them		
13.4 I prefer to use textbooks		
13.5 Other		

If you chose "Other", please specify.

_____

Section B: Usage of Web 2.0 tools for Teaching.

The purpose of this section is to analyse the level of usage of Web 2.0 tools in teaching.

1. Do you use Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for teaching and/or for faculty use? Select **ONE** option only

☐ I use them for teaching only

☐ I use them for faculty work only

☐ I use them for both teaching and faculty work

☐ I do not use them at all

If your answer is "I don't use them at all", please skip to section C.

2. Indicate whether you use the following Web 2.0 tools for teaching and how often do you use these tools?

Tools	Yes	No	Average number of hours in a day			
			Less than 2	From 2 to less than 4	From 4 to less than 6	6 hours or more
2.1 Wiki						
2.2 Blog						
2.3 Audio Podcast						
2.4 Video Podcast						
2.5 RSS						
2.6 Other						

If you chose "Other", please specify.

_____

3. Indicate your level of agreement that the following benefits can result from using Web 2.0 tools in education:

Benefits	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1 Broadens faculty perspective					
3.2 Helps in obtaining students' feedback					
3.3 Follows students' interest trends					
3.4 Draws on collective knowledge to better serve the students' needs					
3.5 Improves teachers' inter-departmental communications					
3.6 Facilitates instant problem solving					
3.7 Improves knowledge sharing and collaboration					

4. Indicate your satisfaction with the usage of Web 2.0 tools

Highly dissatisfied	Moderately dissatisfied	Neutral	Moderately satisfied	Highly satisfied

Section C: Academics perceptions on the benefits and shortfalls of using Web 2.0 for educational purposes.

The purpose of this section is to obtain academics' perceptions on the benefits and shortfalls of using Web 2.0 for educational purposes.

1 Pedagogical Factors Technological

1.1 Indicate your agreement with the following statements regarding the use of Web 2.0 tools in education:

	I find the use of Web 2.0 tools in education...	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1.1.1	... helps me to form groups to relay information quickly to a specific targeted audience					
1.1.2	... is helpful in terms of storing information online and resource sharing					
1.1.3	... is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time					
1.1.4	... helps build a sense of community					
1.1.5	... increases interaction and communication among the instructor and students					
1.1.6	… helps develop a better sense of connectivity between students and teachers					
1.1.7	… affords students opportunities to connect and communicate with classmates and resources throughout the world					
1.1.8	… gives students the opportunity to create content themselves instead of just listening to lectures					
1.1.9	... is very helpful in engaging students' interest					
1.1.10	… allows more collaborative learning than traditional face to face delivery					
1.1.11	… helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls					
1.1.12	… allows me to creatively use and reuse material in novel ways because there is not one centralised power controlling the web					

1.1.13	… changes me from a passive to an active information consumer, allowing my online voice to be part of the conversation					

1.2 Indicate your agreement that the following pedagogic statements should be supported.

	Pedagogical statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.2.1	Allowing individual students to support one another by working in groups, participating in forums, blogs, etc.					
1.2.2	Enhancing learning and creativity by encouraging creative expression through blogs, etc.					
1.2.3	Social networking (e.g. Facebook) for informal learning enabling students to build their knowledge, share materials and grasp issues in class.					
1.2.4	Collaborative learning by working in groups on a structured activity.					

2 User/People Factors

2.1 Indicate your agreement that the following items are barriers to the use of Web 2.0 tools.

	Barriers	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.1.1	The lack of knowledge on how to use the tool effectively					
2.1.2	The lack of instructional value or appropriateness					
2.1.3	Using Web 2.0 tools requires more planning and effort than traditional face to face teaching					
2.1.4	Lack of motivation					

2.2 Indicate your agreement with the following statements regarding your attitude towards the use of Web 2.0 tools in education.

	Attitudes	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.2.1	I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses					
2.2.2	I can supplement my lectures more effectively and efficiently with the use of Web 2.0 tools					
2.2.3	I find the use of Web 2.0 tools to be easier than traditional face to face communication					
2.2.4	I find using Web 2.0 tools to be very time consuming as more preparation is involved					
2.2.5	Web 2.0 tools are not appropriate for teaching					
2.2.6	I can do without Web 2.0 tools in teaching and learning and still get the same results					
2.2.7	Modern teaching cannot do without Web 2.0 tools					
2.2.8	I can deliver as effectively with Web 2.0 tools compared to traditional face to face instruction					

2.3 Indicate your agreement with the following statements regarding your effort involved towards the use of Web 2.0 tools in education opposed to traditional face to face teaching in a blended environment.

	Effort involved	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.3.1	Web 2.0 tools involves more work than in traditional face to face education					
2.3.2	Web 2.0 tools requires careful wording because of the absence of audio/visual cues					
2.3.3	Web 2.0 tools requires more communication					
2.3.4	Web 2.0 tools requires more planning and effort than traditional face to face teaching					
2.3.5	Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching					

3 Organisational

3.1 Indicate your agreement that the following items are organisational barriers to the use of Web 2.0 tools in education.

	Organisational barriers	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1.1	Low bandwidth					
3.1.2	Lack of security and privacy in social networked learning					
3.1.3	Lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools					
3.1.4	Inadequate student ICT facilities to use Web 2.0 tools					
3.1.5	Shortage of adequately trained teaching staff					
3.1.6	Inadequate training in the usage of ICT applications					

3.2 Indicate your agreement that the following support is provided by your institution when using Web 2.0 tools in education.

	Support	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
3.2.1	Development support in terms of staff training and workshops					
3.2.2	Monitoring of the appropriate use of online social networks					
3.2.3	There is adequate technical assistance for students and staff.					
3.2.4	There are adequate resources e.g. Wi-Fi hot spots for students, etc.					

3.2.5	There is an institutional policy that encourages lecturers to use new Web tools like Blogs, Wikis, video and audio Podcasting in the faculty to share their teaching experience and knowledge.					

4. System Quality

4.1 Indicate your agreement with the following statements regarding system quality.

	Statement	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
4.1.1	The system is reliable					
4.1.2	The system is easy to use					
4.1.3	The system is easy to understand					
4.1.4	The system provides a collaborative environment					
4.1.5	The system is efficient and effective					
4.1.6	The system allows for rich and responsive interactions					
4.1.7	The system is easily adapted as a learning tool to create interaction, enable knowledge sharing, etc.					

5. Usage

5.1 Indicate your agreement with the following statements on your usage of Web 2.0 tools.

	The usage of Web 2.0 tools depends on...	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**StronglyAgree**

5.1.1	Institutional policy and framework in terms of training, technical supports, etc.					
5.1.2	Teaching methods and learning styles					
5.1.3	The adequacy of ICT facilities					
5.1.4	My confidence in using Web 2.0 tools					

5.2. Indicate the average level of usage of the following Web 2.0 features in your courses.

		Never	**Rarely**	**Sometimes**	**Often**	**Usually/ Always**
5.2.1	Posting course content (e.g. notes, PowerPoint presentations; external links to other sources of content, tutorials, etc.)					
5.2.2	e-mail communication					
5.2.3	Online real-time chat					
5.2.4	Blogs					
5.2.5	Wikis					
5.2.6	Video and audio podcasting					

Appendix 2: Interview Schedule

1. What is your academic rank?

2. What discipline do you lecture in?

3. How long have you been lecturing for?

4. What web 2.0 tools (social media, wikis, blogs, etc.) do you use for teaching and learning in the courses/subjects you teach?

5. How long have you been using Web 2.0 tools in teaching and learning?

6. Are you comfortable with the use of Web 2.0 tools for educational purposes?

7. How are Web 2.0 tools used for teaching and learning in the subjects you teach?

8. Do you find the use of Web2.0 tools useful for educational purposes?

9. What learning tasks, in your opinion, (e.g. discussions, quizzes, peer evaluations) lend themselves to the use of Web 2.0 tools?

10. How can educators to promote collaborative learning in a higher education context use Web 2.0 tools?

11. In your view, what are the possible advantages of using Web 2.0 tools for learning when compared to the traditional lecture-based education system?

12. In your view, what are the characteristics of Web 2.0 tools that promote usage for education?

13. What in your view are the factors that motivate academics to integrate Web 2.0 tools in their teaching?

14. Have you experienced any problems whilst using Web 2.0 tools?

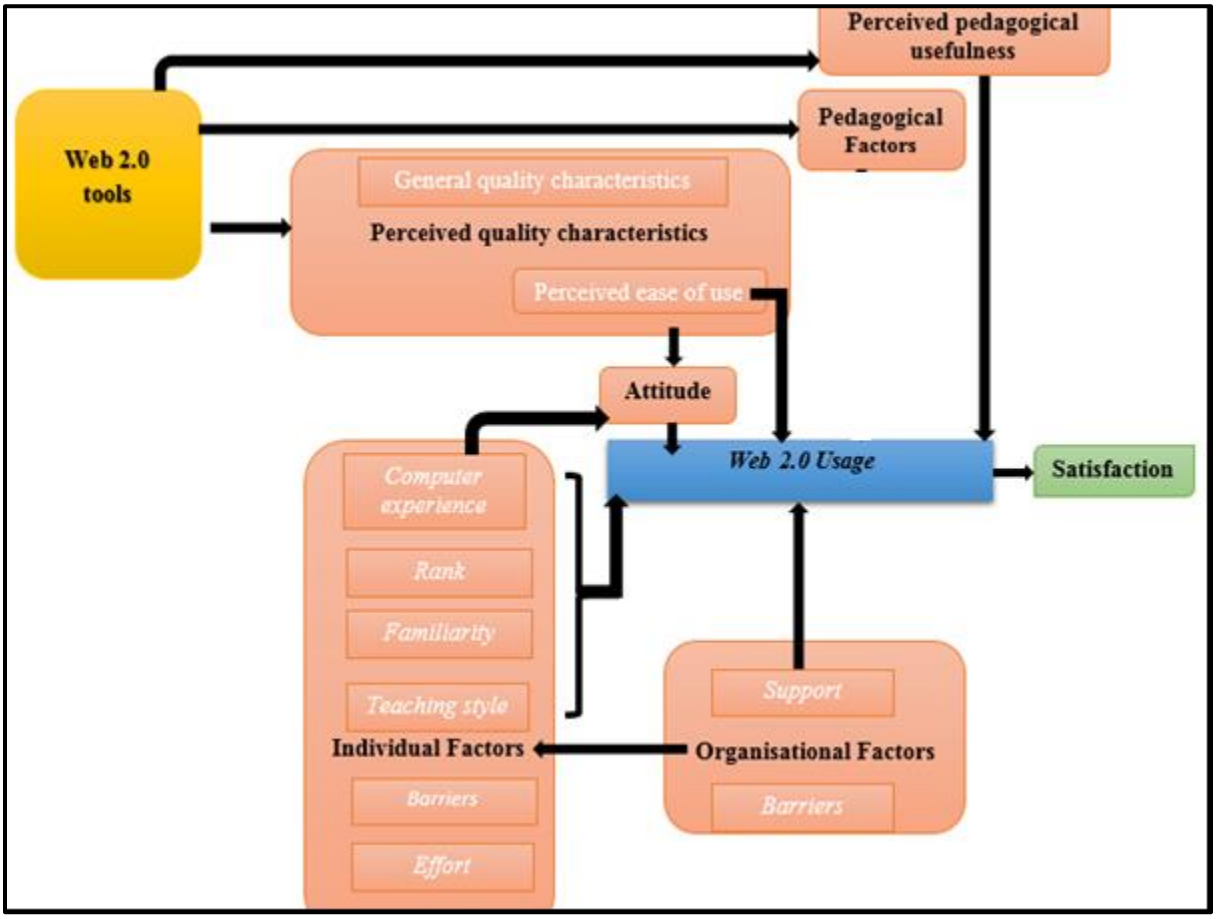
15. What in your view are the personal barriers/challenges that academics have in integrating Web 2.0 tools in their teaching?

16. What is the higher education institution's attitude towards the use of Web 2.0 tools in education?

17. Does the institution provide the necessary support in terms of training/workshops and technical support from ICT to ensure the adoption and use of Web 2.0 tools by academics?

18. **Only answer if no support is provided from previous question.** Would you make use of Web 2.0 tools if support were provided?

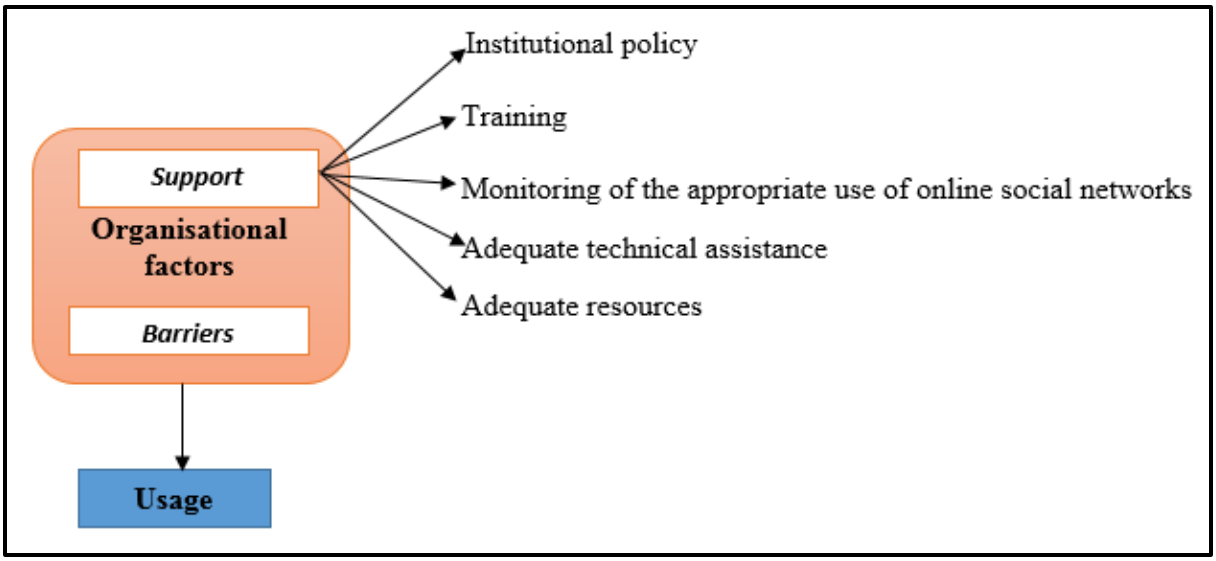
Appendix 3: Interview schedule for confirmation of Web 2.0 usage model



1. Do you believe that Perceived quality characteristics, Perceived usefulness, Individual factors and Organisational factors are relevant to the usage of Web 2.0 tools in education?

2. Usage comprised of the following Web 2.0 tools: YouTube, Facebook; Quizlet; Khan Academy-Chemistry; Wikis; Blogs/Discussion forums and Qwizdom. Do you agree that these tools are effective as educational tools?

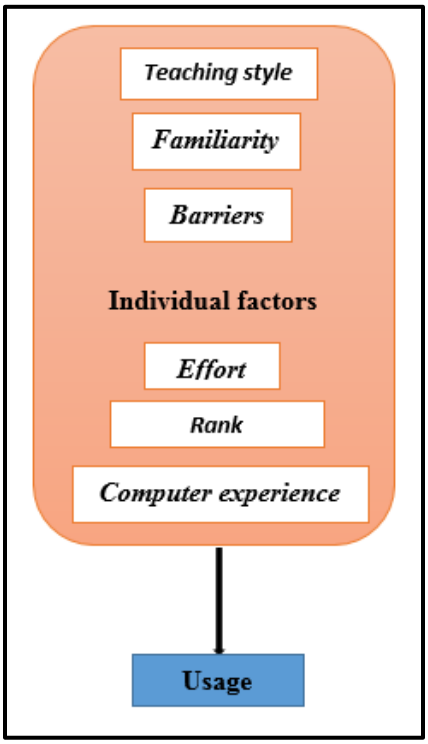
3. Do you believe that this model would lead to improved usage of Web 2.0 tools among academics and academic managers?



4.1 Based on the diagram, do you believe that the organisational factors (support) is applicable to the usage of Web 2.0 tools?

4.2 Is there any other elements within the SUPPORT sub-factor of ORGANISATIONAL FACTORS that would influence the usage of Web 2.0 tools in education?

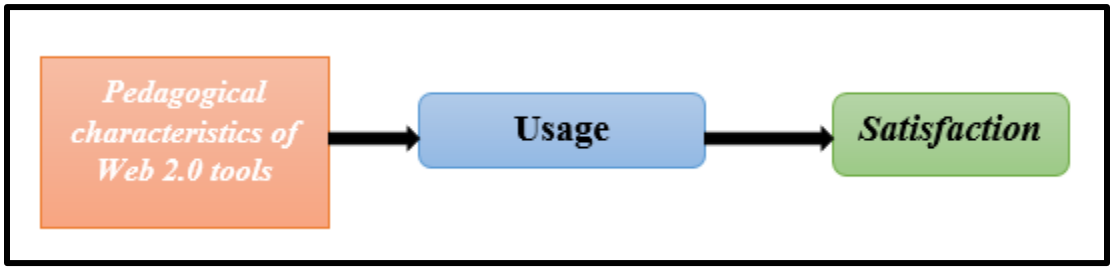
5.1 This research study has shown a significant relationship between the teaching styles, the level of rank of academic, personal barriers, effort, familiarity and computer experience that influences the usage of Web 2.0 tools in education. Do you believe that the sub-factors within individual factors are relevant for the usage of Web 2.0 tools by academics?



(Teaching style comprised of a blended approach using face to face and online teaching and traditional approach of face-to face teaching; *Familiarity* related to awareness/knowledge of Web 2.0 tools in education; Barriers were the lack of knowledge on how to use the tool effectively, the lack of instructional value or appropriateness, using Web 2.0 tools requires more planning and effort than traditional face to face teaching and lack of motivation; *Effort* in terms of Web 2.0 tools involves more work than in traditional face to face education, Web 2.0 tools requires careful wording because of the absence of audio/visual cues, Web 2.0 tools requires more communication, Web 2.0 tools requires more planning and effort than traditional face to face teaching and Web 2.0 tools requires giving more support to students than is required with traditional face to face teaching; Academic *rank* was made up of Lecturer, Senior Lecturer, Associate Professor and Professor and *Computer experience* is the use of computer applications such as MS Word, MS Excel, MS PowerPoint, email, etc.

5.2 Are there any other sub-factors within the INDIVIDUAL FACTORS that are relevant to the usage of Web 2.0 tools?

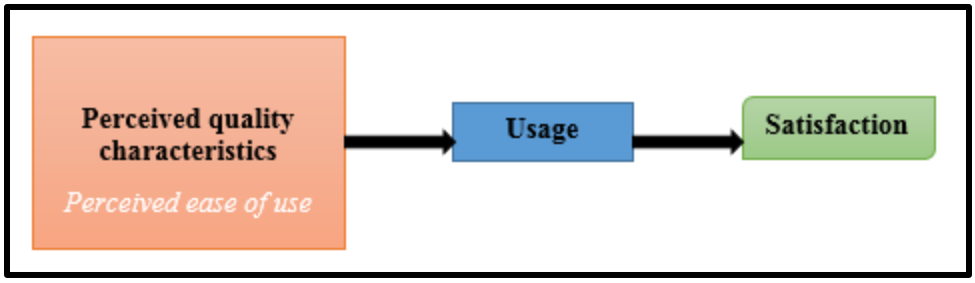
6.1 This research study has shown a significant relationship between PEDAGOGICAL FACTORS (Pedagogical beliefs and pedagogical characteristics of Web 2.0 tools) and usage. Do you believe that these elements are applicable to the usage of Web 2.0 tools in education?



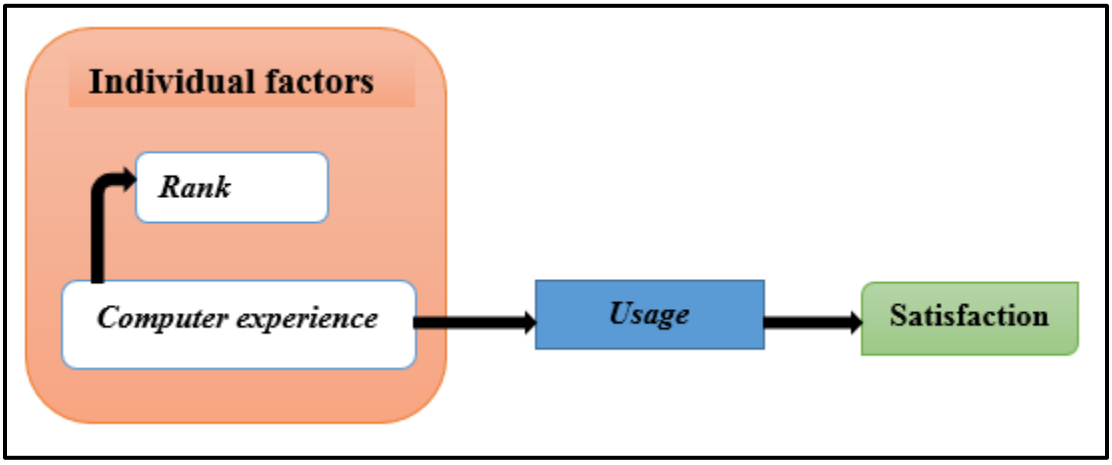
Pedagogical beliefs comprised of *Allowing individual students to support one another by working in groups, participating in forums, blogs, etc.; Enhancing learning and creativity by encouraging creative expression through blogs, etc.; Social networking (e.g. Facebook) for informal learning enabling students to build their knowledge, share materials and grasp issues in class and Collaborative learning by working in groups on a structured activity.*

Pedagogical characteristics of Web 2.0 tools was made up of The use of Web 2.0 tools in education: *Is more flexible than traditional teaching in terms of delivery of the content in that the teaching process can be conducted anywhere at any time; helps build a sense of community; ... is very helpful in engaging students' interest and helps to remove time constraints by providing a more flexible learning environment that is not inhibited to classroom walls.*

6.2 Perceived ease of use as a sub-factor of PERCEIVED QUALITY CHARACTERSITCS results in a higher usage of Web 2.0 tools in education. Do you agree? Please explain.



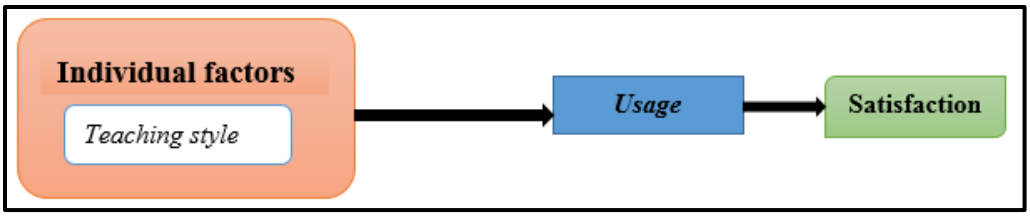
Perceived ease of use related to: *The system is easy to use and the system is easy to understand.*



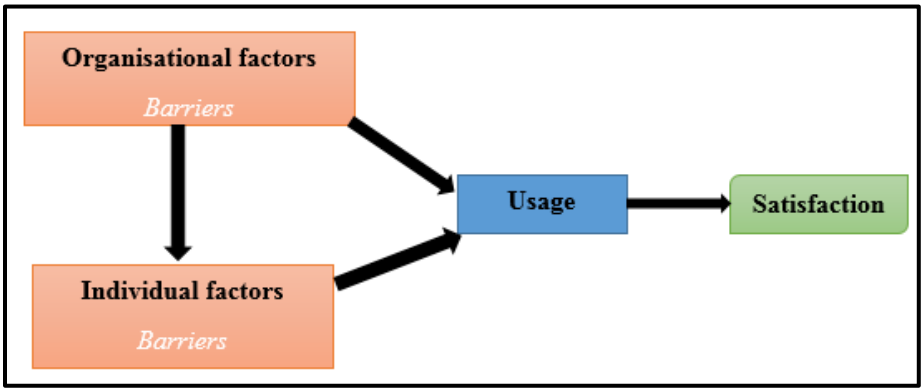
7.1 The research study has shown a significant relationship between INDIVIDUAL FACTORS (Rank and computer experience) and Web 2.0 usage. Do you believe that this relationship is relevant for the usage of Web 2.0 tools? Please explain.

7.2 Are there any other sub-factors within the INDIVIDUAL FACTORS that should be incorporated in the usage of Web 2.0 tools?

8. The research study has shown a strong correlation between teaching style and the usage of Web 2.0 tools. Do you believe that blended teaching style will lead to a higher usage of Web 2.0 tools?



9.1 The research study shows that the usage of Web 2.0 tools in education are directly related to the organisational factors and individual factors in terms of the barriers that exist/experienced. Do you believe that the barriers that exist/experienced has a negative effect on the rate of usage of Web 2.0 tools in education?

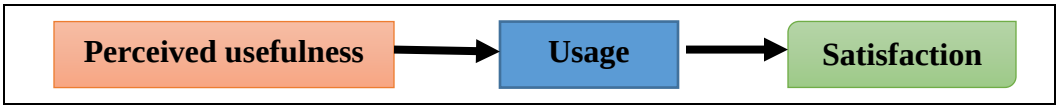


Organisational barriers comprised of low *bandwidth; lack of security and privacy in social networked learning; lack of University support to provide an ICT enabling environment for teaching with Web 2.0 tools; inadequate student ICT facilities to use Web 2.0 tools, shortage of adequately trained teaching staff and inadequate training in the usage of ICT applications.*

Individual barriers were made up of: *The lack of knowledge on how to use the tool effectively; the lack of instructional value or appropriateness; using Web 2.0 tools requires more planning and effort than traditional face to face teaching and lack of motivation.*

9.2 Are there any other sub-factors within ORGANISATIONAL FACTORS that should be incorporated in the usage of Web 2.0 tools?

10. The research study has shown a significant relationship between perceived usefulness (broadens faculty perspective; helps to get student feedback; follows students' interest trends; draws on collective knowledge to better serve the students' needs; improves teachers' inter-departmental communications; facilitates instant problem solving and improves knowledge sharing and collaboration) and usage. Do you believe that perceived usefulness influences academics to use Web 2.0 tools in education?



11. Do you agree on the usefulness of information/knowledge on the various sub-factors comprising each of the major factors influencing Web 2.0 usage?

Major contributing factor/sub-factor	Yes/No	Comment
Pedagogical factors		
Individual factors *(Familiarity)*		
Individual factors *(Rank)*		
Individual factors *(Computer experience)*		
Individual factors *(Teaching style)*		
Organisational factors *(support)*		
Perceived quality characteristics *(Perceived ease of use)*		
Perceived usefulness		

Appendix 4: Additional Quantitative analysis findings

1. Significant relationships

The purpose of these findings are to show the significant relationship between the factors and the overall results (the institutions results were combined) of the higher education institutions.

Chi-square test of independence was used to determine if there was a relationship between the demographic variables (Academic rank, Teaching style, Computer comfort, Computer experience, Awareness of Web 2.0 tools, Knowledge of Web2.0 tools, Familiarity with Web 2.0 tools) and usage of Web 2.0 tools. Only significant cross tabulations are shown where there were significant associations/relationships.

1.1 Academic rank and awareness of Web 2.0 tools

Table 1.1 and 1.2 below, shows that there were significant relationships between the academic rank of senior lecturer and the awareness of Web 2.0 tools for educational purposes. A significant number of the respondents (senior lecturers) indicated that they are not aware of Web 2.0 tools that can be used for educational purposes.

Crosstab

			7. Are you aware of any of the following Web 2.0 tools - "Wikipedia", "YouTube", "Facebook", "Flickr" or "MySpace" - that can be used for education ?		
			No	Yes	Total
2. What is your current academic rank?	Lecturer	Count	3	97	100
		Expected Count	5.5	94.5	100.0
		% within 2. What is your current academic rank?	3.0%	97.0%	100.0%
		Std. Residual	-1.1	.3	
	Senior lecturer	Count	4	13	17
		Expected Count	.9	16.1	17.0
		% within 2. What is your current academic rank?	23.5%	76.5%	100.0%
		Std. Residual	3.2	-.8	
	Associate professor	Count	0	1	1
		Expected Count	.1	.9	1.0
		% within 2. What is your current academic rank?	.0%	100.0%	100.0%
		Std. Residual	-.2	.1	
	Professor	Count	0	6	6
		Expected Count	.3	5.7	6.0
		% within 2. What is your current academic rank?	.0%	100.0%	100.0%
		Std. Residual	-.6	.1	
	Other	Count	0	3	3
		Expected Count	.2	2.8	3.0

	% within 2. What is your current academic rank?	.0%	100.0%	100.0%
	Std. Residual	-.4	.1	
Total	Count	7	120	127
	Expected Count	7.0	120.0	127.0
	% within 2. What is your current academic rank?	5.5%	94.5%	100.0%

Table 1.1 relationship between academic rank and awareness of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	12.391[a]	4	.015	.075		
Likelihood Ratio	8.684	4	.069	.049		
Fisher's Exact Test	9.879			.040		
Linear-by-Linear Association	.309[b]	1	.578	.748	.342	.136
N of Valid Cases	127					

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .06.

b. The standardized statistic is -.556.

Table 1.2 Chi-Square test for awareness of Web 2.0 tools

1.2 Academic rank and familiarity with Web 2.0 tools

Table 1.3 and 1.4 below, shows that there were significant relationships between the academic rank of senior lecturer and associative professor and the familiarity of Web 2.0 tools for educational purposes.

A significant number of the respondents (senior lecturers and associative professors) indicated that they are not familiar with the usage of Web 2.0 tools for educational purposes.

Crosstab

			10. Are you familiar with "Web 2.0" tools that can be used for education?		
			No	Yes	Total
2. What is your current academic rank?	Lecturer	Count	22	78	100
		Expected Count	28.3	71.7	100.0
		% within 2. What is your current academic rank?	22.0%	78.0%	100.0%
		Std. Residual	-1.2	.7	
	Senior lecturer	Count	9	8	17
		Expected Count	4.8	12.2	17.0
		% within 2. What is your current academic rank?	52.9%	47.1%	100.0%
		Std. Residual	1.9	-1.2	
	Associate professor	Count	1	0	1
		Expected Count	.3	.7	1.0
		% within 2. What is your current academic rank?	100.0%	.0%	100.0%
		Std. Residual	1.3	-.8	
	Professor	Count	3	3	6
		Expected Count	1.7	4.3	6.0
		% within 2. What is your current academic rank?	50.0%	50.0%	100.0%
		Std. Residual	1.0	-.6	
	Other	Count	1	2	3
		Expected Count	.9	2.1	3.0

	% within 2. What is your current academic rank?	33.3%	66.7%	100.0%
	Std. Residual	.2	-.1	
Total	Count	36	91	127
	Expected Count	36.0	91.0	127.0
	% within 2. What is your current academic rank?	28.3%	71.7%	100.0%

Table 1.3 relationship between academic rank and familiarity of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	10.995[a]	4	.027	.018		
Likelihood Ratio	10.407	4	.034	.036		
Fisher's Exact Test	10.801			.015		
Linear-by-Linear Association	4.797[b]	1	.029	.029	.024	.009
N of Valid Cases	127					

a. 7 cells (70.0%) have expected count less than 5. The minimum expected count is .28.

b. The standardized statistic is -2.190.

Table 1.4 Chi-Square test of familiarity of Web 2.0 tools

1.3 Teaching style and aware of Web 2.0 tools

Table 1.5 and 1.6 below, shows that there were significant relationships between the traditional teaching style and not being aware of Web 2.0 tools for educational purposes.

Crosstab

			7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?		
			No	Yes	Total
3. What kind of teaching style do you prefer?	Blended	Count	0	85	85
		Expected Count	4.7	80.3	85.0
		% within 3. What kind of teaching style do you prefer?	.0%	100.0%	100.0%
		Std. Residual	-2.2	.5	
	Traditional	Count	7	35	42
		Expected Count	2.3	39.7	42.0
		% within 3. What kind of teaching style do you prefer?	16.7%	83.3%	100.0%
		Std. Residual	3.1	-.7	
Total		Count	7	120	127
		Expected Count	7.0	120.0	127.0
		% within 3. What kind of teaching style do you prefer?	5.5%	94.5%	100.0%

Table 1.5 relationship between teaching style and awareness

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	14.993[a]	1	.000	.000	.000	
Continuity Correction[b]	11.964	1	.001			
Likelihood Ratio	16.336	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	14.875[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.31.

b. Computed only for a 2x2 table

c. The standardized statistic is -3.857.

Table 1.6 Chi-Square test for awareness of Web 2.0 tools

1.4 Awareness and knowing of Web 2.0 tools

Based on the results in Table 1.7 and 1.8 below, there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) that can be used for educational purposes and not knowing of Web 2.0 tools such as “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups”.

Crosstab

			9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?		
			No	Yes	Total
7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	No	Count	7	0	7
		Expected Count	.8	6.2	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	100.0%	.0%	100.0%
		Std. Residual	6.8	-2.5	
	Yes	Count	8	112	120
		Expected Count	14.2	105.8	120.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	6.7%	93.3%	100.0%
		Std. Residual	-1.6	.6	
Total		Count	15	112	127
		Expected Count	15.0	112.0	127.0

	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	11.8%	88.2%	100.0%

Table 1.7 relationship between awareness and knowing of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	55.316[a]	1	.000	.000	.000	
Continuity Correction[b]	46.718	1	.000			
Likelihood Ratio	33.455	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	54.880[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is .83.

b. Computed only for a 2x2 table

c. The standardized statistic is 7.408.

Table 1.8 Chi-square test for awareness and knowing of Web 2.0 tools

1.5 Awareness and familiarity of Web 2.0 tools

In Table 1.9 and 1.10 below, there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) that can be used for educational purposes and not being familiar with Web 2.0 tools.

Fisher’s exact test was used in Table 1.26, as conditions were not met.

Crosstab

			10. Are you familiar with "Web 2.0" tools that can be used for education?		
			No	Yes	Total
7. Are you aware of any of the following Web 2.0 tools - "Wikipedia", "YouTube", "Facebook", "Flickr" or "MySpace" - that can be used for education ?	No	Count	7	0	7
		Expected Count	2.0	5.0	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - "Wikipedia", "YouTube", "Facebook", "Flickr" or "MySpace" - that can be used for education ?	100.0%	.0%	100.0%
		Std. Residual	3.6	-2.2	
	Yes	Count	29	91	120
		Expected Count	34.0	86.0	120.0
		% within 7. Are you aware of any of the following Web 2.0 tools - "Wikipedia", "YouTube", "Facebook", "Flickr" or "MySpace" - that can be used for education ?	24.2%	75.8%	100.0%
		Std. Residual	-.9	.5	
Total		Count	36	91	127
		Expected Count	36.0	91.0	127.0

	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	28.3%	71.7%	100.0%

Table 1.9 relationship between awareness and familiarity of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	18.727[a]	1	.000	.000	.000	
Continuity Correction[b]	15.179	1	.000			
Likelihood Ratio	18.715	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	18.579[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.98.

b. Computed only for a 2x2 table

c. The standardized statistic is 4.310.

Table 1.10 Chi-Square test for awareness and familiarity

1.6 Knowing and being familiar of Web 2.0 tools

Based on the results in Table 1.11 and 1.12 below, there was a significant relationship between not knowing of Web 2.0 tools (“Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or “Mashups”) that can be used for educational purposes and not being familiar with Web 2.0 tools.

Cross tabulation

			10. Are you familiar with "Web 2.0" tools that can be used for education?		
			No	Yes	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - "Wikis", "Blogs", "RSS", "Podcasting", "AJAX", or "Mashups" - that can be used for education?	No	Count	15	0	15
		Expected Count	4.3	10.7	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - "Wikis", "Blogs", "RSS", "Podcasting", "AJAX", or "Mashups" - that can be used for education?	100.0%	.0%	100.0%
		Std. Residual	5.2	-3.3	
	Yes	Count	21	91	112
		Expected Count	31.7	80.3	112.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - "Wikis", "Blogs", "RSS", "Podcasting", "AJAX", or "Mashups" - that can be used for education?	18.8%	81.3%	100.0%
		Std. Residual	-1.9	1.2	
Total		Count	36	91	127
		Expected Count	36.0	91.0	127.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	28.3%	71.7%	100.0%

Table 1.11 relationship between knowing and being familiar of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	42.995[a]	1	.000	.000	.000	
Continuity Correction[b]	39.088	1	.000			
Likelihood Ratio	43.336	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	42.656[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.25.

b. Computed only for a 2x2 table

c. The standardized statistic is 6.531.

Table 1.12 Chi-Square test for knowing and being familiar of Web 2.0 tools

1.7 Academic rank and the usage of Wikis

In Table 1.13 and 1.14 below, there was a relationship between senior lecturers and professors and not using Wiki sites.

Crosstab

			12.2 Wiki sites like Wikipedia, Wiki and Javapedia and others		
			No	Yes	Total
2. What is your current academic rank?	Lecturer	Count	47	53	100
		Expected Count	53.5	46.5	100.0
		% within 2. What is your current academic rank?	47.0%	53.0%	100.0%
		Std. Residual	-.9	1.0	
	Senior lecturer	Count	13	4	17
		Expected Count	9.1	7.9	17.0
		% within 2. What is your current academic rank?	76.5%	23.5%	100.0%
		Std. Residual	1.3	-1.4	
	Associate professor	Count	0	1	1
		Expected Count	.5	.5	1.0
		% within 2. What is your current academic rank?	.0%	100.0%	100.0%
		Std. Residual	-.7	.8	
	Professor	Count	6	0	6
		Expected Count	3.2	2.8	6.0
		% within 2. What is your current academic rank?	100.0%	.0%	100.0%
		Std. Residual	1.6	-1.7	
	Other	Count	2	1	3
		Expected Count	1.6	1.4	3.0

	% within 2. What is your current academic rank?	66.7%	33.3%	100.0%
	Std. Residual	.3	-.3	
Total	Count	68	59	127
	Expected Count	68.0	59.0	127.0
	% within 2. What is your current academic rank?	53.5%	46.5%	100.0%

Table 1.13 showing the relationship between academic rank and usage of Wikis

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.880[a]	4	.018	.006		
Likelihood Ratio	14.783	4	.005	.006		
Fisher's Exact Test	11.898			.005		
Linear-by-Linear Association	6.242[b]	1	.012	.012	.006	.003
N of Valid Cases	127					

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .46.

b. The standardized statistic is -2.498.

Table 1.14 showing the Chi-Square test of academic rank and usage of Wikis

1.8 Academic rank and usage of Blogs

Based on the results in Table 1.15 and 1.16 below, there were significant relationships between the academic rank of lecturer and associative professor and the usage of blogging websites.

There was also a significant relationship between senior lecturer and not using blogging websites.

Crosstab

			12.3 Blogging websites like Blogger.com and Blogspot.com		
			No	Yes	Total
2. What is your current academic rank?	Lecturer	Count	66	34	100
		Expected Count	71.7	28.3	100.0
		% within 2. What is your current academic rank?	66.0%	34.0%	100.0%
		Std. Residual	-.7	1.1	
	Senior lecturer	Count	17	0	17
		Expected Count	12.2	4.8	17.0
		% within 2. What is your current academic rank?	100.0%	.0%	100.0%
		Std. Residual	1.4	-2.2	
	Associate professor	Count	0	1	1
		Expected Count	.7	.3	1.0
		% within 2. What is your current academic rank?	.0%	100.0%	100.0%
		Std. Residual	-.8	1.3	
	Professor	Count	6	0	6
		Expected Count	4.3	1.7	6.0
		% within 2. What is your current academic rank?	100.0%	.0%	100.0%
		Std. Residual	.8	-1.3	
	Other	Count	2	1	3
		Expected Count	2.1	.9	3.0

	% within 2. What is your current academic rank?	66.7%	33.3%	100.0%
	Std. Residual	-.1	.2	
Total	Count	91	36	127
	Expected Count	91.0	36.0	127.0
	% within 2. What is your current academic rank?	71.7%	28.3%	100.0%

Table 1.15 relationship between academic rank and the use of blogging websites

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	13.237[a]	4	.010	.006		
Likelihood Ratio	19.408	4	.001	.001		
Fisher's Exact Test	14.431			.002		
Linear-by-Linear Association	2.921[b]	1	.087	.103	.047	.021
N of Valid Cases	127					

Table 1.16 Chi-Square test for academic rank and blogging Websites

1.9 Teaching style and the use of social software applications

Based on the results in Table 1.17 and 1.18, there was a significant relationship between traditional teaching style and the use social software applications. The results displayed in Table 1.17 shows this significant relationship (χ^2 (1) = 6.064, p<.014).

Crosstab

			12.1 Social software applications like Facebook, flickr and others.		
			No	Yes	Total
3. What kind of teaching style do you prefer?	Blended	Count	46	39	85
		Expected Count	39.5	45.5	85.0
		% within 3. What kind of teaching style do you prefer?	54.1%	45.9%	100.0%
		Std. Residual	1.0	-1.0	
	Traditional	Count	13	29	42
		Expected Count	19.5	22.5	42.0
		% within 3. What kind of teaching style do you prefer?	31.0%	69.0%	100.0%
		Std. Residual	-1.5	1.4	
Total		Count	59	68	127
		Expected Count	59.0	68.0	127.0
		% within 3. What kind of teaching style do you prefer?	46.5%	53.5%	100.0%

Table 1.17 relationship between teaching style and the use of social software applications

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.064[a]	1	.014	.015	.011	
Continuity Correction[b]	5.169	1	.023			
Likelihood Ratio	6.191	1	.013	.015	.011	
Fisher's Exact Test				.015	.011	
Linear-by-Linear Association	6.017[c]	1	.014	.015	.011	.007
N of Valid Cases	127					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 19.51.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.453.

Table 1.18 Chi-Square test for the teaching style and use of social software application

1.10 Awareness of Web 2.0 tools and usage of Web 2.0 tools for fun or for extending learning

Based on the results in Table 1.19 and 1.20 there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) and using Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace”) for fun only.

Fisher’s exact test was used in Table 1.20, as conditions were not met.

Crosstab

			11. Do you use any Web 2.0 tools, applications, or services like YouTube, Wikipedia, Facebook, MySpace, or Flickr either for fun or for extending teaching?				
			Boty teaching and for fun	For fun only	Teaching only	Not at all	Total
7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	No	Count	0	7	0	0	7
		Expected Count	4.3	1.7	.8	.2	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	.0%	100.0%	.0%	.0%	100.0%
		Std. Residual	-2.1	4.0	-.9	-.5	
	Yes	Count	78	24	14	4	120
		Expected Count	73.7	29.3	13.2	3.8	120.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	65.0%	20.0%	11.7%	3.3%	100.0%

	Std. Residual	.5	-1.0	.2	.1	
Total	Count	78	31	14	4	127
	Expected Count	78.0	31.0	14.0	4.0	127.0
	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	61.4%	24.4%	11.0%	3.1%	100.0%

Table 1.19 relationship between awareness and usage of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	22.942[a]	3	.000	.001		
Likelihood Ratio	21.065	3	.000	.000		
Fisher's Exact Test	17.247			.000		
Linear-by-Linear Association	2.179[b]	1	.140	.145	.115	.061
N of Valid Cases	127					

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .22.

b. The standardized statistic is -1.476.

Table 1.20 Chi-Square test for awareness and usage of Web 2.0 tools

1.11 Awareness of Web 2.0 tools and usage of social software applications

The results in Table 1.21 and 1.22 shows that there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) and not using social software applications (“Facebook”, “Flickr”, etc.).

Fisher’s exact test was used in Table 1.22, as conditions were not met.

Crosstab

			12.1 Social software applications like Facebook, flickr and others.		
			No	Yes	Total
7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	No	Count	7	0	7
		Expected Count	3.3	3.7	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	100.0%	.0%	100.0%
		Std. Residual	2.1	-1.9	
	Yes	Count	52	68	120
		Expected Count	55.7	64.3	120.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	43.3%	56.7%	100.0%
		Std. Residual	-.5	.5	
Total		Count	59	68	127
		Expected Count	59.0	68.0	127.0

	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	46.5%	53.5%	100.0%

Table 1.21 relationship between awareness and usage of social software applications

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.538[a]	1	.003	.004	.004	
Continuity Correction[b]	6.412	1	.011			
Likelihood Ratio	11.205	1	.001	.004	.004	
Fisher's Exact Test				.004	.004	
Linear-by-Linear Association	8.471[c]	1	.004	.004	.004	.004
N of Valid Cases	127					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.25.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.911.

Table 1.22 Chi a-Square test of awareness and usage of social software applications

1.12 Awareness of Web 2.0 tools and the use of Wiki sites

Based on the results in Table 1.23 and 1.24 there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) and not using Wiki sites24

Fisher’s exact test was used in Table 1.24, as conditions were not met.

Crosstab

			12.2 Wiki sites like Wikipedia, Wiki and Javapedia and others		
			No	Yes	Total
7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	No	Count	7	0	7
		Expected Count	3.7	3.3	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	100.0%	.0%	100.0%
		Std. Residual	1.7	-1.8	
	Yes	Count	61	59	120
		Expected Count	64.3	55.7	120.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	50.8%	49.2%	100.0%
		Std. Residual	-.4	.4	
Total		Count	68	59	127
		Expected Count	68.0	59.0	127.0

	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	53.5%	46.5%	100.0%

Table 1.23 showing the relationship between awareness and use of Wiki sites

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.428[a]	1	.011	.015	.011	
Continuity Correction[b]	4.603	1	.032			
Likelihood Ratio	9.099	1	.003	.015	.011	
Fisher's Exact Test				.015	.011	
Linear-by-Linear Association	6.377[c]	1	.012	.015	.011	.011
N of Valid Cases	127					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.25.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.25.

Table 1.24 showing the Chi-Square test of awareness and use of Wiki sites

1.13 Awareness and usage of Web 2.0 tools

Based on the results in Table 1.25 and 1.26 there was a significant relationship between not being aware of Web 2.0 tools (“Wikipedia”, “YouTube”, “Facebook”, “Flickr” or “MySpace”) and not using Web 2.0 tools (blogs, podcasting, wikis, RSS, and social software applications).

Fisher’s exact test was used in Table 1.26, as conditions were not met.

Crosstab

			1. Do you use Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for teaching and/or for faculty use?				
			Teaching only	Faculty work only	Both teaching and faculty work	Do not use	Total
7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	No	Count	0	0	0	7	7
		Expected Count	.8	.4	2.9	2.9	7.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	.0%	.0%	.0%	100.0%	100.0%
		Std. Residual	-.9	-.6	-1.7	2.4	
	Yes	Count	12	6	47	40	105
		Expected Count	11.3	5.6	44.1	44.1	105.0
		% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	11.4%	5.7%	44.8%	38.1%	100.0%
		Std. Residual	.2	.2	.4	-.6	

Total	Count	12	6	47	47	112
	Expected Count	12.0	6.0	47.0	47.0	112.0
	% within 7. Are you aware of any of the following Web 2.0 tools - “Wikipedia”, “YouTube”, “Facebook”, “Flickr” or ”MySpace” - that can be used for education ?	10.7%	5.4%	42.0%	42.0%	100.0%

Table 1.25 relationship between awareness and usage of Web 2.0 tools

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	10.326[a]	3	.016	.019		
Likelihood Ratio	12.809	3	.005	.006		
Fisher's Exact Test	8.452			.019		
Linear-by-Linear Association	6.059[b]	1	.014	.019	.002	.002
N of Valid Cases	112					

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .38.

b. The standardized statistic is -2.461.

Table 1.26 Chi-Square test for awareness and usage of Web 2.0 tools

1.14 Knowing of Web 2.0 tools and usage of Web 2.0 tools and applications fun or for extending teaching

Based on the results in Table 1.27 and 1.28 there was a significant relationship between not knowing of Web 2.0 tools (“Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or “Mashups”) and using Web 2.0 tools for fun only.

Fisher’s exact test was used in Table 1.28, as conditions were not met.

Crosstab

			11. Do you use any Web 2.0 tools, applications, or services like YouTube, Wikipedia, Facebook, MySpace, or Flickr either for fun or for extending teaching?				
			Boty teaching and for fun	For fun only	Teaching only	Not at all	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	No	Count	1	14	0	0	15
		Expected Count	9.2	3.7	1.7	.5	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	6.7%	93.3%	.0%	.0%	100.0%
		Std. Residual	-2.7	5.4	-1.3	-.7	
	Yes	Count	77	17	14	4	112
		Expected Count	68.8	27.3	12.3	3.5	112.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	68.8%	15.2%	12.5%	3.6%	100.0%
	Std. Residual	1.0	-2.0	.5	.3	
Total	Count	78	31	14	4	127
	Expected Count	78.0	31.0	14.0	4.0	127.0
	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	61.4%	24.4%	11.0%	3.1%	100.0%

Table 1.27 relationship between knowing of Web 2.0 tools and usage of Web 2.0 tools.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	43.815[a]	3	.000	.000		
Likelihood Ratio	38.853	3	.000	.000		
Fisher's Exact Test	34.601			.000		
Linear-by-Linear Association	3.604[b]	1	.058	.062	.049	.024
N of Valid Cases	127					

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .47.

b. The standardized statistic is -1.898.

Table 1.28 Chi-Square test for knowing of Web 2.0 tools and usage of Web 2.0 tools

1.15 Knowing of Web 2.0 tools and usage of social software applications

The results in Table 1.29 and 1.30 shows that there was a significant relationship between not knowing of Web 2.0 tools ("Wikis", "Blogs", "RSS", "Podcasting", "AJAX", or "Mashups") and not using social software applications. The results displayed in Table 1.30 shows this significant relationship (χ^2 (1) = 15.026, p<.0005).

Crosstab

			12.1 Social software applications like Facebook, flickr and others.		
			No	Yes	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	No	Count	14	1	15
		Expected Count	7.0	8.0	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	93.3%	6.7%	100.0%
		Std. Residual	2.7	-2.5	
	Yes	Count	45	67	112
		Expected Count	52.0	60.0	112.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	40.2%	59.8%	100.0%
		Std. Residual	-1.0	.9	
Total		Count	59	68	127
		Expected Count	59.0	68.0	127.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	46.5%	53.5%	100.0%

Tab1e 1.29 relationship between knowing of Web 2.0 tools and usage of social software applications

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	15.026[a]	1	.000	.000	.000	
Continuity Correction[b]	12.965	1	.000			
Likelihood Ratio	17.158	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	14.907[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.97.

b. Computed only for a 2x2 table

c. The standardized statistic is 3.861.

Table 1.30 Chi-Square test for knowing of Web 2.0 tools and usage of social software applications

1.16 Knowing of Web 2.0 tools and usage of Wiki sites

Based on the results in Table 1.31 and 1.32 there was a significant relationship between not knowing of Web 2.0 tools (“Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or “Mashups”) and

not using social software applications. The results displayed in Table 1.32 shows this significant relationship (χ^2 (1) = 14.758, p<.0005).

Crosstab

			12.2 Wiki sites like Wikipedia, Wiki and Javapedia and others		
			No	Yes	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	No	Count	15	0	15
		Expected Count	8.0	7.0	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	100.0%	.0%	100.0%
		Std. Residual	2.5	-2.6	
	Yes	Count	53	59	112
		Expected Count	60.0	52.0	112.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	47.3%	52.7%	100.0%
		Std. Residual	-.9	1.0	
Total		Count	68	59	127
		Expected Count	68.0	59.0	127.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	53.5%	46.5%	100.0%

Table 1.31 relationship between knowing of Web 2.0 tools and usage of Wiki sites

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	14.758[a]	1	.000	.000	.000	
Continuity Correction[b]	12.716	1	.000			
Likelihood Ratio	20.478	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	14.642[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.97.

b. Computed only for a 2x2 table

c. The standardized statistic is 3.826.

Table 1.32 Chi-Square test for knowing of Web 2.0 tools and usage of Wiki sites

1.17 Knowing of Web 2.0 tools and usage of Blogging sites

The results in Table 1.33 and 1.34 shows that there was a significant relationship between not knowing of Web 2.0 tools (“Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or “Mashups”) and not using blogging sites.

Fisher’s exact test was used in Table 1.34, as conditions were not met.

Crosstab

			12.3 Blogging websites like Blogger.com and Blogspot.com		
			No	Yes	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	No	Count	15	0	15
		Expected Count	10.7	4.3	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	100.0%	.0%	100.0%
		Std. Residual	1.3	-2.1	
	Yes	Count	76	36	112
		Expected Count	80.3	31.7	112.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	67.9%	32.1%	100.0%
		Std. Residual	-.5	.8	
Total		Count	91	36	127
		Expected Count	91.0	36.0	127.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	71.7%	28.3%	100.0%

Table 1.33 relationship between knowing of Web 2.0 tools and usage of blogging sites

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.729[a]	1	.009	.011	.005	
Continuity Correction[b]	5.239	1	.022			
Likelihood Ratio	10.775	1	.001	.006	.005	
Fisher's Exact Test				.006	.005	
Linear-by-Linear Association	6.676[c]	1	.010	.011	.005	.005
N of Valid Cases	127					

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.25.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.584.

Table 1.34 Chi-Square test for knowing of Web 2.0 tools and usage of blogging sites

1.18 Knowing of Web 2.0 tools and usage of Web 2.0 tools for teaching and/or for faculty use

Based on the results in Table 1.35 and 1.36 there was a significant relationship between not knowing of Web 2.0 tools (“Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or “Mashups”) and using Web 2.0 tools for Faculty work only as well as a relationship between not knowing of Web 2.0 tools and not using Web 2.0 tools for teaching and/or faculty use.

Fisher’s exact test was used in Table 1.36, as conditions were not met.

Crosstab

			1. Do you use Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for teaching and/or for faculty use?				
			Teaching only	Faculty work only	Both teaching and faculty work	Do not use	Total
9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	No	Count	0	4	1	10	15
		Expected Count	1.6	.8	6.3	6.3	15.0
		% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	.0%	26.7%	6.7%	66.7%	100.0%
		Std. Residual	-1.3	3.6	-2.1	1.5	
	Yes	Count	12	2	46	37	97
		Expected Count	10.4	5.2	40.7	40.7	97.0

	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	12.4%	2.1%	47.4%	38.1%	100.0%
	Std. Residual	.5	-1.4	.8	-.6	
Total	Count	12	6	47	47	112
	Expected Count	12.0	6.0	47.0	47.0	112.0
	% within 9. Do you know, or have you heard of, any of the following Web 2.0 tools - “Wikis”, “Blogs”, “RSS”, “Podcasting”, “AJAX”, or ”Mashups” - that can be used for education?	10.7%	5.4%	42.0%	42.0%	100.0%

Table 1.35 relationship between knowing of Web 2.0 tools and usage of Web 2.0 tools for teaching and/or Faculty use

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	24.197[a]	3	.000	.000		
Likelihood Ratio	22.237	3	.000	.000		
Fisher's Exact Test	19.634			.000		
Linear-by-Linear Association	1.203[b]	1	.273	.309	.174	.071
N of Valid Cases	112					

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .80.

b. The standardized statistic is -1.097.

Table 1.36 Chi-Square test for knowing of Web 2.0 tools and usage of Web 2.0 tools for teaching and/or Faculty use

1.19 Familiarity with Web 2.0 tools and usage of Web 2.0 tools for fun and for teaching

The results in Table 1.37 and 1.38 shows that there was a significant relationship between not being familiar with Web 2.0 tools that can be used in education and usage of Web 2.0 tools for fun only as well as a significant relationship between not being familiar with Web 2.0 tools that can be used in education and non-usage of Web 2.0 tools for both fun and for extending teaching.

There was also a significant relationship between being familiar with Web 2.0 tools that can be used in education and usage of Web 2.0 tools for both fun and to extend teaching.

Fisher's exact test was used in Table 1.38, as conditions were not met.

Crosstab

			11. Do you use any Web 2.0 tools, applications, or services like YouTube, Wikipedia, Facebook, MySpace, or Flickr either for fun or for extending teaching?				
			Boty teaching and for fun	For fun only	Teaching only	Not at all	Total
10. Are you familiar with "Web 2.0" tools that can be used for education?	No	Count	11	17	4	4	36
		Expected Count	22.1	8.8	4.0	1.1	36.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	30.6%	47.2%	11.1%	11.1%	100.0%
		Std. Residual	-2.4	2.8	.0	2.7	
	Yes	Count	67	14	10	0	91
		Expected Count	55.9	22.2	10.0	2.9	91.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	73.6%	15.4%	11.0%	.0%	100.0%
		Std. Residual	1.5	-1.7	.0	-1.7	
Total		Count	78	31	14	4	127
		Expected Count	78.0	31.0	14.0	4.0	127.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	61.4%	24.4%	11.0%	3.1%	100.0%

Table 1.37 relationship between familiarity of Web 2.0 tools and usage of Web 2.0 tools for fun and teaching

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	28.615[a]	3	.000	.000		
Likelihood Ratio	28.534	3	.000	.000		
Fisher's Exact Test	26.663			.000		
Linear-by-Linear Association	16.695[b]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.13.

b. The standardized statistic is -4.086.

Table 1.38 Chi-Square test for familiarity with Web 2.0 tools and usage of Web 2.0 tools for fun and teaching

1.20 Familiarity with Web 2.0 tools and usage of social software applications

Based on the results in Table 1.39 and 1.40, there was a significant relationship between not being familiar with Web 2.0 tools that can be used in education and non-usage of social software applications.

There was also a significant relationship between being familiar with Web 2.0 tools that can be used in education and usage of social software applications. The results displayed in Table 1.40 shows this significant relationship (χ^2 (1) = 16.456, p<.0005).

Crosstab

			12.1 Social software applications like Facebook, flickr and others.		
			No	Yes	Total
10. Are you familiar with "Web 2.0" tools that can be used for education?	No	Count	27	9	36
		Expected Count	16.7	19.3	36.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	75.0%	25.0%	100.0%
		Std. Residual	2.5	-2.3	
	Yes	Count	32	59	91
		Expected Count	42.3	48.7	91.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	35.2%	64.8%	100.0%
		Std. Residual	-1.6	1.5	
Total		Count	59	68	127
		Expected Count	59.0	68.0	127.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	46.5%	53.5%	100.0%

Table 1.39 relationship between familiarity with Web 2.0 tools and usage of social software applications

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	16.456[a]	1	.000	.000	.000	
Continuity Correction[b]	14.893	1	.000			
Likelihood Ratio	16.913	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	16.326[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.72.

b. Computed only for a 2x2 table

c. The standardized statistic is 4.041.

Table 1.40 Chi-Square test for familiarity with Web 2.0 tools and usage of social software applications

1.21 Familiarity with Web 2.0 tools and usage of Wiki sites

The results in Table 1.41 and 1.42 shows that there was a significant relationship between not being familiar with Web 2.0 tools and non-usage of Wiki sites.

There was also a significant relationship between being familiar with Web 2.0 tools that can be used in education and usage of Wiki sites. The results displayed in Table 1.42 shows this significant relationship (χ^2 (1) = 17.925, p<.0005).

Crosstab

			12.2 Wiki sites like Wikipedia, Wiki and Javapedia and others		
			No	Yes	Total
10. Are you familiar with "Web 2.0" tools that can be used for education?	No	Count	30	6	36
		Expected Count	19.3	16.7	36.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	83.3%	16.7%	100.0%
		Std. Residual	2.4	-2.6	
	Yes	Count	38	53	91
		Expected Count	48.7	42.3	91.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	41.8%	58.2%	100.0%
		Std. Residual	-1.5	1.6	
Total		Count	68	59	127
		Expected Count	68.0	59.0	127.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	53.5%	46.5%	100.0%

Table 1.41 showing the relationship between familiarity with Web 2.0 tools and usage of Wiki sites

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	17.925[a]	1	.000	.000	.000	
Continuity Correction[b]	16.292	1	.000			
Likelihood Ratio	19.312	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	17.784[c]	1	.000	.000	.000	.000
N of Valid Cases	127					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.72.

b. Computed only for a 2x2 table

c. The standardized statistic is 4.217.

Table 1.42 Chi-Square test for familiarity with Web 2.0 tools and usage of Wiki sites

1.22 Familiarity with Web 2.0 tools and usage of blogging websites

Based on the results in Table 1.43 and 1.44, there was a significant relationship between not being familiar with Web 2.0 tools and non-usage of blogging website

There was also a significant relationship between being familiar with Web 2.0 tools that can be used in education and usage of blogging websites. The results displayed in Table 1.44 shows this significant relationship (χ^2 (1) = 5.170, p<.023).

Crosstab

			12.3 Blogging websites like Blogger.com and Blogspot.com		
			No	Yes	Total
10. Are you familiar with “Web 2.0” tools that can be used for education?	No	Count	31	5	36
		Expected Count	25.8	10.2	36.0
		% within 10. Are you familiar with “Web 2.0” tools that can be used for education?	86.1%	13.9%	100.0%
		Std. Residual	1.0	-1.6	
	Yes	Count	60	31	91
		Expected Count	65.2	25.8	91.0
		% within 10. Are you familiar with “Web 2.0” tools that can be used for education?	65.9%	34.1%	100.0%
		Std. Residual	-.6	1.0	
Total		Count	91	36	127
		Expected Count	91.0	36.0	127.0
		% within 10. Are you familiar with “Web 2.0” tools that can be used for education?	71.7%	28.3%	100.0%

Table 1.43 relationship between the familiarity with Web 2.0 tools and usage of blogging websites

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.170[a]	1	.023	.028	.017	
Continuity Correction[b]	4.225	1	.040			
Likelihood Ratio	5.674	1	.017	.028	.017	
Fisher's Exact Test				.028	.017	
Linear-by-Linear Association	5.130[c]	1	.024	.028	.017	.012
N of Valid Cases	127					

Table 1.44 Chi-Square test for the familiarity with Web 2.0 tools and usage of blogging websites

1.23 Familiarity with Web 2.0 tools and usage of Web 2.0 tools for teaching and/or for Faculty use

The results in Table 1.45 and 1.46 showed that there was a significant relationship between not being familiar with Web 2.0 tools and usage of Web 2.0 tools for Faculty work only.

There was also a significant relationship between being familiar with Web 2.0 tools that can be used in education and usage of Web 2.0 tools for teaching only.

Fisher's exact test was used in Table 1.46, as conditions were not met.

Crosstab

			1. Do you use Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for teaching and/or for faculty use?				
			Teaching only	Faculty work only	Both teaching and faculty work	Do not use	Total
10. Are you familiar with "Web 2.0" tools that can be used for education?	No	Count	0	4	13	19	36
		Expected Count	3.9	1.9	15.1	15.1	36.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	.0%	11.1%	36.1%	52.8%	100.0%
		Std. Residual	-2.0	1.5	-.5	1.0	
	Yes	Count	12	2	34	28	76
		Expected Count	8.1	4.1	31.9	31.9	76.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	15.8%	2.6%	44.7%	36.8%	100.0%
		Std. Residual	1.4	-1.0	.4	-.7	
Total		Count	12	6	47	47	112
		Expected Count	12.0	6.0	47.0	47.0	112.0
		% within 10. Are you familiar with "Web 2.0" tools that can be used for education?	10.7%	5.4%	42.0%	42.0%	100.0%

Table 1.45 relationship between the familiarity with web 2.0 tools and usage for teaching and/or Faculty use

Ci-Square Tests

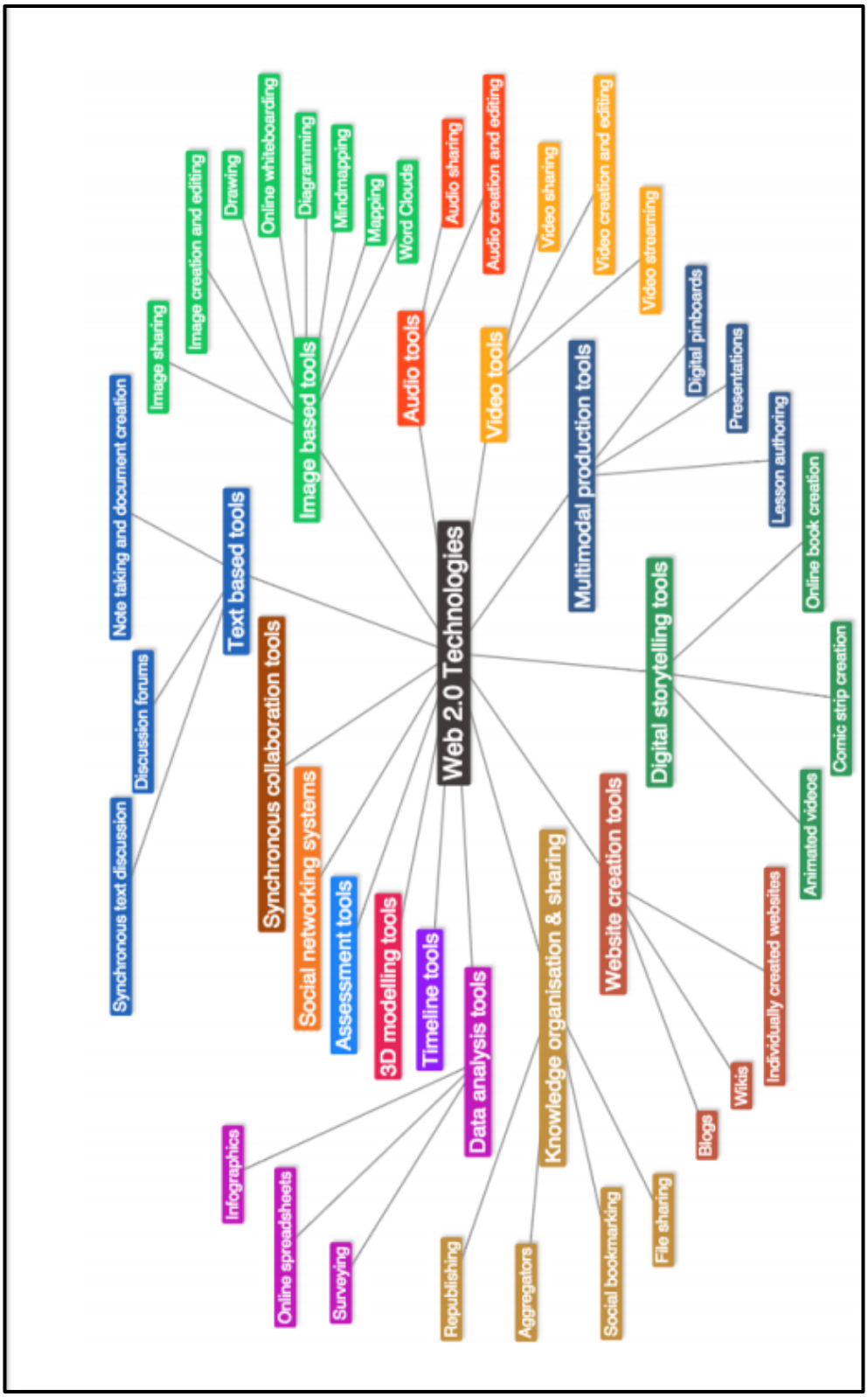
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	10.874[a]	3	.012	.011		
Likelihood Ratio	14.166	3	.003	.004		
Fisher's Exact Test	11.514			.007		
Linear-by-Linear Association	4.198[b]	1	.040	.041	.023	.010
N of Valid Cases	112					

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.93.

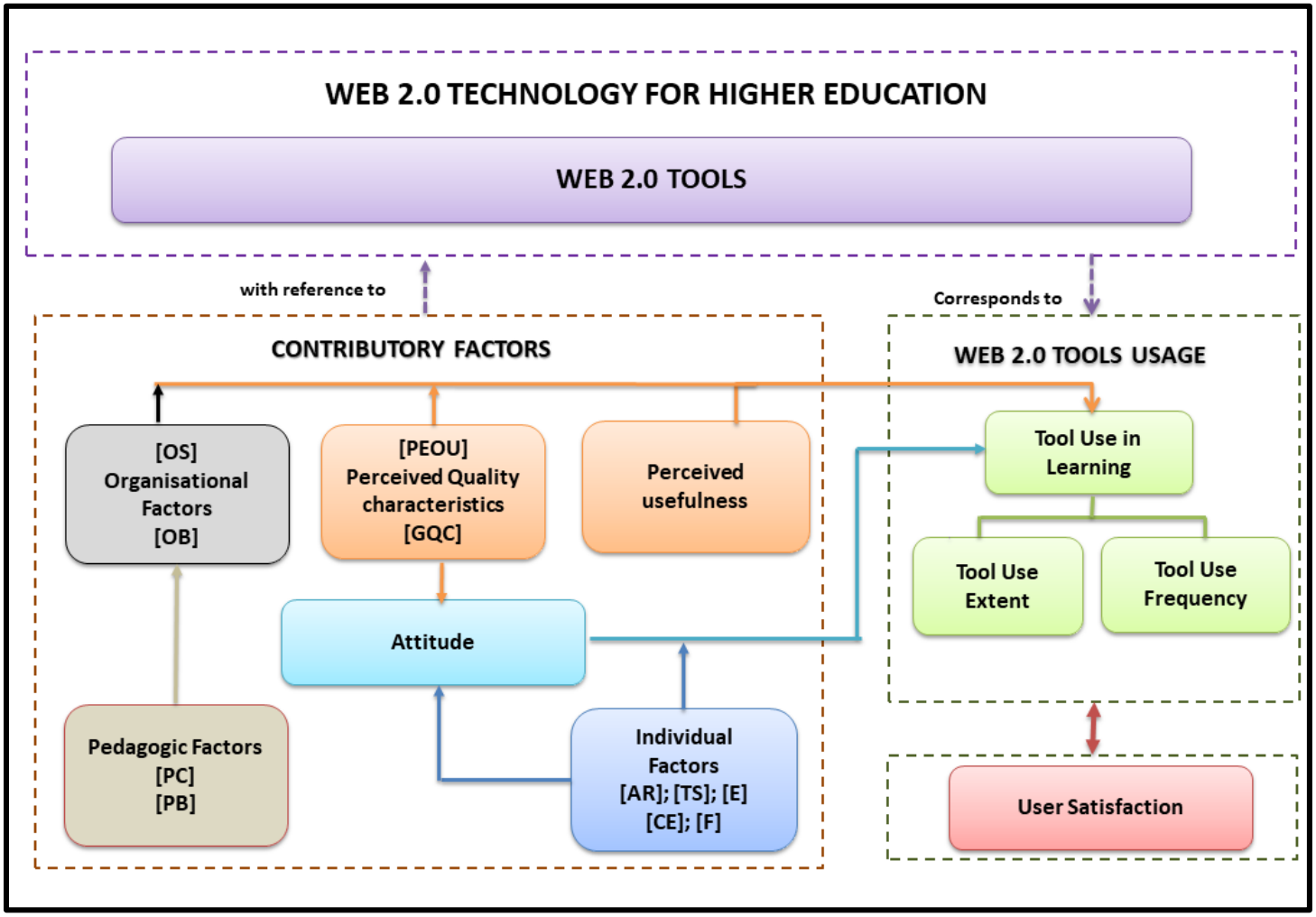
b. The standardized statistic is -2.049.

Table 1.46 Chi-Square test for the familiarity with web 2.0 tools and usage for teaching and/or Faculty use

Appendix 5: The Web 2.0 learning technologies



Appendix 6: New proposed Web 2.0 usage model



In Chapter 7, it was confirmed that two constructs should form part of the model under the organisational sub factor of *institutional culture*:

Promoting the Usage of Web 2.0 tools and Staff incentives. These two constructs will play a significant role in the usage of Web 2.0 tools.

Appendix 7: Regression Tables

The following tables provides the quantitative analysis for the regression analysis discussed in Chapter 4, Section 4.11.

1. Perceived Usefulness

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.645[a]	.415	.406	3.40408	1.865

Table 1 Model summary of perceived usefulness

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1020.948	2	510.474	44.053	.000[a]
	Residual	1436.879	124	11.588		
	Total	2457.827	126			

Table 2 Regression analysis of perceived usefulness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-5.585	1.925		-2.901	.004		
	PU	3.963	.554	.613	7.151	.000	.642	1.557

Table 3 Coefficients of perceived usefulness

2. Teaching style

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.617[a]	.381	.339	3.59088	1.729

Table 4 Model summary of teaching style

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	936.289	8	117.036	9.077	.000[a]
	Residual	1521.538	118	12.894		
	Total	2457.827	126			

Table 5 Regression analysis of teaching style

3. Individual factors: Personal barriers

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.366[a]	.134	.106	4.17637	2.145

Table 6 Model summary of personal barriers

ANOVA[b]

Model	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	329.890	4	82.473	4.728	.001[a]
	Residual	2127.936	122	17.442		
	Total	2457.827	126			

Table 7 Regression analysis of personal barriers

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	19.310	3.051		6.330	.000		
	2.1.1 The lack of knowledge on how to use the tool effectively	-1.876	.579	-.310	-3.242	.002	.779	1.284
	2.1.2 The lack of instructional value or appropriateness	.388	.529	.075	.734	.465	.684	1.461
	2.1.3 Using Web 2.0 tools requires more planning and effort than traditional face to face teaching	.533	.473	.098	1.128	.262	.934	1.070
	2.1.4 Lack of motivation	-1.254	.420	-.272	-2.988	.003	.858	1.165

Table 8 Coefficients of personal barriers

4. Attitude

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	936.289	8	117.036	9.077	.000[a]
	Residual	1521.538	118	12.894		
	Total	2457.827	126			

Table 9 Regression results of attitude factor

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.523	2.915		-.180	.858		
	2.2.1 I am very confident and comfortable using Web 2.0 tools as a delivery method for my courses	2.096	.444	.446	4.722	.000	.587	1.702
	2.2.2 I can supplement my lectures more effectively and efficiently with the use of Web 2.0 tools	-.557	.562	-.087	-.990	.324	.682	1.465

2.2.3 I find the use of Web 2.0 tools to be easier than traditional face to face communication	2.197	.434	.528	5.063	.000	.483	2.072
2.2.4 I find using Web 2.0 tools to be very time consuming as more preparation is involved	.179	.439	.036	.408	.684	.688	1.453
2.2.5 Web 2.0 tools are not appropriate for teaching	-.971	.476	-.205	-2.039	.044	.520	1.923
2.2.6 I can do without Web 2.0 tools in teaching and learning and still get the same results	.896	.315	.233	2.846	.005	.783	1.277
2.2.7 Modern teaching cannot do without Web 2.0 tools	-.542	.374	-.138	-1.449	.150	.576	1.737
2.2.8 I can deliver as effectively with Web 2.0 tools compared to traditional face to face instruction	2.052E-5	.386	.000	.000	1.000	.666	1.502

Table 10 Coefficients of attitude factor

5. Effort

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.097[a]	.009	.001	4.41347	1.860

Table 11 Model summary of factor, Effort

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	22.988	1	22.988	1.180	.279[a]
	Residual	2434.839	125	19.479		
	Total	2457.827	126			

Table 12 Regression analysis of factor, Effort

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	12.862	1.956		6.575	.000		
	EFFORT	-.593	.546	-.097	-1.086	.279	1.000	1.000

Table 13 Coefficients of factor, Effort

6. Organisational factors

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	91.332[a]	1	91.332	4.824	.030	.037
Intercept	14839.931	1	14839.931	783.856	.000	.862
A1	91.332	1	91.332	4.824	.030	.037
Error	2366.494	125	18.932			
Total	17215.000	127				
Corrected Total	2457.827	126				

Table 14 Tests of between-subjects effects

Parameter Estimates

Parameter	B	Std. Error	T	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	11.719	.576	20.335	.000	10.579	12.860	.768
[A1=1] Pearson Institute	-1.705	.776	-2.196	.030	-3.241	-.169	.037
[A1=2] Monash	0[a]	.	.	.	.	.	.

Table 15 Parameter estimates

7. Organisational barriers

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.148[a]	.022	.006	4.40292	1.798

Table 16 Model summary of organisational barriers

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.999	2	26.999	1.393	.252[a]
	Residual	2403.828	124	19.386		
	Total	2457.827	126			

Table 17 Regression analysis of organisational barriers

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7.766	2.496		3.111	.002		
	ORG_BAR_tech	.714	.455	.144	1.569	.119	.939	1.065
	ORG_BAR_skills	.097	.591	.015	.165	.870	.939	1.065

Table 18 Coefficients of organisational barriers

8. Organisational support

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.282[a]	.079	.072	4.25458	1.792

Table 19 Model summary of organisational support

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	195.142	1	195.142	10.780	.001[a]
	Residual	2262.685	125	18.101		
	Total	2457.827	126			

Table 20 Regression analysis of organisational support

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5.466	1.662		3.289	.001		
	ORG_support	1.756	.535	.282	3.283	.001	1.000	1.000

Table 21 Coefficients of organisational support

9. Perceived quality characteristics

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.228[a]	.052	.037	4.33478	1.869

Table 22 Model summary of perceived quality characteristics

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression	127.824	2	63.912	3.401	.036[a]
	Residual	2330.003	124	18.790		
	Total	2457.827	126			

Table 23 Regression analysis of perceived quality characteristic

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.561	2.911		1.223	.224		
	SYS_EOU	1.484	.607	.214	2.442	.016	.997	1.003
	SYS_general	.587	.564	.091	1.040	.300	.997	1.003

Table 24 Regression analysis of perceived quality characteristic

Appendix 8: Cluster Analysis

The following tables provides the cluster analysis tables for Pearson Institute of Higher Education and Monash South Africa. The cluster analysis was discussed in Chapter 5, Section 5.5.

1. Cluster analysis: PIHE

Node A	Node B	Pearson correlation coefficient
Nodes\\Perceived quality characteristic	Nodes\\ Perceived quality characteristic \Ease of use	0.753863
Nodes\\Organisational	Nodes\\Organisational\Institutional support	0.721696
Nodes\\Organisational	Nodes\\Organisational\Attitude	0.546491
Nodes\\ Perceived usefulness characteristic	Nodes\\ Perceived quality characteristic \Ease of use	0.518721
Nodes\\Individual	Nodes\\Individual\Barriers	0.478449
Nodes\\Organisational	Nodes\\Individual\Barriers\Internet connectivity	0.449578
Nodes\\ Perceived usefulness	Nodes\\Organisational\Attitude	0.396319
Nodes\\Organisational	Nodes\\Organisational\Barriers	0.376679
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Collaboration	0.374218
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Discussion forums	0.370637
Nodes\\Individual	Nodes\\ Perceived quality characteristic \Adaptability	0.366592
Nodes\\Individual	Nodes\\Individual\Attitude	0.342901
Nodes\\Individual	Nodes\\Organisational\Attitude	0.309141
Nodes\\Organisational	Nodes\\ Perceived quality characteristic \Easy to understand	0.309115
Nodes\\Individual	Nodes\\Organisational	0.297927
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Blogs	0.286239
Nodes\\Pedagogical	Nodes\\ Perceived quality characteristic Adaptability	0.263568
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Content creator	0.260421
Nodes\\Individual	Nodes\\Pedagogical	0.259658
Nodes\\ Perceived quality characteristic	Nodes\\Perceived quality characteristics\Easy to understand	0.240781
Nodes\\ Perceived quality characteristic	Nodes\\Individual	0.225013
Nodes\\Individual	Nodes\\Organisational\Barriers	0.205843

Nodes\\Organisational	Nodes\\Individual\Barriers	0.204196
Nodes\\Individual	Nodes\\ Perceived quality characteristic Easy to understand	0.194749
Nodes\\Organisational	Nodes\\ Perceived quality characteristic \Adaptability	0.189884
Nodes\\ Perceived usefulness	Nodes\\Individual\Attitude	0.189531
Nodes\\Individual\Barriers	Nodes\\Perceived quality characteristics\Adaptability	0.188417
Nodes\\Individual	Nodes\\Individual\Attitude\Ignorance	0.187755
Nodes\\Individual	Nodes\\Organisational\Institutional support	0.173199
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Promote collaborative learning	0.171291
Nodes\\ Perceived usefulness	Nodes\\ Perceived quality characteristic \Ease of use	0.163917
Nodes\\ Perceived quality characteristic	Nodes\\Individual\Barriers\Internet connectivity	0.159941
Nodes\\ Perceived quality characteristic	Nodes\\ Perceived quality characteristic \Adaptability	0.145208
Nodes\\Pedagogical	Nodes\\Organisational	0.137602
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical	0.137121
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Active learning	0.135318
Nodes\\Organisational	Nodes\\Individual\Attitude	0.133438
Nodes\\Pedagogical	Nodes\\ Perceived quality characteristic \Easy to understand	0.131526
Nodes\\Pedagogical	Nodes\\Individual\Barriers	0.125893
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.125223
Nodes\\ Perceived quality characteristic	Nodes\\Individual\Barriers	0.121797
Nodes\\Organisational	Nodes\\Individual\Attitude\Ignorance	0.120109
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.119693
Nodes\\Pedagogical	Nodes\\Organisational\Attitude	0.114776
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.112582
Nodes\\Individual	Nodes\\Individual\Barriers\Internet connectivity	0.110311
Nodes\\ Perceived quality characteristic	Nodes\\Organisational	0.101958
Nodes\\ Perceived quality characteristic	Nodes\\ Perceived quality characteristic \Ease of use	0.101784
Nodes\\ Perceived usefulness	Nodes\\Organisational\Attitude	0.100843

Nodes\\ Perceived quality characteristic	Nodes\\Organisational\Barriers	0.100525
Nodes\\Pedagogical	Nodes\\Organisational\Institutional support	0.100031
Nodes\\ Perceived quality characteristic	Nodes\\Organisational\Attitude	0.090284
Nodes\\Pedagogical	Nodes\\Individual\Attitude	0.084902
Nodes\\ Perceived usefulness	Nodes\\ Perceived quality characteristic \Ease of use	0.082398
Nodes\\Individual	Nodes\\ Perceived quality characteristic \Ease of use	0.078069
Nodes\\Organisational	Nodes\\ Perceived quality characteristic \Ease of use	0.059544
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Quizzes	0.049717
Nodes\\ Perceived quality characteristic	Nodes\\Organisational\Institutional support	0.048811
Nodes\\ Perceived usefulness	Nodes\\ Perceived quality characteristic \Ease of use	0.048742
Nodes\\Pedagogical	Nodes\\Individual\Barriers\Internet connectivity	0.048589
Nodes\\ Perceived quality characteristic	Nodes\\Individual\Attitude	0.040711
Nodes\\Pedagogical	Nodes\\Organisational\ Barriers	0.040684
Nodes\\Perceived usefulness	Nodes\\ Perceived quality characteristic \content delivery	0.040672
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Blogs	0.040668
Nodes\\Pedagogical	Nodes\\Individual\Attitude\Ignorance	0.029347
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.029188
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Discussion forums	0.022582
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Facebook	0.010988
Nodes\\ Perceived quality characteristic	Nodes\\Individual\Attitude\Ignorance	0.003635
Nodes\\Pedagogical	Nodes\\Perceived quality characteristics\Ease of use	-0.002473
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Online presence	-0.002165
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Discussion forums	-0.010335
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Blogs	-0.013382
Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Facebook	-0.013382
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\	-0.013382

Nodes\\ Perceived quality characteristic	Nodes\\Pedagogical\Web 2.0\Quizlet	-0.013382
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Facebook	-0.015928
Nodes\\Perceived usefulness	Nodes\\Perceived quality characteristics\Ease of use	-0.132769
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Blogs	-0.018064
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Facebook	-0.018064
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Discussion forums	-0.021387

Table 1 Pearson Institute of Higher Education cluster analysis summary

2. Cluster analysis: MSA

Node A	**Node B**	**Pearson correlation coefficient**
Nodes\\Perceived quality characteristics	Nodes\\Perceived quality characteristics\Ease of use	0.753863
Nodes\\Organisational	Nodes\\Organisational\Institutional support	0.721696
Nodes\\Organisational	Nodes\\Organisational\Attitude	0.54649
Nodes\\ Individual	Nodes\\ Individual \Barriers	0.478449
Nodes\\Organisational	Nodes\\ Individual \Barriers\Internet connectivity	0.449578
Nodes\\Perceived usefulness	Nodes\\ Perceived usefulness\Content creation	0.376679
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Discussion forums	0.370637
Nodes\\ Individual	Nodes\\Perceived quality characteristics\Adaptability	0.366592
Nodes\\ Perceived usefulness	Nodes\\Individual\Attitude	0.342901
Nodes\\ Individual	Nodes\\Organisational\Attitude	0.309141
Nodes\\Organisational	Nodes\\Perceived quality characteristics\Easy to understand	0.309115
Nodes\\Individual	Nodes\\Organisational	0.297927
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Blogs	0.28623
Nodes\\ Perceived usefulness	Nodes\\Organisational\Barriers	0.263568
Nodes\\Individual	Nodes\\Pedagogical	0.259658
Nodes\\Perceived quality characteristics	Nodes\\Perceived quality characteristics\Easy to understand	0.240781

Nodes\\Perceived quality characteristics	Nodes\\Individual	0.225013
Nodes\\Individual	Nodes\\Organisational\Barriers	0.205843
Nodes\\Organisational	Nodes\\Individual\Barriers	0.204196
Nodes\\Pedagogical\Web 2.0	Nodes\\Individual\Attitude\Usage of Web 2.0 tools	0.202323
Nodes\\Individual	Nodes\\Perceived quality characteristics\Easy to understand	0.194749
Nodes\\ Perceived usefulness	Nodes\\Organisational\Attitude	0.193206
Nodes\\Organisational	Nodes\\Perceived quality characteristics\Adaptability	0.189884
Nodes\\Individual\Barriers	Nodes\\Perceived quality characteristics\Adaptability	0.188417
Nodes\\ Perceived usefulness	Nodes\\Individual\Attitude\Ignorance	0.187755
Nodes\\Individual	Nodes\\Organisational\Institutional support	0.173199
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical\Web 2.0\Promote collaborative learning	0.171291
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Access anytime	0.159941
Nodes\\Perceived quality characteristics	Nodes\\Perceived quality characteristics\Adaptability	0.145208
Nodes\\Pedagogical	Nodes\\Organisational	0.137602
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical	0.13712
Nodes\\Organisational	Nodes\\Individual\Attitude	0.133438
Nodes\\Pedagogical	Nodes\\Perceived quality characteristics\Easy to understand	0.131526
Nodes\\Pedagogical	Nodes\\Individual\Barriers	0.125893
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.125223
Nodes\\Perceived quality characteristics	Nodes\\Individual\Barriers	0.121797
Nodes\\Organisational	Nodes\\Individual\Attitude\Ignorance	0.120109
Nodes\\ Perceived usefulness	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.119693
Nodes\\Pedagogical	Nodes\\Organisational\Attitude	0.114776
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.112582
Nodes\\Individual	Nodes\\Individual\Barriers\Internet connectivity	0.110311
Nodes\\Perceived quality characteristics	Nodes\\Organisational	0.101958
Nodes\\ Perceived usefulness	Nodes\\ Perceived usefulness\Flipped classroom	0.100525
Nodes\\Pedagogical	Nodes\\Organisational\Institutional support	0.10003
Nodes\\Perceived quality characteristics	Nodes\\Organisational\Attitude	0.090284

Nodes\\Pedagogical	Nodes\\Individual\Attitude	0.084902
Nodes\\Individual	Nodes\\Perceived quality characteristics\Ease of use	0.078069
Nodes\\Organisational	Nodes\\Perceived quality characteristics\Ease of use	0.059544
Nodes\\ Perceived usefulness	Nodes\\Pedagogical\Web 2.0\Quizzes	0.049717
Nodes\\Perceived quality characteristics	Nodes\\Organisational\Institutional support	0.048811
Nodes\\Pedagogical	Nodes\\Individual\Barriers\Internet connectivity	0.048589
Nodes\\Perceived quality characteristics	Nodes\\Individual\Attitude	0.040711
Nodes\\Pedagogical	Nodes\\Organisational\Barriers	0.040684
Nodes\\ Perceived usefulness	Nodes\\Pedagogical\Web 2.0\Blogs	0.040668
Nodes\\Pedagogical	Nodes\\Individual\Attitude\Ignorance	0.029347
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical\Web 2.0\Khan Academy	0.029188
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical\Web 2.0\Discussion forums	0.022582
Nodes\\Pedagogical	Nodes\\Pedagogical\Web 2.0\Facebook	0.010988
Nodes\\Perceived quality characteristics	Nodes\\Individual\Attitude\Ignorance	0.003635
Nodes\\ Perceived usefulness	Nodes\\Perceived quality characteristics\Ease of use	-0.002473
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Discussion forums	-0.010335
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical\Web 2.0\Blogs	-0.013382
Nodes\\ Perceived usefulness	Nodes\\Pedagogical\Web 2.0\Facebook	-0.013382
Nodes\\Perceived quality characteristics	Nodes\\Pedagogical\Web 2.0\Quizlet	-0.013382
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Facebook	-0.015928
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Blogs	-0.018064
Nodes\\Individual	Nodes\\Pedagogical\Web 2.0\Facebook	-0.018064
Nodes\\Organisational	Nodes\\Pedagogical\Web 2.0\Discussion forums	-0.021387

Table 2 Monash South Africa cluster analysis summary

Appendix 9: Ethical clearance

Please see the following pages for the ethical clearance documents.

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

18 December 2017

Miss Kobashnee Moodley (200304758)
School of Mangement, IT Governance
Westville Campus

Dear Miss Moodley,

Protocol reference number: HSS/1051/016M
New project title: Factors influencing the usage of Web 2.0 tools in higher education

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 14 December 2017 has now been approved as follows:

- Change in Title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Indira Padayachee
Cc Academic Leader Research: Professor Isabel Martins
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: singhsh@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
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MONASH
SOUTH AFRICA

PERMISSION TO CONDUCT RESEARCH AT THE MSA CAMPUS
EXTERNAL APPLICANTS ONLY
PROJECT SUMMARY

Please do not provide your full research proposal here: what is required is a short project description. Complete the project summary outlined below and attach all relevant documents.

Principal Investigator's name and surname:

Kebashnee Moodley

Principal Investigator's affiliation:

PhD Student

Name(s) of co-investigator(s)/researcher(s):

NA

Main supervisor's name and surname (if applicable):

Name and Surname: Dr Indira Padayachee

In the case of a student being the principal investigator the main supervisor must confirm that the student is registered at the institution stated above and that the student is under his/her supervision. I can confirm that Kebashnee Moodley is currently registered

YES... √ NO_____

Title of project:

Factors influencing the adoption of Web 2.0 tools in higher education.

Abstract of project:

The researcher aims to investigate the use of Web 2.0 technology tools in South African higher education organisations amongst academics, as well as the barriers that may arise when using these tools and how to effectively implement the new tools in higher education

Background of project:

The purpose of this study is to assess the effect on the teaching and learning process by introducing Web 2.0 tools in the traditional face-to-face teaching and learning environment. The use of this technology for teaching and learning (Teaching enhanced learning) opens a door of opportunities for students in higher education.

The adoption of Web 2.0 tools can assist students to easily participate in groups by means of collaborative learning in higher education. The use of traditional face to face teaching styles linked with a Web 2.0 tools can change the way education is taught and understood by students in schools and in higher education.

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14 June 2016

To Whom It May Concern:
PEARSON INSTITUTE OF HIGHER EDUCATION
UNIVERSITY OF KWAZULU-NATAL

RESEARCH ETHICAL CLEARANCE NO:
PIHE/2016/0614/01

RESEARCH TOPIC: Factors influencing the adoption of Web 2.0 tools in higher education

This is to confirm that the Research Ethics Committee of the Pearson Institute for Higher Education (previously known as Midrand Graduate Institute), acting on behalf of the Research Committee and Management of PIHE, has granted **Ms Kebashnee Moodley** approval to undertake a research project with a selected sample of staff at the Institute.

It is understood that appropriate protocols, with particular reference to consent by, and confidentiality for all participants, will be observed. It is further understood that the results of the research will be made available to the Research Committee and to Management.

The Research Committee wishes Ms Moodley success in her research project.

Sincerely, and on behalf of the Research Ethics Committee,

Dr Luke Mlilo
Dean: Research & Eduvate
E: lukem@mgi.ac.za
T: +27 (0)11 690-1717

Dr Johan Freysen
Vice-Principal (Academic)

COLLEGE OF LAW AND MANAGEMENT STUDIES
HIGHER DEGREES

CONFIRMATION OF INTENTION TO SUBMIT DISSERTATION/THESIS

(THIS FORM IS TO BE COMPLETED THREE MONTHS BEFORE SUBMISSION OF MASTERS DISSERTATIONS AND THREE MONTHS BEFORE SUBMISSION OF PHD THESIS, AND HANDED IN AT THE SCHOOL OFFICE)

NAME OF STUDENT: Kebashnee Moodley

STUDENT NUMBER: 200304758

DEGREE: PhD (Information Systems and Technology)

SCHOOL: School of Management, Information Technology and Governance

NAME OF SUPERVISOR: Dr Indira Padayachee

TITLE OF DISSERTATION/THESIS: Factors influencing the usage of Web 2.0 tools in higher education.

DATE OF INTENTION TO SUBMIT: 16 July 2018

POSTAL ADDRESS: 37 Atlanta, Mulder Street, Centurion, 0158

CELLPHONE: 0732176503

E-MAIL ADDRESS: kebashneemoodley@yahoo.com

SUPERVISOR'S SIGNATURE: I Padayachee **DATE:** 11/6/2018