School of Management

A Social Networking Model for Higher Education in Pakistan (SNMHEP)

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Declaration

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number # HRE2018-0314.

Signature: Sumaiya Pervaiz Date: 27 September 2019

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In the Name of Allah, the Most Beneficent, the Most Merciful

I am tremendously grateful to Allah, who has showered countless blessings on me and given me the strength and composure to complete this research. I also express my special gratitude to Prophet Muhammad (peace be upon him) whose guidance and teaching about acquiring knowledge inspired me to do this research.

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Finally, I confirm that this dissertation is my own work and I have adequately acknowledged all references used in its preparation.

Abstract

The enormous potential of social networking tools has provided endless opportunities for improving teaching and learning in the higher education sector. Many universities worldwide have already adopted this technology to facilitate students and teachers to enhance the quality of learning and teaching methods. Pakistan, along with other developing countries, employs social networking technologies for communication as well as entertainment purposes. Although the use of social networking in academic institutions for marketing and information is prevalent, there is a need to shift towards social networking for educational purposes and to devise a model which can be used as a framework for the implementation of social networking technologies in the higher education sector. This could enhance and improve students' motivation, communication, collaboration, cooperation, and connections between their peers and lecturer. To date, no model has been designed which can fulfil this purpose in the schools, colleges and universities of Pakistan. Therefore, the objective of this research is to develop and evaluate a social networking model for the higher education sector of Pakistan. This research will prove to be valuable as it strives to fill this vacuum. It will play a major positive role in shaping the perception of Pakistani users towards social networking in an academic environment.

The primary research question is specifically aimed at understanding the factors comprising a social networking model in the higher education sector. Its objective is to determine factors that must be incorporated in the development of a social network model for Pakistani higher education. This research also seeks to answer a secondary question, which involves understanding the attitudes of Pakistani students and staff members towards the social networking model. Moreover, it is important to relate the use of a social networking model to global issues which are also associated with the education system.

A mixed-methods research approach (quantitative and qualitative) based on two phases of data collection was used. The first phase of this study comprised an online survey, designed and conducted through Qualtrics with a sample size of 681 people from Pakistani universities. The factor analysis technique was used to determine the final number of factors and sub-factors to be considered and included in the final Social Networking Model in Higher Education in Pakistan (SNMHEP). All five factors of the model exhibited excellent model fit and a strong factor loading apart from privacy, inspiration and gender and age. Moreover, new sub-factors

were discovered for the final model. Green IT emerged as a new sub-factor in the model. Finally, web-based interviews conducted via Qualtrics were conducted among 18 expert staff members of different universities. A six-step guide and thematic analysis processes were used for qualitative data analysis. This analysis was conducted using manual coding and NVivo version 12 software. The outcomes of the interviews not only confirmed the three sub-factors, but also ensured the relevance of all existing factors in the model.

This research had several limitations. Firstly, there was a disparity between the number of females and the number of males in the sample. Further, this research was designed to take into account the culture of Pakistan as well as that of other developing countries with similar cultural characteristics. In the future, a useful extension of this research would be the formal implementation of social networking in a university(es) of Pakistan in compliance with the SNMHEP factors to confirm whether this model stands practical tests, or whether additional factors need to be addressed. In this manner, the efficacy of this model as a blueprint for implementation could be tested.

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1. Issa, Sulaiman; Alqahtani, Theodora; Issa, Noorminshah; Iahad, Peldon; Peldon, Sooyoung; Kim; Samant, Saurabh; Sumaiya. Pervaiz; Sun Joo. Yoo (2019). Asia-Pacific Students' Awareness and Behavior Regarding Social Networking in the Education Sector. *Journal of Global Information Management*, 27, 4, 1

2. Pervaiz, Sumaiya, 2016, "The advantages and risks of using social networking in higher education in Pakistan", Social Networking and Education global perspectives, ISSN 2190-5428, ISSN 2190-5436 (electronic), ISBN 978-3-319-17715-1, ISBN 978-3-319-17716-8 (eBook), DOI 10.1007/978-3-319-17716-8

Chapter 1: Introduction

1.1 Introduction

This chapter provides the background of the research, along with the introduction and overview of all seven chapters in this study. Firstly, it focuses on the reason behind the selection of this topic. Then the significance of the research is discussed, which is important to the evaluation of its validity. Moreover, the contribution of this research to the education field is highlighted. This research adopts a mixed-methods approach; both phases of the research are explained. The initial social networking model in higher education in Pakistan and the new sub-factors gained during the study of the model are discussed in the research findings. The limitations are acknowledged, and avenues for future research are suggested. Finally, an overview of all the chapters is provided, summing up the breadth of the study.

1.2 Purpose of this research

The purpose of this research is to develop a new methodology for social networking for higher education in Pakistan. As presented below, in section 2.6.2, several researchers (Shafique, Anwar and Bushra 2010; Kundi, Nawaz and Khan 2010; Issa, Isaias and Kommers 2016; Abro, Chhachhar and Gillani 2014; Mirani 2011) have claimed that, although various studies have been undertaken to analyse and understand the role of social networking in education and how it can affect the quality of e-learning in higher education sectors, these studies have been conducted in developed countries only, such as those in the United Kingdom, Europe and the United States, and have not been not designed to focus on developing countries such as Pakistan (Shafique, Anwar and Bushra 2010; Kundi, Nawaz and Khan 2014). Moreover, the research conducted by Pervaiz (2016) highlighted the advantages and risks associated with the use of social networking sites in higher education of Pakistan, and showed that ease of marketing, personal development as well as psychosocial and learning management are some of the major advantages, while social and moral issues, security problems and distraction are the main risks (Pervaiz 2016). In this study, the research aims to assess the current situation in the higher education sector in Pakistan and develop and assess a new model for social networking to minimise these risks and maximise the advantages.

A social networking model is required for Pakistan's higher education sector, which will enhance the advantages and mitigate the risks associated with social networking in the

education sector (See table 52 and 53). In conclusion, through this research, a new social networking model (see section 6.5) will be constructed based on all the required factors. Furthermore, this model will serve as an ideal, particularly for the implementation of social networking in the higher education of Pakistan as well as of other developing countries after modifying the model according to the needs of a particular country.

1.3 Research questions

The primary question that drives this research is: What are the essential factors which must be considered when developing a social network model for Pakistan's higher education sector? This research question is specifically aimed at understanding the factors comprising the implementation of social networking in the higher education sector. Its objective is to determine factors that must be incorporated in the development of a social network model for Pakistani higher education. This research also seeks to answer the secondary question: What are the students' and staff's opinions and attitudes towards a social network model for Pakistani higher education? To understand these issues, it is important to relate the use of social networking in global issues that impact the education system.

1.4 Research significance

The main contributions of this research are both conceptual and practical in the context of the use of social networking sites in the higher education sector of Pakistan. On the conceptual side, it will give strategies for increasing awareness and knowledge regarding the use of the social networking in higher education for teaching and learning in the universities, as well as providing useful knowledge for academics and researchers in Pakistan and globally. In terms of the practical aspect, it will provide educators with the knowledge and awareness of best practices for future advancement of social networking use in higher education. It is expected that this research will lead to further research queries and guidelines for successful implementation of social networking in Pakistan's higher education sector.

As explained in section 7.5 and 7.6, Pakistani universities' educators, students and affiliated institutions would benefit from this research (see table 52 and 53). It will also benefit higher education sectors in other developing countries. This research will serve as a steppingstone for future researchers in the same field. Furthermore, the successful implementation of this model will improve students' literacy, reduce carbon emission by means of social networking as a green information technology tool, and provide quality, affordable, and low-cost education.

1.5 Research method

A mixed-methods research approach (quantitative and qualitative) was used for data collection and data analysis (Halcomb and Hickman 2015). For the quantitative analysis, an online survey was designed and conducted through Qualtrics and the survey link was sent to the students. The social science statistics software (SPSS), version 25 and factor analysis were employed for data analysis of the survey responses. A technique called factor analysis was used for data reduction. Basically, this reduces and refines the amount of data through the grouping of factors. The survey targeted more than 700 students, and 681 responses were considered valid. The purpose of the survey was to explore the factors and sub-factors of a Social Networking Model in Higher Education in Pakistan (SNMHEP).

For qualitative analysis, web-based interviews were conducted through Qualtrics. The interviews were conducted with experts who had adequate knowledge of social networking technology. Thematic analysis was used for the analysis of interview data, along with manual coding and the NVivo version 12 software. The aims of the interviews were to re-confirm several factors yielded from the research and survey phases, along with revalidation of all factors of this model. Eighteen comments from the expert interviewees were taken into consideration.

1.6 Initial Social Networking Model in Higher Education in Pakistan (SNMHEP)

The initial social networking model for the higher education sector in Pakistan (SNMHEP) was based on five factors.

Each factor was divided into the relevant sub-factors. Chapter 2 details these five factors.

- Organizational support (see section 2.9.1), which included:
    - teaching and learning methods (see section 2.9.1.1),
    - top management support (see section 2.9.1.2), and
    - training (see section 2.9.1.3).
- Social factors (see section 2.9.2), which also included:
    - user acceptance technology (see section 2.9.2.1),
    - culture (see section 2.9.2.2), and
    - gender and age (see section 2.9.2.3).
- Psychological aspects (see section 2.9.3), which included:

  - motivation (see section 2.9.3.1),
  - inspiration (see section 2.9.3.2),
  - encouragement (see section 2.9.3.3),
  - awareness (see section 2.9.3.4), and
  - constructive feedback (see section 2.9.3.5).
- Design aspects (see section 2.9.4), which included:
  - usability (see section 2.9.4.1),
  - navigation (see section 2.9.4.2), and
  - human–computer interaction (see section 2.9.4.3).
- Technological context (see section 2.9.5), which included:
  - system and compatibility (see section 2.9.5.1),
  - security (see section 2.9.5.2), and
  - privacy (see section 2.9.5.3).

1.7 Outline of the thesis

This thesis consists of seven chapters, each of which is summarised by means of a diagram.

1.7.1 Chapter 1– Introduction of all chapters

Figure 1 shows the outline of the thesis. The first chapter of the study introduces all seven chapters. The literature review is discussed in the second chapter. The third chapter explains the significance of the research. The research method and design are described in the fourth chapter. The fifth chapter explains the data collection process and the analysis of the online survey. The results of the data analysis and the interview findings are presented in chapter six. The last chapter concludes the thesis by further exploring the research findings, by discussing both the implications and shortcomings of the study and offering suggestions for future research.

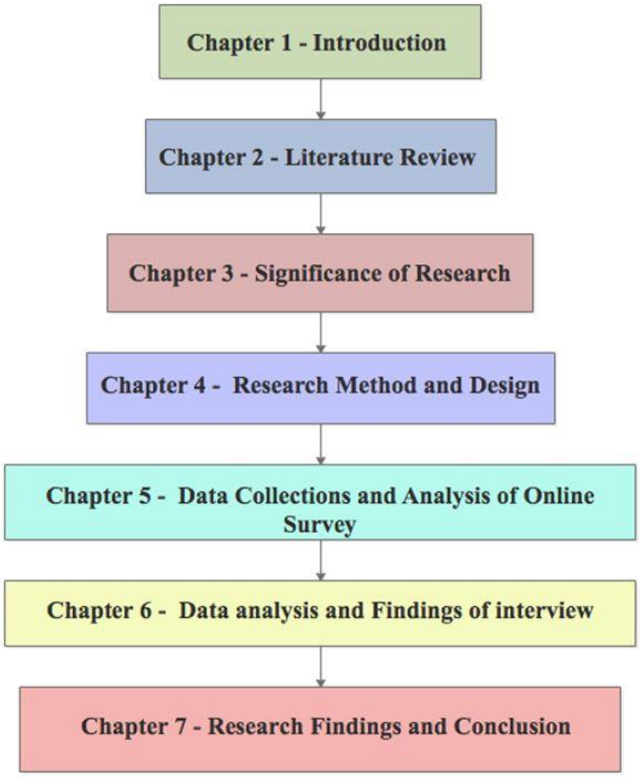


Figure 1: Chapter 1 - Flowchart of all chapters (prepared by author).

1.7.2 Chapter 2 - Literature Review

Figure 2 shows the layout of Chapter 2. Chapter 2 starts by discussing the scope of the literature review. The history of internet and web are then discussed with a special focus on the relationship between social networking and web 2.0. It details the use of social networking in the industrial, health and education sectors. The perspective on social networking in the higher education sector is explained along with the advantages and risks of these technologies. Chapter 2 then discusses the main trends in the formal integration of social networking in higher education in terms of teaching and learning, and the factors related to technology, society and culture. Further, it discusses worldwide social networking models which have been used in the application of social networking in different countries in the education sector. This is most important because it helps to identify the factors of a best fit model. The research gap section helps explore factors relevant to a social networking model for higher education in Pakistan (SNMHEP). An initial model is presented in this chapter which is further analysed according to the outcomes of the survey and comments from the interviews.

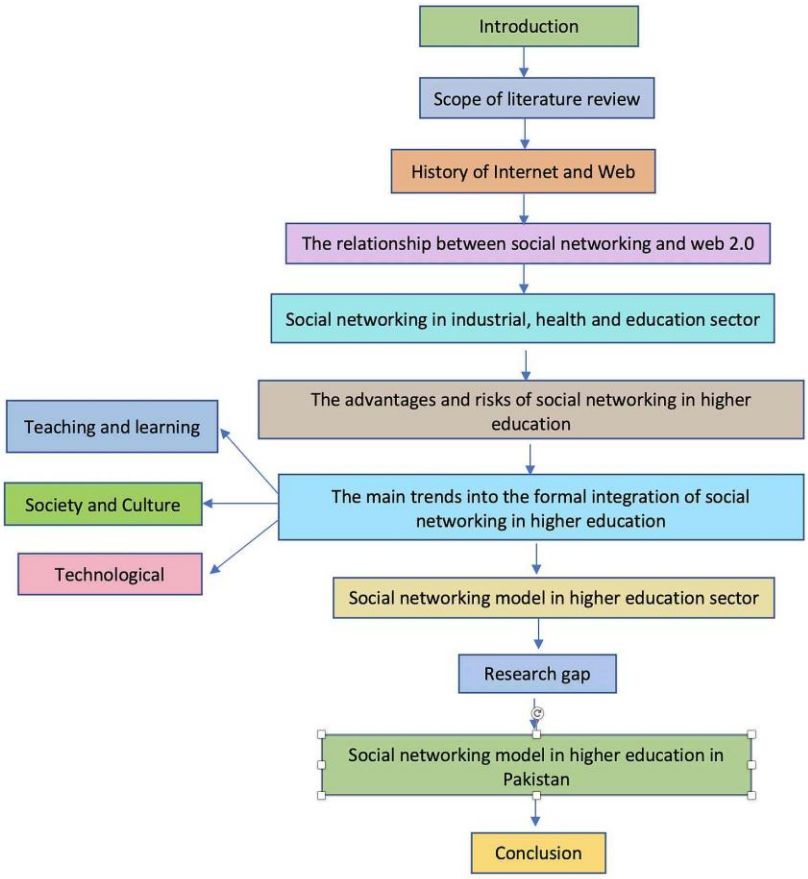


Figure 2: Chapter 2 – Literature review (prepared by author).

1.7.3 Chapter 3 - Research questions, objectives and significance

Figure 3 explains Chapter 3 which addresses the research questions, objectives and the significance of the research. It begins with introduction and proceeds to the topic selection and the significance of the research. As this research has both conceptual and practical applications, both are explained. After this, it addresses the primary and secondary research questions. Finally, it concludes all aspects of the chapter.

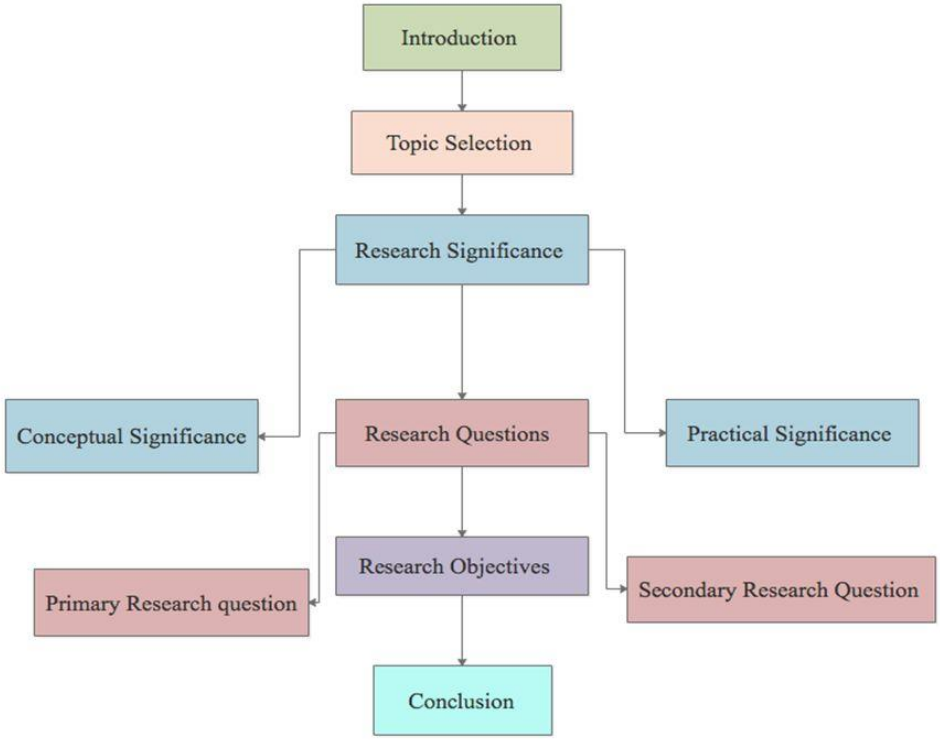


Figure 3: Chapter 3- Research questions, objectives and significance (prepared by author)

1.7.4 Chapter 4 - Research method and Design

Figure 4 depicts Chapter 4, explaining the research method and design. Descriptions of various research philosophies follow the introduction, and include ontology, positivism, objectivism, interpretivism, subjectivism, realism, epistemology, pragmatism and axiology. This study is based on the pragmatism research philosophy and involves survey as a research strategy. Whereas, for the time horizon, the cross-sectional approach is considered. There are two types of research methods: qualitative and quantitative. This study is based on the mixed-methods research approach. The survey and interview design sections comprise the unit of analysis, target population/target sample, data collection and data analysis. The advantages and disadvantages of web-based surveys are also discussed. It then describes the reliability and validity tests used for qualitative and quantitative research.

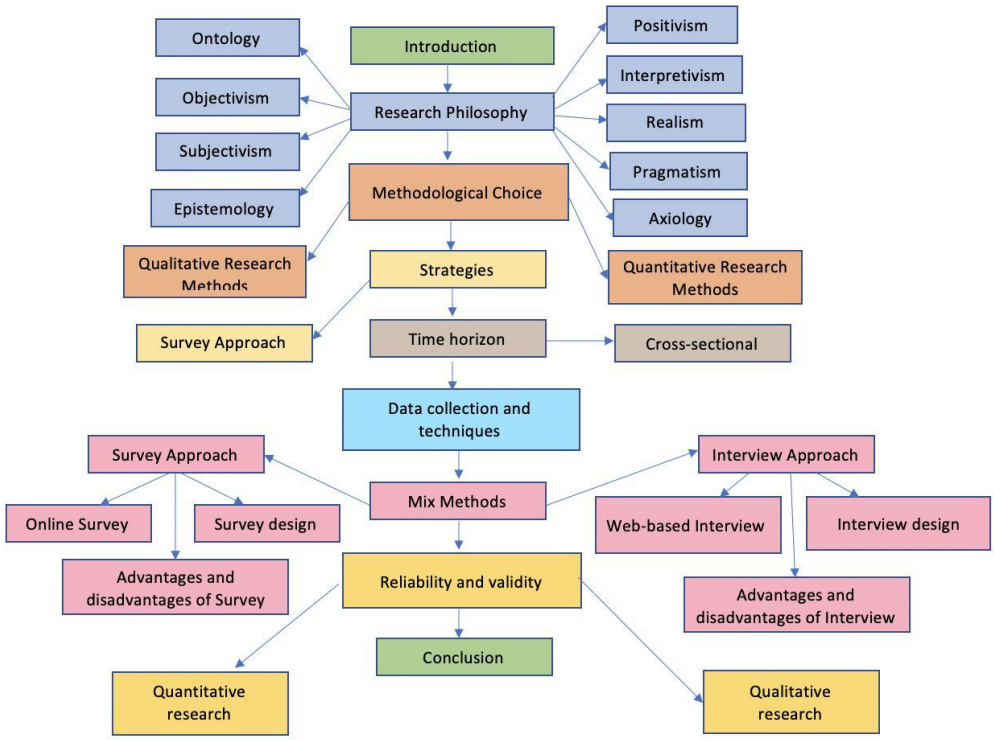


Figure 4: Chapter 4- Research method and design (prepared by author).

1.7.5 Chapter 5 - Data Collections and Analysis of Online survey

Figure 5 gives an overview of Chapter 5 involving the data collection and analysis of the online survey data. It describes the analysis of the data regarding the participants' gender, age, qualifications, highest level of education, average number of hours spent on social networking, and email. Three tests are applied to determine the reliability of the data: the alpha KMO and Bartlett's Test of Sphericity; then rotated component matrix tables are established for each factor. The third step is based on the new sub-factors derived from each factor in the model. After concluding the analysis of the online survey data, the new social networking model for higher education in Pakistan (SNMHEP) is established.

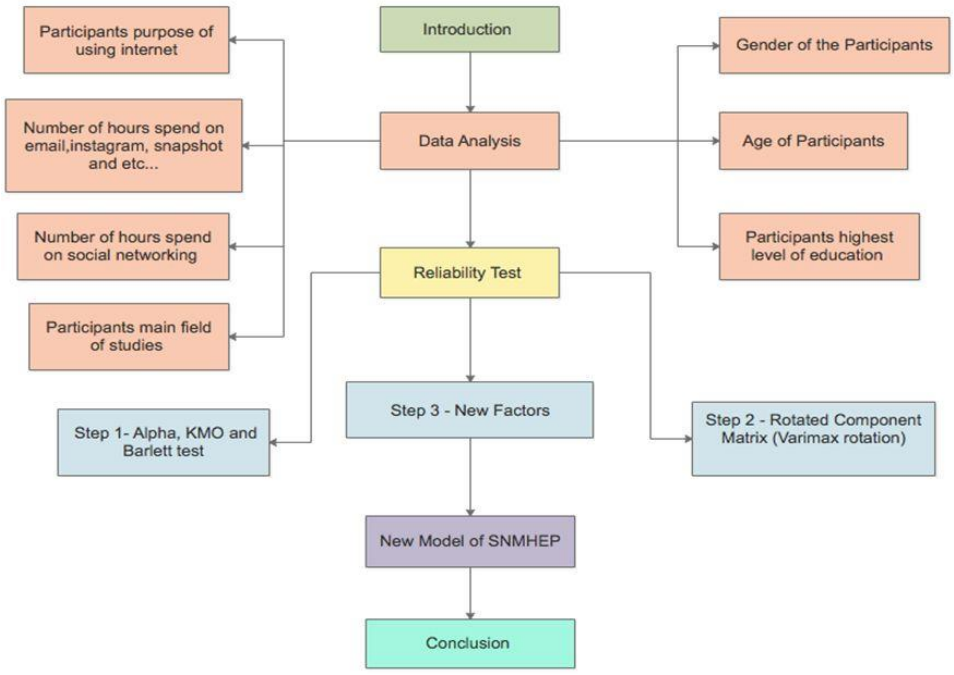


Figure 5: Chapter 5- Data Collections and Analysis of online survey Online survey (prepared by author).

1.7.6 Chapter 6 - Data analysis and findings of interview

Chapter 6 discusses the data analysis and interview findings and is depicted in Figure 6. Although Chapter 5 established a new model, several sub-factors of the model—privacy, inspiration, age and gender—needed to be re-confirmed. Since, this research wanted to re-confirm all factors of this model, this chapter is based on web-based interviews, data analysis and its findings. The interviews were conducted with experts who had extensive experience with this technology. The interview asked four questions, with three questions targeting each factor, and the last one was about factors of the model. For data analysis, a six-phase guide was used following the Braun and Clarke (2006) recommendations and then manual coding and NVivo version 12 software were used for analysis. Each question referred to a specific factor that needed to be confirmed. Each factor was fully justified by the experts' comments. Moreover, the final version SNMHEP was presented in this chapter.

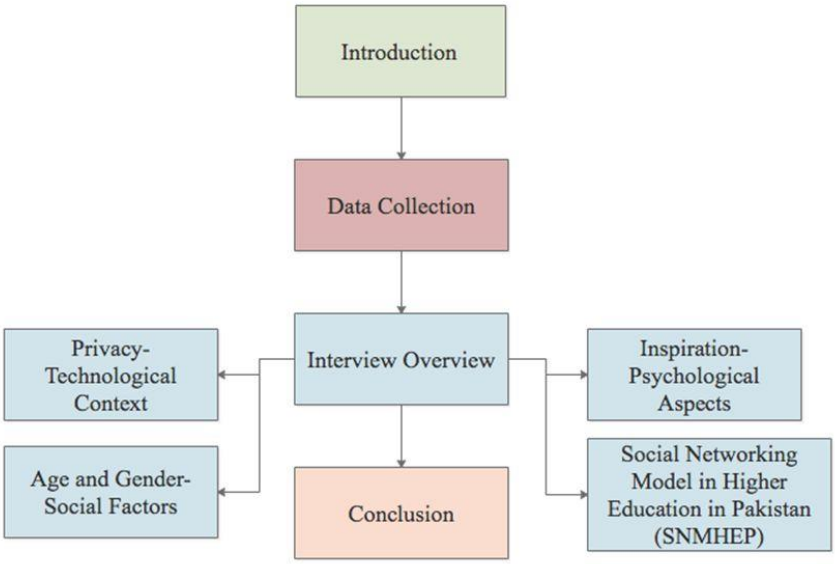


Figure 6: Chapter 6 - Data analysis and findings of interview (prepared by author).

1.7.7 Chapter 7 - Research findings and conclusion

Figure 7 depicts Chapter 7, in which the research findings and conclusion are discussed. Primarily, it summarises all factors of the SNMHEP model, along with the survey and interview findings. In addition, it discusses how this model will mitigate the risks and enhance the advantages of using social networking in the higher education sector in Pakistan. Moreover, it explains and aligns the research findings with both primary and secondary questions. Various research limitations, in terms of sample size, budget and others, are acknowledged. The significance of this study, for future research and recommendations regarding the model, are discussed. This chapter serves as the last chapter of the thesis, the main purpose of which is to summarise all findings and explain how this model will benefit Pakistan's higher education sector.

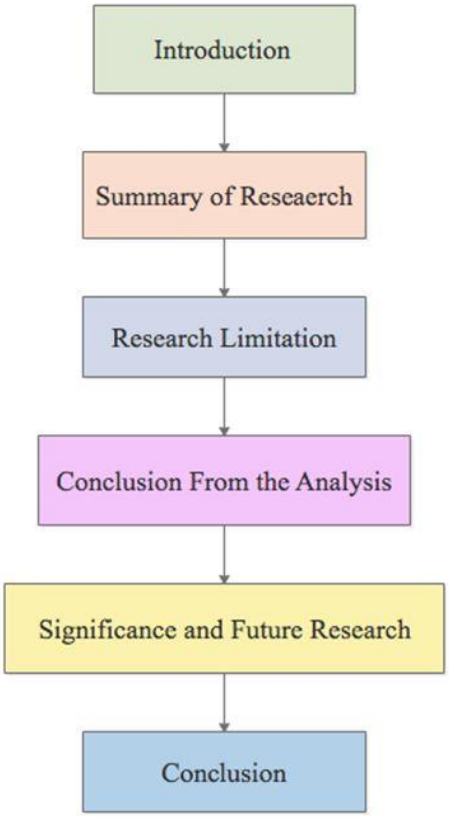


Figure 7: Chapter 7- Research Findings and Conclusion (prepared by author).

1.8 Conclusion

This chapter provides an overview of all the chapters in this dissertation. Primarily, it consists of the background of the study, such as the purpose of the research, the research methods employed, the outcomes, limitations and future research options. Then a summary of each chapter is presented. This research is comprised of seven chapters comprising: the introduction of all chapters, literature review, significance of the research, research method and design, data collection and analysis of survey, data collection and analysis of interview and research findings and conclusion.

Chapter 2 - Literature Review

2.1 Introduction

This chapter details scope of the literature review and discusses the history of internet and web technologies. It highlights the relationship between social networking and web 2.0. It explores the use of social networking in different sectors, then narrows down to social networking in education. The advantages and risks related to social networking in higher education are mentioned. Moreover, various models from studies worldwide have been discussed to propose the model of implementing social networking into the higher education sector in Pakistan, called the Social Networking Model for Higher Education in Pakistan (SNMHEP). Research gaps have been identified. Finally, all factors are analysed and discussed, after obtaining insights from the aforementioned studies, to get precise factors to leverage benefits of the model for Pakistani higher educational sector.

2.1.1 Scope of the literature review

The literature review is designed to cover various themes and to investigate scholarly contributions regarding the emerging need for social networking as an academic tool. The review comprises 165 articles from various sources including ICT educational specialist eBooks, journals, and web articles, with a focus on literature published between 2000-2019. To make the literature review more precise and authentic, the majority of the references have been taken from B-publishers based on the research school for the Socio-Economic and Natural Sciences of the Environment (SENSE) recommended publishers such as Elsevier Science, Sage Publications, Taylor and Francis, Springer, University of California Press and etc. Moreover, most of the journals have an h-index ranging from 57 to 227.

The review begins with consideration of the history and development of the internet and online technologies. It explains various phases of the web paradigm from web 1.0 to web 6.0, while concentrating on the interactive and collaborative phase called web 2.0 and culminating in consideration of the different types of web 2.0 technologies that are considered under the term “social networking site”.

The review then focuses on the penetration of social networking into various sectors, such as industrial and health applications and then moves towards the main theme, that is social

networking use in the higher education sector. In addition, this study explores various ways in which social networking sites already have been, and could further be, formally introduced and incorporated into university pedagogy in contrast to spontaneous use. In line with this, usage of social networking in various developed and developing countries i.e. Asia–Pacific, Europe, South and North America and the Middle East is also considered.

Furthermore, the review categorises the contribution of various researchers in this field into three main areas: technological or design-based, teaching and learning-based and context-based. The technological approach refers to the architecture of the system, software, hardware and the related technical considerations required to incorporate social networking into universities. The teaching and learning-based approach defines the articles which examine teaching and learning activities and strategies. Lastly, the contextual approach highlights how the technology is context-bound and value-laden, and explores an investigation of the surrounding cultural, economic, and social influences. These approaches are then collated, and sub-factors identified into an integrated social networking model as teaching and learning aid in universities. This model is considered in the context of social networking in higher education in Pakistan.

This review finds that social networking in the higher education sector of Pakistan is only being considered minimally at this stage. No social networking model has been found, specifically designed for the higher education sector in Pakistan. Acknowledging this need, the review then focuses on various social networking models which are specifically designed for educational purposes. It examines the research gap against the factors and sub-factors of the existing models. Finally, the proposed initial model of social networking implementation is designed which enables Pakistan to benefit from the established practices required in the implementation of social networking in the context of pedagogy.

2.2 History of the internet and the World-Wide Web

This section aims to present the history of the Internet and World Wide Web. These technologies have become necessary for sharing knowledge and collaboration

The architecture of the internet has evolved over time. The internet was created in the 1960s by ARPA (Advanced Research Projects Agency) scientists through packet -switching technology. Before ARPANET (Advanced Research Projects Agency Network) was created, most experts had doubts about its efficacy and believed that this technology would never

survive. The first network experiment was conducted in 1965. It was the first time that packets were used for communication between computers. Scientists had not yet imagined the concept of packet switching for multiple usage in society. Although Kleinrock was the inventor of packet switching, he believed that the internet would have no significant impact on different aspects of society. The model devised during the initial stages of the internet was by no means holistic. The internet was employed only for educational and research purposes and was used without any restrictions by selecting TCP/IP (Transmission Control Protocol/Internet Protocol) for the NSFnet (The National Science Foundation Network) and other networks. All these decisions were very critical for the final development of internet versions. By the beginning of the 21st century, the internet had embraced around 300,000 networks all over the world. Its communication travels on telephones lines, cable television lines, optical fibres and radio waves, and; hence, the traffic grows continuously at a rapid pace. The advent of cell phones and advanced communication devices have further contributed to the vast network. Data is tagged with websites and allowed to interact on the huge mesh of devices and computers (Leiner et al. 2009; Radu 2019).

Nowadays, the rapid growth of cloud computing is introducing new ways to build and support the latest software in a user-friendly environment. It is also enabling individuals and companies to rent computing power and storage space from services such as Amazon Compute Cloud, which is faster and easier for those who want to use it as an online service. This leads to enormous amounts of new uses for the internet and increases its traffic, which results in the most impressive web communication in the history of mankind. Millions of people around the world cannot imagine their lives and work without the internet (Cohen-Almagor, 2013). According to many researchers (Aghaei, Nematbakhsh and Farsani 2012; Choudhury 2014; Kambil, 2008), the World-Wide Web (WWW) evolved as a fundamental form of interaction for commercial and individual purposes. There are five stages of web evolution, namely: Web 1.0, Web 2.0, Web 3.0, Web 4.0, Web 5.0 and Web 6.0.

Web 1.0 was created as the basic environment for publishing and transactions. Tim Burners-Lee advised creating a hypertext space globally where all accessible information from a network would be linked by a single Universal Document Identifier (UDI). The main aim of this web generation was to create a common space for people where they could communicate by sharing information. Web 1.0 was unidirectional, static and read-only. One of its uses in the

business world involved web customers viewing brochures and catalogues of different products and then contacting the firms to purchase (Aghaei, Nematbakhsh and Farsani 2012, 1).

Whereas, **Web 2.0** was introduced as a space where users could co-create value. It was a bi-directional web with a read and write ability. This technology is known by social networking to allow users to communicate, collaborate, connect and corporate (see section 2.3). Various names such as people-centric web, participated web and wisdom web have been used to define Web 2.0. It was not only an upgraded version of Web 1.0, but also offered many novel features at the time such as a flexible web design, creative reuse, updates, modification and collaborative content creation. One of the most conspicuous features of Web 2.0 is its ability to maintain cooperation and to assist in accruing collective intelligence more efficiently and effectively than Web 1.0 (Aghaei, Nematbakhsh and Farsani, 2012, 1; Fuchs et al. 2010).

Web 3.0 uses a semantic space where human intelligence combines with machine intelligence to make latest insights. The main aim of Web 3.0 is to modify the structure of data used and link it for automation, search, integration, and reuse across many applications. it is known as the 'semantic web'. It was advised by Tim Berners Lee who was also the creator of the world-wide web (WWW). It was officially announced by John Markoff, in 2006, as a third-generation web. A dedicated team created a World-Wide Web Consortium (W3C) to increase, improve and standardise this system, and in this regard, languages and publications tools have been established since then (Aghaei, Nematbakhsh and Farsani, 2012, 5; Singh and Gulati. 2011).

Web 4.0 followed, which is designed as a mobile space where the user integrates with real and virtual objects to create value. The basic purpose of Web 4.0 is to provide better interaction between humans and machines acting in symbiosis; hence its name: 'symbiotic web'. The recent rapid growth of wireless communication has allowed another vital transition: the capability to connect objects and people anywhere, anytime in both the virtual and physical worlds. In Web 4.0, the main challenge for the strategist is to devise algorithms to facilitate the integration of virtual and physical objects with other user-generated content to generate value. This often results in a new generation of Supervisory Control and Data Acquisition (SCADA) applications or a specific form of entertainment that mixes user information and objects. Web 4.0 is an evolving space, several applications integrating users with virtual and real objects can still be imagined using this platform. Web OS and Web 4.0 can be conceptualised as intermediate software that will start working as an operating system (Kambil, 2008; Solanki and Dongaonkar, 2016).

Web 5.0, the latest addition to the web technology, was introduced as a sensory–emotive space in an effort to transform the web from a flat, emotionless environment to a dynamic space for interactions. It has been developed to create a real-time, emotionally responsive space on the internet. Realising that without emotional awareness, the web potential is limited, so the advent of Web 5.0 is a welcome addition (Kambil 2008, 3). A San Francisco-based company, EMOTIV, takes this phenomenon one step further by sensing neurological activity through the use of non-invasive electroencephalography (EEG). They can also sense the blood pressure and measure neurological and other physiological states of the user. Also, the headset can be equipped to control object reaction in a computer game (Colino et al. 2013; Kambil 2008).

Web 6.0 as 'web service extensions' has been included in the internet Information Services Manager (ISM) in Internet Information Services (IIS) 6.0. The application of IIS 6.0 server configuration delivers web hosting services via a suitable architecture that can be used to control server resources with better efficiency, performance and stability. "IIS separates applications into isolated pools and automatically detects memory leaks, defective processes and over-utilised resources. When problems occur, IIS manages them by shutting down and redeploying faulty resources and connecting faulty processes to analytical tools" (Khanzode and Sarode 2016, 9).

This section explained the Internet and World Wide Web history, since this technology has become an essential for individual and organizations to connect and collaborate information and sharing knowledge. Based on the above, this technology will play a major role in several factors including education. The next section will discuss the relationship between social networking and Web 2.0 and later a discussion will be presented in relation to the social networking and education.

2.3 The relationship between Social Networking and Web 2.0

The earliest forms of the internet, such as CompuServe, were developed in the 1960s. Primitive forms of email were also developed during this time. By the 1970s, networking technology had improved, and in 1979, UseNet allowed users to communicate through a virtual newsletter (Hendricks 2013). Web 2.0 emerged in the late 1990s. It was done by shifting the way value and content was collaboratively and socially co-created by using the WWW (Kambil 2008).

In spite of a decade of research, an agreement regarding the proper method of alluding to modern digital technologies has not yet been achieved and the terms, 'Social Networking'(SN), 'Web 2.0 technologies', 'Social Networking Sites' (SNSs), 'social media', 'Computer-

Mediated Communication' (CMC), and 'User-Generated Content' (UGC) are used interchangeably in literature. According to Zaidieh (2012, 18) social networking exists on web 2.0 (websites) where millions of people can share their interests across various disciplines and make information accessible and available to members of these networks, sharing photos, files, videos, as well as send messages, create blogs and conduct real-time conversations. These networks are referred to as social, they allow communication with colleagues and friends and strengthen ties between members of the networks. Therefore, social networking has two prevailing schools of thought, some researchers use 'social networking' to refer to a broad spectrum of applications such as wikis, websites for media object sharing (photographs, video and audio clips), blogs, chat forums, alongside websites like Myspace and Facebook with the specific purpose of social networking (Pour 2013; Weaver and Morrison 2008; Thompson 2007; Magro et al. 2009).

Moreover, Facebook is the largest (in term of active users) social network. Twitter is a micro-blog service that allows its users to read and send messages known as tweets. Tweets are text massages that are presented on the user's profile page and sent to other users who have subscribed as followers (users) (Harris and Rea 2019, 139). In social networking, the internet became a collaborative platform where companies could use the collective power of distributed users to capitalise on data access and network effects that create extraordinary value (Hitt 2006). Social networking has many applications such as Facebook, Twitter, YouTube, and LinkedIn, and thousands of user contributions are used to improve and innovate its contents. Also, the strategic question is more focused on how to improve business models to user-generated content value and leverage the 'long tail' to realise extraordinary gains from scaling the impacts of individual contributions. Social networking provides an environment in which to collaborate and share information. Hence, users can negotiate better prices, as well as reverse auctions and manage social movements to pressurise company leaders. Therefore, social networking addresses the need for creating and dealing with transparent markets (Kambil 2008).

Aghaei, Nematbakhsh, and Farsani (2012) describe various social networking tools including wikis, social networking, blogs, Really Simple Syndication (RSS), podcasting, mashups folksonomy, etc. The most popular social networking sites are Facebook, Wikipedia, YouTube, and Twitter. The widespread usage of social networking tools indicates strong engagement between consumers and numerous organisations. These tools are defined in Table 1.

Table 1: Social networking tools

Tools	**Definition**
Blog	Blog is a type of website which includes various web pages that are known as 'posts' that are published sequentially with the most recent at the top, in the style of a journal. Blogs are textual and, therefore, users can add and edit their comments, but there are other types such as podcasts, videoblogs or Vlogs, photoblogs or photo log which allow the users to turn to blogs for different material such as videos and graphics (Aghaei, Nematbakhsh and Farsani 2012, 3).
Wiki	Wiki is a set of web pages made to allow users to have access to edit their own existing content or contribute the content by working simplified markup language, that is used to make contributive websites. The most familiar wiki is Wikipedia. Wikis can be used effectively in educational sectors to improve the knowledge system operated by students (Harris and Rea 2019, 139).
Facebook	Facebook is one of the latest examples of communications technologies that have been widely adopted by students and, consequently, have the potential to become a valuable resource to support their educational communications and collaborations with faculty (Roblyer et at. 2010).
Twitter	Twitter is a social networking application that improves blogging, short messaging service (SMS) and messaging. "The intention behind the Twitter design was emergency communication as distinct from high performance communication" (Pervaiz 2016, 86). Moreover, Twitter can support the scientific community and serve as resource at scientific conferences (Ebner and Reinhardt 2009).
Virtual World	This is a computer-simulated environment that permits users to communicate with others despite geographical restraints. Each user in this environment acts through an avatar. This avatar may be a representation assigned to him/her, so it looks like the user in appearance in terms of hair, colour, gender etc. Currently, the virtual world has 1.5 million accounts registered and is known as Linden Lab's Second Life (SL) (Harris and Rea 2019,139). Moreover, "The Virtual and Augmented Reality (VAR) will transform teaching and be embedded within education as a teaching tool to enhance and motivate learning" (Sahri and Helmi 2019, 112).
Web Syndication	This is a concept of presenting data, taken from various web pages, on a single page. To publish the digital content, the format RSS (Really Simple Syndication) is used, and its updated version are podcasts, news feeds and Weblogs. This software allows information to be presented as an Extensible Markup Language (XML) file known as an RSS channel or RSS feed (Dorn 2010, 308).
YouTube	This is the biggest user-driven video content provider in the world. It has emerged as a major platform for distributing multimedia information. "A major contribution to its success comes from the user-to-user social experience that differentiates it from traditional content broadcasters" (Wattenhofer, Wattenhofer and Zhu 2012, 1).
Mashups	This is a website that collects information and services from different sources on the web. It can be grouped into seven categories: mapping, massaging, shopping, search, mobile, sports and movies. Mapping mashups account for more than 40% of all mashups. It is easier and faster to make mashups than applications from scratch in traditional ways: this facility is one of the most valued characteristics of social networking. Mashups are normally created by using the Application Programming Interface (API). For instance, Google Maps API has been integrated into various applications such as earth measurements and housing maps (Aghaei, Nematbakhsh and Farsani 2012, 4; Miah and Gammack 2008).
Podcasts	This is a digital media file (video and audio) which is available for downloading without any cost from the internet with the help of a software that can use RSS feeds. Such digital media files allow users to operate mobile devices or personal computers whenever they want. Nowadays, the YouTube podcast is the most well-known site to post. Three other types of podcasts are Double Twist, VodCasts, and Enhanced podcasts. Podcasts can be played on different devices such as mobile phones, iPod, laptop computers, PDAs, MP3 players and other portable devices (Ashley 2009).
Social search engines	Social search engines are designed as a part of social networking since they can filter online communities to tag the relevant content. These tags are added to the information embedded in web pages, in theory to maintain results for a particular

keyword. A user can see the recommended tags for a particular research term, marking tags that have been previously added. Various versions of social engines have been started including Eurekster, Rollyo, Anoox, Sproose and google coop (Rouse 2011).

2.4 Social networking in industrial, health and education sectors

Social networking has application in many different sectors; this section aims to discuss social networking in the industrial, health and education sectors. In the **industrial sector**, social media gives companies the opportunity to create leadership, spread awareness and form strong relationships between existing and future buyers and other stakeholders. These social channels are perfectly suited to marketing content for promotion and distribution such as videos, articles, white papers, case studies, eBooks, webinars etc. An audience of technical professionals and others engage with social media as they prefer to see and read, as social media content customers instead of content-makers. It is suggested that businessmen should integrate social media with marketing strategies by including LinkedIn, YouTube, Twitter and Facebook on their commercial websites and promoting their presence along with marketing programs.

Through social networking, the **health sector** can directly communicate with patients to discuss general medical advice and information. This approach is easier, faster, and more effective. Therefore, more and more people prefer to communicate with their doctors and get advice in this way. Also, they can obtain more useful online information for better treatment. This information is available in regard to medicines, medical procedures and medical professionals. Creating a venue and initiating dialogues regarding healthcare issues will significantly benefit mainstream social media users and increase awareness of treatments and procedures (Doctor 2013; Freeman et al. 2015).

Many factors influence distance education, and the teaching and learning experiences it offers. Kimbrell (2013) mentioned the distance education was conducted using two experiments. The first experiment examined tools of Web 2.0 technology (blogs, wikis, and podcasts), Web 3.0 technology (virtual reality), and course framework (course design, technical problems, instructor feedback, peer collaboration, and student needs). It was observed that technical problems overwhelmingly contributed the most to a negative learning experience. Results identified factors that impacted on positive and negative learning experiences for distance education students. The future of Web technologies in distance education will one day become Web 4.0 driven. Data suggest that developments are progressing towards 3-D printers, 3-D holographs, and the ability to control a computer with one's thoughts (Kimbrell, 2013, 1).

Altbach, Reisberg, and Rumbley (2009, 18) assert that the internet has changed the traditional way of delivering education now that knowledge can be transferred electronically. In the developed world, the use of ICTs has increased immensely and have influenced virtually all secondary education, such as e-mail for academic assistance and electronic journals are used to acquire knowledge with efficiency and ease. Likewise, Santos et al. (2009, 323) state that although students like to use the Learning Management System (LMS) to check course materials, for detailed discussion they prefer Facebook. Also, lecturers find it easy to interact on Facebook rather than via LMS for coursework discussions on a weekly basis. This trend shows a shift in decision making, as students like the tools which best suit their needs. In the same context, Greenhow, Robelia and Hughes (2009) have pointed out the use of social media in medical education, highlighting its departure from a paradigm where consultants, medical librarians, and medical school lecturers act as guardians of medical knowledge. For medical students, Facebook provides an environment for negotiating professional identities related to a sociocultural understanding of learning. Through this approach, students discuss professional norms or challenges related to professional conduct by sharing intellectual content as images or texts.

In regard to the social networking use from the students' perspective, Tariq et al. (2012, 409) mention that researchers (Ellison, Steinfield and Lampe 2007; Wiley and Sisson 2006) have "calculated that more than 90% of college/university students use social networks". Platforms play an essential role in online learning and teaching styles. Particular technologies and services that contribute to the higher education sector include syndication of content through RSS, social bookmarking, Wikis, media sharing, tag-based folksonomies and social networking sites. Already, a huge number of users in universities are using these technologies for learning and teaching activities. Therefore, it is important to realise that social networking has something creative and innovative to offer the higher education sector (Darwish and Lakhtaria 2011, 209).

The latest web features will significantly change the educational environment by shaping the pedagogical approaches of the 21st century. The internet has dramatically changed the way that knowledge is transferred. "In the most developed economies of the world, ICTs have increased exponentially and affected virtually all areas of tertiary education such as online social networking (OSN) spaces and e-mail deliver paths for academic cooperation and joint

research" (Issa, Isaias and Kommers 2016, 88). Electronic journals have become essential and well-known in many fields. Also, traditional publishers of books and journals have increasingly turned to the internet to disseminate their publications. The development of open educational resources has gained impetus, allowing easier access to courses, curricula and teaching approaches not locally accessible (Altbach, Reisberg and Rumbley 2009, 18).

Hamid, Chang and Kurnia (2009, 420) mention that the idea of offering educational activities through social networking tools is known as learning 2.0. It is basically a creative e-learning space used for teaching and learning. A learning 2.0 environment is the most modern participatory medium and enhances many kinds of social learning. With the popularity of social networking, several reports have been published on its suitability for educational purposes in the higher education sector. Nonetheless, many of these applications are not implemented university wide as all of these studies look at small-scale implementations and are restricted to a small number of studies. Hence, finding educational features for the successful implementation of social networking for learning 2.0 is a productive research endeavour.

However, the incredible use of social networking for pedagogical purposes has completely changed the demands and direction of higher education. Hamid, Chang and Kurnia (2009) state that educators are being encouraged to implement social technologies in teaching with the aim of promoting and encouraging e-learning and to train students who will later make positive contributions to a society that depends largely on social networking technologies. Hamid, Chang and Kurnia (2009) indicate that social networking activities are used to complement teaching and learning practices. The categorisation of one or more social technologies to facilitate networking activities depends on the level of confidence of the teachers as well as the suitability of social technologies to teaching and learning in classes.

Although, social networking provides various benefits in health, business and education, there is a need for making contemporary digital technologies more significant in these sectors. The next section will focus on the advantages and risks of using social networking in the educational sector. This will also provide a better understanding of these aspects, required for the initial SNMHEP model.

2.5 The advantages of social networking in higher education

For the acquisition of more precise information it is vital to discuss the advantages of the use of social networking in the higher education sector at this stage. According to Arquero and Romero-Frias (2013), 93% of students agree that the use of social networking sites assists them to study for a specific subject more efficiently and effectively, and 99% agree that these sites are a flexible way to approach the teachers. Whereas, Hussain (2012, 641) mentions that the usage of social networking in higher education is an essential means of communication. Social media has a great potential to act as a communication facilitator for those students who want their educational institutions to employ social networking sites for strengthening the classroom environment. Similarly, Chen and Sharma (2015) illustrate that Facebook provides the best means of communication and encourages interaction between teachers and students.

Assessing the same element, Hussain, Gulrez and Tahirkheli (2012, 190) highlight the same communicative nature of social networking sites among learners and teachers. Roblyer et al. (2010) state that the fundamental feature of social networking sites is their utility as communication tools, so faculties may see these tools as being the same as email services, enabling staff and students to use them for academic purposes such as course details etc. Moreover, educational research can be conducted through social networking applications. Madge et al. (2009) state that the use of social media increases educational interaction and access and it can also serve to decrease the learning gap between 'digital immigrants' and 'digital native' staff members.

Another study shows social networking's role in preventing 'friendsickness', that experience which students feel after moving away from college (Paul and Brier 2001). Social networking sites provide benefits in terms of educational outcomes but also providing supportive relationships, encouraging a sense of self-esteem, the forming of identity and a sense of belonging. In a related context, Collin et al. (2011) assert that the strong sense of community and mutual progress developed by social networking sites has the potential to support flexibility that assists youth to efficiently and effectively manage stressful change and events. Also, Greenhow, Robelia and Hughes (2009) state that scholars admire social networking technologies for their ability to encourage and engage students in content exchange, teamwork, and communicatory practices. For example, various studies have shown that social networking sites help in developing new relationships while maintaining the high-school friendships of

young students who have recently shifted from schools to universities. Ellison, Steinfield, and Lampe (2007) contend that those students who were not satisfied with university life and suffered from low self-esteem benefited more from active use of Facebook. Also highlighted was the fact that social networking permits access to social groups, thereby creating strong bonds as students acquire a vast sub-set of friends on campus, in clubs and societies and through acquaintances of co-workers and friends. These friendship communities, especially on Facebook, may also include profiles of users both known and unknown to the people in real life. Moreover, this leads to the creation of interest groups because of mutual interest and hobbies (Steinfield, Ellison and Lampe 2008).

In terms of pedagogical aspects, according to Moran, Seaman and Tinti-Kane (2011), faculties agree that social media sites improve the quality of teaching. They trust wikis, videos, podcasts etc., as useful tools for teaching purposes. Similarly, they assert social media can be valuable tools for cooperative learning. E-learning is a recent trend introduced in the higher education sector. It is a system that gives its users online access to learning content and also works by "changing demographic factors of the students, changing conditions for education delivery and the innovation in technology itself" (Qureshi et al. 2012, 311). The popularity of social networking sites shows that by encouraging communication among teachers and students one can create successful learning environment (Roblyer et al. 2010, 137). This increased flexibility provided by e-learning is a positive aspect for students. Likewise, Carr et al. (2008) states that in terms of communication, collaboration and creativity, social networking tools can assist educators to support and improve the learning process. Ebner et al. (2010) mention that social networking technologies are the biggest interest for the internet use for educational purposes. Besides, Kuh et al. (2008) demonstrate that academic and co-curricular activities are strong forces in the psychosocial development and academic success of a student. Students who are insufficiently prepared for the university or college experience, show improvements in their grades as a result of their persistent engagement with e-learning.

Similarly, the findings of Button, Harrington and Belan (2014, 11) indicate that students appreciated prompt replies and instant access to the instructors via electronic email. A few students and instructors encouraged a mixed-learning method based on both classroom and online learning in order to acquire the maximum benefit from both approaches. This method combines the real-world classroom and online learning. Focusing on the overall characteristics of e-learning, Tess (2013 62) contends that the main role of social media in higher education

is that of an enhancer and facilitator. Social networking focuses on collaborative work in the learning environment. Thus, in teamwork and collaborative learning, such sites act as a helping tool and the positive aspects of sharing ideas among users are highly appreciated.

Additionally, the benefits obtained through the availability of large number of views are praised and rated as the biggest advantage of social networking applications. Social media are widely described as technological systems associated with community and collaboration. Social networking sites are usually known for wikis, blogs, multimedia platforms, virtual social world and virtual game worlds etc. Apart from being a tool for collaboration, Yu et al. (2010, 1494) observed that social networking seems to improve learning outcomes and social acceptance. They further assert that apart from affecting students' learning capabilities, social networking helps them achieve social acceptance by adapting to the university environment. These features are vital in enhancing student learning outcomes which is a high priority for all educators.

The use of social networking sites in e-learning and its management by analysing the data is one of the major factors associated with social networking in higher education. Rosmala (2012) examined the use of social networking in the higher education sector especially among teachers and students and its impact on e-learning. They observed that social networking was used basically for exam discussion, announcements, rescheduling of classes, work assignment and for related applications i.e. Twitter, blog, Facebook, and instant messenger.

Similarly, social networking sites also give new opportunities for improving the level of worldwide competence in higher education. "Therefore, an increasing number of institutions in higher education are relying on social networking technologies for teaching and learning purposes" (Zelick 2013, 88). According to Junco (2012), the efficiency and productivity of any academic practice is directly related to the capacity of that academic practice to escalate student involvement: If Facebook enhances such involvement, it is viable for Facebook to be utilised for learning and teaching in order to improve students' academic outcomes. Likewise, Wang et al. (2012) state that the use of Facebook in pedagogical practices assists students to achieve higher grades, an increased level of involvement, and an overall enhancement of the learning experience. Hence, Facebook is recommended as an educational, communication and collaboration tool that permits teachers to embrace a more participatory and dynamic role in e-learning.

The use of social networking in e-marketing of academic institutions was examined by Rosmala (2012, 157). They have found that social networking is the usual channel of communication among college students all over the world; additionally, universities and colleges are trying to implement such technologies to connect current students with future students. Moreover, the increasing use of social networking sites has greatly benefited the e-marketing of educational institutions. Social networking sites provide flexible features such as quickness of response, "directed personalisation of marketing efforts, and low institutional financial obligations" (Rekhter 2012, 27). Further, the author underscores the role of social networks in modern practices for e-marketing internationally and nationally. Roblyer et al. (2010, 46) claims that universities and colleges are using social networking sites for marketing and in this capacity, Facebook is assumed as an efficient and effective way of communicating with the users (students) since it helps the universities to target future students.

The above literature shows that social networking in higher education has various advantages in terms of communication, collaboration, interaction, sense of belonging, maintaining relationship with peers, success of a student, e-learning etc. Similarly, another study mentions the same advantages in higher education in Pakistan which are; 'assist study', 'develop networking and professional skills also gaining awareness on environmental issues', 'connect me with my peers and information from the past', 'maintain current relationships and establish new networks' and as an 'information and learning channel' (Pervaiz 2016). As these advantages are specifically concluded for higher education in Pakistan, they are considered to be addressed by the proposed model of SNMHEP, to enhance and improve the quality of learning in higher education in Pakistan (See Table 53).

2.6. The risks of social networking in higher education

Although social networking can facilitate learning and communication, it has also created some serious concerns in regard to security and privacy in the areas where it has been implemented, including the education sector. Brady, Holcomb and Smith (2010, 154) explained that regardless of the increasing use of Facebook and Myspace, United States higher education administrators have significantly restrained staff members from integrating social networking sites in their syllabus. Nowadays, the media's focus on, and concerns about, the safety of students' personal information have led academic administrators to discourage the use of social networking sites within educational institutions.

The security and privacy issues are two of the risks associated with social networking as evident in this statement: "respondents who were against use of social networking sites for education were more concerned about security and privacy issues" (Zanamwe, Rupere and Kufandirimbwa 2013, 12). This also influences the attitudes of users towards social networking sites. Additionally, Shafique, Anwar and Bushra (2010) suggest that concerns about privacy and security often stop people from using social networking sites, thereby discouraging potential future users.

Similarly, the issue about the lack of security and privacy is observed by Cha (2010). The researcher mentions that these issues deter the regular users of social networking sites. Hence, it is crucial that the designers of social networking sites protect users and prevent breaches of online confidentiality. Without assurances of privacy, it is unlikely that users will register for and remain signed into these sites on a regular basis (Ahmad and Elhossing 2012; Turan, Tinmaz and Goktas 2013).

Moreover, Facebook not only enables users to make friends but may lead to the formation of undesirable associations. Thus, it is a difficult if not impossible task to ensure that social networking interactions are appropriate and positive. Usually, the engineers of social networking sites such as Facebook are unsuccessful in their attempts to identify complex, ethical breaches (Light and McGrath 2010, 307). Also, such sites can be vulnerable to direct malicious attacks such as the sending of a virus to damage the property of the receiver, or the sending of threats or insults etc. Indirect attacks may be in the form of identity theft, rumour-spreading, or masquerading as a user for malicious intent through social networks (Antoniadou and Kokkinos 2015, 2).

Another study shows that the use of social networking by students has often been the cause of distraction as specified by a study by Yu et al. (2010, 1501). Interviews with various students to identify their attitudes towards social networking, drew answers such as: "I am not sure [whether I will enjoy academic learning in Facebook], since I am easy to distracted (sic) and I cannot concentrate on the work I am doing" and " I think it [Facebook] may have some passive impact on my studies, because I may not be able to concentration (sic) on what I want to learn" (Yu et al. 2010, 1501). In discussing the drawback of Facebook, Wise, Skues and Williams (2011, 1332) state that despite encouraging online engagement in a way that might increase educational engagement, it seems that Facebook is likely to work as a distracting stimulus.

In terms of other risks, Welker (2010) states that Facebook, Myspace, Twitter, and other social networking sites are conducive to cyber bullying that causes harm to students' mental health. Moreover, Millard (2006) expounds that social networking sites such as Facebook and Myspace, are available to students in schools, colleges and universities and can provide an avenue for bullying or abuse. Similarly, Weiss (2013, 5) claims that social networking may lead to self-destructive behaviours, and its excessive use may cause feelings of depression, solitude, and a high level of anxiety.

According to Suris et al. (2010), excessive use of the internet by students in the 16 to 20-years age group led to lack of sleep, obesity, and unhappiness. Similarly, Kim et al. (2010) found that intense users had become addicted to the internet and had developed bad habits such as avoiding meals, having irregular sleeping times, eating junk food. Shek, Sun and Yu (2013) report that internet addiction badly damages the immune system and can cause ill-health issues such as insomnia, eye strain, neck and back pain issues, carpel tunnel syndromes etc.

The previous literature provided the foundation to identify the risks associated with social networking in higher education. The risks which cannot be overlooked are security and privacy issues, ethical issues and health impacts. Similar work has been carried out by Pervaiz (2016, 94) that points out the risks of social networking in higher education in Pakistan. These risks are social networking being an 'inhibitor to do socialising', 'triggers anxiety and loss of interest', 'cynicism on data security', 'inhibitor to develop my cognitive skills', 'decreases motivation to undertake intelligent exercises and easy loss of focus'. As these risks are associated with the higher education sector in Pakistan, they are considered (see Table 52 in section 7.2), in the development of the proposed model SNMHEP and will minimise them for the successful implementation of social networking in the higher education sector in Pakistan. For a better understanding to propose the social networking model in higher education sector in Pakistan (SNMHEP), it is significant to study in the next section, fundamental patterns to inquire about the formal consolidation of social networking in higher education in Pakistan.

2.7 Main trends in formal integration of social networking in higher education

The literature on the adaptation of social networking in the education sector for the purpose of teaching and learning can be categorised into three approaches: those based on the educational values embedded in social networking tools and technology, those which specify the design and technological components of proposed or actual models of implementation, and those which attempt to identify the contextual factors needed for successful implementation. These approaches examined to understand general orientations regarding the consideration of social networking technology as a pedagogical tool. The purpose of reviewing these trends in this research is to identify and analyse the key factors which may form a framework for successful implementation of social networking in higher education in Pakistan.

2.7.1 Teaching and learning (pedagogical)

Many researchers of social networking technology in higher education consider the interplay between social networking and teaching and learning (pedagogical) theories, insofar as this technology enables an interactive and collaborative paradigm of education (Grosseck 2009; Mazman and Usluel 2010; Tella, Alias and Ithnin 2009; King 2012). Shafique, Anwar and Bushra (2010) state that, although various research has been undertaken to understand the use of social media and how it can influence the quality of learning in higher institutions, such studies have been conducted only in developed countries such as the US, Europe and UK with no particular focus on developing nations such as Pakistan. However, on the other side, a tremendous increase has been observed in the use of such websites in Pakistan but again no study has been done so far to determine the use of social media by university students.

Traditionally, learning theories are grouped into three large categories: "behaviourist, cognitivist and constructivist. In short, behaviourist theories are those that propose that knowing is the result of objective experience; cognitivist theories are those that propose that knowing is the outcome of mental processing; and constructivist theories are those that propose that knowing is subjectively constructed" (Flynn, Jalali and Moreau 2015, 558). However, connectivism is a very latest learning theory based on the use of technology in education. The unique concept of connectivism is that "how people learn, work and function is altered by the technology that is being used" (Flynn, Jalali and Moreau 2015, 559). Basically, connectivism

and constructivism are learning theories, they are reflected in the approach to using social networking in learning and teaching activities (Flynn, Jalali and Moreau 2015; Mattar 2018).

2.7.2 Technological

Technology is another element of the research. Although still drawing on the connection between social networking tools and theories of education, it has concentrated on the 'back end' technical infrastructure needed in educational settings in order to ease 'front-of-stage' learning and teaching activities using social networking tools. This approach focuses on the recognition of the need for a more integrated, university-wide application of social networking which surpasses the customised, area-centric efforts mentioned above in the section 2.7.1 on social networking and its pedagogical possibilities.

Due to the open and shared nature of social networking sites, the technical integration of these sites has been depicted as difficult. There are basic profit-driven business models and the incompetence of universities to use control over their compatibility and availability within existing university infrastructure (Veglis 2014) creates issues. According to White (2010), rich interface and bottom-up are two main principles of social networking which are not translated well into a university's arena, due to issues with accessibility, compatibility and connectivity. The researcher further mentions that universities are often honoured just for using social networking technology rather than for how well this technology is actually used and implemented in enabling learning and teaching methods. To fix this problem, the technical approach has created models that unite teaching and learning methods with specified applications, technological tools and platforms.

According to Shaikh and Khoja (2013), ICT can play a significant role in shaping the future of the Pakistani higher education system. Unfortunately, the use of ICT tools/application in higher education in Pakistan is insufficient. The reason for the lack of ICT infrastructure in universities is lack of money, leading to limited access to software and computers. Moreover, Kanwal and Rehman (2017) mention that e-learning assists in improving the literacy rate of rural and urban users. Therefore, there is a need to implement e-learning systems in Pakistan. However, the acceptance and adoption of technology such as internet, computer systems and software are a prime concern in Pakistan. Similarly, Soomro, Zai and Jafri (2015, 1) assert that the literature on web 2.0 experiences (social networking) in the higher education sector of developing countries like Pakistan is very limited. A deep understanding of the knowledge and practices of higher education with social networking tools can be effective in mapping

strategies for adopting modern digital technologies to support teaching and learning approaches in higher education in Pakistan.

2.7.3. Society and culture

Apart from pedagogical and technological factors, the contextual factors based on society and culture are also important to discuss. In terms of gender, developed countries pay equal attention to both genders in their higher education systems. However, females are often neglected in higher education in developing countries and this is true in Pakistan. "Though the total enrolment in higher education institutions increased from 0.276 million during 2001-02 to 1.298 million by 2014-15, Pakistan's Gross Enrolment Ratio in higher education was just 10% during 2015-16. For instance, female enrolment increased from 36.8% to 47.2% by 2014, but the dream of gender equality in higher education is far away" (Mehmood, Chong and Hussain 2018, 379).

According to the British council, the university research system in Pakistan revealed that the most essential needs encountered are "the need to intensify faculty debate and collaboration, increase research funding, build demand for research in the government and the private sectors, assert academic rather than bureaucratic control over research decisions, expand thematic research on national challenges, develop flexible evaluation criteria, and build faculty skills in research methodologies, collaboration, dissemination and commercialisation" (Ul Haque et al. 2018, 3). To date, the absence of these themes, make Pakistan different from those countries where most of the extant research has taken place. On the same theme, Kundi, Nawaz and Khan (2010) assert that Information Technology (IT) is still a new concept in developing countries such as Pakistan. Nonetheless, the government is trying to promote an IT culture (in terms of e-learning) in the higher education sector of the country. Shafique, Anwar and Bushra (2010) further highlight the areas of focus by noting the possible use of web tools (Twitter, Facebook, Wiki, Myspace, etc.) for education in remote areas of Pakistan. Such studies and practices would provide a better understanding of the use of these tools as a means of dealing with the illiteracy issues in developing nations.

The above discussion about major trends in the integration of social networking in higher education provides an insight into Pakistan's specific limitations and problems regarding e-

learning which should be addressed properly. Accordingly, the proposed social networking model in the higher education sector of Pakistan should consider these trends.

2.8 Social networking models in the higher education sector

To conclude the factors impacting a social networking model in higher education in Pakistan, it is of value to discuss various worldwide social networking models in the higher education sector, to find the one most appropriate for higher education in Pakistan. Various models were considered and analysed for this research are mentioned below in detail.

2.8.1. Social Networking and educational model (SNEM)

According to Issa, Isaias and Kommers (2016, 335), a Social Networking and Educational Model (SNEM) was designed as a result of online surveys obtaining data from different regions such as Europe, the Americas, the Caribbean, Asia-Pacific and the Middle East that revealed new risks and advantages related to the implementation of social networking in educational institutions. This model was created to assist administrators to implement social networking in higher education sector successfully by mitigating the risks and enhancing the benefits related to social networking.

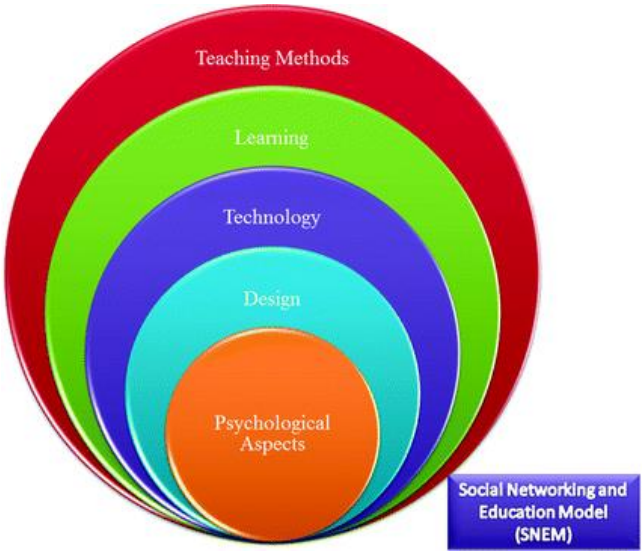


*Figure 8**:** A Social Networking and Education Model (SNEM) (Issa, Isaias and Kommers 2016, 335)*

The SNEM has five elements: learning, technology, design, psychological aspects, and teaching methods. All five elements contain several sub-elements to ensure the successful implementation of social networking in the education sector.

Teaching methods

First of all, teaching methods comprise four approaches: blended learning, learning to learn, pedagogy and curriculum. The blended learning combines online learning and face-to-face learning in order to achieve successful delivery of knowledge to students. Learning to learn is a method which involves a set of skills and principles to assist students to learn more efficiently and effectively. Pedagogy is related to professional practice, teaching principles, guiding, leading, and teaching methods. Whereas, curriculum represents the course content, learning activities and assessment tasks required of students if they are to achieve successful learning outcomes.

Learning

The learning element comprises two sub-elements: pragmatism and connectivism. Pragmatism is a learning theory which focuses on teamwork and problem solving. Connectivism is a digital theory associated with the dissemination of knowledge, information and data via internet connections, enabling the teaching and learning process to be conducted without the constraints of barriers such as time and location.

Technology

The element of technology comprises three sub-elements: system, security and social. These sub-elements are significant for the SNEM to confirm that social networking is aligned with student needs, especially in order to achieve *security* for data storage and personal information of the user. System refers to the practical implementation of social networking in higher education, whereas universities are needed to provide software, database, hardware troubleshooting (help and support) and internet connectivity for lecturers and students. Finally, the social sub-factor is used for the successful implementation of social networking and to fulfil student needs in terms of Moodle, Blackboard, and other facilities.

Design

Design is an important aspect of social networking because it plays a vital role in terms of usability, interface, navigation and Human–Computer Interaction. Attention to the design aspects is important because it reduces user frustration. Moreover, usability ensures the interface is safe, easy to use, effective, easy to remember, efficient, and visible. While the principles of Human–Computer Interaction ensure that the interface is attractive in term of

fonts, style, graphics, text, and colour. Lastly, navigation aims to create communication between the user and the interface in a web application.

Psychological aspects

The psychological aspects of the SNEM assist lecturers to understand students' behavioural and cognitive attitudes toward the use of social networking in the teaching and learning process. This aspect will fulfil student needs and requirements since lecturer feedback plays a vital role, especially in term of assessments and activities. In social networking constructive feedback is intended to check whether students are on the right track and encourages students to rectify their mistakes and avoid them in future. Moreover, this approach in academic institutions improves student confidence and motivation to complete not only their assessments on time, but also aligns with the unit's aims and objectives. Also, psychological aspects refer to awareness and inspiration; awareness concerns having the knowledge to make accurate judgements, while inspiration occurs when users hear or see something which encourages them to create and develop new ideas and thoughts.

In the research gap table 2, the factors of this model related to the technological context, design aspects and psychological aspects are concluded. Moreover, it has been observed that this model has some sub-factors related to organisational support (i.e. training, teaching and learning methods) and social factors (i.e. user acceptance technology). These factors and sub-factors are used in the research gap to conclude the factors for the initial model SNMHEP. However, this model does not include sub-factors related to top management support, culture and gender/age.

2.8.2. Conceptual model

Jucevičienė and Valinevičienė (2010, 57) present a model of social networking in higher education in their research. They suggest that social networking should be comprised of two basic criteria: firstly, the students' level of comfort with the learning style and the interface; and secondly, the functionality of social networking sites which enables users to group and link them together. This feature is not available in other web-based learning environments such as course management systems. Social networking needs a flexible user-generated environment that challenges traditional views related to prevalent effective management of learning and teaching. In this way, academic service support becomes successful when social networking sites provide tools for networking and grouping, allowing users to connect with their peers.

In figure 9, the ‘communication tools’ are the most significant tools for spreading educational information. It is vital to provide the student with academic support as well as event-sharing information. This in turn facilitates teacher–student collaboration. Specific social networking tools for events, walls, and discussions assist in conveying a message effectively and promptly. These tools may be used by students or staff members to encourage informal communication. Another aspect of social networking is creating a “collaborative learning environment in virtual reality that uses multimedia and provides communication tools to support collaboration among students” (Jucevičienė and Valinevičienė 2010, 57). Hence, a social networking learning environment has to be enriched with a synchronous and asynchronous multimedia environment and communication tools, to provide best practices that accommodate personal learning styles, and to encourage cooperative learning. Whereas, “an asynchronous system is one in which learners can work at their own places and preferred times such as e-mail or online conferencing systems. Meanwhile, synchronous system is that which occurs at the same time for all learners but at different places thanks to the Internet; synchronous systems include text chats and video conferencing” (Chen, Liu and Wong 2007, 217). In this regard, interactive information-sharing tools such as blogs, wikis, and online data processing are preferable. They provide the opportunity for the co-creation of knowledge which is very helpful for working groups and problem-based learning environments. Various knowledge constructs can be created from communication tools which allow users to express themselves in the virtual world. User information can also be expressed as a way to show user achievements. The need to put all educational achievements in one place leads to the creation of a student e-portfolio. Usually, social networking sites have no e-portfolio as a specific tool. In a few cases, students use only two different tools for data storage, and use blogs to create a personal e-portfolio. Therefore, it is essential to ensure that students have adequate tools to create a professional e-portfolio and display it on their personal profile.

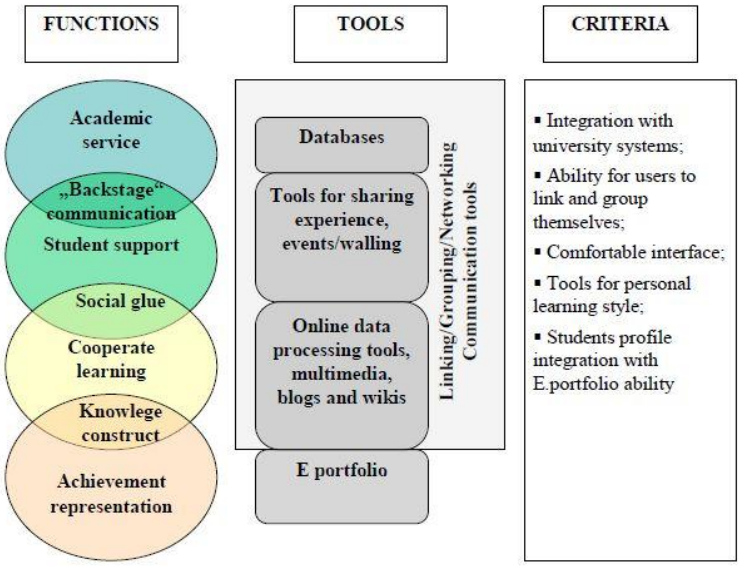


Figure 9: Conceptual Map (Jucevičienė and Valinevičienė *2010, 57)*

Considering the above analysis, a conceptual model was created. In the section on 'Functions', four basic functions of social networking in education are discussed. These functions merge, creating sub-functions which, in turn, add additional value to the main functions. Among these, communication and linking tools are the most commonly needed functions and essential to social networking. In the column 'Criteria' the compliance criteria for each tool are discussed which needs to be considered when selecting a social networking site.

In table 2, this model is used to confirm some sub-factors in the research gap i.e. system and compatibility from technological context, usability and navigation from design aspects, awareness from psychological aspects, training and teaching and learning methods from organisational support. These sub-factors are used for the analysis of the initial model SNMHEP. Conversely, the sub-factors related to security, privacy, Human Computer Interface (HCI), inspiration, motivation, feedback, encouragement, top management support, culture, gender/age and user acceptance technology are not found in the model.

2.8.3. Enterprise Systems Model (ESM)

Ooko and Oduor (2013, 288) proposed a model named the 'Enterprise Systems Model' (ESM) for social media in distance education. This model has four input factors: organisational context, technological context, environment context and student factor (see Figure 10). Together, this set of inputs produces social media benefits for distance education. These benefits are quick access time, mobility, global reach, universal standard, increased

intractability and innovative learning experience. One of the inputs in the 'student factor' is about the 'ICT knowledge and skills' and 'experience with social media'. The other three inputs of the model are discussed below in detail.

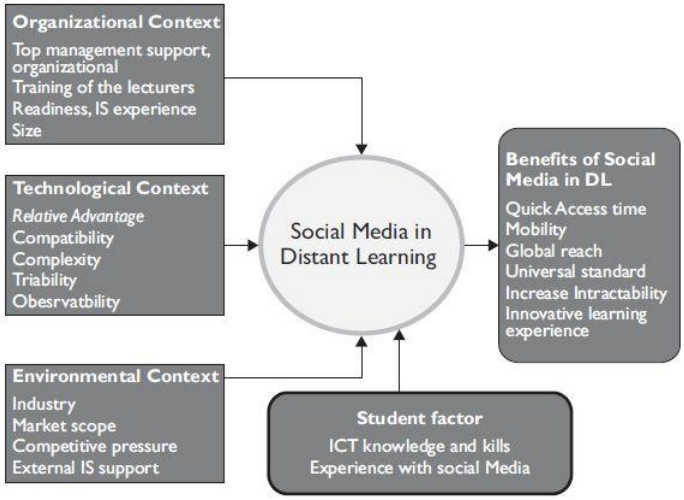


Figure 10: Enterprise Systems Model (ESM) (Ooko and Oduor (2013, 288)

Technological context

According to researchers, few studies have investigated the effect of technological aspects in terms of educational institutions. Here, the innovation diffusion theory for organisations has been applied as the theoretical basis for examining the effects of technological factors on the willingness of universities to implement ESM. "Relative advantage is defined as the degree to which an innovation is perceived as being better than the idea it supersedes" (Ooko and Oduor 2013, 288). Studies have concluded that this variable is positively related to the adaptation of information system innovations. When an information system is perceived to provide relative benefit over the performance of the organisations current system, it is most likely to be adopted. This perception has been supported by the basic diffusion/innovation research, particularly in the case of small businesses. ESM provides many advantages to adopters in terms of enhancing their business processes, managing business growth and decreasing administrative costs and business operations. "In a highly competitive marketplace, these benefits render significant motivations for adopting these technologies" (Ooko and Oduor 2013, 289).

Organisational context

The characteristics of the organisational context are the focus of various studies on the adoption of this technology**.** Organisational readiness, information system size, experience and top

management support are observed to be factors which influence universities to adopt ESM. "Top management can stimulate change by communicating and re-enforcing values through an articulated vision for the organisation. Many studies have found top management support to be critical for creating a supportive climate for the adoption of new technologies" (Ooko and Oduor 2013, 289).

Environmental context

In industry, external information system support, market scope, and competitive pressure are observed to be the factors which encourage universities to implement ESM. The services industry depends on information processing and relies on an information system. Social media tools come in many forms such as social networking, social bookmarking, blogging and multimedia sharing. Some well-known and popular examples of social media tools, that are also used as social media educational tools to supplement and facilitate effective distance education are: Blogging/micro-blogging: Blogger, Word Press, Twitter, Social networking: Facebook, Myspace, LinkedIn, Ning, Social bookmarking: Delicious, Diggo, Collaborative authoring: Wikipedia, Google Docs, Zoho Office Suite, Multimedia sharing: Flickr, YouTube, Qik, Web conferencing: WebEx, GoToMeeting, DimDim (Ooko and Oduor 2013, 289). Jucevičienė and Valinevičienė (2010, 57) discuss the effects of social media on knowledge and information transfer. They conclude that there are obvious benefits in using social media for distance education. Social media services introduce learners, and teachers experience better and new types of interaction and communication. Social networking in distance education keeps teachers and students more connected to each another. Social media tools keep students from feeling alone. These new technologies and trends continuously make distance education evolve.

For the research gap table 2, this model provides a consideration of some sub-factors such as system and compatibility (technical context), user acceptance technology (social factors), and all the three sub-factors of organisational support. However, most of the sub-factors such as security, privacy, usability, Human Computer Interface (HCI), navigation, inspiration, awareness, motivation, feedback, encouragement, culture and gender/age are not available in the model.

2.8.4 Adopted framework

Arthur, Adu-Manu and Yeboah (2013, 73) determined that social networking sites could be implemented and adopted to benefit learning and teaching in private universities. To explore the adoption factors, their theoretical model, Unified Theory of Acceptance and Use of Technology (UTAUT) was considered. This model is shown in Figure 11.

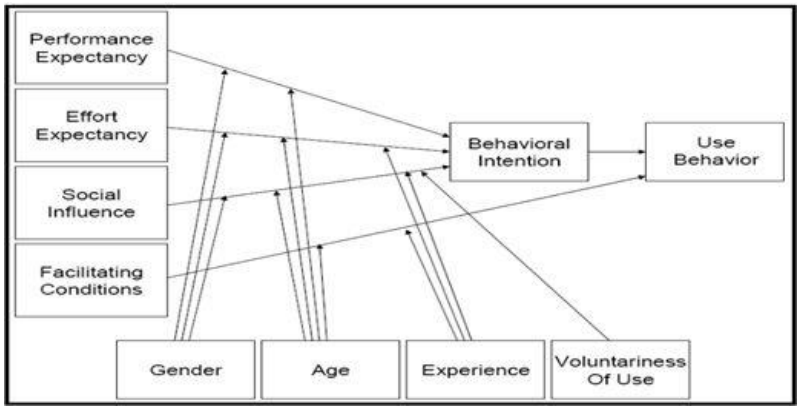


***Figure 11: UTAUT Model* (Ismail 2010, 81)**

Firstly, the UTAUT theoretical model is explained in order to understand the adopted model later on. Ismail's (2010, 81) intention was to "evaluate the international students' acceptance on using the social networking site to support their learning activities, using the UTAUT model, which postulates the constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions on using technology".

It postulates six constructs: self-efficacy, effort expectancy, social influence, performance expectancy, attitude and anxiety toward using technology to discover the behavioural intent. Another two constructs 'behavioural intent' and 'facilitating conditions' effect the 'use behaviour'. The UTAUT model contains four moderating variables: gender, experience, age and voluntariness that influence the primary constructs. The aim of their research is to examine international students' acceptance of social networking sites and to explain, forecast and improve the usage pattern. Moreover, their research also evaluated the UTAUT and its applicability to social networking sites as an innovative learning tool in university education systems.

According to the UTAUT model (Venkatesh et al. 2003), students' acceptance of social networking sites depends on the effort required, social influence, facilitating conditions and performance expectancy. Along with these constructs, the research considered: "How is the performance expectancy/effort expectancy/social influence/facilitating conditions related to the adoption of SNS to support learning activities?" (Ismail 2010, 85).

According to Ismail (2010, 85), the assumptions of the UTAUT model's constructs that are represented in the research questions, lead to the following hypotheses:

> Performance Expectancy (PE) is defined as the degree to which the international students believe that using the SNS will help support their learning activities. The hypothesis 1: PE is positively associated with intention to adopt SNS to support learning activities. Effort Expectancy (EE) is defined as the degree of ease associated with the use of the SNS. While the hypothesis 2: EE is positively associated with intention to adopt SNS to support learning activities. Social influence (SI) is defined as the degree to which an international student perceive that it is important for others to believe that he or she should use the SNS. Moreover, the hypothesis 3: SI is positively associated with intention to adopt SNS as learning technology. Facilitating conditions (FC) represents the organisational support, which includes the constructs of perceived behavioural control, facilitating conditions, and compatibility with other platform of technology. Lastly, hypothesis 4: FC is positively associated with intention to adopt SNS as learning technology (Ismail 2010, 85).

According to the results, H1 is supported:

> Behavioural intention of using SNS as learning tool will only be dependent on the performance expectancy after all the other factors (i.e. effort expectancy, social influence and facilitating conditions) are no longer a problem. H2 is confirmed: the behavioural intention of using SNS to support learning activities is secondly depending on effort expectancy of the international students. Regarding H3, a high percentage indicates it is understood that international students depend highly on their social surroundings and influence. Lastly, in regard to H4, facilitating conditions affect the behavioural intention of using SNS to support learning activities among international students, and this shows that the technology support affects the international students' intention of using the SNS other than just for personal use (Ismail 2010, 87).

In Figure 12, the Unified Theory of Acceptance and Use of Technology (UTAUT) model is merged with additional factors of ICT policies, culture and infrastructure to fill the research gap. An analysis of the data collected from universities indicated that all factors were influencing the implementation and adoption of social networking technologies for teaching purposes, apart from 'level of trust' and 'culture'. Whereas, 'budgeting and accountability', 'policies' and 'command of language' were found to have a negative impact on the implementation of social networking technologies for the purpose of teaching (Arthur, Adu-Manu and Yeboah 2013, 73).

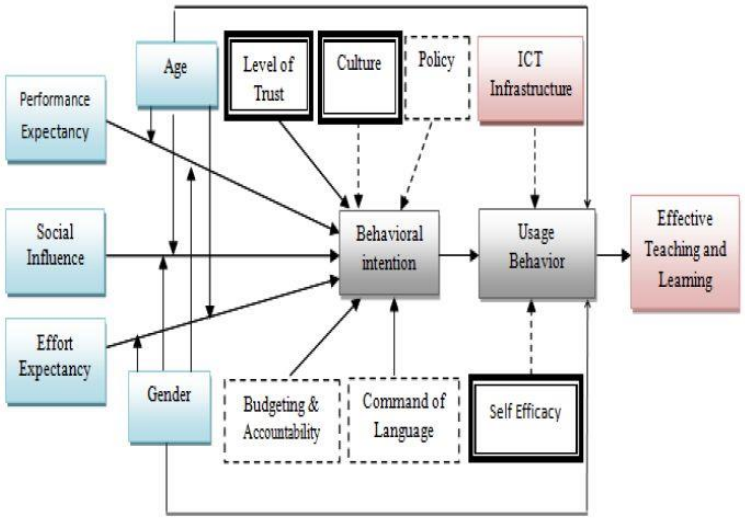


Figure 12: Adopted framework (Arthur, Adu-Manu and Yeboah 2013, 73)

In the research gap (table 2), this model is used to mention factors of technological context, design aspects, and social factors. Besides, it also has sub-factors i.e. top management support (in terms of budget and accountability) and teaching and learning methods of social factors which are used to conclude the factors and sub-factors of the initial SNMHEP. Whereas, sub-factor training and others related to the psychological aspects are missing in the model.

2.8.5. Model showing acceptance to use social networking for learning

Few empirical studies have been conducted to determine the acceptance of social networking tools for the purposes of learning and teaching, and no studies included staff and student perspectives in terms of their different cultures, which is the main focus of this study. Usoro, Echeng and Majewski (2014) present a pilot study that goes some way to addressing the gap by investigating two countries (developing and developed) in order to determine the attitudes, level of acceptance and perceptions of social networking in regard to learning and teaching.

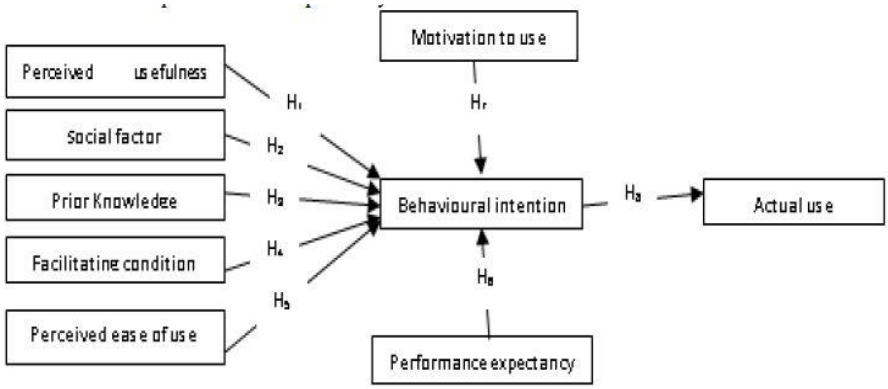


Figure 13: Model showing acceptance of using Web 2.0 for learning (Usoro, Echeng and Majewski 2014, 648)

The conceptual model in Figure 13 shows the design of an initial pilot study comprising nine variables and eight hypotheses. For this purpose, data was collected from 273 students and lecturers from a university in Scotland as well as from 317 students from five universities in Nigeria. The findings show that "all the variables are validated from the data collected in Scotland, but motivation via learning management systems, which are not presently used in the universities in Nigeria, affect intention to use social networking for e-learning in Nigeria. Some of the validated variables are perceived usefulness and prior knowledge" (Usoro, Echeng and Majewski 2014, 644). Moreover, results revealed that seven out of eight variables are significantly related to behavioural intention. These variables are performance expectancy, prior knowledge, social factors and perceived usefulness. This research suggests the need to make these tools available in the first place in the higher education sector in Nigeria, and to implement them so that they can be used easily in a teaching and learning environment. It has been observed that motivation did not have a notable influence on intention possibly because the students were not using learning management systems such as Blackboard or Moodle, whereas, motivation was emphasised in the usage of Blackboard or Moodle platforms to improve learning activities.

In conclusion, this model confirms that the usage of social networking stimulates and facilitates learning. This model plays a vital role in the acceptance of social networking tools for learning and teaching. It will also assist e-learning stakeholders including technology vendors, service providers and content developers. Moreover, it supports management decisions regarding investments in technology to improve the education sector.

This model has usability, Human Computer Interface (HCI), navigation from design factor, culture, age, user acceptance technology from social factors, awareness, motivation and encouragement from psychological aspects, and system and compatibility from technological context. All these factors and sub-factors are mentioned in research gap table 2 to conclude the sub-factors of the initial model SNMHEP. But sub-factors such as security, privacy, inspiration, feedback and top management support are not found in the table.

2.8.6. Enhanced model of acceptance of social networking (Web 2.0) in learning in higher education

Echeng and Usoro (2016) mention that improvement in quality of learning by means of social networking tools requires a good implementation framework that incorporates best practices. Unfortunately, insufficient research has been conducted to determine what comprises best practice for the implementation and adaptation of social networking in learning activities. Therefore, the previous model (Model showing acceptance of using Web 2.0 for learning) is used for new study as an enhanced model of acceptance of web 2.0 in learning in higher education in terms of the perspectives of the students and lecturers. This research contributes to the area that focuses on the perception of students in regard to the rapid increase in the use of social networking tools for learning activities. This research reports that an increase in the usage of social networking tools in the higher education sector is positively related to perceived ease of use, motivation to use it, performance expectancy, perceived ease of use, social factors and prior knowledge. The research findings relate to the perspectives of students and lecturers and indicate how the use of social networking tools for learning in education can be rapidly increased.

The constructs of the model and their implications are shown in Figure 14.
"**Perceived usefulness**: Give users reasons for online collaboration and tell them the usefulness of this participation in their learning processes. **Social factors:** Get students to start and move together in learning groups and encourage activities using interventions such as emails. **Motivation to use**: Encourage students to write constructively and ask them to collaborate with others by giving feedback to each other and participating in peer review. **Behaviour**: Frequently check their online activities and encourage them to use Web technologies to support themselves in their learning and to establish a network of learning using technologies.

Facilitating conditions: Ensure that users have access to institutional or personal ICT facilities; also support users at different stages of learning activities when needed. **Ease of use**: Ensure that the platforms or tools used for learning activities are reasonably easy (not requiring much training effort) to serve as motivation to users, and this also enhances confidence and frequency of use. **Prior knowledge**: Get users to be familiar with the platform or tools so that they are motivated to use it frequently. **Performance expectancy**: Give users a clear importance of participation that relate with reward and expectation in performance in test assignments, in order to motivate quality participation" (Echeng and Usoro 2016, 98).

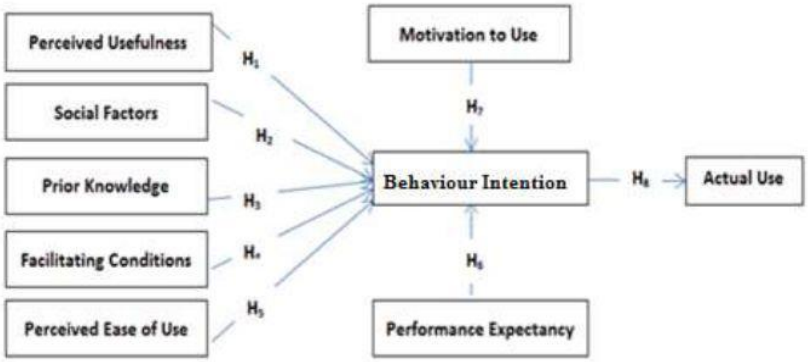


Figure 14: Enhanced model of Acceptance of Web 2.0 in Learning in Higher Education (Echeng and Usoro 2016, 95)

Quantitative data analysis showed that learning tools such as social networking (on Web 2.0) need to be simple, easily accessible, easy to use and find. Moreover, guidelines for the best use of these tools should be provided for the students, especially new students. The best use of these learning tools could be achieved when participation and use is made compulsory for every student. For motivation, allocating points for commenting and participating via posts and giving extra marks for students' overall performance would encourage positive behaviour. The awareness of these learning tools can create positive attitudes in students towards social networking. Also, the provision of training on the use of these tools for those who are not familiar with platforms, tools and applications will encourage participation. Further, the application or tools should be available offline as well to cater for those with restricted or poor internet service. All the above implications for practice need to be considered to motivate students to use social networking tools for learning (Echeng and Usoro 2016).

This model is considered for research gap in table 2. It has sub-factors which are related to the design aspects, social factors and psychological aspects. These sub-factors are considered for the formation of the initial model of SNMHEP. Yet, some sub-factors related to security, privacy, inspiration and top management support are not found.

2.8.7. A model for using social networking sites in educational context

Stanciu, Mihai and Aleca (2012, 64) propose a model for using social networking in education. The main aim of the research is to analyse the influence of social networks on education in Romanian higher education. By employing a theoretical framework related to the educational value of social networking sites, they suggest a model for the adoption and use of Facebook for teaching and learning in the higher education sector. For this purpose, data was collected through a survey of students in the 'Bucharest Academy of Economic Studies'. Results show that social networking has become popular among students and can be considered as a valuable learning tool for academics.

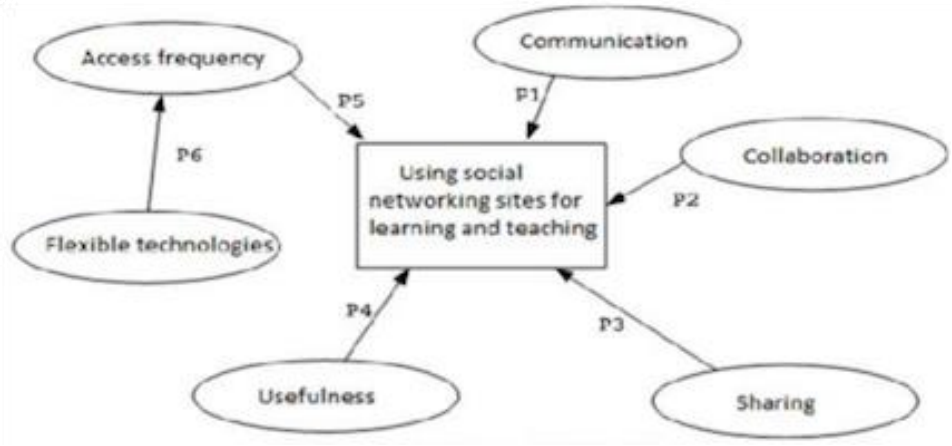


Figure 15: A model for using social networking sites in educational context (Stanciu, Mihai and Aleca. 2012, 64)

As shown in Figure 15, researchers have made several proposals regarding the use of social networking sites, that will be considered based on the data collection from academics and students. This model has six constructs: communication, collaboration, sharing, usefulness, flexible technology, and access frequency. Communication with lecturers through social networking can be considered an extension of the traditional classroom communication face-to face. The first proposition is "Communication has a significant influence on the potential use of social networking sites for educational purposes" (Stanciu, Mihai and Aleca 2012, 65).

Collaboration emphasises that social networking sites can support learning. Also, students can join various study groups corresponding to a certain class, group and faculty with which they can communicate in order to acquire and share information effectively and conveniently. The second proposition is "collaboration has a significant role in using social networking as a support for educational activities" (Stanciu, Mihai and Aleca 2012, 65). Sharing of knowledge and resources by using social networking sites allows the sharing of multimedia resources such as videos, photos and hyperlinks to other websites. One of the main benefits of using social networking as a tool for academic purposes is that it involves sharing of knowledge and collaborative group work. The third proposition is "Resource sharing has a significant influence on the use of social networking sites in educational purpose" (Stanciu, Mihai and Aleca 2012, 65).

The usefulness factor concerns "the degree to which a person believes that using a particular system would enhance his or her job performance" (Stanciu, Mihai and Aleca 2012, 65). The usefulness of social networking sites is that it enables users to exchange information, resources and communication which can be achieved through both semi-public and public profiles. The fourth proposition is "The usefulness has a significant influence on the use social networking sites for educational purpose" (Stanciu, Mihai and Aleca 2012, 65).

In terms of frequency of access, some researchers believe that the usage of social networking sites in daily life and the fact that the majority of users spend more time online give good support to the educational context. The fifth proposition is "Frequency of hits has a significant influence on the use of social networking sites in educational purpose". (Stanciu, Mihai and Aleca 2012, 65)

The use of flexible technologies in IT & C gives anytime and anywhere access to websites through mobile communication device. The sixth proposition is "Flexibility of access provided by new technologies has a significant influence on the frequency of accessing social networking sites" (Stanciu, Mihai and Aleca 2012, 65).

The survey results confirm propositions 1, 2, 3, 4 and 6. Whereas, the research did not show a specific relationship between the use of social networking sites and frequency of hits for academic purposes, so proposition five could not be verified.

Regarding research gap in table 2, this model shows technological context, design aspects, and some sub-factors of psychological aspects, organisational support and social factors. These factors and sub-factors are considered for the initial model SNMHEP. However, the sub-factors such as inspiration, awareness, motivation, top management support and user acceptance technology are missing in the model.

2.8.8. Model for evaluating social learning impact on educational achievement

Blair and Serafini (2014, 28) propose a model for evaluating the impact of social learning on educational achievement. This has four aspects: learner, device, social and information. In Figure 16, the four areas showed in the model are: mobile learning, device usability, interaction learning and social technology.

Researchers have explained that the quality of learning depends on the usability of social technology, the device, and the interaction to allow users to acquire knowledge. For mobile learning, it is important to develop a social community first. To answer the question about what constitutes social learning, they state that it is "a method of learning using mobile devices (smart phones, tablets, or computers) to enable peer review through social media technology in eLearning. Social media engages internet users and social learning uses their power for education" (Blair and Serafini 2014, 28). Nowadays, learners prefer this method of learning because it encourages them to communicate socially with their peers. Since the new generation of learners overlooks printed magazines, books and newspapers and seeks materials online, this mindset shift seems natural. Further, the number of users of social networking sites such as Twitter, Facebook and Google+ are increasing daily. So, being innovative, these researchers' approach to learning by highlighting the great significance of social media sites in classrooms can leverage the engagement of current users of this technology.

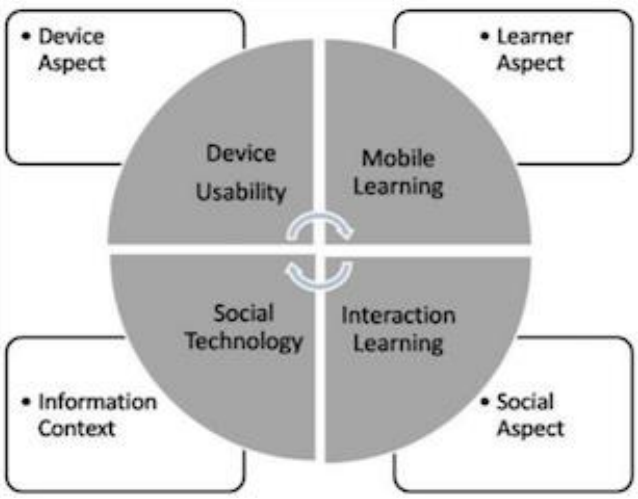


Figure 16: Model for evaluating social learning impact on educational achievement (Blair and Serafini 2014, 28)

The next question which they address is whether it works. The proliferation of the users of social media indicate that youth worldwide are eager to interact with their peers and are highly skilled at doing so in a personal context.

The developments and improvements in web technology can be used for academic purposes, especially peer reviews; students can develop a sense of community with one another while focusing on the main learning points in their subjects. Students see the advantages of peer reviews that result in stronger memory, and social learning through social networking. It also makes the required knowledge accessible and easier to understand. Students learning English can use this new form of learning to develop their writing skills. It is essential to implement these strategies and continue practicing outside the class in a media which further engages the students.

This model has various sub-factors such as system and compatibility, usability, awareness, and teaching and learning methods. These sub-factors are considered in research gap table 2 for the development of the initial model SNMHEP. Whereas, some sub-factors of technological context (security and privacy), design aspect (human computer interface (HCI) and navigation), psychological aspects (inspiration, motivation, feedback and encouragement), organisational support (top management support and training) and social factors (culture, gender/age, user acceptance technology) are not found in the model.

2.8.9. The pyramid of blended learning

Paulet-Crainiceanu (2014, 797) addresses the trends in Web 2.0 (social networking) learning, the constructivist theory, and scholars' views, as well as the urgent need to reform the Romanian higher education sector. He presents the blended learning model which consists of the concept of student- teacher collaboration.

In Figure 17, the model is illustrated as a pyramid, that has 'enthusiastic teacher' as its foundation. The teacher manages two kinds of interaction: one is the traditional face-to-face interaction while the other is based on social networking, mentioned in the margin the bottom. In support of these social networking for teaching and learning activities, the teacher requires support from the university and cooperation from his co-workers. In the context of face-to-face interaction, the teacher's expertise to guide students plays an important role in assessing student work and refining knowledge. The 21st century students are pro-active students. They must have motivation to work and learn and the urge to explore issues with their teachers and co-workers, and to innovate by learning. According to the model "when the 'enthusiastic teacher' meets the 'pro-active student' on a basis of cooperation, mutual trust and thirst for knowledge, the top of the pyramid is reached: co-produced knowledge, which is useful for the student in real life and is rewarding for the teacher" (Paulet-Crainiceanu 2014, 798). Consequently, in order to achieve the goals of the academic process, students and teachers should work together. The model is both teacher- and student-centred and none of them is seen as passive or sitting on the sidelines of the academic process. According to the model, both student and teacher could benefit from the interaction provided by social networking technologies to increase cooperation and collaboration, although institutional assistance is required. However, the traditional face-to-face interaction remains equally significant for a good interaction between student and teacher and is the basis of the relationship.

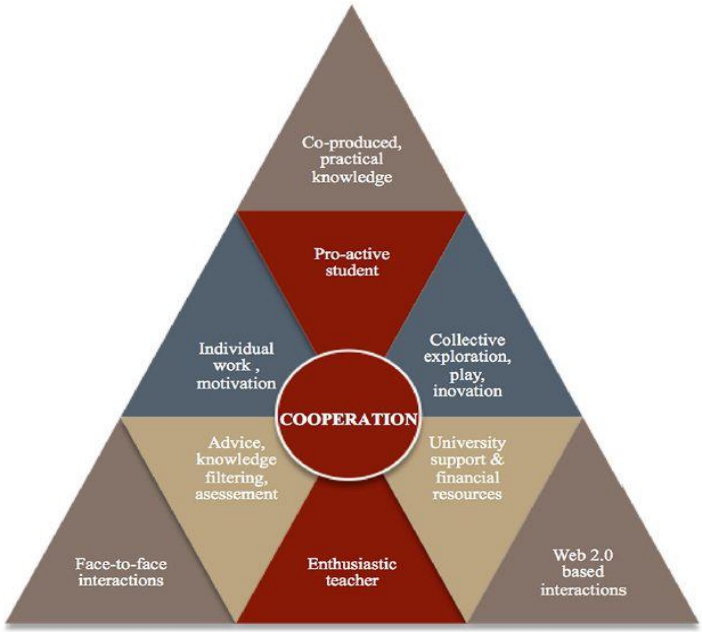


Figure 17 : The pyramid of blended learning (Paulet-Crainiceanu 2014, 797)

According to Paulet-Crainiceanu (2014, 798), "this model is grounded on the premise that the condition for successful blended learning is the enthusiasm and will of both teacher and student to develop a knowledge-gathering-based, inter-connection. While this may be considered an idealist approach and a drawback of the model, the researcher of this study argues that the constructivist theory on learning and the social networking philosophy are based on this premise". Hence, the model suggests that teacher and students sometimes feel powerless and experience boredom with these sites, demanding the need for a change in students' attitudes, so the students should not expect the teacher to be pro-active; they should learn willingly and the teachers should engage students in the sharing of information and making use of face-to-face and social networking sites for communication.

In summary, this model shows an overview of the contrasting views and biases in regard to learning via social networking. "Under the pressure of a 'replacement discourse', the role of the student, teacher and university are under pressure to change. The researcher argues for a tuning in attitude for all the members in the education 'business', without altering the institutionalised education values" (Paulet-Crainiceanu 2014, 798). This transformation would not only address the higher education issues in Romania but could assist the 'troubled faculty-student interaction' in respect to recovering the confidence in the academic process. This proposed educational model, which focuses on teacher and student, is based on the concept that universities can experiment with social networking technologies in a constructivist

direction, expecting unnecessary risks, but addressing the faculty-students relationship and status issue.

This model has some sub-factors such as system and compatibility, inspiration, awareness, motivation and feedback, top management support and training. These sub-factors are considered for research gap in table 2, for the conclusion of the sub-factors of initial model of SNMHEP. Conversely, this model does not include factors related to design aspects and social factors. Besides, some sub-factors such as privacy and security, encouragement, and teaching and learning methods are also missing in the model.

2.8.10. The decomposed theory of planned behaviour (DTPB)

Depicted in Figure 18, Amundson (2014, 57) proposed a best-fit path model namely, 'The Decomposed Theory of Planned Behaviour' (DTPB). This model's factors are peer influence, compatibility, superior influence, and facilitating condition resources guided through mediating factors of subjective norms, perceived behavioural control, and attitude to identify the behavioural intent of teachers to adopt social networking tools to collaborate and communicate with peers. This best-fit model addresses all the other factors of DTPB simultaneously. "In order to have behavioural intention, it is stronger if all of these factors are present in an individual, and not just one or two on their own. The factors collectively work together to influence behaviour intention" (Amundson 2014, 100).

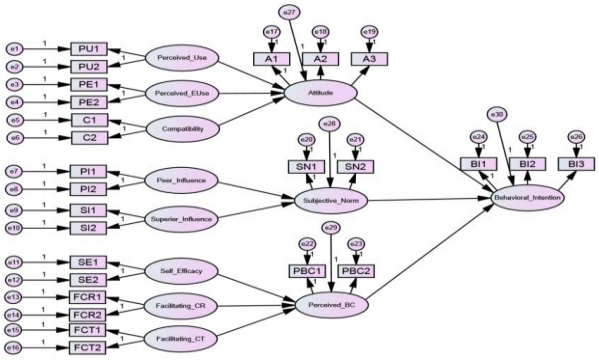


Figure 18: The Decomposed Theory of Planned Behaviour (DTPB) (Amundson 2014, 57)

This study concentrated on the empirical evidence of the perception of benefits, currents uses, and the best-fit path model to explore the behavioural intention of the teacher to adopt social networking tools to collaborate with peers. **"**Understanding if preservice teachers are using

social networking technologies, why they are using it, and what they intend to do through the use of social networking technologies, will be beneficial to teacher preparation faculties in colleges across the United States" (Amundson 2014, 5). Staff members then may determine whether encouraging the use of social networking tools by their academics will benefit the teachers' future collaboration, or whether it is only a trendy tool. Determining the factors and identifying their impact on behavioural intention, according to the model, assists staff to prepare for and to understand the predictive factors for social networking tools. This determination allows valuable participation in social networking tools or allows staff members to elect to not use these tools in the existing teacher preparation program.

Attitude

"The factor of attitude (β =. 441) is a strong desire to use social networking technologies to collaborate and is impacted by compatibility (β =.93) if the preservice teacher perceives how well the tool of social networking works with collaboration" (Amundson 2014, 100). There is a strong indication that if preservice teachers consider Web social networking tools as compatible with collaboration, then they are likely to have a 'strong desire' to use these tools, that will lead to behavioural intention. However, there was no evidence to suggest that the perceived ease of use or perceived use makes preservice teachers feel that these tools will increase their work efficiency and assist in good collaboration. The components of attitude are perceived ease of use, perceived usefulness, and compatibility with the theory.

Perceived behavioural control

"The factor of perceived behavioural control (β=. 535) refers to an individual's self-confidence and whether they feel in control when they are using social networking tools. Perceived behavioural control is strongly impacted by facilitating condition-resources (β=.86), which refers to an individual's ability to have access to the technology needed to use social networking technologies to collaborate" (Amundson 2014, 101). If pre-service teachers have ready access to social networking tools, they will feel more confident and then are more likely to use these tools for collaborative purposes. However, the self-efficacy factor indicates that individual perceptions of social networking did not have a strong relationship in the path model. In the past, pre-service teachers have had great experience with these technologies, and they agree that if they have resources, then their self-confidence (perceived behavioural control) will improve. They should know the technology because they have used it, and do not require further instructions. The current generation has learned how to use technology by just playing

around with it, and that influences their behavioural intention when introduced to new technology.

Subjective norm

"The factor of subjective norm refers to how the referent groups (peers and superiors) influence the decisions to adopt technologies" (Amundson 2014, 102). Findings show that peer influence is a strong indicator, which means that a preservice teacher's peers have a notable influence on her/his intention to use social networking tools in the future when mediated via subjective norms.

In summary, this research found through this model that preservice teachers are using social networking tools for their teacher preparation programs. Preservice teachers perceive sharing resources and peer interaction as the biggest collaborative benefits of these tools. When the combined factors of compatibility, peer influence, subjective norms, attitude, perceived behavioural control, facilitating conditions, and superior influence are identified, preservice teachers intend to collaborate via social networking tools as professional teachers. The teacher preparation program faculty should be encouraged to use social networking tools in their teaching with the understanding that this will benefit the teachers' future collaboration.

This model has sub-factors such as system and compatibility, usability, human computer interface (HCI), navigation, motivation, feedback, training, teaching and learning methods, gender/age and user acceptance technology. All these sub-factors are considered for research gap table 2. Nonetheless, some sub-factors such as security, privacy, inspiration, awareness, encouragement, top management support and user acceptance technology are not found.

Finally, examining the above models will provide a clear and concise foundation of the required factors for developing a social networking model in the higher education sector, because, none of the above models contain all of the above-mentioned factors. For higher education in Pakistan a suitable social networking model is required that has all five factors (technological, psychological, design, organisational and social). Accordingly, these social networking models will be considered to define the research gap and based on that, an initial model (SNMHEP) will be developed for this study

2.9 Research gap

The literature concerning social networking experiences in the higher education sectors of developing countries such as Pakistan is very minimal. Understanding the current practices and

having an awareness of social networking tools and their use in the higher education sector can be useful when planning strategies for the implementation of the latest technologies. This can assist in the teaching-learning processes in the higher education sectors of developing countries (Soomro, Zia and Jafri, 2015). Regarding librarians, Arif and Mahmood (2012) assert that in Pakistan, no study has been conducted to date regarding the adoption of social networking tools by librarians.

Kundi and Nawaz (2014) state that the use of ICT in higher education institutions is a worldwide issue for researchers, institutions, societies and governments. Also, the main reason for this research gap in Pakistan between practice and theory is 'Lack of Research' (also see section 2.6.3). This lack of data about the local environment, the facility to record user views, the requirements and finally the planning for implementation create hindrances.

In Table 2, worldwide, different models are found which are specifically designed for the implementation of social networking tools in the higher education sector. Issa, Isaias and Kommers (2016, 335) designed a 'Social Networking and Education Model' (SNEM) which comprises five major areas: psychological aspects, design, technology, learning and teaching methods. A conceptual model of social networking in higher education was proposed by Jucevičienė and Valinevičienė (2010, 57) which consists of three modules: functions, tools and criteria. Each module has further categorisations. The functions are academic service, student support, cooperative learning, and assessment records. Also, databases, tools for sharing experience events, online data processing tools, multimedia, blogs, wikis, and e-portfolio are categorised as tools. Finally, a criterion is established for the smooth and flexible integration of this model into university systems. Ooko and Odour (2013, 288) presented a model of social media for distance education. The unified theory of acceptance and use of technology (UTAUT) was proposed by Ismail (2010, 84), while an extension of the same model was proposed by Arthur, Adu-Manu and Yeboah (2013, 73). Stanciu, Mihai and Aleca (2012, 64) created a model for social networking sites in the education context. Blair and Serafini (2014, 28) proposed a model for evaluating the impact of social learning on educational achievement. Also, Amundson (2014, 57), Paulet-Crainiceanu (2014, 797) and Usoro, Echeng, and Majewski (2014, 3) proposed various social networking models that are presented in Table 2 and show the research gaps. Besides, this research gap is based on the already discussed social networking models in section 2.7. In table 2 it has been observed that three models namely; 'social networking and education model (SNEM)', 'enhanced model of acceptance of social

networking in learning in higher education' and 'a model for using social networking sites in educational context' have ticked boxes for most of the sub-factors of the factors, however, social networking and education model (SNEM) does not include some sub-factors such as top management support, culture and gender/age. Similarly, the missing sub-factors in 'enhanced model of acceptance of social networking in learning in higher education' are security, privacy, inspiration and top management support. Likewise, 'a model for using social networking sites in educational context' has no sub-factors related to inspiration, awareness, motivation, top management support and user acceptance technology. Therefore, this research gap reveals the need for a model specific to Pakistani higher education sector which has all the factors and sub-factors available in it.

Table 2: *Research Gaps*

Model And Researchers	Technological Context			Design Aspects			Psychological Aspects					Organisational Support			Social Factors		
	Systems & Compatibility	Security	Privacy	Usability	HCI	Navigation	Inspiration	Awareness	Motivation	Feedback	Encouragement	Top Mgt support	Training	Teaching & learning methods	Culture	Gender / age	User acceptance technology
Social Networking and Education Model (SNEM), Issa, Isaias and Kommers 2016	X	X	X	X	X	X	X	X	X	X	X		X	X			X
Conceptual model, Jucevičienė and Valinevičienė 2010	X			X		X		X					X	X			
Enterprise systems model, Ooko and Odour 2013	X											X	X	X			X
Adopted framework, Arthur, Adu-Manu and Yeboah 2013	X	X	X	X	X	X						X		X	X	X	X
Model showing acceptance to use social networking (Web 2.0) for learning, Usoro, Echeng, and Majewski 2014	X			X	X	X		X	X		X		X	X	X	X	X
Enhanced model of acceptance of social networking (web 2.0) in learning in higher education, Echeng, Usoro and Ewuzie 2016	X			X	X	X		X	X	X	X		X	X	X	X	X
A model for using social networking sites in educational	X	X	X	X	X	X				X	X		X	X	X	X	

context, Stanciu, Mihai and Aleca 2012																	
Models for evaluating social learning impact on educational achievement, Blair and Serafini 2014	X			X				X						X			
The pyramid of blended learning, Paulet – Crainiceanu 2014	X						X	X	X	X		X	X				
The Decomposed theory of planned behaviour, Amundson 2014	X			X	X	X			X	X			X	X	X	X	

Note: X indicates presence of the factors in that model

At this stage, the factors (i.e. technological context (Guo, Gao and Chen 2013), design aspects (Srinath 2015), psychological aspects (Lin, Tov and Qiu 2014), organisational support (Naik, 2015) and social factors (Dholakia, Bagozzi and Pearo 2004) were considered for the initial social networking model in higher education in Pakistan (SNMHEP). These factors were obtained from the literature review and further grouped under each heading. Moreover, each factor has its own colour scheme which is used throughout the whole study: technological context has green, design aspect has yellow, organisational support has pink, social factor has blue and psychological aspect has red.

2.10 Social networking model in higher education in Pakistan (SNMHEP)

It has been observed (in Table 2) that no model shows the presence of all factors. Even though some boxes are ticked, still other significant factors are missing. None of these models can be used for higher education in Pakistan because of specific technological, cultural and social aspects. Hence, there is a need to design a model as per the needs of Pakistani higher education. The following sections will discuss in detail factors of the initial social networking model in higher education in Pakistan (SNMHEP).

2.10.1 Organisational support

Organisational support has three aspects: teaching and learning methods, top management support, and training which enable the smooth implementation of the model.

2.10.1.1. Teaching and learning methods

Organisational support is required to establish the criteria for teaching and learning methods (Issa, Isaias and Kommers 2016). Regarding training, Arthur, Adu-Manu and Yeboah (2013,

77) maintain that both faculty and students need to be trained on the use of social networking technologies. The management of academic institutions must therefore organise regular workshops and seminars. This will improve both student and teacher knowledge of the use of social networking technologies for learning and teaching.

Paulet-Crainiceanu (2014, 798) mentions in the learning model, "The model is both student- and teacher-centred and neither one of them is seen as passive or sitting on the sidelines of the educational process. According to the model, both teacher and student could benefit from social networking tools interactions in order to enhance collaboration and cooperation, but institutional help is needed. Yet, the traditional communication remains equally important for a good cooperation between teacher and students, while it represents the base ground of the relationship". Moreover, organisational support in various social networking models are mentioned by many researchers in their studies and creation of social networking models (Amundson 2014; Arthur, Adu-Manu and Yeboah 2013; Ismail 2010; Issa, Isaias and Kommers 2016; Jucevičienė and Valinevičienė 2010; Ooka and Odour 2013; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014).

Based on the section 2.8.1, according to many researchers (Driscoll 2002; Lalonde and Castro 2015; Murphy et al. 2004; Oliver and Trigwell 2005; Thompson et al. 2008) teaching methods are based on four factors: blended learning, learning to learn, pedagogy and curriculum. Each factor is further divided into sub-factors. Blended learning is a combination of both face-to-face learning (traditional learning) and online learning. It is essential in teaching and learning to deliver knowledge and materials to the students. 'Learning to learn' provides the definition of learning since it includes a set of skills and principles to help students learn more efficiently and effectively. Pedagogy and curriculum are based on professional practices, guiding, leading, teaching principles and methods of teaching. whereas Curriculum relates to activities and assessments which students will complete to attain academic outcomes. The learning factor comes from learning theories, especially, social learning and learning styles (Issa 2016, 336).

Pragmatism and Connectivism are two categories of learning theories. Pragmatism is based on hands-on problem solving, experimenting, teamwork and projects which is later used for

decision making (Duke, Harper and Johnson 2013; Kivinen and Ristela 2003). However, the connectivism for the digital age states that data, information and knowledge are disseminated through a network of connections, therefore, the teaching and learning methods comprise the ability to construct and traverse the networks by using the latest technology (Siemens 2017). The different learning styles include read/write, visual, kinesthetic learning modes and auditory (Felder and Silverman1998; Murphy et al. 2004). In visual learning the learners like to use flowcharts, graphs, maps, and drawings despite audio and text. In this type of learning the learners rely on graphical presentation of information and visual cues which can be understood easily. Moreover, it helps leaners to understand the concept and organise the ideas being presented. The group of auditory learners prefer to speak and listen rather than taking notes of lectures. They have the ability to discuss and argue with other students and lecturers in order to understand the concepts being studied. The technology helps them to rewind, pause, forward the audio for better understanding. These types of learners are well equipped to do the interpretation of abstract perceptions into essays and arguments (Issa 2016, 337).

2.10.1.2. Top management support

Arthur, Adu-Manu and Yeboah (2013, 78) suggest that top management should establish a proper auditing group to monitor the use of this technology. This will show the performance of the university's faculty and students in terms of the performance of the technology. Also, a policy should be developed to govern the usage of social networking technologies to ensure that students and faculty staff do not misuse it. Besides, lecturers should encourage social networking sites for e-learning because staff have a strong influence on their students and other faculty members. With regard to social networking usage, management should consider this technology for their faculty appraisal. This will also encourage all lecturers in the institutions to use the social networking technologies in their teaching. Moreover, an ICT team should be assigned to provide assistance to staff members and students who have difficulty using social networking technologies. This team will provide guidance on the usage of social networking technologies and other technical issues.

Ooko and Odour (2013) have found in their model of social media for distance education that top management support is essential for the successful adoption of information system

innovations. Top management can motivate change by strengthening values through a vision for academic institution. “Many studies have found top management support to be critical for creating a supportive climate for the adoption of new technologies” (Ooko and Odour 2013, 298). In Pakistan, the top management support in higher education sector refers to the Ministry of Science and Technology (https://most.gov.pk/), the Ministry of Federal Education and Professional Training (http://mofept.gov.pk/), the Higher Education Commission and the board of directors of each university.

2.10.1.3 Training

Jucevičienė and Valinevičienė (2010, 56) “shared their large practice on social networks creation for academic institutions’ learning purposes, that guidelines included training people to use the tool; give users room to discuss new ideas and don’t over moderate conversations; place thoughtful limits on content authoring, sourcing and rating; do not allow anonymity; the social network system must integrate with other systems; encourage freshness and frequency with regular content updates by community leaders; promote adoption and ongoing use by celebrating the findings, activity and results of your network; document what constitutes misuse and make it visible, so the network becomes self-governing; and remember that these tools are user-driven by nature, so the measure of success is participation, choose a platform that is easy to use, proven and intuitive”. Moreover, the training factor for a social networking model is suggested by researchers (Amundson 2014; Echeng, Usoro and Ewuzie, 2016; Issa, Isaias and Kommers. 2016; Jucevičienė and Valinevičienė 2010; Ooka and Odour 2013; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014).

2.10.2. Social factors

Social factors should be considered such as culture, values and gender. Also, the university should take a positive approach to ensure the successful adoption of this technology and a smooth transition from traditional to more modern teaching and learning approaches (Dholakia, Bagozzi and Pearo 2004). Social factors have three components: culture, gender/age, and user acceptance of technology.

2.10.2.1. User acceptance of technology

This factor is an interpersonal agreement that connects people or individuals within a specific situation. There are other external factors that might affect the acceptance of this technology. Research also supports the argument that social factors are positively related to the intention to

use social networking as learning tools (Usoro, Echeng and Majewski 2014). Regarding the acceptance of technology in a social networking model, universities and colleges are required to provide a student database, troubleshooting, internet connectivity, and software and hardware for both teachers and students. For the effective implementation of social networking, students require new media technology and applications like Moodle, Blackboard and others (Issa, Isaias and Kommers 2015, 338).

2.10.2.2. Culture

Culture is an essential aspect of the social factor. "Additional factors of ICT infrastructure conditions, policies and culture were considered to fill the gap" (Arthur, Adu-Manu and Yeboah 2013, 77). Usoro, Echeng, and Majewski (2014, 448) state that "perceived usefulness is the belief of an individual that technology will make their work better". Moreover, it is a factor that can affect the acceptance of technology and the variable is valid across various cultures. Also, other studies have confirmed this factor (Ismail 2010; Usoro, Echeng, and Majewski, 2016; Stanciu, Mihai and Aleca 2012).

2.10.2.3. Gender and age

Gender and age in the social networking model are mentioned by Arthur, Adu-Manu and Yeboah (2013). Similarly, these factors are also expounded by many researchers in their social networking models (Echeng, Usoro and Ewuzie 2016; Ooko and Odour 2013; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014). "Social media has become a part of almost everyone's daily routine, but how it's used can differ based on age, race and ethnicity, household income and especially gender" (Olivas 2019, para 1). To the best of our knowledge, none of the studies conducted in Pakistan discusses gender and age perspectives (Olivas 2019) in the use of social networking models in Pakistan.

2.10.3. Psychological aspects

The psychological aspect will assist lecturers to understand their students' behavioural and cognitive approach towards the use of social networking model in the teaching and learning process (Issa, Isaias and Kommers 2016, 340). The psychological aspects are inspiration, awareness, motivation, constructive feedback and encouragement. Additionally, this factor will allow students to fulfil their study requirements effectively, since lectures delivered by means of these social networking technologies play a vital role in assessments and learning activities.

2.10.3.1. Motivation

"By the educational model specific necessities are learning as knowledge construction and accumulation; community building and socialisation; strengthening motivation for learning" (Paulet-Crainiceanu 2014, 797). The acceptance of this approach in the higher education sector will improve student motivation and confidence to complete the assessment activity on time, and most significantly, will align with the unit aims and objectives (Amundson 2014; Blair and Serafini, 2014; Echeng and Usoro 2016; Issa, Isaias and Kommers 2016, 340; Usoro, Echeng and Majewski 2014).

2.10.3.2. Inspiration

"Inspiration is a process that takes place when a user sees or hears something that causes them to develop and generate new ideas" (Issa, Isaias and Kommers. 2016, 340). An amazing benefit of using social media is to educate and inspire students. After the connection has been established between the staff and students on social media, it will increase the reach out to their community. "Social channels as part of an intentional communications strategy that simultaneously educates and inspires" (Stoller 2015, para 9).

2.10.3.3. Encouragement

Encouragement is intended to help users move ahead towards an aim or goal. Several authors (Issa, Isaias and Kommers 2016, 340; Echeng and Usoro 2016; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014) have mentioned encouragement as a sub-factor of their social networking models. According to Leis (2014) states that Twitter is an effective tool to encourage confident students to become autonomous learners.

2.10.3.4. Awareness

The aim of awareness is to have judgement and knowledge of something (social networking). Regarding the social networking model for the higher education sector, Usoro, Echeng and Majewski (2014, 68) mentioned that the utilisation of these tools for academic purposes as well as awareness is needed to derive benefits from them (Echeng and Usoro 2016; Issa, Isaias and Kommers 2016; Paulet-Crainiceanu, 2014).

2.10.3.5. Constructive feedback

Constructive feedback is intended to confirm whether the students are on the right track, and to encourage students to improve themselves and learn from their mistakes. Moreover,

constructive feedback is intended to increase student courage and awareness, inspire and motivate them during the process of learning, encourage their learning, and will improve their personal and professional skills by using the social networking technology and, specifically, accessing their lecturers' regular feedback (Amundson 2014; Echeng and Usoro 2016; Issa, Isaias and kommers 2016, 340; Paulet-Crainiceanu 2014; Stanciu, Mihai and Aleca 2012).

2.10.4. Design aspects

During the design phase, it is essential to consider the site's usability, navigation, human–computer interaction and interface (Issa, Isaias and Kommers 2016, 339). These considerations will assist the higher education sector to understand students' behavioural and cognitive approach towards the use of social networking. Hence, for social networking implementation without user frustration, design plays a significant role in this model, especially in terms of usability, interface, navigation and human–computer interaction (HCI).

2.10.4.1 Usability

Usability means a user interface that is easy to understand and efficient. Usability refers to methods which are used in the design process to improve ease of use. Moreover, it means that the interface is effective, easy to learn, safe, easy to remember, visible, practical, efficient, easy to use and evaluate, and delivers a satisfactory experience.

The social networking tools to be used for teaching and learning must be based on two criteria: "(1) students should be comfortable with the interface; and (2) it should be associated with their learning styles" (Usoro, Echeng and Majewski 2016, 1136). They recommended platform environments such as course management systems as a very efficient means of improving the effective use of social networking tools in e-learning.

Arthur, Adu-Manu and Yeboah (2013) in a research on private universities in Ghana, claim that in order to successfully implement social networking technologies, it is important to improve the ICT infrastructure of the institution first. "The speed of the internet should be enhanced; a much more robust network infrastructure should be established because students are particular with how secured the system is" (Arthur, Adu-Manu and Yeboah 2013, 77). Hence, if ICT infrastructure is improved, professors and students would have a consistent interest in the usage of the social networking technologies for learning and pedagogical purposes.

Regarding the significance of top management support in a social networking model, Arthur, Adu-Manu and Yeboah (2013, 77) state that university managements should provide laptops and systems for all their students which would strongly encourage them to engage with the technology. A wireless network must be set up in the university. The access to the network through wires will affect the mobility of teachers and students when using the technology. At worse, hotspots must be established on campus where students can use the technology. Moreover, the significance of usability in the design of a social networking model is mentioned by many researchers (Amundson 2014, 57; Arthur, Adu-Manu and Yeboah 2013, 77; Blair and Serafini 2014, 28; Echeng and Usoro 2016, 1140; Ismail 2010; Issa, Isaias and Kommers 2016; Jucevičienė and Valinevičienė 2010; Stanciu, Mihai and Aleca 2012, 64; Usoro, Echeng and Majewski 2014, 3).

2.10.4.2. Navigation

The navigation aims to maintain communication between the user and the interface in the hypermedia application such as World Wide Web (WWW) (Issa, Isaias and Kommers 2016, 340). The significance of navigation is mentioned by many researchers (Amundson 2014, 57; Arthur, Adu-Manu and Yeboah 2013, 77; Echeng and Usoro 2016, 1140; Ismail 2010; Issa, Isaias and Kommers 2016; Jucevičienė and Andres 2010, 57; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014, 3).

2.10.4.3. Human–computer interaction

The aim of human–computer interaction is intended to ensure that the interface is visually attractive in relation to style, layout, fonts, colours and graphics (Issa, Isaias and Kommers 2016, 340). The importance of human–computer interaction is mentioned by many researchers in their social networking models (Amundson 2014; Arthur, Adu-Manu and Yeboah 2013; Echeng and Usoro 2016, 1140; Ismail 2010; Issa, Isaias and Kommers 2016; Stanciu, Mihai and Aleca 2012; Usoro, Echeng and Majewski 2014, 3).

The general implication of Usoro, Echeng and Majewski's (2014) research is that the use of social networking tools would encourage students and lecturers in active participation in learning and teaching. If the usability is improved, better user navigation and human–computer interaction would encourage greater use of the system and technologies: "The systems should

be customised in a way that is as easy to use as possible so as to encourage its use" (Usoro, Echeng and Majewski 2014, 3).

2.10.5. Technological context

The SNMHEP model considers the technology required for virtual communication in higher education sectors, in areas where the availability of wikis, blogs and social networking (e.g., LinkedIn, Facebook and others) is necessary (Chung 2012). The technological context is further categorised into systems and compatibility, security and privacy.

2.10.5.1. System and compatibility

In order to access these social networking sites, computers and internet access are essential. Various studies have been conducted on the significance of technology compatibility because it is essential for decision making related to technology adaptation (Ghobakhloo et al. 2012; Grandon and Pearson 2004; Sharif 2015, 72). To prevent users from becoming frustrated with a site, the design of a social network must be pleasing and user-friendly. The use of social networking tools is not possible without the internet. Students must have access to computers with an internet facility in order to use social networking sites for their academic activities. Therefore, social networking requires students to have access to the internet for the effective use of this technology (Usoro, Echeng, and Majewski 2014). Regarding system and compatibility, Venkatesh et al. (2003) presented a model known as the 'Unified Theory of Acceptance and Use of Technology (UTAUT)'. In this model, student acceptance of social networking sites depends on the effort expended, performance expectancy, facilitating conditions and social influence.

Arthur, Adu-Manu and Yeboah (2013, 73) mention that regarding ICT infrastructure development, three factors must be considered if an institution of higher education wants to achieve high efficiency: performance, availability and accessibility. Technical factors are explained as access to technology and technical support. For successful and effective implementation of social networking technologies in academic institutions of higher education, these three indicators must be considered: software and hardware issues, internet and network issues and privacy and security issues. The significance of system and compatibility has also been addressed by many researchers of social networking models (Amundson 2014, 57; Arthur, Adu-Manu and Yeboah 2013, 73; Blair and Serafini 2014, 28; Echeng and Usoro 2016; Ismail

2010; Issa, Isaias and Kommers 2016; Jucevičienė and Valinevičienė 2010, 57; Ooko and Oduor 2013, 288; Paulet-Crainiceanu, 2014; Stanciu, Mihai and Aleca 2012, 64).

2.10.5.2 Security

Security is considered as one of the main concerns of social networking. Security has emerged as a critical issue in social networking. Normally, it happens when a hacker gets unauthorised access to a website's protected coding (Shin 2010, 428). Various studies discuss security in social networking model (Arthur, Adu-Manu and Yeboah 2013; Ismail 2010; Issa, Isaias and Kommers 2016; Stanciu, Mihai and Aleca 2012).

2.10.5.3. Privacy

Privacy is the main concern when dealing with social networking (Zhang et al. 2010). Further, Sedek, Ahmad and Othman (2018, 1) show in their findings that there is an important relationship between perceived vulnerability, perceived security, self-efficacy and response efficacy and privacy concerns about information; there is also a crucial relationship between this concern and the strategies used for privacy protection. This research is significant as it provides guidelines and instructions that assist users of social networking sites to maintain their privacy completely (Arthur, Adu-Manu and Yeboah 2013; Issa, Isaias and Kommers 2016; Stanciu, Mihai and Aleca 2012).

The social networking model for higher education in Pakistan (SNMHEP) is given in Figure 19 and a more detailed version is shown in Figure 20.

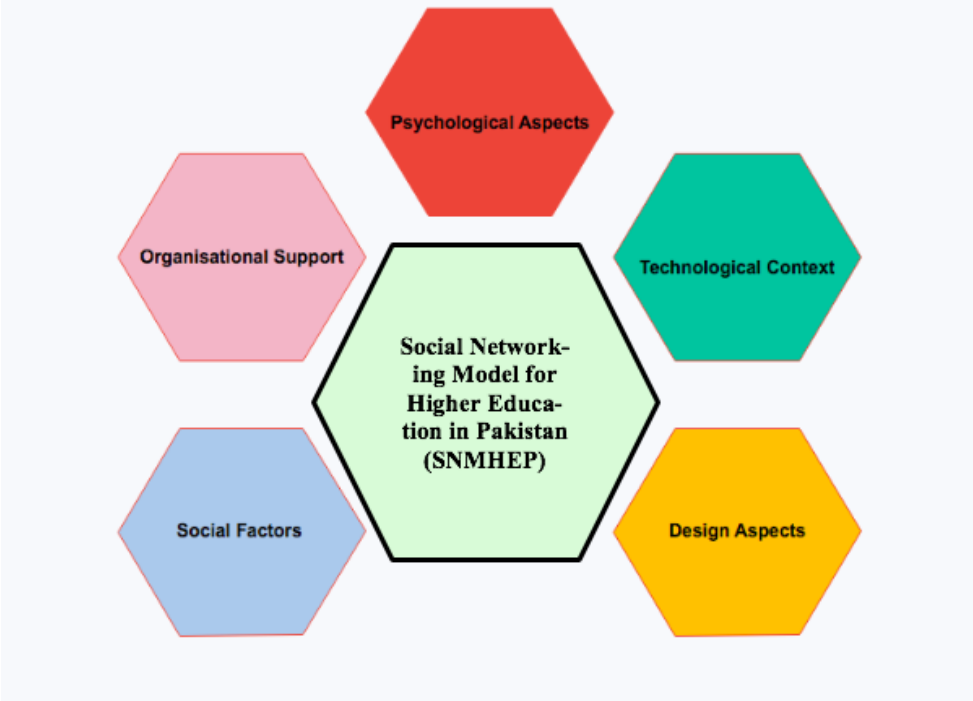


Figure 19: Social Networking Model for Higher Education in Pakistan (SNMHEP) (prepared by author)

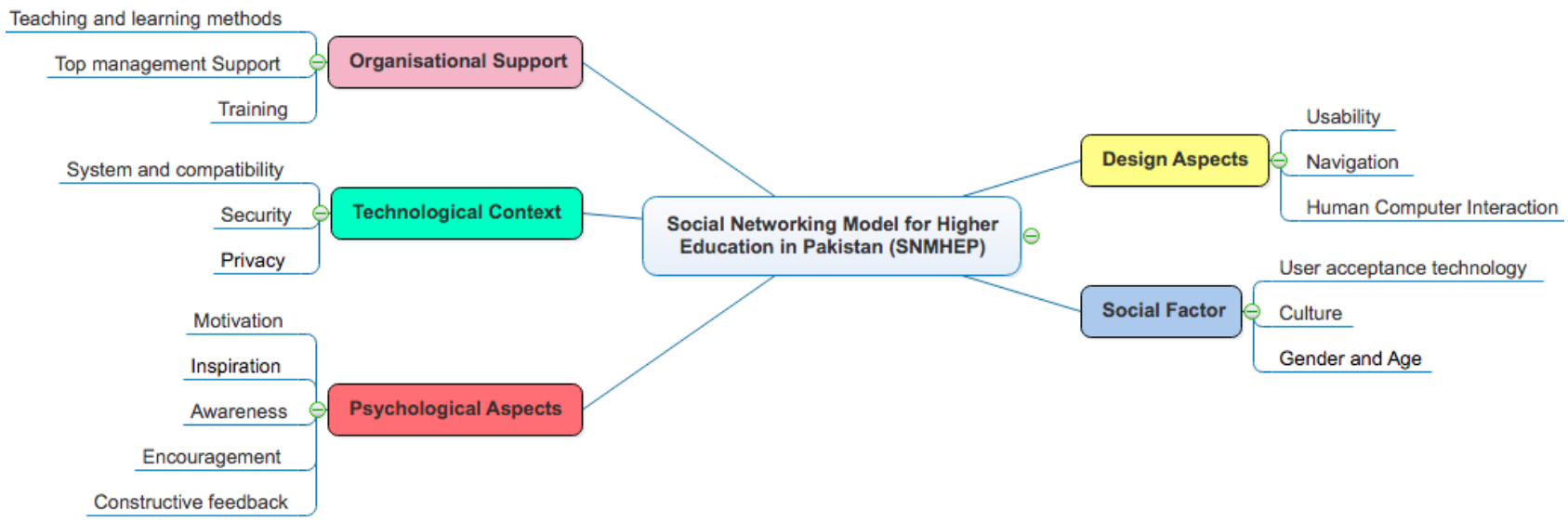


Figure 20: A detailed Social Networking Model for Higher Education in Pakistan (SNMHEP) (prepared by author)

2.11 Conclusion

This chapter is divided into five sections, with the first section providing a literature review of all types of Web including social networking tools and technologies. The next section discusses social networking use by different sectors, including the education sector. The third section discusses the positive and negative impacts of social networking sites in the education sector in different countries. It also examines the implementation of social networking tools in higher education in Pakistan. The fourth looks at social networking models worldwide which have been designed specifically for academic purposes. Also, it shows the research gap by analysing various worldwide social networking models. The last section presents the structure and factors in the social networking model for higher education in Pakistan (SNMHEP).

Chapter 3 - Significance of Research, Research Questions and Objectives

3.1 Introduction

This chapter focuses on research topic selection, research questions and the significance of the research. It starts by discussing the significance of the chosen research topic, then explains both the conceptual and practical significance of the research. Finally, it formulates the primary and secondary research questions, and their objectives. Hence, this chapter gives a complete background of the research topic, significance and questions of the study.

3.2 Research significance

To understand the importance of research, it is necessary to analyse the benefits that will contribute to the betterment of society. According to Salkind (2009), research can be non-experimental and experimental. The conceptual significance is further divided into descriptive, historical, correlational, and qualitative. Whereas, the practical significance can be true experimental or quasi-experimental. This research has both conceptual and practical significance, which provides concrete and useful suggestions for best practice in the future. Moreover, it is hoped that this study will make a contribution by suggesting future research directions and offering guidelines for the implementation of social networking in Pakistani universities and in other developing countries.

3.3 Conceptual significance

On the conceptual side, it is anticipated that this research will provide strategies for increasing awareness and knowledge regarding the use of social networking in higher education. It will provide solutions to the issues of social factors associated with social networking in the education sector of Pakistan and other developing countries. Further, it will deliver useful knowledge for institutions and researchers in Pakistan and globally. It will also investigate the views of Pakistani students in regard to the usage of social networking for educational purposes. Moreover, this will help to shape the structure of the social networking model for this particular region. Based on literature review in chapter 2, in Pakistan, extremely limited research exists on this current theme. Regarding the proliferation of the usage of social

networking in Pakistan, there is a need to create a social networking model for pedagogical practice to improve the academic standard of university graduates.

3.4 Practical significance

In terms of practical application, this study will give educators an awareness of the best practices for effective future advancement in the higher education sector. It is anticipated that this research will contribute to the creation of additional research guidelines and queries to manage the implementation of social networking in the Pakistani higher education sector. Thus, it will provide an efficient and smooth incorporation of social networking in the higher education sector. The advantages and risks of using social networking in higher education in Pakistan has been established and this research moves forward by examining more closely not only the positive and negative factors of the social networking model for higher education in Pakistan, but also Pakistani students' and university staff's perspectives and attitudes towards the model. The social media statistics for Pakistan in December 2018 revealed that 86.06% use Facebook (StatCounter 2019). Thus, there is tremendous scope for a social networking model which can deliver numerous benefits, solutions and suggestions regarding the smooth transition of a traditional education culture to a modern learning system which will meet the needs of today's modern world.

3.5 Research questions

According to Alzahrani (2011), social networking is widely used for interaction, communication, and collaboration. Therefore, it attracts many users, specially the younger generation. Moreover, social networking is penetrating not only health, banking, media and business sectors, but also the education sector. For this reason, students can attain knowledge and information about academic institutions and courses via social networking to increase and organise their studies and for other socio-educational purposes. Ashoor (2000) emphasises the significance of social networking and explains that social networking is not only used for communication, but also plays a vital role in the management of institutions. It has aligned the educational sector's services with advanced online technology that includes providing online notes, information about institutions, information about various courses and so on. Furthermore, many academic institutions already have online libraries, blackboard (online learning program) and e-marketing.

As outlined previously, social networking has been adopted officially by educational institutions as a pedagogical tool. Therefore, there is a growing need for a social networking model in higher education which can maximise the benefits of social networking and minimise its risks and take higher education on next level. The advantages and risks of social networking in higher education in Pakistan have already been detailed. In the light of these advantages and risks, this research proposes a social networking model for higher education in Pakistan and other developing countries.

3.5.1. Primary Research Question(s)

Zachos, Paraskevopoulou-Kollia and Anagnostopoulos (2018, 9) state that "on one hand, our research seems to confirm the expectation for revealing empirical data that would record the connection of social networks with successful academic outcomes. On the other hand, it raises difficulty for educators to integrate social networks into educational practices in a massive and constructive manner".

This can be done by understanding the need for a social networking model in the higher education sector that can provide best practices for students' needs from course offerings to graduation. Also, it can benefit the education sector in terms of marketing and ranking among universities worldwide. Social networking can deliver good communication and collaboration, although there are risks associated with privacy, security, and data integrity issues. Therefore, it is essential to design a model or framework for social networking according to the needs of the higher education sector of Pakistan and other developing countries. The model will improve the quality of higher education and minimise the risks associated with the implementation of this modern technology.

Thus, the primary question that drives this research is: What are the essential factors which must be considered when developing a social network model for implementation in Pakistani higher education? This research question is specifically aimed at understanding the factors in a social networking model for the higher education sector. The objective of this research question is to determine factors that must be considered when developing a social network model for Pakistani higher education.

3.5.2. Secondary research questions

Aside from concentrating on the factors of the social networking model, it is also significant to understand the opinions and examine the attitudes of Pakistani students and staff members towards the use of a social networking model for the higher education sector. Thus, this research also seeks to answer the question: What are the student and staff perspectives and attitudes towards the developed social network model for Pakistani higher education?

Because the secondary objective of this research is to understand the attitudes of Pakistani students and staff members towards a social networking model, it is important to relate the use of social networking model with global issues associated with the education system.

3.6 Research objective

Social networking tools are globally considered to be the most efficient and inexpensive means of communication. Social networking technologies are used in various fields such as healthcare, education, hospitality, construction etc. Hence, information systems have become mandatory in every area of modern life. The education sector needs to comprehensively understand the usefulness of this technology and implement it in a way which can fully utilise the benefits. Prestigious universities such as Oxford, Cambridge, Harvard other renowned institutions are also considering and implementing social networking as an alternative environment for education (Stanciu, Mihai and Aleca 2012). Similarly, Pakistani universities should undertake the successful implementation of this technology and take advantage of its benefits. Although Pakistan is a developing country, it has adequate facilities of telecommunication, enough internet service providers and a huge number of existing users of social networking sites such as Facebook, Twitter, Instagram, Myspace etc. Currently, the Pakistani higher education system is exploring the role of ICT in shaping the future of Pakistani education to meet modern standards.

Social networking tools such as social networking sites (Facebook and Twitter) as well as social networking features such as blogs, wikis, Blackboard and others are being used for pedagogical purposes. But, because of the risks associated with these technologies, a model is needed which will improve the usability of this technology and minimise its risks. As these risks may be associated with cultural, social and moral issues, a demographic-focused research is required to investigate and examine these elements. This will also help in the construction

of a model for the successful implementation of social networking in the higher education sector in Pakistan and other developing countries.

Most people in Pakistan use social networking tools and technologies for communication and entertainment purposes. Although, they are using social networking in academic institutions for marketing and information, there is still a need to shift their mindset towards the objectives and features of social networking for educational purpose. To date, no model has been designed that can be used for schools, colleges and universities in Pakistan. Hopefully, this research will prove to be valuable as it fulfils this need and will play a major positive role in changing the mindset of Pakistani users about social networking in an academic environment. The objectives, questions and research methods are given in Table 3.

Table 3: Objectives, Questions and research methods

Objectives	**Questions**	**Research Methods**
To determine factors that must be incorporated in the development of a social network model for Pakistani higher education	What are the important factors which must be considered to develop a social network model for Pakistani higher education?	Quantitative and Qualitative
To determine the student and staff perspectives and attitudes towards social network model for Pakistani higher education	What are the student and staff perspectives and attitudes towards a social network model for Pakistani higher education?	Quantitative and Qualitative

3.7 Conclusion

In summary, this study concentrates mainly on four areas: the reason for selecting this topic, the significance of the research, the research questions and research objectives. This research has both conceptual and practical significance. Theoretically and conceptually it will improve Pakistan's education standards and give further advantages to improve social networking for academic purposes. Its practical application will support and provide best practices for the

integration and implementation of a social networking model for the higher education sector in Pakistan and other developing countries.

Chapter 4 - Research Method and Design

4.1 Introduction

This chapter details the research methods and design. Firstly, it discusses the research philosophies of ontology, objectivism, subjectivism, epistemology, positivism, interpretivism, realism and axiology (value theory). Further, it explains qualitative and quantitative research methods. First, inductivism and deductivism are explained. The mixed-methods approach comprising both quantitative and qualitative research methodologies, chosen for this research, is described. Further it mentions survey as a strategy for this study and cross-sectional approach as time horizon. Then, it discusses some advantages and disadvantages of online surveys and web-based interviews. Careful consideration of research design is essential to all research. Therefore, all areas of research designs for online survey and web-based interview are considered including survey design, interview design, unit of analysis of survey/interview, target population and sample for survey/interview, and data collection for survey/interview. Finally, it gives insights into data reliability and validity for precise outcomes.

4.2 Research philosophy

Information technology has become essential in every sector, and stakeholders in these sectors need to fully understand the IT theories, models, frameworks, impacts, use, and abilities. Consequently, IT researchers often face challenges in recognising adequate findings and theories that require critical insights into a trend of interest. Therefore, a mixed-methods design can be employed as a powerful method to help information systems researchers to deal with such situations. Saunders et al. (2007,130) have developed the 'Onion Design' design, which was supported in this study. This design consists of six parts, and the overall research design choices adopted for this study are depicted in Figure 21.

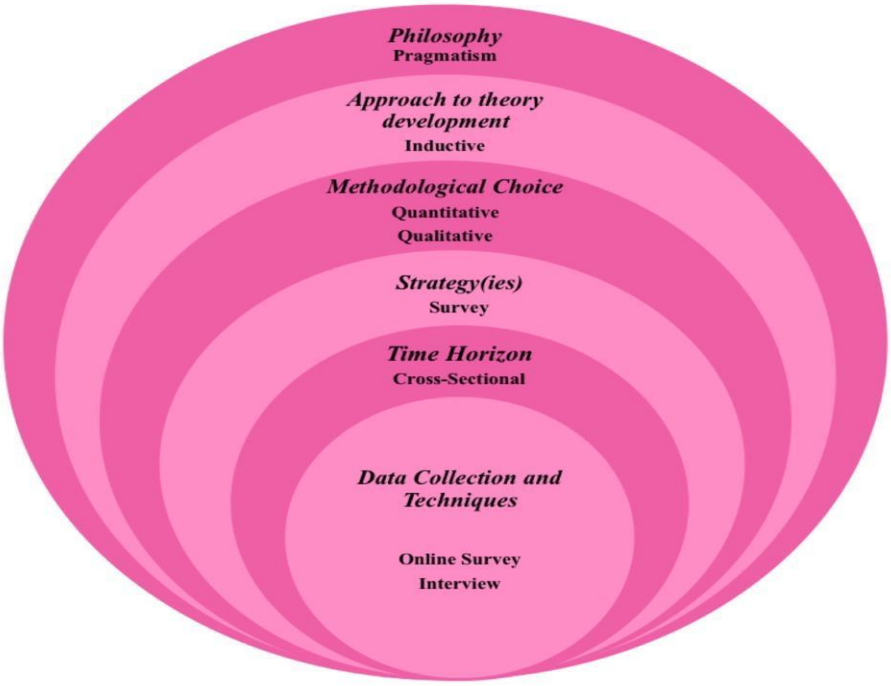


Figure 21- "Research onion" adopted by Saunders et al. (2007) (prepared by author)

The research philosophy is considered the first research layer in the research onion based on Thornhill et al. (2009). This layer aims to assist the researcher to identify, select and direct which theories are needed for the research, to determine the nature of the development of knowledge and its required basic research strategy. The current study aims to identify the crucial factors which are needed to create a social networking model for the higher education sector in Pakistan, by identifying the staff and students' perspectives towards social networking in higher education and to create recommendations to apply social networking. The research philosophy taken in this study is pragmatism with an inductive approach to assess and understand the incorporation of social networking in education and then generate a model for Pakistani higher education.

The American philosopher Kuhn (2012) was the first to use the word 'paradigm' which refers to a philosophical way of thinking. Paradigm has its roots in the Greek word meaning 'pattern'. In educational research, paradigm is used to delineate the researcher's worldview. This worldview is the thinking, perspective, set of shared beliefs or school of thought, that leads to the interpretation or meaning of research data. According to various researchers, the term 'paradigm' inherently reflects the researcher's beliefs about the world and who lives in and

wants to live in it. It constitutes principles and beliefs which shape how a researcher sees the world and interprets the acts in that world. Thus, it is like a lens through which a researcher observes and perceives the world. Moreover, it is the conceptual lens which makes the researcher study the methodological aspects of his/her research to explore the research methods that would be used for data analysis. Paradigm can be defined as a world view or set of beliefs that guides research investigation (Kivunja and Kuyini 2017).

Some proponents of qualitative research describe paradigms as "human constructions, which deal with first principles or ultimately indicating where the researcher is coming from so as to construct meaning embedded in data" (Kivunja and Kuyini 2017, 26). Hence, paradigms are significant because they give dictates and beliefs that, for scholars in a specific discipline, influence what and how should be studied and how the outcomes of the research should be interpreted. Basically, the researcher's paradigm gives a philosophical orientation to the researcher, which has important implications for decision-making in the research process including choice of methods and methodologies. In short, the paradigm tells the readers how meaningful data has been constructed, based on individual experiences (where the researcher is coming from) (Denzin and Lincoln 2008; Kuhn 2012).

4.2.1 Ontology

"Ontology is the study of being and raises basic questions about the nature of reality and the nature of the human being in the world" (Levers 2013, 2). According to Antwi and Hamza (2015), the term 'ontology' is derived from the Greek words *onto*, which means 'being' and *logia*, which means 'science, study or theory'. It refers to a branch of philosophy that deals with articulating the structure and nature of the world. According to Scotland (2012), ontology is a branch of philosophy concerned with the human's assumptions which lead to the belief that something makes sense, or with the nature of the social phenomenon which humans are investigating. Basically, it is the philosophical study of reality, nature and existence, of being or becoming, and the primary categories of existing things and their relations. It explores the underlying belief systems of humans or researchers in regard to the nature of being and existence. It assists humans to conceptualise the nature of reality and what could be known about that reality.

Philosophical assumptions about the nature of reality are important to understand how gathered data makes sense. These concepts help to align human thinking about the research problem, its

importance and how the researcher might approach it to acquire the solution. Furthermore, ontology is crucial to a paradigm because it helps to give an understanding of the things that constitute the known world. It seeks to explore the foundational beliefs or the nature of reality that comprise themes which researchers analyse to make sense of the research data. It enables the researcher to ask questions such as, "is reality of an objective nature, or the result of individual cognition? What is the nature of the situation being studied?" (Kivunja and Kuyini 2017, 27). Thus, it identifies the nature and shape of reality and what can be known and understood about it. There are two broad categories within this: objectivism and subjectivism (Antwi and Hamza 2015).

4.2.2. Objectivism

Objectivism is a belief that the meaning and truth of an object exist independently of human subjectivity. Adherents of objectivity theory claim that all contextual factors must be excluded in order to know and perceive a phenomenon as it exists independently of the mind. The removal of human biases leads to the discovery of knowledge. What is being observed remains the same regardless of the observer, nor is the observer being affected by the observed (Levers 2013, 3). According to Rønnow-Rasmussen (2003), objectivism constitutes a full range of possibilities, but not all of them. By eliminating value from the subject, the first- and third-person view is insignificant to an objectivist. The subject's point of view does not come into the picture at all. "Disagreements between objectivists will notably concern the nature of the supervenience (in philosophy, this refers to a relation between sets of properties or sets of facts) and the ontological status of value" (Rønnow-Rasmussen, 2003, 260).

4.2.3. Subjectivism

According to Levers (2013, 3), "Subjectivism is the belief that knowledge is always filtered through the lenses of language, gender, social class, race, and ethnicity". No one can deny the existence of an external reality; subjective epistemology identifies knowledge as of enormous value. External reality's universal and unaffected knowledge is not possible beyond individual interpretations and reflections. Observations are influenced by the observer which, in turn, gets affected by the observed. Subjective knowledge can be explained with the example of a Rubin Vase that can be perceived as either two persons facing each other or a white vase with a black background. The image perceived depends on individual interpretation or perception, so there is no wrong or right answer. Thus, the aim of subjective research is to develop understanding,

enhance sensitisation to moral and ethical issues, and achieve political and personal emancipation.

4.2.4. Epistemology

The term 'epistemology' originates from the Greek work *epistêmê* meaning 'knowledge'. It is a philosophy of how to attain knowledge and generate the beliefs, use and understand knowledge that are considered to be valid and acceptable. It reflects how a researcher's worldview influences epistêmê (knowledge) and how this is communicated and articulated with other humans in a manner that can be easily interpreted and understood. Thus, these assumptions of what reality contains describe how they make efforts to collect knowledge about the reality. So, their perception about ontology influences their epistemological underpinnings (McManus et al. 2017).

Epistemology is the study of knowledge which deals with "a way of understanding and explaining how I know what I know" (Levers 2013, 3). Moreover, Denzin and Lincoln (2008) explain that epistemology inquiry concentrates on the relationship between the knowledge and the knower, and asks the question "how do I know the world?" Thus, it is about making meaningful sense of the world. Ontological beliefs logically confine epistemological beliefs, although there is epistemological scope within ontology boundaries. For instance, it is believing that a word exists independently of knowledge and does not necessitate that the meaning exists in the same manner. According to McManus et al. (2017), epistemology contains differing and more often complementary philosophies such as realism, positivism and interpretivism.

4.2.5. Axiology (Value Theory)

Axiology postulates that values are features of human behaviour that appeared during evolution and provide researchers' goals, opinions and aims through the knowledge of their direct actions. In contrast, humans' values develop their desires and intentions and these, in response, make changes in their epistemologies, since they define what it is that they wish to achieve, and accordingly what needs to be done in order to achieve their goals (Allen and Varga, 2014).

According to Kivunja and Kuyini (2017), the term 'axiology' refers to the ethical issues that must be considered when preparing a research proposal. It encompasses the philosophical

approach to make valuable right decisions. It includes understanding, evaluating, and defining ideas of right and wrong behaviour within the research. It represents what value researchers will attribute to the various aspects of their research, the data, the audience, the participants that they will report the outcomes of their research. In other words, it asks the question, "how do I know about ethics and ethical behaviour?' To answer this query, it is significant for researchers to have regard for human values that would relate to their research project. This assumption is facilitated by asking the following questions: "What values will you live by or be guided by as you conduct your research? What ought to be done to respect all participants' rights? What are the moral issues and characteristics that need to be considered? Which cultural, intercultural and moral issues arise and how will I address them? How shall I secure the goodwill of participants? How shall I conduct the research in a socially just, respectful and peaceful manner? How shall I avoid or minimise risk or harm, whether it be physical, psychological, legal, social, economic or another?" Answers to these questions are best guided by four criteria of ethical conduct namely, teleology, deontology, morality and fairness. These questions can be answered by four criteria of ethical conduct: morality, deontology, fairness and teleology. Teleology is the concept of morality that considers doing what is basically desirable and the moral responsibilities which should be fulfilled in all human endeavours (Kivunja and Kuyini 2017, 28; Briddle and Schafft 2014) Thus, teleology is the researcher's attempts to ensure the research outcomes will be useful for society. "An application of this criterion is facilitated by questions such as, "are the methods used in this research pragmatic and do they make common sense? Will the actions undertaken in the research produce more benefits than harm? Am I convinced that the actions that will be taken during the research will be the right ones? Have I considered all possible consequences of this research?" (Scheffler 1994, 28).

4.2.5. Positivism

The view of positivism recognises that the social world should be perceived objectively. Thus, the social world has external existence, and the researcher is free to arrive at generalisable outcomes (McManus et al. 2017).

According to Ahmed (2008), positivism considers knowledge based solely on perceivable facts and dismisses postulation about 'ultimate origin'. Moreover, Crotty (1998, 27) states, "One thing is certain: positivism is linked to empirical science as closely as ever". Similarly, it is an aspect of scientific paradigm that might emulate the experimental design of academic research.

Positivism guides the experimental design of the research and is also based on 'causal linkages. "Positivists believe that that there are real causes that are temporally precedent to or simultaneous with effects" (Ahmed 2008, 4). Additionally, it emphasises and focuses on priority theory or hypothesis.

4.2.6. Interpretivism

Interpretivism purposes to bring hidden social structures and forces into consciousness. Its analysis mostly contains thematic interpretation of data although explicit values are given to these interpretations (Scotland 2012). According to an interpretivist point of view, people are creative and deliberate in their actions; they act deliberately and create meanings through their activity. Besides, people intentionally create their social world, "they are not 'the cultural dopes' or 'the passive dolls' of positivism" (Cohen, Manion and Morrison 2013, 17). Also, this world is examined in its original state without the manipulation and intervention by the researcher. Moreover, interpretivism shows that, firstly, individuals are not generalisable but unique. Secondly, there are multiple explanations of, and perspectives on, every single situation and event. Finally, situations need to be considered from the participants' perspective, rather than that of the researcher.

The term 'interpretivism' is an approach to obtain knowledge by creating an understanding of phenomena through in-depth analysis and examination if those phenomena. Basically, interpretivism does not affirm the generalisability of results, but rather gives outcomes that are restricted to a specific context (McManus et al. 2017).

4.2.7. Realism

The realist view posits that scientific theories provide an exact and real account of the world. However, there is a common understanding that people and their attitudes need a subjective acknowledgement because subjectivity is intrinsic to all humans (McManus et al. 2017).

In ontology, reality is thus developing a fundamental ecological and physical system, inherited by individuals and their opinions depend on their values, that are influenced by their experiences, and that also guide them to find out knowledge in order to achieve their desires. An elementary circularity happens because the actions that give experience are guided by the knowledge or epistemology of the individuals and these are used to translate an individual's opinions into activity that creates the experiences that lead to values. "Not

only is there no longer an inside and outside, since other individuals' insides are outside any particular inside, but experiences are made up of the dynamic interactions of peoples' actions on each other, and these experiences are causing changes to values and epistemologies and therefore making it impossible to interpret our experiences in any definitive way" (Allen and Varga, 2007, 20). The basic meaning and causes of experiences are not the same.

According to Scotland (2012), relativism is the concept in which reality is subjective and varies from person to person. Basically, our realities are arbitrated by our senses. The world is meaningless and aimless without consciousness. Reality raises when consciousness interacts with objects that are already conceived with meaning. Realism is individually created, and there are as many realities as there are individuals. Language passively labels objects and actively shapes the reality. Hence, reality is made from the association of language with aspects of this independent world.

4.2.8. Pragmatism

Information systems researchers are recommended to use the pragmatism approach in their research, since this approach is "associated with action, intervention, and constructive knowledge" (Goldkuhl 2012, 135). Pragmatism research philosophy can integrate more than one research approach and strategies within the same study i.e. qualitative, quantitative and action research methods. Kuhn (2012) confirms that paradigm philosophy aims to assist researchers to identify which appropriate methods should be used to answer the research questions. Mixed-method approaches are mainly correlated with pragmatism research philosophy, and the data is gathered via quantitative and qualitative approaches to address and answer the research objectives and questions. The main advantage of selecting the pragmatic approach, is that both quantitative and qualitative research methodologies will assist the researcher to collect the necessary research data for a research, and to obtain and combine the different perspectives which assist in explanation the clarification of the data in research.

Therefore, for this study, the pragmatism philosophy is used to avoid methodological bias and to understand the experience being investigated, and the research questions for this study are the main rationale behind the philosophy selection, since the combination of both qualitative or quantitative approaches will allow the research to find what works well and

find solutions to solve the problems (Biesta 2010, Morgan 2014).

4.3 Approach to theory development

The paradigm research approach was selected for this study and is the next layer in the "research onion" which is focused on the approach to theory development. This layer aims to analyse two contrasting research approaches namely: deductive and inductive. These approaches depend on the existing literature as a starting point. The deductive approach proves a theory by creating, measuring and testing hypotheses, while the inductive method is based on data collected and deriving patterns and meanings from them (Newman, 2000, Young et al. 2020).

"Inductivist science starts with the assumption that there is no method or logic of scientific discovery, that is, that there would exist a more or less mechanical procedure that could be learned and then followed in order to find something new" (Patokorpi and Ahvenainen 2009, 127). Scientific research should gather all facts because of its scientific nature, but from an inductivist point of view, it is unrealistic to gather all the facts related to a topic. As discussed earlier, in inductivism. there is no method or logic in exploring new facts or truths, so instead of collecting all truths, the hypothetic-deductive approach suggests constructing or collecting all hypotheses and then examining them. Which raises another question: how realistic is it to expect that researchers can collect all hypotheses? If there is no method or logic of scientific discovery, the researcher would be forced to assume all possibilities no matter how trivial or insane or unlikely it may seem. Both hypothetico-deductivist and inductivists believe that research discovery belongs to sociology and psychology but not to scientific theory (Patokorpi and Ahvenainen 2009).

Ali and Birley (1999, 2) argue "the difference between inductivist and deductivist research is how they draw upon existing research: in inductivist research, theory can be used where it is composed of constructs, while theory represented in the form of variables is more appropriate in hypothetico-deductive research". Moreover, Hoyningen-Huene (2007) explains that inductivism is the process of creating a hypothesis via a rule-governed process. However, for deductivism, the making of hypotheses is not restricted, as long as the resulting hypotheses are empirically falsifiable. Whether the hypothesis is accepted in science temporarily, nevertheless, would be determined by the process of testing. Finally, the approach employed for this study is inductive since this study will use online survey and interview phases for the data collection to justify and support the research questions and aims. The mixed-methods

(inductive) approach will be used via quantitative and qualitative approaches to capture staff and students' perspectives towards social networking integration in the Pakistani universities.

4.4. Methodological choice

This research is based on both quantitative and qualitative (interpretive approach) methods. It "involves the use of qualitative data such as interviews, documents and participant observation, to understand and explain social phenomena" (Myers 2002, 1). With the quantitative research method, surveys and interviews will allow the researcher to gather a huge range of information from the universities in order to acquire the insights of the Pakistani students' perspectives about social media. Whereas, the collection of users' subjective opinions about the system can exclude irrelevant parts from the design, thus interviews give qualitative data. On the other hand, survey questionnaires provide quantitative data that can be statistically analysed (Issa 2007).

4.4.1. Qualitative Research Methods

Data sources for qualitative research approach include "observation and participant observation (Fieldwork), interview and questionnaires, documents and text, and the researcher's impressions and reactions" (Myers 2002, 4).

There are some advantages of using qualitative research methods and approaches. Firstly, this approach can derive detailed descriptions of participants' experiences, opinions and feelings, along with interpretation of their actions. Secondly, "There are some who argue that the qualitative research approach (interpretivism) holistically understands the human experience in specific settings" (Rahman 2017, 104). Thirdly, this approach is considered an ideographic research, the research of individual events and cases, and it has the potential to understand the different participants' meaning, voices and events. Fourth, qualitative research methods such as unstructured interviews, participant observation, direct observation, and relevant records are most frequently used for data collection. During the collection of data, researchers communicate with the subjects directly; the data collected through interviews is generally detailed and subjective. Lastly, this interactive research approach creates a flexible structure in which design can be constructed and reconstructed to a huge extent. Appropriate analysis of the issues can be conducted by using qualitative research methods, so that the participants have enough freedom to know what is consistent for them. Eventually, complex problems can be understood easily (Rahman 2017).

Qualitative research involves collecting, analysing, and interpreting data by observing people's behaviour. Quantitative research measures and counts things, whereas qualitative research involves concepts, characteristics, symbols, metaphors, and descriptions of things. Qualitative research is more subjective than quantitative research and utilises various methods for collecting information including in-depth interviews, mostly individual, and focus groups. Basically, this type of research is open-ended and exploratory. Small groups of people are interviewed in detail and/or comparatively small focus groups are managed. In this method, the participants are asked to answer the general questions and the interviewers explore their responses to define and identify people's feelings, opinions and perceptions about the ideas and topic. The findings' quality is directly dependent upon the experience, skills and sensitivity of the group moderator and interviewer.

This kind of research is inexpensive and tremendously effective in obtaining information about participants communications needs and their views on, and responses to, the topic. Qualitative data comprises open-ended information which the researcher collects through interviews with the participants. Generally, open-ended questions allow participants to give the answers simply and in their own words. Qualitative data can be obtained from observations of the participants, from public and private documents, or from audio-visual materials such as artefacts or videotapes. "The analysis of the qualitative data typically follows the path of aggregating the words or images into categories of information and presenting the diversity of ideas gathered during data collection" (Tran 2016, 6). Hence, qualitative data can be either nominal or ordinal.

The interview process was conducted after the collection and analysis of the online survey results. This was used for the confirmation of the initial research model. A letter was sent via email to a selected number of staff members (based on working experience and use of social network in teaching) inviting them to participate in an interview. The interview data collected from expert staff members helped to consolidate the data gathered from the online survey questionnaires. In order to better understand and achieve the research objective, the interview data was expected to confirm the validity of the online survey results. In addition, this helped to refine the initial research model. As a sample size, eight to 10 interviews are generally adequate (Guest, Namey and McKenna 2017). NVivo qualitative software version12 for windows was used to analyse the interview data.

4.4.2. Quantitative Research Methods

The quantitative research method requires a significant number of respondents. This method requires measurements that must be valid in terms of quantitative statistics and objectivity. It is basically about data that is objective and numerical. The survey sample size is decided on by statisticians using formulas to find the best sample size required from the given population to reach findings with a degree of precision. Normally, researchers obtain sample sizes that lead to findings with a 99% confidence interval -/+ a margin error of 5% points. Thus, numerous surveys are designed to have an insignificant margin of error. In fact, quantitative data is based on close-ended questions that relate to behaviour, performance, and attitude. The collection of quantitative data includes a close-ended checklist, by means of which the researcher can examine and observe a phenomenon. Sometimes, this data is found in documents reporting attendance or census records. "The analysis consists of statistically analysing scores collected on instruments, checklists, or public documents to answer research questions or to test hypotheses" (John and Creswell 2000, 6).

Primary data was collected by means of an online survey. There are three types of data collection surveys: a five-point Likert scale ranking, close-ended and open-ended questions (Tran 2016). For the online survey, the hyperlink (via Qualtrics) was sent via emails and social networks to all participants including students of the top five universities of Pakistan (see Appendix A) (UniRank 2017). These universities were selected based on their ranking and whether they had the technology required to access and respond to surveys. The sampling process acquired 661 responses (see Appendix B for the calculation of sample size) from Pakistani adult students to establish the interrelation between demographic factors and new factors of social networking. The collected data was subjected to factor analysis.

4.5 Strategies

In the research onion figure, strategy is one of the layers required in design. It is defined as a plan of action to accomplish an aim. There are various common strategies such as surveys, case studies, grounded theory, action research, ethnography, experiment, and narrative inquiry. A survey is a methodology considered to gather primary or secondary data from a sample (a subset of the population), to generalise the outcome to a population. Whereas, a case study methodology is used to examine a single phenomenon (the case) in a natural setting using a range of methods to attain in-depth knowledge. Grounded theory is a framework, which uses a joint data collection, coding and examination using an organised set of procedures to acquire

an inductively derived theory. Action research methodology is used in applied research to explore methods of bringing about a deliberate change on a semi-controlled environment. Similarly, in ethnography methodology, the research uses socially attained and shared knowledge and information to realised patterns of human activities. On the other hand, experimental methodology is used to examine the relationship between variables, in which the independent variable is purposely manipulated to see the impact on the dependent variable (Collis and Hussey, 2009). Lastly, "a narrative inquiry functions as a mode of research that invites readers to think with stories" (Leavy 2014, 203).

4.6 Time horizon

The research's time horizon is the time period in which a project or plan is anticipated to be completed. In research, a time horizon is the time needed by a researcher to gather relevant data and the way that data is acquired over a period of time. There are two time periods by which research data is obtained, longitudinal or cross-sectional (Rindfleisch et al. 2008).

A longitudinal horizon refers to the study of events as they occur over a period of time rather than at a specific point in time. A cross-sectional horizon is the collection, use, and analysis of data which is gathered from a target population for research or from representative sections of that population. A cross-sectional study also known as a one-shot study involves collecting data on the topic at a single and specific point in time. This approach is often used for both quantitative research (survey) and qualitative studies (in-depth interviews). This can be used to deal with a range of research queries focusing on the contemporary state of the phenomenon of interest (Rose, Spinks and Canhoto 2014).

A cross-sectional time horizon is chosen for this research due to its various advantages. Firstly, with this approach, large volumes of data can be gathered within a short timeframe. Owing to the shorter time horizon, the data gathering process needs less effort and is less expensive. Cross-sectional studies are also significant where the researcher is looking for a relationship between one or more dependent and independent variables. Also, the researcher will be able to collect the required data straight away at that specific point in time and so there is less chance of the researcher leaving the study before it is finalised, or the participants will depart from the research (Brain 2001).

Moreover, unlike research data obtained from longitudinal study, data from a cross-sectional population is largely comparable because it is not affected with the passage of time (Bailey 2008).

4.7. Data collection and Techniques

This research is based on positivist methodology which is the combination of both numerical and quantifiable data to create a social networking model for higher education in Pakistan and other developing countries. The survey data was analysed using factor analysis and compared by using SPSS version 25. For the interview data, the same quantitative approach was used namely, NVivo qualitative software 12 for windows was used to analyse the interview data.

Figure 22 shows the stages of the mixed-methods and research process for this study by examining the initial model (SNMHEP) based on the literature review in chapter 2. The model (SNMHEP) was also confirmed and refined through online survey (quantitative), as seen in chapter 5. Moreover, to confirm the final version of the model (SNMHEP) an interview phase (qualitative) was conducted with experts in the field, as explained in chapter 6.

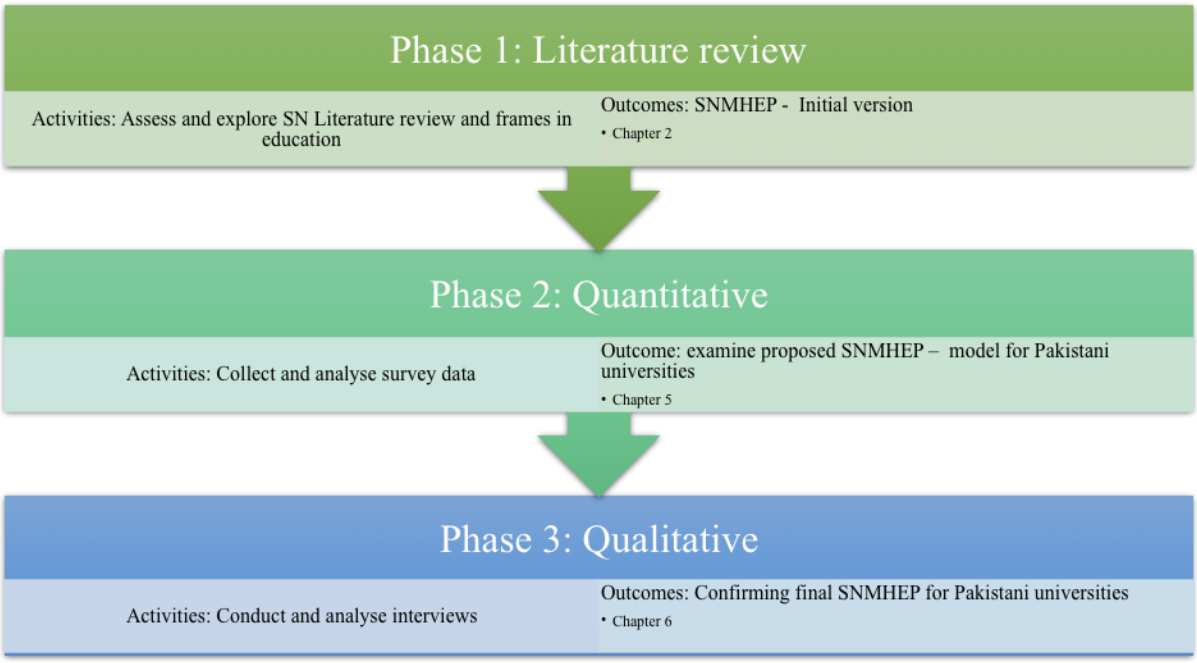


Figure 22- The stages of the mixed-methods and research process

4.7.1. Mixed-methods

A mixed-methods research approach (quantitative and qualitative) was adopted in this study for data collection and data analysis (Halcomb and Hickman 2015). This approach is

considered appropriate for research practice when there is no precise or perfect workable definition to achieve an aim in the field and no constant definition as this approach is constantly changing over time and growing continuously. This approach is known as the mixed approach because researchers use both qualitative and quantitative methods. Mixed-methods research makes use of the strengths and advantages of quantitative and qualitative approaches and each addresses the other's shortcomings enabling inferences to be drawn that give a better understanding of the researched topic. Hence, "mixed-method research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches for the broad purposes of breadth and depth of understanding and collaboration" (Johnson, Onwuegbuzie and Turner 2010, 123).

Researchers who use mixed methods designs combine narrative and numeric data and analysis. On the other hand, qualitative researchers concentrate on narrative data, while quantitative researchers concentrate solely on numerical data and analysis. Similarly, the mixed-methods researchers examine and explore the issues and problems, based on their belief in the value of the research and its significance to the community of scholars (Teddlie and Tashakkori 2009). Moreover, the researchers who use the mixed-methods approach accept those ideas that are compatible with both qualitative and quantitative methods. "Thus, a mixed-methods researcher works in engaging objective or subjective points of view with respect to the study" (Mukherjee and Kamarulzaman 2016, 40).

"Triangulation is the use of multiple methods in the study of the same phenomenon" (Duffy 1987, 131). The advantages of triangulation are discussed in two ways: The contribution of quantitative methods to qualitative methods and vice versa. In the qualitative method, the benefits of triangulation can be achieved by research design, data collection and data analysis. For instance, exploratory interviews and/or observations can improve the sampling framework by collecting information and confirming whether or not the individuals constituting the sample are suitable for the study. In data collection, exploratory interviews can give useful information about the receptivity, frames of reference and attention spans of respondents prior to the development of quantitative survey instruments specially when extensive systematic presenting cannot be done because of time or financial constraints. Quantitative methods can make many contributions to qualitative studies; however, these contributions seem less acknowledged than the other. Quantitative research can improve a primarily qualitative approach by identifying both representative and non-representative cases at either the system or the individual level (Duffy 1987, 132).

For this study, mixed method has been used (qualitative and quantitative) data to confirm the research aims and validity of research (Gallivan 1997). Mixing methods in information systems and information technology is essential to capture the necessary data to confirm and check the validity of the research aims. Since one single method could not afford a complete picture about the study, therefore, in this study mixed method is used to identify the necessary factors to develop a social networking model for Pakistan.

4.8. Survey approach

The survey approach is designed to give a "snapshot of how things are at a specific time" (Denscombe 2014, 8). In research, "there is no attempt to control conditions or manipulate variables; surveys do not allocate participants into groups or vary the treatment they receive" (Kelley et al. 2003, 261). Surveys are perfect for descriptive studies but are also used to understand aspects of a situation, or to explore explanations and provide data for examining hypotheses Moreover, it is essential to understand that "the survey approach is a research strategy, not a research method" (Denscombe 2014, 148). Descriptive research (cross-sectional survey) is a primary investigation that collects and analyses information about a specific phenomenon at a single point in time. The aim is to find a situation by finding significant factors related to the situation, such as socio-economic, demographic, events, behaviours,

events, attitudes, knowledge and experiences (Kawulich 2005). Furthermore, merits and disadvantages of the survey approach are discussed below.

4.8.1. Advantages and disadvantages of the survey approach

Some advantages and disadvantages are associated with the survey approach. According to many researchers (Evans and Mathur 2005; Mathiyazhagan and Nandan 2010; Pervaiz 2016; Tiene 2000; Wyse 2012; Dillman 2017; Dillman et al. 2009; Dillman, Reips and Matzat, 2010) the survey approach is more practical, easy to use and efficient compared to the traditional data collection research approach. However, this approach can cause problems and risks involving privacy, hacking and security. The following list will outline the advantages and disadvantages of the survey research phase.

Advantages of online survey

1. Web-based surveys and paper version surveys are the same because both allow participants to take time for the successful completion of the survey.

2. Online surveys are considered a better option when sensitive questions are being asked. The participants feel a sense of freedom because the interviewer is anonymous to them and not present.

3. Online surveys are conducted on an electronic device (computer, laptops, iPad etc.) and no tools such as paper or pen etc. are required, so it is environment-friendly and promotes green IT.

4. The online survey is a much faster way to collect the data directly within a specific timeframe.

5. Online surveys can provide good graphics, images, and hyperlinks, which help respondents to understand the questions accurately.

6. The online survey offers several options that make the respondents' job easier; for example, they can click through for more detail and read more or skip the question and move to another one.

7. The survey approach is a faster and inexpensive method of data collection compared to other methods. Also, survey data may be made more accurate by probabilistic sampling.

8. The online survey approach can easily access a large number of people.

9. In this study, the online survey uses research materials and methods aligned with the topic being researched.

10. The online survey approach is gathering demographic information from respondents. Besides, it is the only method whereby generalised information can be gathered from almost any section of the human population.

Disadvantages of online survey

1. Usually, an invitation to participate in the survey is sent via email. Sometimes such emails land in the recipients' spam or junk folder, and the researcher is helpless to address this.

2. The designers of the survey must keep in mind that the internet is not flawless; in fact, it is full of viruses and errors. Errors and glitches can appear on the sender or respondent side, or in the middle.

3. Online surveys are more likely to contain inappropriate or ambiguous questions. One of the reasons is that survey questions are designed for the general population, and sometimes they are not suitable for all types of participants.

4. The survey data may be superficial or not real/accurate. To ensure representative data, it can be more expensive.

5. Survey data has no internal and external validity, so it may not have construct validity because of self-report issues. The external validity issue occurs because of bias response and poor sampling.

4.8.2. Online survey

Online surveys have revolutionised survey methodology. With the internet, these surveys can be used by large organisations and professionals, as well as the general public. Online surveys can also be designed with the help of websites and software for the general public at a very affordable cost, which allows anyone to conduct a survey without difficulty. For this reason, the wide range and good quality of web-based surveys is considered all over the world.

Surveys can take advantage of the power of visual design, which is far better than a paper-based survey as the graphics, colour and images can be achieved inexpensively. Thus, web-based surveys can be improved with a range of design skills. The wide range of response

options in web-based survey are check boxes, drop-down menus, skip patterns and Likert scales, as a few examples.

Web-based surveys are frequently used by companies to gauge customer satisfaction. This type of online survey is completed by participants in response to an invitation via email. Sometimes, not receiving any response is the biggest issue with web-based surveys. Even with pre-recruited panels, researchers face the non-response problem at different stages in the survey process. In some cases, even when survey tools (pen, paper, eraser and etc...) are provided, non-response can still be an issue (Gunn 2002).

4.8.3. Survey Design

Normally, there are three types of questions in a survey: open-ended (opinion of respondents), scale response (rate 1 to 5 for each query), close-ended (No/Yes, True/False). Each type of survey has its advantages and disadvantages (Reja et al. 2003). "A fully labelled 5-point AD (agree/disagree) scale is better than a 7- or 11-point AD scale with only the end points labelled, thus, employing more than five categories with only end points labelled in an AD scale is not recommended" (Revilla, Saris and Krosnick 2014, 92). Moreover, they mentioned the significance of 5-point Likert scale, that "if researchers want to use AD scales, they should offer five answer categories rather than seven or 11, because the latter yield data of lower quality" (Revilla, Saris and Krosnick 2014, 73). The survey questionnaire design contains three sections. The first section collects demographic information, where students answer questions about age, gender, qualification etc. The second section contains statements which would be answered by using the Likert scale. Lastly, the participants are invited to offer more information in response to the questions.

Mostly, two types of questions have been asked in the survey, one is close-ended and other is open-ended. The close-ended and open-ended questions differ in several ways and characteristics in the role of respondents when they answer these questions. Open-ended questions permit the respondent to give an opinion without being influenced by the researcher, while close-ended questions restrict the respondent to the offered list of alternatives. It has many consequences for the quality of data in the survey. The open-ended questions increase the possibility of discovering spontaneous, unbiased individuals' responses which may not be possible to obtain with close-ended questions. However, "open-ended questions also have

disadvantages in comparison to close-ended, such as the need for extensive coding and larger item non-response" (Reja et al. 2003, 159).

The survey contained closed-ended questions intended to collect demographic information such as the respondent's such gender, qualifications, and use of social networking sites and so on. Whereas, other questions seek their opinions and responses are recorded on a scale ranging from 'strongly agree' to 'strongly disagree' (see Appendix C).

The survey instrument used in this research contained open-ended and scaled responses. The scale response questions were designed to obtain data regarding the five factors and sub-factors of the model; whereas, the open-ended questions allow the respondents to give their personal opinion about each factor (see Appendix C).

4.8.3.1. Target Population and Target Sample for the survey

In this research, 661 students (creative research system, nd) (see Appendix B) from Pakistan's top universities (see section 4.4.2) were sampled in order to explore the interrelationship between social networking usage in education and demographic factors. Participation was voluntary and participants remained anonymous. Also, participants could withdraw at any time without prejudice or negative consequences and without needing to provide the reason. It was anticipated that the survey would take ten minutes to complete. It had six sections. Participants needed to read each statement carefully and then click or tick the boxes to select a response from the options. The online survey link was distributed via the student affairs wing of each university's department of administrative services.

Given "the following guidance in determining the adequacy of sample size: 100= poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent" (Pearson and Mundform 2010, 359), this survey was intended to reach over 600 participants. It has been suggested that an ideal sample size for quantitative analysis is more than 600 participants (Camrey and Lee 2013).

The data source and collection for the quantitative research is given in Table 4, based on the sample size (see Appendix B).

Table 4 : Data source and data collection for quantitative research

Data Source	Data collection	Total
Survey (Students)	Online survey	661

4.8.3.2. Data collection for survey

As stated previously, the data was gathered by using an online tool, Qualtrics, which is the website that facilitates survey design. The link to this survey questionnaire was sent to the university students via email.

4.8.3.3. Data analysis for survey

The survey was conducted through Qualtrics and the social science statistics software (SPSS) version 25 was employed for the data analysis of survey results. Moreover, factor analysis and descriptive statistical tools were used for data analysis and to reveal new factors for the social networking model for higher education in Pakistan (SNMHEP) and for other developing countries. Furthermore, Pakistani students' and staff members' knowledge and opinions of Green IT and sustainability through the implementation of the SNMHEP model in the education sector was also determined.

A technique known as factor analysis was used for data reduction by grouping it under factors. "By studying the correlations existing between the variables, factor analysis allows the compression of a large set of variables. Thus, it enables lots of variables to be managed with ease which could then be used in other tests" (Pallant and Manual 2007, 168).

Costello and Osborne (2005, 2) emphasised the significance of factor analysis, stating that it is a desirable approach for principle component analysis. There are two main types of factor analysis approaches: Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA). Brown (2015, 14) described "both EFA and CFA aim to reproduce the observed relationship among a group of indicators with a smaller set of latent variables, but they differ fundamentally by the number and nature of a priori specifications and restrictions made on the factor model". He mentioned that EFA is a data-driven approach, so no specification is used in terms of the pattern of relationships or number of factors between the indicators (i.e., factor loading) and the common factors. Ideally, a researcher uses EFA as a descriptive or exploratory technique to find the precise number of common factors, and to discover which measured

variables are logical indicators of the different latent dimensions (such as by the differential magnitude and size of factor loading). Whereas, in CFA, the researcher in advance identifies the pattern of indicator-factor loading and number of factors, with other parameters like the covariance or independence of the factors and indicators of unique variance. The pre-determined solution of factor is evaluated in terms of how well it recreates the sample correlation (covariance) matrix of the measured variables (Brown 2015).

According to William, Onsman and Brown (2010), Exploratory Factor Analysis (EFA) is a heuristic approach in which the researcher has no idea or anticipation regarding the amount and nature of the variables and, as the name suggests, this approach is exploratory in nature. It allows the researcher to find the main dimensions in order to formulate a model or theory from a larger set of hidden constructs mostly characterised by a set of items.

Exploratory Factor Analysis (EFA) is widely used and broadly applied statistical approach in the field of social sciences. Moreover, it also maintains that the efficiency of exploratory factor analysis constitutes its ability to make stable and accurate interpretable estimates of factor loadings (Costello and Osborne 2005; Preacher and MacCallum 2002, Reio and Shuck 2015).

Both CFA and EFA normally rely on the same estimation methods such as maximum likelihood (ML). When maximum likelihood is applied, the factor models emerging from CFA and EFA can be evaluated in terms of how well the solution recreates the observed covariances and variances among input indicators, such as goodness-of-fit evaluation. Moreover, the quality of CFA and EFA models is evaluated by the size of resulting parameter estimates (like factor intercorrelations and magnitude of factor loading) and also how well every factor is presented by observed measures such as size of indicator commonalities, number of indicators per factor, and factor determinacy (Brown 2015). In EFA, all variables are standardised in the analysis. A correlation matrix is used as input in EFA, and both indicators and factors are fully standardised. Although CFA also creates a fully standardised solution, most of the analysis does not standardise the observed and latent variables. Despite using a correlation matrix such as a fully standardised variance-covariance matrix, CFA normally analyses a variance-covariance matrix or raw data which are used by the software program to create an input variance-covariance matrix. Therefore, "the CFA input matrix is composed of indicator variances on the diagonal (a variance equals the indicator's standard deviation squared; i.e., $VAR=SD^2$), and indicator covariances in the off-diagonal (a covariance can be calculated by multiplying the correlation of two indicators by their standard deviations" (Brown 2015, 41).

"Communality is a squared variance-accounted-for statistic reflecting how much variance in measured variables is reproduced by the latent constructs (e.g., the factors) in a model" (Lewis-Beck, Bryman and Liao 2003, 147). When a large amount of variance is obtained via factor solution, the result is larger commonalities and when it does not explain a significant part of a variable's variance, the consequence is small commonalities. Difference between small and large values is not easy because there are no specific statistical guidelines. The analysis in this study recognised commonalities with a value > 0.5. Thus, the variables having commonalities less than 0.5 were discarded from the analysis.

Overview of quantitative research (Survey)

The overview of quantitative research (Survey) is given in Figure 23.

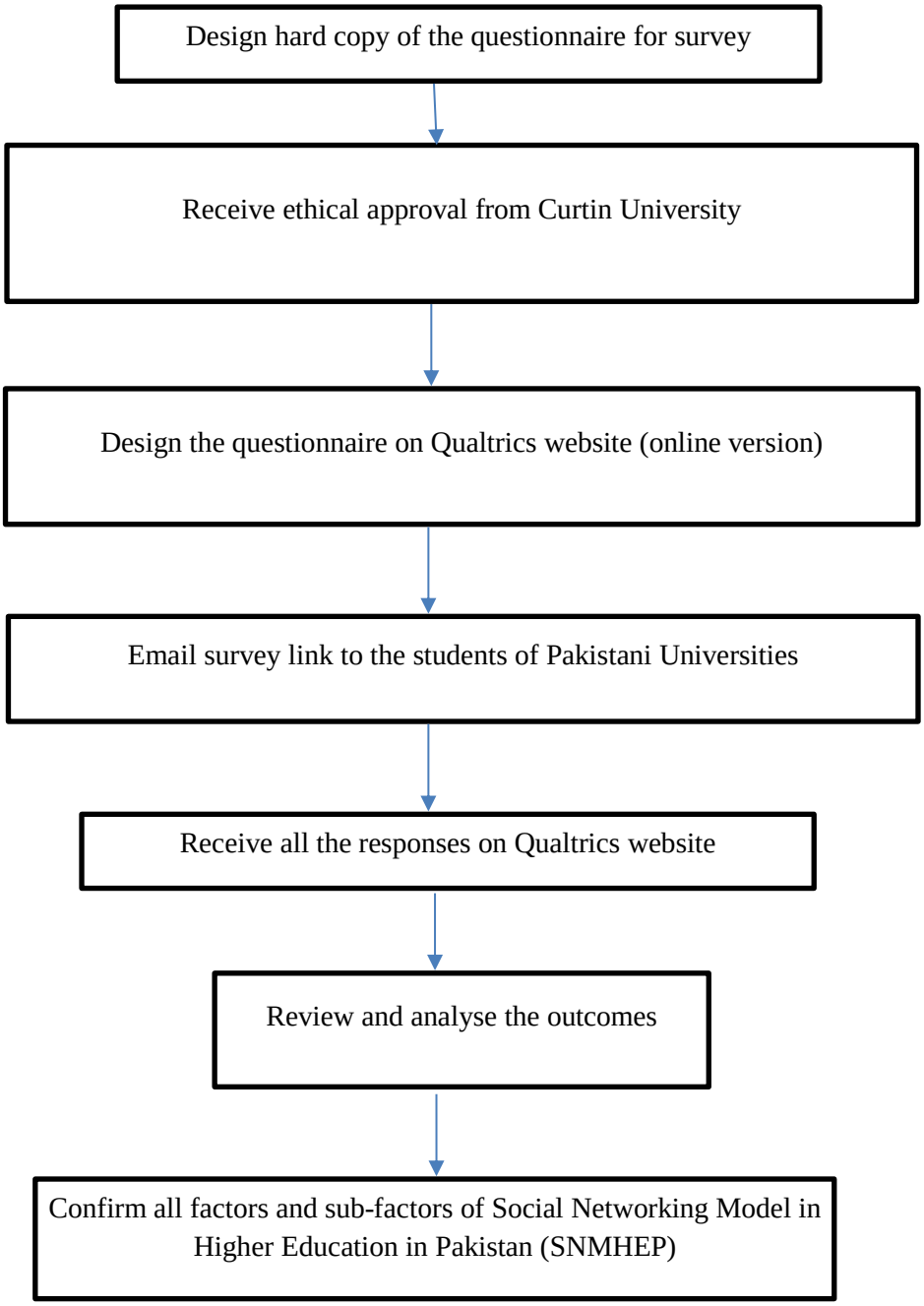


Figure 23: Overview of Quantitative research (Survey) (prepared by author)

4.9. Interview approach

In an interview, participants are asked a set of questions so that the researcher can acquire more information and knowledge about the specific topic of interest. Normally, interviews are conducted face-to-face or via telephone or web. The aim behind the use of a web technique was to attain information about a system, also how it is used, or will be used in future. Usually, there are three types of interviews: unstructured, structured, and semi-structured. The "unstructured interview is not directed by a script; the data is rich but not replicable. Structured

interviews are tightly scripted, often like a questionnaire. These are replicable but may lack richness. Semi-structured interviews combine the features of structured and unstructured interviews and use both open and closed questions" (Issa 2007, 62).

After the analysis of the survey data, interviews were conducted with expert university staff members to confirm the factors in the model. The interview comprised five questions; each question referred to a different factor in the social networking model for higher education in Pakistan (SNMHEP). The interview was designed in the Qualtrics website, the web-based interview link was sent to eight to 10 staff members from different universities who are experts in the information technology field.

The second phase, the research interviews, was limited to experts because it required additional, more detailed information. It was essential to gather the opinions of both students and experts in regard to different factors since it helped to confirm the factors in the model (See Appendix D) but evaluation of the model was best done by experts on the topic.

4.9.1. Advantages and disadvantages of interviews

Several studies (Alshenqeeti 2014; Mathiyazhagan and Nandan 2010; O'Connor et al. 2008; Opdenakker 2006; Turner 2010) state that the interview approach has some advantages and disadvantages. The below list will outline the advantages and disadvantages of the interview research phase.

Advantages of interviews

1. More detailed information can be collected. Personal information can be obtained more easily and there is a low non-response rate.
2. Responses can be more spontaneous and instant. There is less chance that interviewees will misinterpret the questions.
3. The interviewers can gather primary information about the personal characteristics of respondents and the environment which is valuable and influences the interpretation of the gathered data.
4. This research method is more flexible because the interviewer can restructure the questions as required.

Disadvantages of interviews

1. The interview method is more time consuming and expensive, especially when a wide range of geographical samples is taken into account.
2. Both interviewers and interviewees could be biased.
3. For interviews, sometimes it is difficult to obtain the target sample of respondents, because obtaining appropriate persons and then giving them training and supervising the interview process is not an easy task.
4. In an interview, the interviewer's presence could make respondents nervous.

4.9.2. Web-based interviews

Web-based interviews are "powerful tools for maintaining respondent interest in the survey and for encouraging completion of the instrument" (Issa 2007, 67). It is self-administered and handled by computer-to-computer communication via internet, and users are invited to respond to the survey and answer survey questions by adding comments. In comparison with the traditional interview (face-to-face or telephonic), these web surveys are speedy, cost saving and with a high response rate. Also, they are "designed so as to provide a more dynamic interaction between respondent and questionnaire than can be achieved in e-mail or paper surveys" (Dillman, 2011, para5). However, these Web-based interviews can be difficult, if not impossible, for people who have no access to and knowledge of the Web.

4.9.3. Interview Design

The data required was carefully considered prior to conducting interviews with the participants. Also, before the interview, the researcher wanted to address the following issues: "understanding the concepts behind the interface; defining the issues, which need to be clarified from the user such as - tasks, problems, and procedures, which need to be followed to accomplish a specific task" (Issa 2007, 67). During this process, it is important to understand the interface itself, the tasks and then problems and finally the steps to complete the tasks (Alshenqeeti 2014; Issa 2007; Warren 2002).

After analysis of survey data, interviews were conducted to confirm the factors of the model. Interviewees were asked five questions, each of which referred to a factor in the model (See Appendix D). This interview was designed in Qualtrics. The Qualtrics's link was sent to 18 staff members of different universities who are experts in the information technology field. The questions related to the privacy issues, psychological issues, and gender and age issues related to the use of social networking sites in higher education institutes.

4.9.3.1. Target Population and Target Sample for interview

"Recent guidelines for thematic analysis categorise suggestions by the type of data collection and the size of the project ('small', 'medium', or 'large'). For small projects, 6–10 participants are recommended for interviews" (Fugard and Potts 2015, 671).

The data source and data collection for the qualitative research phase (interview) are given in Table 5. For the interview phase, the researcher selected 18 expert staff members from different universities of Pakistan based on specific criteria (working experience and use of social networks for teaching purposes) and advised their responses would be anonymous. There was no time limit given to complete the interview questions. They could access the online interview within a week as many times as they needed in order to complete it. A consent form was used to obtain participant signatures. This form was first sent to their emails, and once this form was signed, the interview link was emailed.

Table 5: Data source and data collection for qualitative research

Data Source	**Data collection**	**Total**
Interviews (staff members)	Online	8-10

4.9.3.2. Data Collection for interview

The data was collected online using 'Qualtrics', a platform that facilitates web-based interviews. University staff members were emailed the link to this online interview (after they returned their consent forms via email).

4.9.3.3. Data Analysis for interview

The interview was designed and conducted through the Qualtrics website. The software NVivo version 12 was used for qualitative data analysis. Inductive methodology was adopted as this approach starts with specific observations, and conclusions are reached. In this methodology, after considering some observations correctly, a researcher can draw conclusions from all or a group of the same situations and conditions. These assumptions need to be examined, as some of them may be proved and others rejected (Zalaghi and Khazaei 2016). "The purposes of using an inductive approach is to (1) condense extensive and varied raw text data into a brief,

summary format; (2) establish clear links between the research objectives and the summary findings derived from the raw data and (3) to develop model or theory about the underlying structure of experiences or processes which are evident in the raw data" (Thomas 2003,1). Moreover, according to Huberman and Miles (2002, 309), "qualitative data analysis is essentially about detection, and the tasks of defining, categorising, theorising, explaining, exploring and mapping are fundamental to the analyst's role". Thematic analysis and manual coding were used for data analysis. Thematic analysis is discussed in more detail in chapter 6, section 6.4.

Overview of qualitative research (Interview)

The overview of the qualitative research phase (interview) is given in Figure 24.

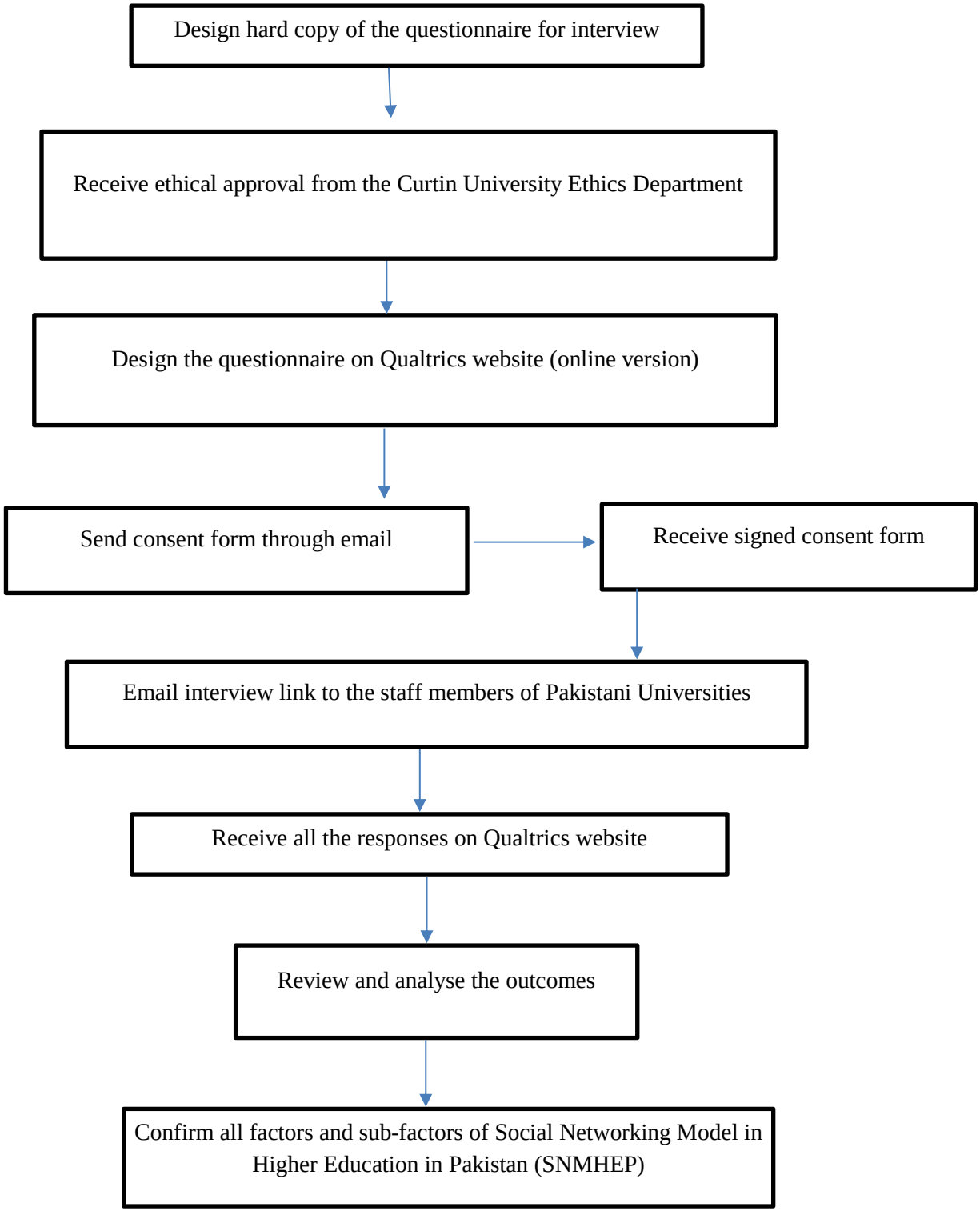


Figure 24: Overview of qualitative research (Interview) (prepared by author)

4.10. Assessing reliability and validity of quantitative research

For quantitative research, Tavakol and Dennick (2011) stated that reliability and validity are two primary factors in the analysis of measurement instruments. High quality experiments are very important to estimate the validity of data collected for a research study. Moreover, Gray (2019, 91) has provided seven types of validity: "internal, external, criterion, construct, content, predictive and statistical. Internal validity refers to correlation question (cause and effect) and to the extent to which causal conclusions can be drawn. The external validity is the extent to which it is possible to generalise from the data to a larger population or setting. Criterion validity is where we compare how people have answered a new measure of a concept, which exists, widely accepted measures of a concept. Construct validity is concerned with the measurement of abstract concepts and traits, such as ability, anxiety, attitude knowledge etc. Content validity is associated with validating the content of a test or examination. Predictive validity shows how well a test can forecast a future trait such as job performance or attainment. Statistical validity is the extent to which a study has made use of the appropriate design and statistical methods that will allow it to detect the effects that are present" Gray (2019, 91).

Furthermore, Brace (2018) indicate that testing the online survey for validity asks whether the questions posed address the study objectives and research questions and checks to ensure that there are no errors in the online survey questions. The research supervisors checked to ensure that the questions asked addressed the research objectives. In addition, the supervisors checked for errors, and the necessary amendments were made.

Before doing factor extraction, many tests should be conducted to determine the suitability of the respondents' data used for factor analysis. These tests include Cronbach's Alpha, Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Williams, Onsman and Brown 2010, 5).

"The Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer the Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. Based upon the formula _ = rk / [1 + (k -1) r] where k is the number of items considered and r is the mean of the inter-item correlations, the size of alpha is determined by both the number of items in the scale and the mean inter-item correlations. The following rules of thumb apply: _ >.9 – Excellent, _ >.8 – Good, _ >.7 – Acceptable, _ >.6 – Questionable, _ >.5 – Poor, and _ <.5 – Unacceptable"

(Gliem and Gliem 2003, 87). Alpha is normally employed as an index of experiment reliability and it is influenced by size, direction, and test. Different studies report that desirable values of alpha should be between 0.70 and 0.95. Items with correlations smaller than 0.70 are discarded. The maximum 0.9 alpha is suggested. The test (identical or not) length increases its reliability. A larger alpha value (>0.9) may suggest redundancies and means the test length may be minimised.

The measure of sampling adequacy KMO yielded a 0.983 value, showing that the sample size was adequately large to assess the factor structure (Chan and Idris 2017, 405). "The KMO index, in particular, is recommended when the cases to variable ratio are less than 1:5. The KMO index ranges from 0 to 1, with 0.50 considered suitable for factor analysis. The Bartlett's Test of Sphericity should be significant ($p<.05$) for factor analysis to be suitable" (Williams, Onsman and Brown 2010, 5).

According to Chan and Idris (2017, 403) "if the Kaiser-Meyer-Olkin (KMO) is greater than 0.6 and the Bartlett's Test of Sphericity (BTS) is significant at $\alpha <.05$, then the factorability of the correlation matrix is assumed". In other words, the KMO test and BTS determine whether the sampling was adequate to proceed with factor analysis".

4.11. Assessing reliability and validity of qualitative research

For qualitative research, the concept of reliability refers to the quality of the information (Golafshani 2003). Similarly, a good qualitative research can assist researchers "to understand a situation that would otherwise be enigmatic or confusing" (Eisner 2017, 58). This concept is used to assess the quality of data in quantitative research with the 'aim of explaining' whereas the same concept in quantitative research has the purpose of 'creating understanding' (Stenbacka 2001). The issue of validity in qualitative research has been described in many and varied ways. "The concept of validity is described by a wide range of terms in qualitative studies. This concept is not a single, fixed or universal concept, but rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects" (Golafshani 2003, 602). However, some qualitative researchers argue that validity cannot apply to qualitative research. Therefore, to confirm the validity of the qualitative research in this study, the researcher used thematic analysis, see section 6.4. According to various researchers (Anney 2014; Thomas and Magilvy 2011; Golafshani 2003), the correct qualitative trustworthiness criteria are credibility, transferability, dependability, and confirmability. Credibility is described as the confidence that could be found in the truth of the

research findings (Anney 2014). Moreover, some examples of strategies used for credibility are peer examination or peer debriefing, member checking, and reflexivity (Thomas and Magilvy 2011, 153). Whereas, transferability defines the degree to which the findings of qualitative research could be transferred to other contexts with other respondents (Anney 2014). Furthermore, Golafshani (2003) explains that transferability and credibility give lenses to analysing the results of a qualitative research. Dependability referred to reliability in quantitative terms, happens "when another researcher can follow the decision trail used by the researcher" (Thomas and Magilvy 2011, 153). Confirmability refers to the degree in which findings of an inquiry can be confirmed by other researchers (Anney 2014). Besides, "confirmability, similar to objectivity in quantitative terms, occurs when credibility, transferability, and dependability have been established" (Thomas and Magilvy 2011, 154).

4.12. Conclusion

This chapter is divided into six sections. The first section described the research philosophies of ontology, objectivism, subjectivism, epistemology, positivism, interpretivism, realism and axiology in detail. The second section explained the qualitative and quantitative research methods. In the third section, survey as a strategy as well as cross-sectional approach for time horizon were discussed. In the fourth section, an explanation was given for the choice of the mixed-methods approach, comprising an online survey and interviews. The fifth section considered the positive and negative sides of online surveys and web-based interviews. The research approach was discussed in the fifth section and included the research design, unit of analysis, target population and target sample for the survey, data collection and analysis of the survey results and interview data. The concluding section discussed the reasons for choosing the mixed-methods approach in terms of the accuracy, reliability, and validity of the collected data.

Chapter 5 - Data Collection and Analysis of Online Survey

5.1 Introduction

This chapter deals with the survey designed and collected through Qualtrics. The data collection and analysis were done by using the SPSS version 25 software. There are two main sections in the survey questionnaire. The first section was intended to gather demographic information (gender, age, qualification) about the participants, as well as information regarding their internet usage. The second section contained questions related to sub-factors of the Social Networking Model for Higher Education in Pakistan (SNMHEP). Therefore, firstly, the demographic data is analysed and presented in the form of graphs. Secondly, each factor of SNMHEP is analysed by using three steps. In the first step, the reliability test is applied to each sub-factor in the model: Cronbach's Alpha determined the 'internal consistency of the items', the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity to determine whether the sampling was appropriate and adequate to proceed with factor analysis. In the next step, the rotated component matrix (varimax rotation) for the same sub-factors is established by using factor analysis. The purpose of rotating factors is to make interpretation easier. In the last step, new sub-factors for each sub-factor are concluded. These sub-sub factors not only confirm their suitability for inclusion the model, but also increase the model's applicability for the higher education sector in Pakistan and in other developing countries.

5.2 Data analysis and discussion

As mentioned in the previous chapter, numerous students in Pakistani universities were invited to participate in the online survey. The online survey was designed and conducted via the Qualtrics website. The online survey link was sent to the students via email. After data collection, the data was analysed using the Statistical Package for the Social Sciences (SPSS) version 25 software. In this section, participants' (university students) personal information in term of age, gender, qualification, job, and usage of internet are analysed. In section 4.4.2 the sample size was 661 (see Appendix B for the calculation of sample size), but the total respondents were 744 and selected participants after the filtering was 681 as shown in Table 6. After the filtering process, 63 responses were removed since they were incomplete.

Table 6: Survey Participants

Total Respondents	Selected Participants	Response rate
744	681	91.5%

5.2.1. Gender of participants

A total of 744 university students participated in the online survey. However, of all the responses received, 681 were considered as valid, and the remaining 63 were discarded. In this survey, 25.99% were females (177), while 74.01% males (504). The gender of respondents is given in Table 7.

Table 7: Gender of Respondents

Respondents	Number	Percentage
Male	504	74.01
Female	177	25.99
Total	681	100

5.2.2. Age of participants

The 681 participant ages were categorised into four groups, 18-22, 23-32, 33-42, and 43-52. According to Table 8, 92 (13.51%) respondents are in the 18-22 age bracket. The 23-32 bracket has the highest number of participants (386 or 56.68%), while 39 (5.73%) responses were recorded for 43-52 age group.

Table 8: Age of Participants

Age	Count	Percentage
18-23	92	13.51
23-32	386	56.68%
33-42	164	24.08%
43-52	39	5.73%
Total	681	100%

5.2.3. Participants' main fields of study

Analysis shows various fields of study of the participants. According to Table 9, 127 (18.68%) participants studied accounting. The second highest 88 (12.94%) were from computer science, 65 (9.56%) from humanities, 60 (8.82%) from other fields, 55 (8.09%) from information technology, 51 (7.50%) from science and engineering, 46 (6.76%) from management, 44 (6.47%) from economics and finance, 36 (5.29%) from health sciences, 33 (4.85%) from business law, 28 (4.12%) from marketing, 27 (3.9%) from art and design and 20 (2.94%) from information systems.

Table 9: Main fields of study

Answer	Count	Percentage
Accounting	127	18.68%
Business Law	33	4.85%
Economics and Finance	44	6.47%
Information Systems	20	2.94%
Computer Science	88	12.94%
Information Technology	55	8.09%
Management	46	6.76%
Marketing	28	4.12%
Health Sciences	36	5.29%
Humanities	65	9.56%
Science and Engineering	51	7.50%
Art and Design	27	3.97%
Other(s)- Please specify	60	8.82%
Total	680	100%

5.2.4. Participants' highest level of education

In Table 10, the participant's highest level of education is categorised into seven groups i.e. higher secondary/pre-university, professional certificate, diploma, advanced/higher/graduate diploma, bachelor's degree, post-graduate diploma and master's degree. The highest number of respondents, 232, (34.27%) have bachelor degrees; 172 (25.41%) have a master's degree;

103 (15.21%) have higher secondary/pre-university qualifications; 50 (7.39%) have a diploma; 48 (7.08%) have a post graduate diploma; 30 (4.43%) have a professional certificate, and 28 (4.14%) have an advanced/higher/graduate diploma.

Table 10: Participants highest level of education

Answer	Count	Percentage
Higher Secondary/Pre-University	103	15.21%
Professional Certificate	30	4.43%
Diploma	50	7.39%
Advanced/Higher/Graduate Diploma	28	4.14%
Bachelor's Degree	232	34.27%
Post-Graduate Diploma	48	7.09%
Master's Degree	172	25.41%
Total	663	100%

5.2.5. The number of hours participants spend on social networking

The number of hours which participants normally spend on social networking are categorised into five categories. As indicated in Table 11, 293 participants spend less than an hour, 226 spend up to five hours, 109 spend up to five to ten hours, 32 spend 20 hours and only six spend over 20 hours on social networking.

Table 11: Number of hours participants spend on social networking, not email

Answer	Count	Percentage
Less than an hour	293	43.99%
Up to five hours	226	33.93%
Five to ten hours	109	16.37%
Ten to 20 hours	32	4.80%
Over 20 hours	6	0.90%
Total	666	100%

5.2.6. The number of hours participants spend on the internet for emails, Instagram, Snapchat

Table 12 shows the number of hours that participants spend on the internet for emails, Instagram, Snapchat etc., and are grouped into five categories. As seen in Table 12, the highest number of participants, 331 (49.18%), spend less than an hour, 191 (28.38%) spend up to five hours, 115 (17.09%) spend five to ten hours, 32 (4.75%) spend ten to 20 hours, and four participants (0.59%) spend over 20 hours.

Table 12: The number of hours participants spend on internet for emails, Instagram, Snapchat

Answer	Count	Percentage
Less than an hour	331	49.18%
Up to five hours	191	28.38%
Five to ten hours	115	17.09%
Ten to 20 hours	32	4.75%
Over 20 hours	4	0.59%
Total	673	100%

5.2.7. Participants purpose of using Internet

According to the data analysis presented in Table 13, the highest level of participants, 243 (35.63%) use internet for working, 121 (17.74%) use internet for email, 106 (15.54%) use it for studying, 53 (7.77%) use it for researching hobbies, 50 (7.33%) for other purposes, 35 (5.13%) for chatting, 18 (2.64%), for researching travel information and/or making reservations, 17 (2.49%) for playing games, 13 (1.91%) for online shopping, 11 (1.61%) for banking online, 9 (1.32%) for buying stock and investing online, and 6 (0.88%) for buying goods or services.

Table 13: Participants reasons for using the internet

Answer	Count	Percentage
Email	121	17.74%

Answer	Count	Percentage
Playing games	17	2.49%
Studying	106	15.54%
Working	243	35.63%
Shopping online	13	1.91%
Chatting	35	5.13%
Researching hobbies	53	7.77%
Banking online	11	1.61%
Buying goods or services	6	0.88%
Buying stocks or investing online	9	1.32%
Researching travel information and/or making reservations	18	2.64%
Other(s) - Please Specify	50	7.33%
Total	682	100%

5.3. Reliability test

Alpha, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were conducted to determine reliability. Reliability testing is explained in chapter 4, section 4.10.

5.3.1. Psychological aspects

The factors related to the Psychological aspects of the SNMHEP are explained in chapter 2, section 2.10.3. these are: motivation, inspiration, encouragement, awareness, and constructive feedback.

Step 1: Alpha, KMO and Bartlett test of sub-factors of Psychological Aspects

Table 14 represents the psychological factor's sub-factors alpha, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. The alpha values greater than 0.9 were motivation (0.940), inspiration (0.950), encouragement (0.954), awareness (0.953), and constructive feedback (0.971) indicating excellent "internal consistency of the items in the scale, it does not mean that the scale is unidimensional" (Gliem and Gliem 2003, 87).

The KMO of motivation factor (0.844) indicates that the sample size was suitable for the analysis, and factor analysis can proceed (Williams, Onsman and Brown 2010). The KMO

(0.9) of all other sub-factors (inspiration, encouragement, awareness, and constructive feedback), indicate an excellent sample size appropriate for the analysis.

In Table 14, the values obtained by Bartlett's Test of Sphericity were highly significant = 2592.676, df = 6, p <.000 showing that the scale items were satisfactorily correlated for factors to be obtained (Berkman and Reise 2011; Field 2005; Tabachnick, Fidell and Ullman 2007). Moreover, Bartlett's Test of Sphericity for motivation (= 3504.419, df = 10, p <.000), encouragement (= 4324.812, df = 15, p <.000), awareness (= 3627.233, df = 10, p <.000), and constructive feedback (= 7917.016, df =36, p <.000) were highly significant and suitable for factor analysis.

Table 14: Alpha, KMO and Bartlett's Test of sub-factors for Psychological Aspects

Factors	**Alpha**	**KMO**	**Bartlett's Test** χ^2 =, df =, p <
1. Motivation	0.940	0.844	χ^2 = 2592.676, df = 6, p <.000
2. Inspiration	0.950	0.906	χ^2 =3504.419, df = 10, p <.000
3. Encouragement	0.954	0.925	χ^2 =4324.812, df = 15, p <.000
4. Awareness	0.953	0.906	χ^2 = 3627.233, df = 10, p <.000
5. Constructive feed back	0.971	0.948	χ^2 =7917.016, df =36, p <.000

Step 2 - Rotated Component Matrix (Varimax rotation)

Factor analysis was employed for data reduction of the variables for the main factors of the SNMHEP. "Factor analysis operates on the notion that measurable and observable variables can be reduced to fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality" (Pallent 2007, 168; Yong and Pearce 2013, 80).

The factors were rotated to make interpretation easier. Various items were predicted and explained by various underlying factors, with each factor describing more than one item. Although obtaining a simple structure is the aim of rotation, in reality, this is not always attained. Another thing which is considered in factor loading is the extent to which a simple structure is achieved. The matrix table is the key to explaining and understanding the outcomes of the analysis (Plonsky 2015).

The following tables present the ‘rotated component matrix’. This matrix shows the factor loading for each variable for the ‘psychological aspects’ factor. Each row is highlighted in which variables loaded greater than 0.6. Three variables are loaded on a factor to obtain useful and meaningful interpretation. Variables with loadings greater than 0.6 are accepted, while others are discarded. Hence, ‘To access knowledge easily’, ‘to become more aware of global/local issues’, ‘to share information with peers’, ‘to become more creative’, ‘to develop professional skills such as reading, writing, decision making, critical thinking team work’ were discarded; the remainder are under consideration.

1. Motivation

Table 15 shows the rotated component matrix for motivation. It presents the loadings for each variable based on four factors. The highest loading variables are displayed for each individual factor. These variables could be utilised to classify and label, as latent, all the equivalent factors. According to the table below, two variables loaded on a factor to obtain meaningful interpretation. The first two highlighted factors, 'To learn new information and acquire knowledge' and 'to acquire up-to-date information', have 0.849 (greater than 0.6) variable loadings. While the other two, 'to communicate with scholars, students and teachers worldwide' and 'to understand and solve study problems easily', have 0.873 and 0.763 respectively. Hence, these four factors are highly correlated with motivation.

Table 15: Rotated Component Matrix (Varimax rotation) of Motivation

Rotated Component Matrix[a]		
	Component	
	1	2
To learn new information and acquire knowledge	0.849	0.457
To acquire up-to-date information	0.849	0.457
To communicate with scholars, students and teachers worldwide	0.415	0.873
To understand and solve study problems easily	0.542	0.763

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

2. Inspiration

In Table 16, two variables loaded on a factor to obtain useful interpretation. The first four factors which are ‘to share information with peers’, ‘to become more creative’, ‘to improve work by sharing with peers’ and ‘to learn new things from peers’ work’ have variable factor loadings of 0.885, 0.798, 0.712, and 0.707 respectively. Whereas, for the second variable, only one factor ‘more innovative’ has a loading of 0.896. This is insufficient to be considered at this stage. Therefore, this research will examine ‘inspiration’ once again in the interview phase to confirm the validity.

Table 16: - Rotated Component Matrix (Varimax rotation) of Inspiration

Rotated Component Matrix[a]		
	Component	
	1	2
To share information with peers	0.885	0.354
To become more creative	0.798	0.478
To improve work by sharing with peers	0.712	0.598
To learn new things from peers’ work	0.707	0.594
More innovative	0.408	0.896

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

3. Encouragement

In the Table 17, two variables loaded on an individual factor for interpretation. The first three factors, 'to develop professional skills such as reading, writing, decision making, critical thinking, teamwork', 'to create logical conclusions more easily', and 'to develop personal skills such as leadership, communication, problem solving, time management and motivation', have values of 0.876, 0.804, and 0.763 respectively. The last factor, 'to overcome study stress', has 0.875. All these factors are strongly correlated with encouragement.

Table 17: - Rotated Component Matrix (Varimax rotation) of encouragement

Rotated Component Matrix[a]		
	Component	
	1	2
To develop professional skills such as reading, writing, decision making, critical thinking, teamwork.	0.876	0.384
To create logical conclusions more easily.	0.804	0.468
To develop personal skills such as leadership, communication, problem solving, time management and motivation.	0.763	0.551
To overcome study stress.	0.375	0.875
To study independently.	0.517	0.755
To complete tasks more quickly.	0.608	0.669

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

4- Awareness

As indicated in Table 18, the five factors of awareness are loaded on two variables. The first three factors, 'to access knowledge easily', to become more knowledgeable', and to become more aware of global/local issues' have values of 0.849, 0.814 and 0.787 respectively. While the last two factors 'to remember historical data' and 'to develop cultural awareness' have 0.879 and 0.709 respectively. Thus, all these five factors are strongly correlated with the awareness.

Table 18: Rotated Component Matrix (Varimax rotation) of Awareness

Rotated Component Matrix[a]		
	Component	
	1	2
To access knowledge easily	0.849	0.426
To become more knowledgeable	0.814	0.467
To become more aware of global/local issues	0.787	0.488
To remember historical data	0.431	0.879
To develop cultural awareness	0.614	0.709

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in three iterations.

5- Constructive Feedback

As shown in Table 19, the nine factors for constructive feedback are loaded on three variables. The first four factors, 'to become more professional', 'to reduce mistakes', 'to solve problems easily' and 'to discuss issues with peers frequently', have loaded on 0.793, 0.751,0.735 and 0.653 respectively. The other four factors, 'to communicate with peers from different universities', 'to communicate and collaborate with peers frequently', 'to discuss issues with peers from different universities' and 'to cooperate with peers from different universities', have loaded on 0.766, 0.738 and 0.738 respectively. The last two factors, 'to cooperate with peers from different universities' and 'to cooperate with peers frequently', have loaded on 0.745 and 0.714 respectively. Hence, all these factors are strongly correlated with the constructive feedback.

Table 19: Rotated Component Matrix (Varimax rotation) of constructive feedback

Rotated Component Matrix[a]			
	Component		
	1	2	3
To become more professional	0.793	0.332	0.389
To reduce mistakes	0.751	0.433	0.364
To solve problems easily	0.735	0.383	0.402
To discuss issues with peers frequently	0.653	0.628	
To communicate with peers from different universities	0.329	0.766	0.401
To communicate and collaborate with peers frequently	0.495	0.738	
To discuss issues with peers from different universities	0.377	0.722	0.475
To cooperate with peers from different universities	0.458	0.412	0.745
To cooperate with peers frequently	0.457	0.468	0.714

Step 3 - New Factors

"Interpretation involves the researcher examining which variables are attributable to a factor and giving that factor a name or theme. Traditionally, at least two or three variables must load on a factor so that it can be given a meaningful interpretation. The labelling of factors is a subjective, theoretical, and inductive process. The meaningfulness of latent factors is ultimately

dependent on researcher definition. The reason for thorough and systematic factor analyses is to isolate items with high loadings in the resultant pattern matrices. In other words, it is a search to find those factors that, taken together, explain the majority of the responses" (Williams, Onsman and Brown 2010, 9).

In this step, new factors were concluded for different themes. Usually, two or three variables load on a factor to obtain a meaningful interpretation (Williams, Onsman and Brown 2010, 9). In the Table 20, two new factors 'become knowledgeable' and 'worldwide communication' are proposed for motivation. Furthermore, 'information sharing' and 'be innovative' are concluded for inspiration. For encouragement, two new factors, 'improve professional skills' and 'reduce study stress', emerge. In the same way, 'easily access knowledge' and 'data availability', are proposed for awareness. Moreover, three new factors are suggested for constructive feedback which are 'quality management', 'communication and collaboration' and 'improve peer learning'.

Table 20: New Factors of psychological aspects

Themes	New Factors
Motivation	1. Become knowledgeable 2. Worldwide Communication
Inspiration	1. Information sharing 2. Be innovative
Encouragement	1. Improve professional skills 2. Reduce study stress
Awareness	1. Easily access knowledge 2. Data availability
Constructive Feedback	1. Quality management 2. Communication and collaboration 3. Improve peer learning

In the literature review (chapter 2), all the factors for the psychological aspects were fully explained. Motivation (section 2.10.3.1), inspiration (section 2.10.3.2), encouragement (section 2.10.3.3), awareness (section 2.10.3.4) and constructive feedback (section 2.10.3.5) are indispensable factors for the psychological aspects in the model. New factors are mentioned as new findings of each sub-factor of the psychological aspects in the model. Each factor is divided into further categories, which completely explain the importance and purpose

of the factors in the model. The factors for the psychological aspects in the SNMHEP are shown in Figure 25.

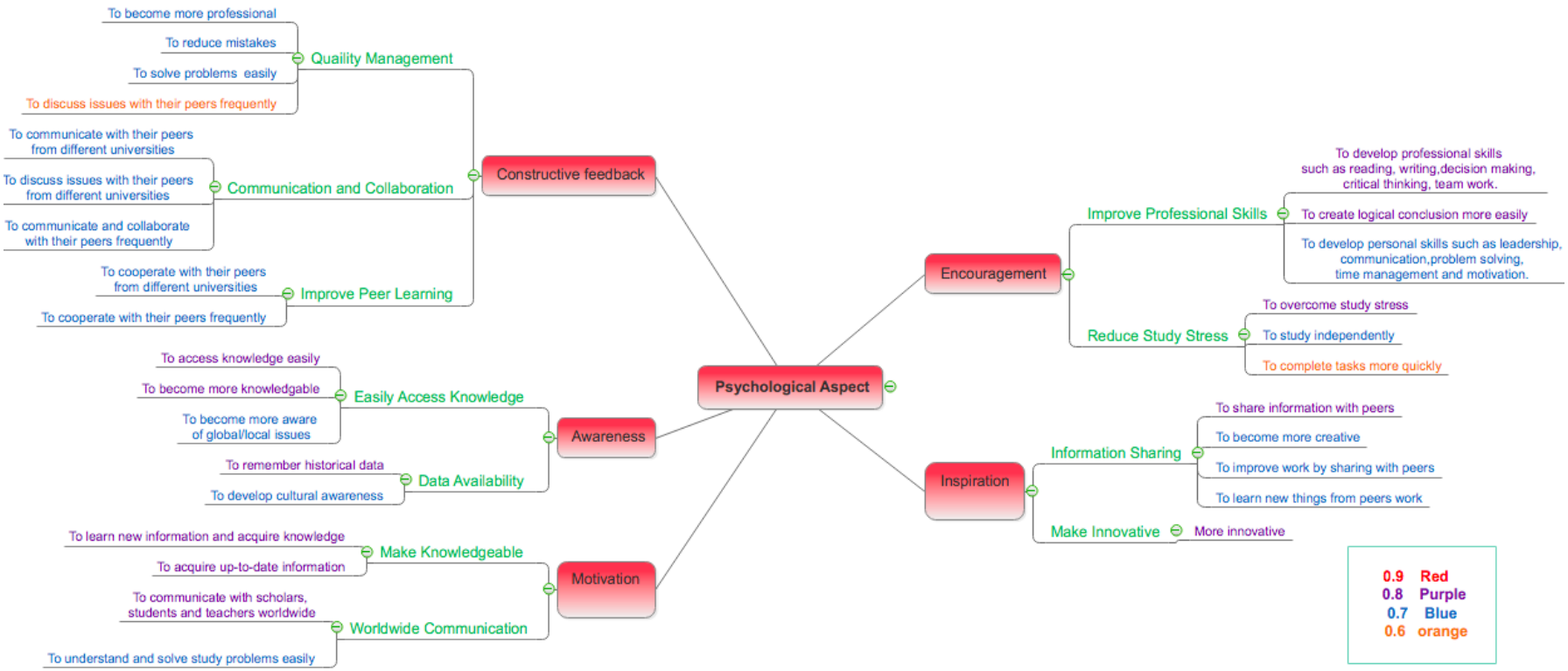


Figure 25: New Mind Map for Psychological Aspects (prepared by author)

5.3.2. Technological context

The technological theme is the second factor of the SNMHEP. According to chapter 2, section 2.10.5, the three sub-factors for the technological theme are system and compatibility, security, and privacy.

Step 1: Alpha, KMO and Bartlett's Test

According to the Table 21, Cronbach's alpha for system and compatibility is 0.963, for security 0.943, and for privacy 0.929. This implies that the size of alpha was excellent by "both the number of items in the scale and the mean inter-item correlations" (Gliem and Gliem 2003, 87).

Whereas, the KMO values for system and compatibility - 0.968; security - 0.897, and privacy - 0.766, shows that the sample size was large enough for factor analysis (Chan and Idris 2017, 405).

Bartlett's Test of Sphericity for system and compatibility is $\chi^2 = 5727.957$ df =21, p <.000, security $\chi^2 = 3210.422$, df =10, p <.000, privacy $\chi^2 = 1685.331$, df =3, p <.000, indicating its significance and suitability for factor analysis (Williams, Onsman and Brown 2010, 5).

Table 21: Alpha, KMO and Bartlett's Test for the Technological context factors

Factors	**Alpha**	**KMO**	**Bartlett's Test** χ^2 =, df =, p <
System and compatibility	0.963	0.931	$\chi^2 = 5727.957$ df =21, p <.000
Security	0.943	0.897	$\chi^2 = 3210.422$, df =10, p <.000
Privacy	0.929	0.766	$\chi^2 = 1685.331$, df =3, p <.000

Step 2 - Rotated component Matrix (Varimax rotation)

The varimax rotation is applied to three sub-factors of the technological theme: system and compatibility, security and finally privacy. All of them are loaded on two variables.

1. Systems and Compatibility

In Table 22, every row indicates the variables loaded (greater than 0.6). Factors that strongly correlate with technological theme are loaded on the first variables; these are: users to access social networking trouble shooting (0.859), users to access help-lines 24/7 (0.797), users to have no compatibility issues with software (0.785), users to have no compatibility issues with hardware (0.748). Whereas, on the second variables the strongly correlated factors that are loaded are: users to meet their needs (0.829), users to have no difficulty when working with those sites (0.828), users to use these sites from remote areas easily (0.780).

Table 22: Rotated Component Matrix (Varimax rotation) of system and compatibility

Rotated Component Matrix[a]		
	Component	
	1	2
Users to access social networking trouble shooting	0.859	0.417
Users to access helplines 24/7	0.797	0.437
Users to have no compatibility issues with software	0.785	0.519
Users to have no compatibility issues with hardware	0.748	0.565
Users to meet their needs	0.463	0.829
Users to have no difficulty when working with those sites	0.443	0.828
Users to use these sites from remote areas easily	0.478	0.780

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

2. Security

In Table 23, security is the second sub-factor of the technological aspect. Elements that strongly correlated with the security loaded on the first variables are: data theft (0.882), social engineering and malfunctioning of data (0.793), data loss and manipulation (0.748). While the other factors loaded on the second variable are: security concerns (0.896) and data ownership issues (0.684).

Table 23: Rotated Component Matrix (Varimax rotation) for system and compatibility

Rotated Component Matrix[a]		
	Component	
	1	2
Data theft	0.882	0.361
Social engineering and malfunctioning of data	0.793	0.453
Data loss and manipulation	0.748	0.530
Security concerns	0.390	0.896
Data ownership issues	0.623	0.684

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in three iterations.

3. Privacy

In Table 24, privacy is the third sub-factor of the technological aspect. The first two factors strongly correlated when loaded on the first variables; these are: privacy issues (0.852), and intellectual concerns (0.817). While only one, sharing of personal information issues (0.876), loaded on the second variable which is non-significant. This research will examine the privacy factor once again in the interview phase to confirm the validity.

Table 24: Rotated Component Matrix (Varimax rotation) of Privacy

Rotated Component Matrix[a]		
	Component	
	1	2
Privacy issues	0.852	0.443
Intellectual concerns	0.817	0.485
Sharing of personal information issues	0.481	0.876
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.[a]		
a. Rotation converged in three iterations.		

Step 3 - New Factors of technological context

As shown in Table 25, several new factors are confirmed for the sub-factors of technological context after factor analysis. For instance, system and compatibility have two new factors: technological support and user satisfaction. Whereas, the data integrity issue and security concern are related to security. Moreover, privacy has privacy issues as a new factor.

Table 25: New Factors of technological context

Themes	**New Factors**
System and compatibility	1. Technical Support 2. User satisfaction
Security	1. Data integrity issue

Themes	**New Factors**
	2. Security Concern
Privacy	1. Privacy issues

According to the literature review in chapter 2, system and compatibility (under section 2.10.5.1), security (under section 2.10.5.2), and privacy (under section 2.10.5.3) are significant sub-factors of the technological context in the model. Each one of these factors is further divided into different categories which describe in-depth the aim behind the use of each sub-factor in the model. The technological context of SNMHEP is given in Figure 26.

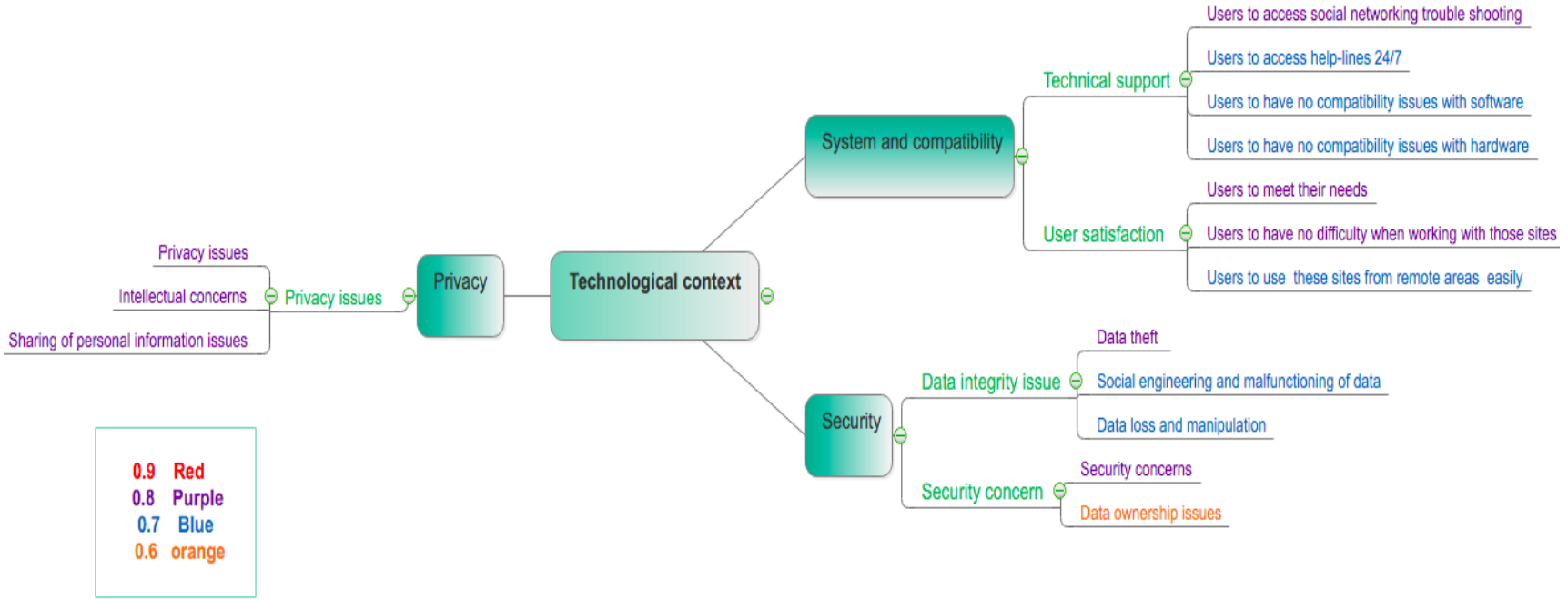


Figure 26: New Mind Map for technological context (prepared by author)

5.3.3. Organisational support

According to the chapter 2, section 2.10.1, in SNMHEP model, organisational support is the fifth factor. It has four sub-factors: teaching and learning methods, top management support, training and finally green IT.

Step 1-Alpha, KMO and Bartlett's Test

The Cronbach's Alpha values are teaching and learning methods (0.940), top management support (0.962), training (0.957) and green IT (0.939), all of which were excellent alpha values.

While the KMO are noted as 0.903 for teaching and learning methods, 0.954 for top management support, 0.917 for training, 0.886 for and green IT. It means that the sample size was large enough to obtain factor structure.

As seen in Table 26, the results of Bartlett's Test of Sphericity of teaching and learning methods were: $\chi^2 = 3059.791$, df =10, p <.000, top management support is $\chi^2 = 5960.983$, df =28, p <.000, training $\chi^2 = 4455.148$, df = 15, p <.000, green IT is $\chi^2 = 3217.459$, df = 10, p <.000. This result shows the significance and suitability of the data for factor analysis.

Table 26: Alpha, KMO and Bartlett's Test - Organisational support

Factors	**Alpha**	**KMO**	**Bartlett's Test** χ^2 =, df =, p <.000
Teaching and learning methods	0.940	0.903	χ^2 =3059.791, df =10, p <.000
Top management support	0.962	0.954	χ^2 = 5960.983, df =28, p <.000
Training	0.957	0.917	χ^2 = 4455.148, df = 15, p <.000
Green IT	0.939	0.886	χ^2 = 3217.459, df = 10, p <.000

Step 2 - Rotated Component Matrix (Varimax rotation)

The varimax rotation is applied to the four sub-factors of organisational support: teaching and learning methods, top management support, training, and green IT. All of these factors are loaded on two variables.

1. Teaching and learning methods

As shown in Table 27, the first three factors, 'user can communicate with peers easily' (0.837), 'user can benefit from the use of e-learning' (0.801), and 'user can learn efficiently from peers' (0.727) are loaded on the first variable. Whereas, the other two, 'user can develop interconnected relationships with peers (for common interests)' (0.871) and 'user can learn effectively from peers' (0.776), are both loaded on the second variable.

Table 27: Rotated Component Matrix (Varimax rotation) of teaching and learning methods

Rotated Component Matrix[a]		
	Component	
	1	2
User can communicate with peers easily	0.837	0.402
User can benefit from the use of e-learning	0.801	0.451
User can learn efficiently from peers	0.727	0.535
User can develop interconnected relationships with peers (for common interests)	0.417	0.871

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

2. Top management Support

In Table 28, the first four factors of top management support, namely, 'it devises and implements a quality management plan for e-learning' (0.849), 'it meets stakeholders' expectations' (0.805), 'it attracts quality employees for e-learning' (0.753), and 'it attracts new opportunities regarding e-learning' (0.704), are loaded on the first variable. The other four, 'It ensures that users' personal information is secured' (0.868), 'It satisfies user needs' (0.772), 'it increases productivity of users' (0.715), and 'it provides a good data management plan for users' (0.702), are loaded on the second variable.

Table 28: Rotated Component Matrix (Varimax rotation) of Top management support

Rotated Component Matrix[a]		
	Component	
	1	2
It devises and implements a quality management plan for e-learning	0.849	0.379
It meets stakeholders' expectations	0.805	0.449
It attracts quality employees for e-learning	0.753	0.516
It attracts new opportunities regarding e-learning	0.704	0.572
It ensures that users' personal information is secured	0.357	0.868
It satisfies user needs	0.508	0.772
It increases productivity of users	0.564	0.715
It provides a good data management plan for users	0.559	0.702

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

3. Training

As indicated in Table 29, ‘users know the pros of this technology’ (0.846), ‘users have adequate knowledge through training enabling them to use these sites for study purposes’ (0.801) and ‘users know the cons of this technology’ (0.793) are loaded on the first variable. while others such as ‘users can enhance their professional attitude towards study and work’ (0.867), ‘users can troubleshoot any problem’ (0.763) and ‘users can achieve their goal easily’ (0.699) are loaded on the second variable.

Table 29: Rotated Component Matrix (Varimax rotation) of Training

Rotated Component Matrix[a]		
	Component	
	1	2
Users know the pros of this technology	0.846	0.451
Users have adequate knowledge through training enabling them to use these sites for study purposes	0.801	0.473
Users know the cons of this technology	0.793	0.472
Users can enhance their professional attitude towards study and work	0.410	0.867
Users can troubleshoot any problem	0.527	0.763
Users can achieve their goal easily	0.588	0.699

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in three iterations.

4. Green IT

In Table 30, five factors are loaded on the first and second variables. The first three factors, 'it makes users, 'greener' in their activities' (0.865), 'users become more sustainable' (0.860), 'carbon emissions are reduced' (0.682), are loaded on the first variable. While 'carbon emissions are reduced' (0.909) and 'pollution is decreased' (0.688) are loaded on the second variable.

Table 30: Rotated Component Matrix (Varimax rotation) of Green IT

Rotated Component Matrix[a]		
	Component	
	1	2
It makes users 'greener' in their activities	0.865	0.348
Users become more sustainable	0.860	0.384
Carbon emissions are reduced	0.682	0.626
Health hazards are reduced	0.330	0.909
Pollution is decreased	0.637	0.688

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

Step 3 - New Factors for organisational support

In Table 31, new factors are observed for organisational support in the SNMHEP model after performing the factor analysis. New factors such as 'enrich communication' and 'improve relationship' are concluded for teaching and learning methods, while for top management support, two new factors, 'improve e-learning quality' and 'provide security', emerge. Two factors, 'afford awareness' and 'enhance users' professionalism', are found for 'training'. Whereas, green IT has been discovered as a new sub-factor as an organisational support. It has two new factors: 'enhance green IT' and 'reduce environment hazards'. The green IT is discovered as a new sub-factor of the organisational support in the survey.

Table 31: New Factors for organisational support

Themes	New Factors
1. Teaching and learning methods	1. Enrich communication 2. Improve peer relationship
2. Top management support	1. Improve e-learning quality 2. Provide security
3. Training	1. Afford awareness 2. Enhance users' professionalism
4. Green IT	1. Enhance Green IT 2. Reduce environment Hazards

According to the literature review in chapter 2, teaching and learning methods (section 2.10.1.1), top management support (section 2.10.1.2), and training (section 2.10.1.3) are significant for the SNMHEP. The findings of each sub-factors are further divided into various branches. Nonetheless, a new sub-factor 'green IT' is explored in the research findings for organisational support. It is further divided into two branches; enhance green IT and reduce environment hazards. Thus, for organisational support 'green IT' is another key area which could not be ignored. The organisational support factor of SNMHEP is shown in Figure 27.

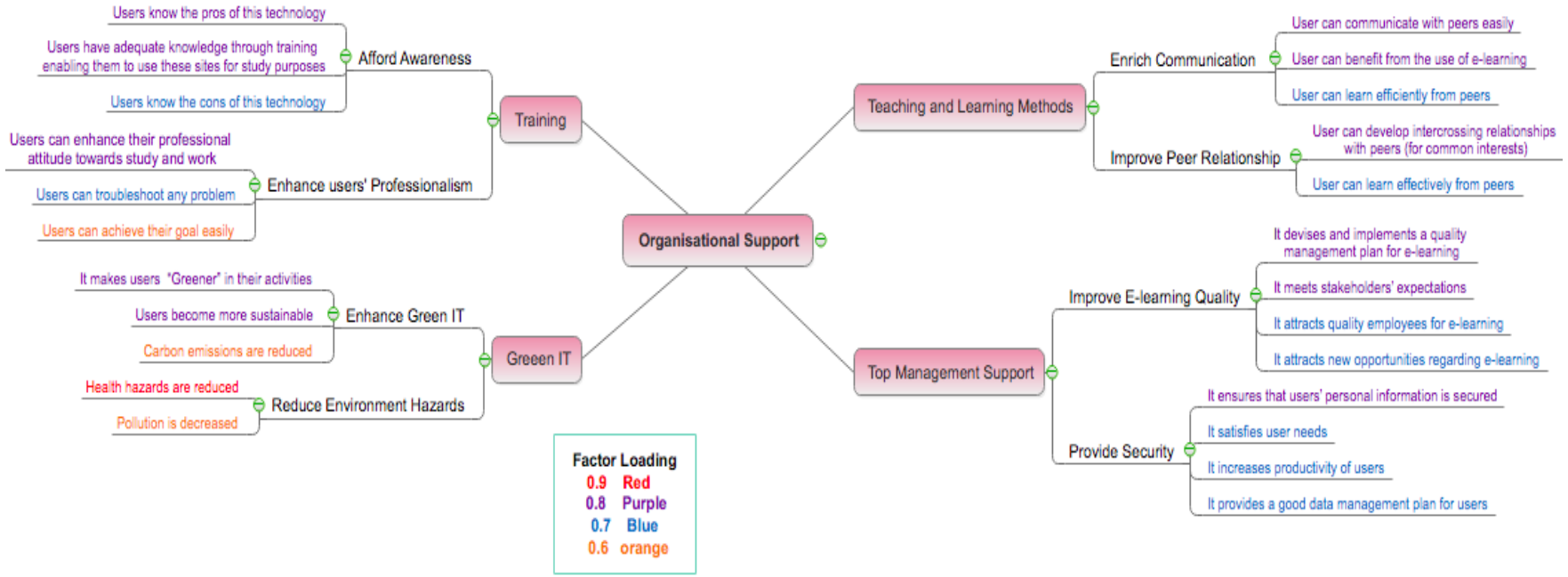


Figure 27: New mind map for organisational support (prepared by author)

5.3.4. Design aspects

The design aspects are the fourth factor of the SNMHEP which has three sub-factors namely, usability, navigation, and human–computer interface. This is explained in the chapter 2, section 2.10.4.

Step1 - Alpha, KMO and Bartlett's Test - Design aspects

As indicated in Table 32, the Cronbach's Alpha values for 'usability' 'navigation' and 'human–computer interface' are 0.972, 0.957 and 0.967 respectively, which was considered excellent.

The KMO values are: 0.948 for usability, 0.957 for navigation, 0.967 for human–computer interface. It indicates that the sample size was large and appropriate in factor structure. Bartlett's Test of Sphericity of usability χ^2 = 7279.777, df =28, p <.000, navigation χ^2 = 3841.117, df = 10, p <.000, and human computer interface χ^2 = 5971.299, df =21, p <.000. This outcome indicates the suitability of the data for factor analysis.

Table 32: Alpha, KMO and Bartlett's Test of Design Aspects

Factors	**Alpha**	**KMO**	**Bartlett's Test** χ^2 =, df =, p <.000
Usability	0.972	0.948	χ^2 = 7279.777, df =28, p <.000
Navigation	0.957	0.910	χ^2 = 3841.117, df = 10, p <.000
Human–Computer interface	0.967	0.949	χ^2 = 5971.299, df =21, p <.000

Step 2 - Rotated component Matrix (Varimax rotation)

The varimax rotation is applied to the sub-factors of design aspects, usability, navigation and human computer interface. These factors are loaded on two variables.

1. Usability

In Table 33, the first five factors are 'to become more effective' (0.815), 'to become more efficient' (0.804), 'to accomplish tasks more easily' (0.804), 'to use these sites easily' (0.702) and 'to learn things more easily' (0.672).

The factors, 'to remember things more easily' (0.832), 'to achieve all their goals' (0.801) and 'to save time' (0.753), are loaded on the second variable.

Table 33: Rotated component Matrix (Varimax rotation) of usability

Rotated Component Matrix[a]		
	Component	
	1	2
To become more effective	0.815	0.475
To become more efficient	0.804	0.483
To accomplish tasks more easily	0.804	0.484
To use these sites easily	0.702	0.541
To learn things more easily	0.672	0.654
To remember things more easily	0.447	0.832
To achieve all their goals	0.510	0.801
To save time	0.573	0.753

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

2. Navigation

In Table 34, the first three factors, ‘to navigate these sites successfully’ (0.835), ‘to navigate these sites easily’ (0.833) and ‘to accomplish a task using a minimum number of steps’ (0.683), are loaded on the first variable. The other factors, ‘to not become frustrated’ (0.865) and ‘to learn quickly’ (0.744), are loaded on the second variable.

Table 34: Rotated component Matrix (Varimax rotation) of Navigation

Rotated Component Matrix[a]		
	Component	
	1	2
To navigate these sites successfully	0.835	0.460
To navigate these sites easily	0.833	0.462
To accomplish a task using a minimum number of steps	0.683	0.658
To not become frustrated	0.424	0.865
To learn quickly	0.570	0.744

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

3. Human–Computer Interaction

In Table 35, the first five factors of human–computer interfere are loaded on the first variable; these are: ‘to navigate these sites without written instructions’ (0.865), ‘to accomplish study tasks more easily’ (0.833), ‘to become more relaxed and confident’ (0.792), ‘to be satisfied with its graphics and colour’ (0.783) and ‘to use a computer more efficiently’ (0.754).

The other two factors, ‘to have a user-friendly environment’ (0.888) and ‘to encounter a pleasing text style, font and layout’ (0.671), are loaded on the second variable.

Table 35: Rotated component Matrix (Varimax rotation) of Human Computer Interaction

Rotated Component Matrix[a]		
	Component	
	1	2
To navigate these sites without written instructions	0.865	0.398
To accomplish study tasks more easily	0.833	0.439
To become more relaxed and confident	0.792	0.497
To be satisfied with its graphics and colour	0.783	0.449
To use a computer more efficiently	0.754	0.536
To have a user-friendly environment	0.421	0.888
To encounter a pleasing text style, font and layout	0.652	0.671

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

Step 3 - New factors for design aspects

After factor analysis of the design aspects of the SNMHEP, various new factors emerged: usability, navigation and human–computer interface. In Table 36, the two new factors ‘usability’ and ‘make work easier’ are finalised for usability. While ‘ease of use’ and ‘reduce

frustration' are used for navigation. Similarly, 'effective navigation' and 'user-friendly' are considered for human–computer interference.

Table 36: New factors for design aspects

Themes	**New Factors**
1. Usability	1. Make effective 2. Make work easier
2. Navigation	1. Ease of use 2. Reduce frustration
3. Human computer interaction	1. Effective navigation 2. User-friendly

According to the literature review presented in chapter 2, usability (under section 2.10.4.1), navigation (under section 2.10.4.2), and human–computer interaction (under section 2.10.4.3) are important factors of the design aspects of the model. Each sub-factor is further divided into various branches. Moreover, these branches fully explain the purpose of each sub-factor of the model. The design aspects of the SNMHEP are depicted in Figure 28.

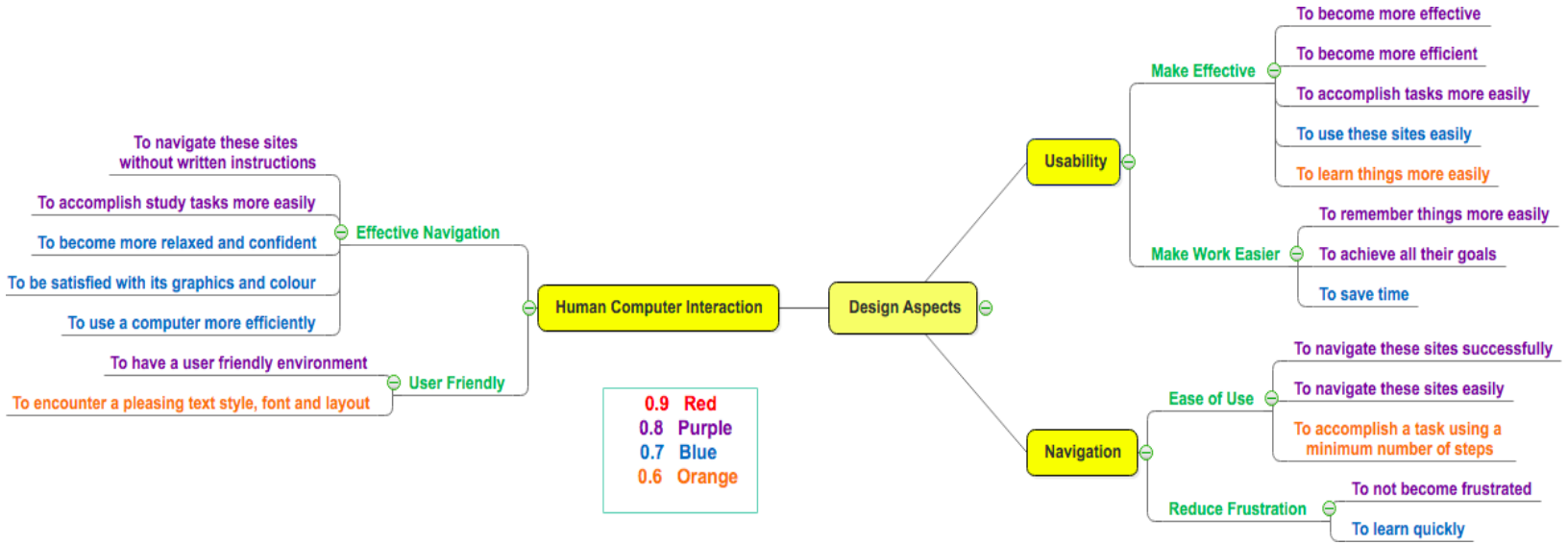


Figure 28: New Mind Map for design aspects (prepared by author)

5.3.5. Social factor

The social factor is the fifth factor of the SNMHEP and has three sub-factors: 'user acceptance of technology' (0.957), 'culture' (0.956) and 'gender and age' (0.911). This is fully explained in chapter 2, section 2.10.2.

Step1- Alpha, KMO and Bartlett's Test

As shown in Table 37, Cronbach's Alpha produced excellent values for 'user acceptance of technology' (0.957), 'culture' (0.956) and 'gender and age' (0.911). The KMO values were 0.886 for user acceptance of technology, 0.865 for culture, and 0.731 for gender and age. It shows that the sample size was perfect for factor analysis.

The values derived from Bartlett's Test of Sphericity were: 'user acceptance of technology' $\chi^2 = 3900.602$, df =10, p <.000, 'culture' $\chi^2 = 3087.259$, df = 6, p <.000 and 'gender and age' $\chi^2 = 1523.889$, df =3, p <.000. This outcome indicates the suitability of the data for factor analysis.

Table 37: Alpha, KMO and Bartlett's Test

Factors	Alpha	KMO	Bartlett's Test χ^2 =, df =, p <.000
User acceptance of technology	0.957	0.886	$\chi^2 = 3900.602$, df =10, p <.000
Culture	0.956	0.865	$\chi^2 = 3087.259$, df = 6, p <.000
Gender and age	0.911	0.731	$\chi^2 = 1523.889$, df =3, p <.000

Step 2 - Rotated component Matrix (Varimax rotation)

The varimax rotation was applied to the sub-factors of social factors that are 'user acceptance of technology', culture and gender and age. These factors are loaded on two variables.

1. User Acceptance of technology

In Table 38, the first three factors, 'the team environment which encourages you to complete your work' (0.841), 'the team environment which inspires you to do your best work' (0.837), and 'the distance learning system that can decrease the cost of learning' (0.680) are loaded on first variable. The other two factors, 'the learning system that is better than the classroom approach' (0.853) and 'the system that satisfied your academic requirements for distance learning' (0.811), are loaded on the second variable.

Table 38: Rotated component Matrix (Varimax rotation) of User Acceptance of Technology

Rotated Component Matrix[a]		
	Component	
	1	2
The team environment which encourages you to complete your work	0.841	0.468
The team environment which inspires you to do your best work	0.837	0.473
The distance learning system that can decrease the cost of learning	0.680	0.609
The learning system that is better than the classroom approach	0.461	0.853
The system that satisfied your academic requirements for distance learning	0.504	0.811

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

2. Culture

In Table 39, two factors, ‘your culture which inspires you to do your best work’ (0.873) and ‘your culture which encourages you to complete your work’ (0.753), are loaded on the first variable. Whereas, the other two factors, ‘your culture that can adopt changes in society’ (0.874) and ‘your culture which provides you more opportunities by using this new technology’ (0.733), are loaded on the second variable.

Table 39: Rotated component Matrix (Varimax rotation) of Culture

Rotated Component Matrix[a]		
	Component	
	1	2
Your culture which inspires you to do your best work	0.873	0.439
Your culture which encourages you to complete your work	0.753	0.589
Your culture that can adopt changes in society	0.444	0.874
Your culture which provides you more opportunities by using this new technology	0.614	0.733

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

3. Gender and Age

In Table 40, 'an environment where females face more difficulties than males' (0.879) and 'an environment which is gender-biased' (0.875) are loaded on the first variable. Whereas, on the second variable, another factor 'an environment in which all users (i.e. disabled users) have no difficulties' is considered a new factor 'disabled users-friendly' with a factor loading of 0.909. However, it is still considered to be an insufficient and invalid factor. Based on the above discussion, this research will examine 'gender and age' once again in the interview phase to confirm the validity.

Table 40: Rotated component Matrix (Varimax rotation) for Gender and Age

Rotated Component Matrix[a]		
	Component	
	1	2
An environment where females face more difficulties than males	0.879	0.397
An environment which is gender-biased	0.875	0.405
An environment in which all users (i.e. disabled users) have no difficulties	0.416	0.909

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.[a]

a. Rotation converged in three iterations.

Step 3 - New Factors for social factors

After factor analysis, new factors for the sub-factors of social factors in the SNMHEP are given in Table 41. Two new factors, 'inspiring learning' and 'new learning system', emerged for 'user acceptance of technology'; likewise, 'culture importance' and 'flexible culture' emerge for culture, while 'gender issues' and 'disabled users friendly' are discovered for 'gender and age'.

Table 41: New Factors for Social factors

Themes	New Factors
1. User acceptance of technology	1. Inspiring learning 2. New learning system
2. Culture	1. Culture importance 2. Flexible culture
3. Gender and age	1. Gender issues 2. Disabled users friendly

According to the literature review, in chapter 2, user acceptance of technology (under section 2.10.2.1), culture (under section 2.10.2.2), and gender and age (under section 2.10.2.3) are considered as important sub-factors of the model. In the table below, each sub-factor has been further categorised into branches. These branches are new factors for the model. The social factors of SNMHEP are given in Figure 29.

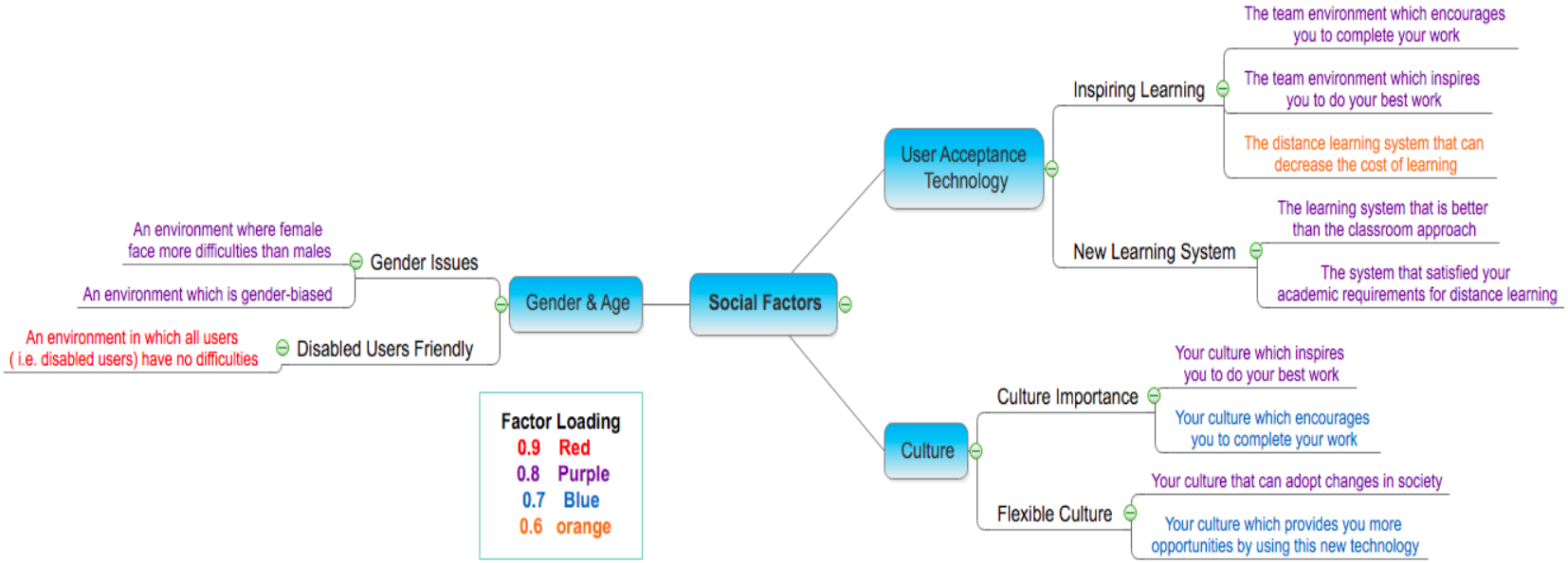


Figure 29: New mind map for social factors (prepared by author)

5.4 The new sub-factors of the SNMHEP found from the online survey

This chapter deals with the data collection process and analysis of surveys. The survey was designed and conducted via the Qualtrics website. The Statistical Package for Social Sciences (SPSS) version 25 is used for data analysis. In this research, a total of 744 students from different universities of Pakistan participated. Of these, 681 responses were considered valid and therefore suitable for analysis. In this research responses from a total 177 females and 504 males were recorded. The age limit was divided into different groups, a minimum age of 18 and a maximum of 52 were noted. The participants were enrolled in different courses at the universities. Furthermore, the highest level of education among the participants was a master's degree whereas, higher secondary was the lowest. The number of hours that participants spent on social networking and their reason(s) for using the internet were also gauged through the data analysis.

The first part of the survey elicited the participants' demographics such as age, education, and usage of social networking. However, the second part was focused on different questions regarding the factors of a social networking model for higher education in Pakistan (SNMHEP). In Figure 30 the results confirmed the new sub-factors of each factor of the SNMHEP model.

The psychological factor has five sub-factors: motivation, inspiration, encouragement, awareness and constructive feedback. New factors for motivation are 'become knowledgeable' and 'worldwide communication'. For inspiration, 'information sharing' and 'be innovative'. Two new factors - 'improve professional skills' and 'reduce study stress' - are proposed for encouragement. Awareness is based on 'easily access knowledge' and 'data availability'. For constructive feedback, only three factors were considered, namely, 'quality management', 'communication and collaboration' and 'improve peer learning'. The inspiration is shown in red in the model and needs to be confirmed.

The analysis confirmed the existing factors for the technological aspect: system and compatibility, security and privacy. Moreover, two new factors for system and compatibility were found, 'technical support' and 'user satisfaction'. Whereas, 'data integrity issue' and 'security concern' were mentioned for security. Privacy has one new factor, namely 'privacy

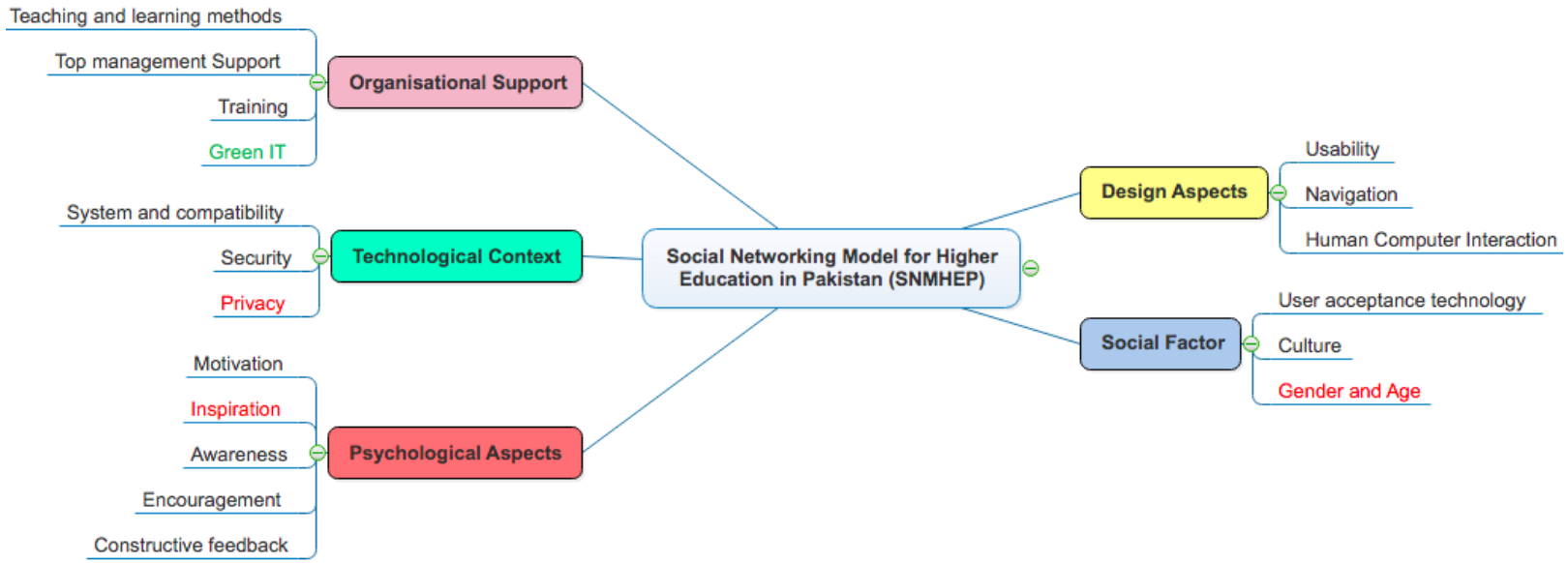
issues'. Privacy needs to be confirmed by the interview phase; hence, in the model it is depicted in red.

For organisational support, four factors - 'teaching and learning methods', 'top management support', 'training' and 'green IT' - were confirmed. Each of these factors gained two new sub-factors: 'enrich communication' and 'improve peer relationship' for teaching and learning methods; 'improve e-learning quality' and 'provide security' for top management support; 'afford awareness' and 'enhance users' professionalism' for training; and 'enhance green IT' and 'reduce environment hazards' for green IT. Green IT emerged as a new sub-factor for organisational support, and is shown in green.

The three factors for the design aspects were confirmed in addition to their sub-factors. Each factor has two sub-factors: 'usability' and 'make work easier' for usability; 'ease of use' and 'reduce frustration' for navigation; 'effective navigation' and 'user-friendly' for human–computer interaction.

Similarly, the three factors confirmed for social factors were 'user acceptance of technology', 'culture' and 'gender and age'. While two new sub-factors for each factor were proposed such as 'inspiring learning' and 'new learning system' for user acceptance and technology, 'culture importance' and 'flexible culture' for culture, and 'gender issues' and 'disabled users friendly' for gender and age. Gender and age also need to be confirmed – hence their red print in the model. The model is given in Figure 30.

Finally, all these sub-factors showed excellent alpha and sample sizes, as well as the satisfactory correlation of factors, making the data highly suitable and significant for factor analysis.



Colour scheme	Explanation
Red colour of Privacy, Inspiration, Gender and Age	Re-confirming
Green Colour of Green IT	New factor

Figure 30: Social Networking Model for Higher Education in Pakistan (prepared by author)

5.4.1 Interview themes, questions, and their sources

The outcomes of the online survey show the need to confirm three factors of the SNMHEP, which are privacy, inspiration, and gender and age. Moreover, this research also wanted to re-check all the factors of the model in the interview phase. The experts' comments were intended to help understand the importance and confirmation of all the factors of the model.

In relation to the aforementioned discussion, the interview questions were designed accordingly. Table 42 shows the connection and logic behind the theme's questions and the source.

Table 42: Themes, interview questions and their sources

Themes	Questions	Source
Privacy	Do you think use of social networking sites in higher education institutes causes data privacy issues? If yes, why and if no, why not? Please give your answer in detail.	Question 1, Chapter 2, section 2.10.5.3
Inspiration	Do you think that use of social networking sites has had psychological impacts on various aspects in the higher education sector, such as inspirations to improve work by sharing with peers, to learn new things from peers' work, to become more creative and innovative etc.? If yes, why and if no, why not? Please give your answer in detail.	Question 2, Chapter 2, section 2.10.3.2
Gender and age	Do you think that social factors employed by social networking sites in higher education sector are associated with gender and age issues? Please give your answer in detail.	Question 3, Chapter 2, section 2.10.2.3

Themes	Questions	Source
SNMHEP	Can you please give your feedback about the current social networking model in higher education in Pakistan; do you think the current structure will match the higher education sector of Pakistan?	Question 4, Chapter 2, 2.10

5.5 Conclusion

This chapter is divided into two sections. The first section was about the personal information of the participants such as age, gender, qualification, job, and how much time they spend on social networking which was revealed in the analysis of the online survey. The next section dealt with reliability tests and factor analysis of all the factors in the SNMHEP model. Through the analysis, the confirmation of the factors in the model along with new sub-factors were explored. Findings produced a new and suitable model of social networking for higher education in Pakistan which would enhance the usability of the social networking in the educational sector both in Pakistan and other developing countries.

Chapter 6 - Data Analysis and Interview Findings

6.1 Introduction

In the previous chapter, the data analysis and new findings from the online survey were discussed. After the factor analysis of survey data, some factors needed to be confirmed. Therefore, interviewing experts to check the significance and the validity of the themes in the SNMHEP began. In this chapter, the data analysis and findings of the interviews are fully explained. In every research, the data collection process is the main and primary step to be designed and discussed. After data collection, data analysis was conducted through a six-step analytical process using NVivo version 12 software. The interview comprised four questions and each of the questions referred to a specific theme. The first question focused on the privacy concerns of social networking. The second referred to psychological aspects such as inspiration and motivation. The third question dealt with the factors of users' age and gender when using social networking in education. The last question focused on the factors in the SNMHEP. For every question, a six-step guideline was followed; therefore, each question was analysed according to these steps.

6.2 Data collection

The target population and data collection process were discussed in detail in chapter 4, sections 4.6.3.1 and 4.6.3.2 respectively. The 18 expert staff members from the state universities were selected for the web-based interviews, six of whom were females and 12 were males. The interview process took approximately two months. However, each interviewee had two weeks to complete the interview. The Table 43 is based on information about participants.

Table 43: Information about participants

Participants	Female	Male	Duration	Job	Universities
Eighteen (18)	6	12	Two months	Academics	Government

The online interview was designed via 'Qualtrics'. The interview comprised four questions (themes) about the SNMHEP. These themes were not fully confirmed by the analysis of the survey data; therefore, they were re-considered in the interview phase for confirmation. Deductive thematic analysis and a priori coding was applied to analyse the interview data with the coding. Moreover, interview data was collected in the English language.

6.3 Interview overview

As seen in Figure 31, the web-based interview had four questions or themes regarding privacy issues (technological context), motivation or inspiration (psychological impacts), age or gender (social factors) and the SNMHEP. The online survey data indicated that some of the sub-factors were not fully confirmed by the participants. Therefore, online interviews were required to confirm the importance, or otherwise, of those factors. Also, another three factors of the SNMHEP—technological context (privacy issues), psychological aspects (inspiration and motivation), social factors (gender and age)—were included in the interview questions. The last question concerned the new model to re-confirm its factors and sub-factors. Thus, as shown in the interview mind map, each question dealt with a different theme, and each theme was categorised into sub-factors.

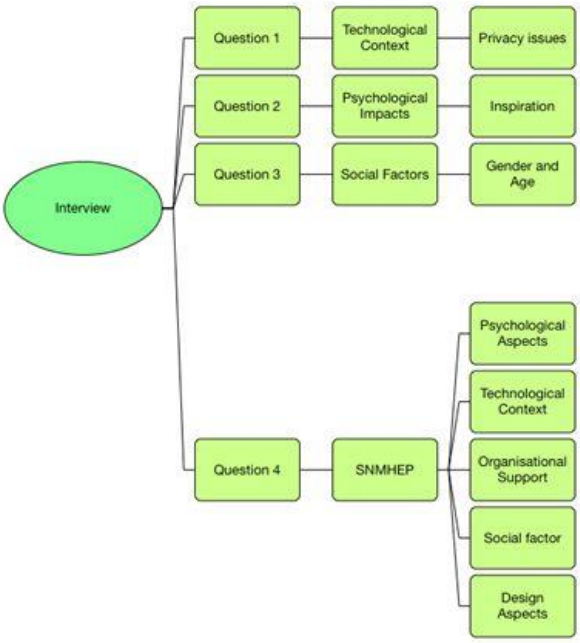


Figure 31: Mind Map of Interview created by NVivo V12 (prepared by author)

6.4. Thematic analysis

The interview phase was conducted to support the quantitative findings and to assess, refine and enhance the result to reach the final form of the Pakistani social networking model. There were two rationales for performing interviews in the second phase of the study: to confirm the answers to the first research question, and to answer the second research question of the thesis by capturing the staff perspectives towards the necessary factors which were needed to develop the social networking model for Pakistan. Interview data was analysed, and the description of

the interviews was illustrated to provide critical concepts covering feedback on the improved SNMHEP. At the end of this chapter, the final social networking model for Pakistan is presented.

The process of analysing the interview data from the different experts followed a thematic analysis. The analysis followed the six phases provided by Braun and Clarke (2006) shown in Figure 32. This thematic analysis is arguably one of the most influential approaches to thematic analysis because it offers a vivid and usable framework for doing thematic analyses. Thematic analysis is described as a descriptive method that reduces the data in a flexible way that dovetails with other data analysis methods. "It is used commonly because of the wide variety of research questions and topics that can be addressed with this method of data analysis" (Nowell et al. 2017, 2). This approach was chosen as it is a well-structured approach to analysing the interview data. The hybrid approach was the method chosen in applying the thematic analysis in this study by combining the data-driven approach from the data collected and the theory-driven approach. According to Boyatzis (1998), the deductive approach matched the research questions and interview questions by using prearranged codes based on key concepts in the theoretical construct. The data analysis was driven based on the initial coding of the research questions for the interviews, and the data was read carefully to find useful information related to the research study and questions. The same information in the text was grouped together in categories and sub-categories.

According to Stemler (2001), there are two approaches to code the data: a priori coding, where codes are generated beforehand and applied to the text, and developing coding where codes are derived from the text. Another technique was used in this study, as similar codes were all gathered together into each theme, and this process is supported by Miles and Huberman (1994) who argue that when performing a deductive thematic analysis, primary topics or themes created from previous search stages, theory, or models can be used as the foundation for the research themes. Initial category list can be generated from an earlier research model, and the model may be amended if any new categories emerge from the analysis. Technology software (i.e. NVivo version 12) was used for coding or on some occasions, manual coding was used where there was fewer interview data.

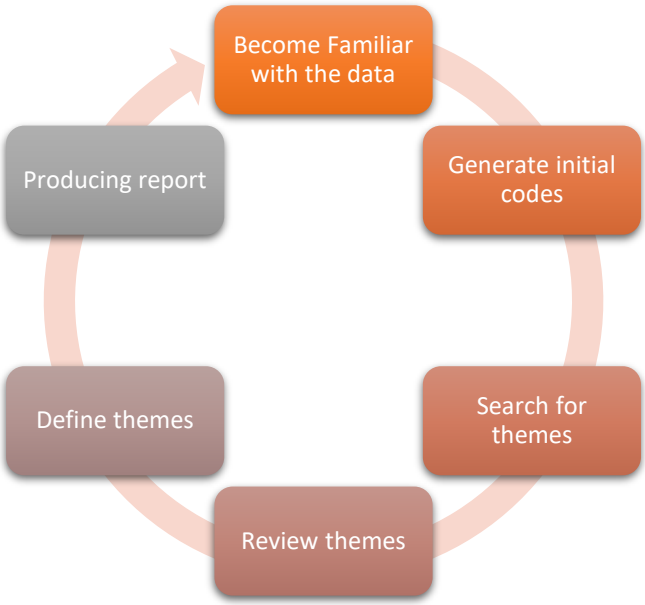


Figure 32 - The Six-Steps of Thematic Analysis (Braun and Clarke 2006) prepared by author

The first step is becoming familiar with the interview data by going through all the interview data collected and noting down the initial ideas emerging from the interview data; the second step aims to generate the initial codes by creating concise labels for important features of the data of relevance to the research questions. The third step aims to sort the interview data relevant to the research question(s); and searching for themes involves looking into the codes to identify the similarities and dissimilarities and to create new codes in some cases. Themes are created based on different codes. All the coded data relevant to each theme are classified. The fourth step of the thematic analysis aims to review and refine themes and confirm if themes work in relation to the coded extracts and the whole data set. The fifth step seeks to define, and describe each of the themes which were identified previously; this definition will assist the researcher to explore what story each theme told, identify how the theme fits into the overall story about the interview data as well as to the study overall research question(s). Finally, this step will identify the core "essence" of each theme and define it with a succinct and useful name for the theme. The final step in this process, is to produce a report to write up the result from the interview data to support your research question(s) and literature.

6.5. Data analysis

The interview data was analysed following the thematic analysis as discussed in section 6.4. For each question of the interview, the Six-Steps of Thematic Analysis guide was followed to conclude the outcomes. Moreover, "NVivo identifies similarities and differences in content

and makes it easier to compare and contrast themes and concepts identified" (Issa et al. 2019, 204).

6.4.1. Privacy (Technological context)

In chapter 2, section 2.10.5.3, the technological context had three factors: system and compatibility, security and privacy. As privacy needed to be re-confirmed by interviewees' responses, it was selected as the first interview question. Hence, the first question was 'Do you think use of social networking sites in higher education institutes causes data privacy issues? If yes, why and if no, why not? (See Appendix D)

1- Become familiar with the data for privacy

This step involved reading and re-reading the answers regarding the questions related to privacy issues, to become familiar with the content.

2- Generate initial codes for Privacy

This step involved generating codes (succinct labels) that described significant features of the data that were relevant to answering the first research question. Therefore, the first step of the coding process was done manually: the answers to the privacy questions were selected from the Qualtrics website and saved in a separate Word file. Later, this file was imported into the NVivo version 12 software for qualitative analysis. Manual coding was done according to Braun and Clarke (2006). At this stage, it is essential to code all possible potential codes and themes. During analysis, it is vital to keep the method as transparent as possible. The benefits of manual coding are to increase the strength of research findings and to permit the readers to understand how the researcher came to those conclusions**.** In Table 44, different keywords were searched in NVivo version 12 software related to privacy issues.

Table 44 : Generate initial codes for privacy

User	Data Item	Initial Codes
User 1	"*yes, sometimes hackers gain unauthorised access to personal information for example fake request from spam profile, risk in social sharing, profile hacking and fake apps and malicious links cause lot of threats and issues for the personal digital data of the student relating to subject material or specific research in some topics."*	Spam profile Social Sharing hacking Fake Apps Malicious Links Threats issues
User 2	*"Yes, it causes data privacy issues in higher education institutes. As social networking has penetrated into our education system like there are many class groups, activity groups and many other groups used to share education documents and information related to the education or their class. So, it can cause data leakage like if there is any secret information which should be kept confidential and one of the students may post it in their group. So, it can cause privacy issues."*	Higher education Institutes Data leakage Secret Information Confidential
User 3	*"Yes. Because installing an application or making ids in social networking sites is not possible without access to personal information, device, and location etc. that's why it can make problems for anybody's privacy. The same way some hackers can send fake id or information to confuse and blackmail people."*	Social Networking sites Personal information Problems Hackers Fake id Confuse

User	Data Item	Initial Codes
		Blackmail
User 4	*"There are a lot of ways they can access your information if they got your email account as your Google account is linked with all your devices you used in your daily life like mobile phone or iPad etc."*	Email account Google account mobile phone iPad
User 5	*"Yes, use of social networking sites in higher education institutes causes data privacy issues because with the creation of Social Networking Sites, colleges and universities across the globe have been playing catch-up with students. I think in higher education institutes they have their own networking, and everything will be monitored."*	Colleges Universities Students
User 6	*"Yes, Because I think in higher education institutes, they have their own networking, and everything will be monitored. Some social networking sites use cookies and also checks for our current location."*	Cookies Current Location
User 8	*Yes. When people use social networking sites, they allow permissions to the site owners to get their personal information as well which leads to data privacy issues. Whenever this data is used for data analysis, they remove user personal information but there are a lot of ways from which user information can be extracted."*	Permissions Remove Extracted
User 9	*"…my personal thinking is social networking sites should be banned in higher education institutes because it causes many problems and fuss between students. As we all know social networking has personal data and is difficult to secure from hackers."*	Banned Fuss

User	Data Item	Initial Codes
User 11	*"YES, there are data privacy issues. But it doesn't mean this issue is only for institutes. Any type of data is very important for the organisation, even the data about students or institutes. If any kind of privacy is disclosed, it may harm the institute".*	Organisation Harm
User 13	*...they get your data from social networking sites and use it where it shouldn't be used or use it against the person to which data belongs. One's hard work gives the benefits to the person who did lesser work."*	hard work Benefits Lesser work
User 16	*Data privacy is a very sensitive topic for sure but on the other hand, tools and policies implemented correctly can solve or mitigate this risk and create a better and secure trust circle as well."*	Sensitive Topic Tools Policies Implemented Mitigate Risk Secure Trust
User 17	*Yes, I think we are at a risk of data privacy being invaded. As far as I have noticed, these institutions do not have any great security systems and it's extremely easy to override or hack them. Another issue is that they're all linked and cause easier access to data of numerous people."*	Invaded Security Systems Override Hack
User 18	*"Yes, I think that using social networking sites in higher educational institutes can cause data privacy issues if one is using the institute's network, VPN, IP and server address..."*	Network VPN IP server address

3- Search for themes for privacy

Different keywords were searched in the NVivo version 12 software related to privacy issues. The word cloud below shows 200 words which were most frequently used in answers to privacy. The bigger the word size the more frequently it was used. Through this word cloud, the big picture regarding the perception of privacy issues can be seen. It also helps to explore the sub-themes for the privacy issue.

In the third step, a theme emerges from a pattern that expresses something interesting or significant about the data related to the research question. Maguire and Delahunt (2017, 3356) state "there are no hard and fast rules about what makes a theme. A theme is characterised by its significance". From the word cloud (Figure 33), four main sub-themes were concluded for privacy issues: social networking sites, higher education, personal information, and threads. Other keywords from initial coding are grouped under each sub-theme.

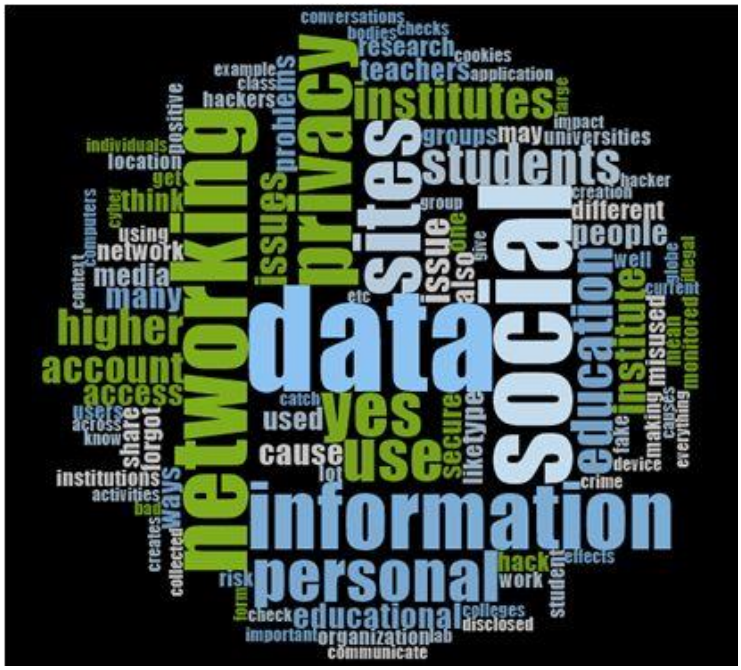


Figure 33 Word cloud of Privacy created by NVivo V12 (prepared by author)

4- Review themes for Privacy

"During this phase we review, modify and develop preliminary themes identified in Step 2 and 3. Do they make sense? At this point it is useful to gather together all the data that is relevant to each theme" (Maguire and Delahunt 2017, 3358). Figure 34 presents the mind map for privacy, created by NVivo version 12.

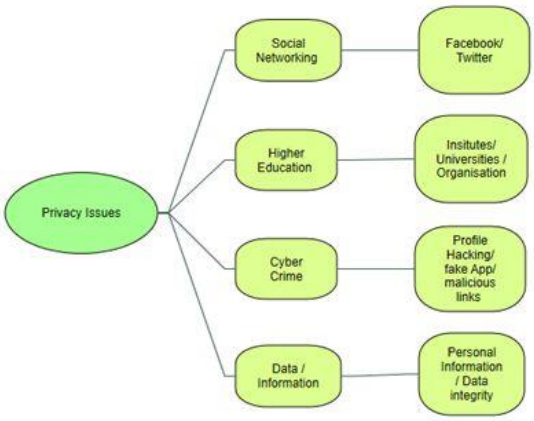


Figure 34: Mind Map of Privacy issue by using NVivo V12 (prepared by author)

5- Define themes for privacy

"This is the final refinement of the themes and the aim is to...identify the 'essence' of what each theme is about" (Braun and Clarke 2006, 92). It was seen clearly in previous steps that the theme of privacy issues was based on four main sub-themes, and each sub-theme was grouped according to relevant keywords. For example, as shown in Table 45, social networking is related to social networking sites. Whereas, the higher education theme refers to institutes, universities, organisations and colleges. Threats include profile hacking, fake applications, malicious links, hacking, etc., while, digital data shows personal information, confidential, Google account, ids and etc.

Table 45: Themes and sub-themes of privacy issues

Themes	**Sub-themes**
Social Networking	Social networking sites
Higher Education	Institutes, Universities, Organisations
Threads	Hacking, malicious links, fake apps etc.
Digital Data	Personal information, confidential, ids etc.

6- Producing a report for privacy

As discussed previously, 'privacy' as a factor of the SNMHEP, was not fully supported by the students' online survey responses. Therefore, this time, the same factor was included in the

interview questions, and the experts were asked to confirm its presence in the model. Expert comments fully justified the significance of the privacy issue in higher education in Pakistan. Hence, this factor was retained in the model.

Privacy was discussed in chapter 2, section 2.10.5.3. According to the experts' responses to this question, privacy is essential in order to secure the personal information of the user. It is also important for data integrity. In the higher education sector, it is essential that students have trust when sharing their work with their peers. This factor will also assist them in this matter.

6.4.2. Inspiration (Psychological aspects)

The psychological aspects in the model are discussed in chapter 2, under section 2.10.3. It had five sub-factors: encouragement, inspiration, motivation, awareness, and constructive feedback. This factor needed to be confirmed by the interviewees. Therefore, the second question was 'Do you think that use of social networking sites has had psychological aspects on various aspects in the higher education sector, such as inspiration to improve work by sharing with peers, to learn new things from peers' work, to become more creative and innovative etc. If yes, why and if no, why not?'

1- Become familiar with the data for inspiration

The first step involved reading and re-reading the answers to the second question that was related to inspiration, in order to become familiar with the data. In this stage, the coding process was done manually and answers to the inspiration questions were selected from the Qualtrics website and saved in a separate Word file.

2- Generating initial codes for inspiration

In this step, initial codes from interviewees' answers to question two were recorded in Table 46. All these codes were used in the next step to search the theme and sub-themes.

Table 46: Initial coding for Inspiration

User	Data Item	Initial Codes
User 1	"Yes, I think so because students are connected to online global communities like online educational lectures and online studies and many experts suggest that students have learned new ways to explore more subject-related information using social networking sites which offer a vast range of information and knowledge relating to specific content. Most student are now familiar with SNS environments as an integral part of their life routine in order for education counselling towards career growth and hence SNS have positive impact on the education sector."	Students Online global communities Experts learned new ways explore subject-related information social networking sites Offer vast range specific content SNS Environment life counselling career growth positive impact education sector
User 2	"In terms of inspiration and motivation, social networking is the best way to improve because the new generation uses social networking a lot. People can share and get work and learning stuff easily"	Inspiration Best way Improve New generation share work learning
User 5	"Yes, Because Social media has a lot of psychological impact on one's personal life, if we talk in the context of sharing an informative and educational related thing on social media it will be good. Like some students make a Group on which they share their due assignments and discuss problems they are facing in any subject. Social media can also be used as a discussion forum. Where	Psychological Personal life Sharing Good Group Assignments Discuss Problems Subject Discussion forum

User	Data Item	Initial Codes
	students from different institutes discuss different things related to education."	Institutes Different things
User 7	"Yes. Social networking sites are basically a popular platform to make relationships and connections between different people. This relationship leaves some extraordinary impact on user's life. In the educational sector it can be inspiration, motivation as well as awareness. But of course, social networking sites have great psychological impact on various aspects."	Popular platform Relationships Connection People Extra ordinary Motivation Awareness Social networking sites Great Various aspects
User 9	"yes, we can take some ideas through social networking sites and help the other person through social networking. We can learn some new things to help other people. Social media is a part of our life. These days social networking is very useful to increase our knowledge."	Ideas Help Useful Increase
User 10	"Yes, Social media has become a part of our daily life. There are many sites nowadays to upload your work experience and get jobs. Such as LinkedIn, Freelancer, Upwork etc. Through Social networking you can share your experience or if any type of difficulty you are facing you can ask questions on it and get answers or reviews from others. So, it is very helpful."	Daily life Upload Work experience Jobs LinkedIn Freelancer Upwork Experience Ask questions Get answers Reviews from others Helpful

User	Data Item	Initial Codes
User 11	"Social networking sites have become increasingly integrated into the way many people today act, think, and relate to each other. Social networking has a multitude of implications in the field of education and its impact on students, educators, administrators, and parents are similar."	Increasingly Integrated Think Multitude Implications Field Educators Administrators
User 12	"In my opinion there are two cases; in some it helps students to find and get some ideas from others but in other cases, students who don't want to do any effort get the ideas from others and don't do the effort which will be useful for them in future life. You can say it depends on the user rather to use it positively or negatively…"	Opinion Some ideas Effort Future life Negatively
User 13	"Yes, social networking sites have had huge psychological impacts to learn and create new things in the higher education sector. When someone initiates a new theory or shares a new idea with their friends, they may be appreciated or criticised on it, both ways they learn new things. When someone criticises it, they try to remove flaws from it and when someone appreciates it, they get inspiration from it."	Huge Higher education sector New theory friends appreciated criticised remove flaws Inspiration
User 14	"Many educational institutions and design bodies use different social networks to share their news and resources. Many students prefer to follow these bodies on social network websites because it is easier to reach and allow them to follow all the resources and projects directly from their Facebook, Twitter, or LinkedIn profiles. Many students and designers have started to build learning groups based on schools, classes, and even specific courses. In these groups, students and designers use groups as a method to learn, discuss assignments, and	Design Bodies News resources Prefer follow Easier Facebook Twitter LinkedIn Profiles Discuss assignments Share projects Digital learning group

User	Data Item	Initial Codes
	share projects together. The digital learning group has replaced many local school learning groups because it allows students to communicate during travels or summer breaks."	
User 15	"Of course, it does because information is available readily and everyone can share/view it too. Can be considered a tool for enhancing the power of an individual in respect of creativity, innovation, farsightedness and improvement of an individual. It also helps in progression and forward thinking and creating a healthy competition amongst peers."	Of course Readily Enhancing Power Individual Creativity Innovation Farsightedness Improvement Progression Forward thinking Creating Healthy competition Amongst Peers
User 16	"It creates a very positive vibe and source of inspiration for all who are joining in. It also creates a paradigm for a future research attitude in students to see new horizons. It also enhances the capabilities of innovation and creativity to compete amongst the peers."	Creates Positive vibe Source of inspiration Paradigm Future research Attitude New horizons enhance
User 17	"I will say YES. Motivation is the key to success. Benefits such as inspiration to improve, develop some ideas with other minds in a short span of time and review your results by adopting a big sample within a minimum time period."	Key to success Benefits Develop Adopting Minimum time period

3- Search for themes for inspiration

In the previous step, the words were extracted as codes that give some meaningful and useful information about the answers. In this step, a word cloud was created using NVivo version 12 software. In Figure 35, the larger words are those which were used more frequently in the interviewees' answers.

Figure 35: Word cloud of inspiration created by NVivo V12 (prepared by author)

4- Review Themes for inspiration

From the above word cloud, the main theme is obviously psychological aspects and sub-themes are higher education sectors, social networking, and positive impact on users. Social networking and higher education are used as themes constantly for all interview questions.

5- Define themes for inspiration

The themes that emerged in the last step were reviewed at this stage. There are four themes: social networking, higher education sectors, keywords related to inspiration, and user benefits. These themes, shown in Figure 36, were reviewed through a mind map created with NVivo version 12. This mind map assists with the coding of categories according to respective themes.

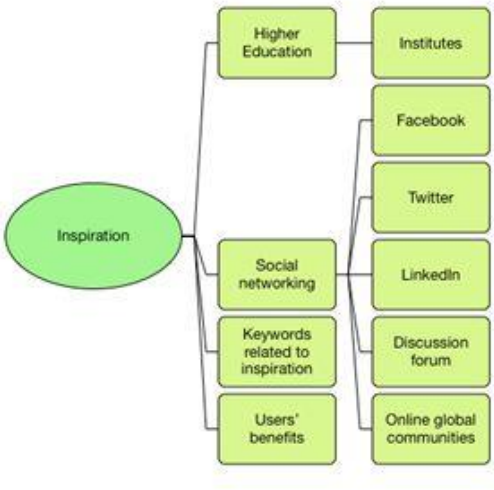


Figure 36: Mind Map for Inspiration created by NVivo V12 (prepared by author)

As mentioned above, the main theme is inspiration while the sub-themes are social networking, higher education, and inspiration. Each sub-theme is based on certain keywords as shown in Table 47.

Table 47: Initial coding for inspiration

Themes	**define themes**
Social networking	Facebook Twitter LinkedIn Discussion forum Online global communities Freelancer
Higher education sectors	Institutes

Themes	define themes
Inspiration	Inspiration Best way Improve Awareness Motivation Inspiration Innovation creativity Enhancing Improvement Progression Helpful Easier
Users' benefits	Counselling career growth Forward thinking Positive vibe New horizons Healthy competition progression forward thinking Friends Appreciated Ask questions Get answers Reviews from others Future research Attitude Discuss assignments Share projects Digital learning group

Themes	define themes
	Key to success Experts learn new ways

6- Producing report for inspiration

After the analyses of the second question in the previous steps, the psychological aspects theme was confirmed for the SNMHEP. Expert comments fully justify the significance of all sub-themes related to psychology such as inspiration, motivation, encouragement, awareness and constructive feedback.

The inspiration theme is explained in chapter 2, section 2.10.3.2. Comments show that inspiration is essential for students while using social networking for academic purposes. Students have new ways to learn new things from experts all over the world. One of the main reasons for keeping this factor in the model was that all students share work with their peers without having any tension or hesitation. This factor will provide a stress-free and reliable e-learning environment to the students. It will also provide data integrity as no-one would receive credit for someone else's work.

6.4.3. Age and Gender (Social factors)

In chapter 2, section 2.10.2. social factors included user acceptance technology, culture, age and gender. The first two factors were confirmed by the students' online survey; only age and gender needed to be checked again through the experts' comments. The same six-step analytical process was used for this question: 'Do you think that social factors employed by social networking sites in the higher education sector are associated with gender and age issues?'

1- Become familiar with the data for age and gender

Comments regarding the third question, related to the age and gender, were read and re-read to understand the significance of the data. In this stage, the coding process was done manually, with answers for age and gender questions selected from the Qualtrics website and saved in a separate Word file.

2- Generate initial codes for age and gender

The initial codes from interviewees comments about age and gender are noted in Table 48. All these codes were applied to search the theme and sub-themes in the next step.

Table 48: Initial coding of Age and Gender

User	Data items	Initial code
User 1	"…Each group of age or gender have their unique approach and perception while using digital data of studies and about usage of SNS in their education."	Age Gender Unique approach Perception Digital data Studies Usage SNS Education
User 2	"Yes, the factors employed by social networking sites in the higher education sector are associated with gender and age issues because all factors have their maturity level issue. In age perspective, undergraduate, graduate and Ph.D. students demand to search their relative contents because the mind set of undergraduates is different from Ph.D. students because of the age and experience difference. Likewise, in case of gender, male and female have different perspective to learn from the social network."	Factors Employed Social networking sites Higher education associated with Issues Perspective Undergraduate Graduate Ph.D. Students Demand Search Relative contents Experience Difference Perspective Get learned Social network

User	Data items	Initial code
User 7	"I think that some social sites can impact age and gender, its impact can be positive and negative."	Impacted Positive Negative
User 8	"Yes, priorities differ with the age difference as well as gender. So, these sites have to maintain interface comfort, the likeness and dislikes of each and every group as well."	Priorities Differ maintain Interface comfort Likeness Dislikeness
User 14	"Social factors play a major role in social networking sites in higher education many teenagers fluently use social media and get help out from it as compared to high age persons because young people accept latest technology faster as compared to old peoples. Culture also has had huge impact on social networking sites in higher education."	Social factors Play Major role Teenagers Use Fluently Social media get Help out Compare High age persons Young people Accept Latest technology Fast Compared Old people Culture huge Impact
User 18	"Yes, I think age and gender both play an important role, but a stereotypical one. Females are considered to be less efficient, and less likely to be employed or given important tasks. But their presence can be used as eye candy in many circles. Likewise, younger people are	Play Important role Stereotypical Considered Less efficient Less likely Important tasks

User	Data items	Initial code
	less likely to be given crucial jobs, with the experience or aged ones taking the lead.”	Presence Crucial jobs experience Aged Taking the lead

3- Search for themes for age and gender

From the word cloud presented in Figure 37, it is observed that the size of the words ‘gender’ and ‘age’ is large, indicating their frequent occurrence. The larger the font size of the word, the more frequently it occurs in the interviewees’ comments. The main themes related to age and gender issues in the usage of social networking in higher education in Pakistan are obviously social networking and higher education. These two themes are also used for this question as well. How performance of users is affected because of age and gender are also considered. The interviewees’ comments indicate that culture also plays important role in regard to age and gender.

Figure 37: Word cloud of Age and gender created by NVivo V12 (prepared by author)

4- Review themes

Different themes were observed in the last step and all of them were reviewed in this step. The NVivo version 12 software was used to create the mind map shown in Figure 38.

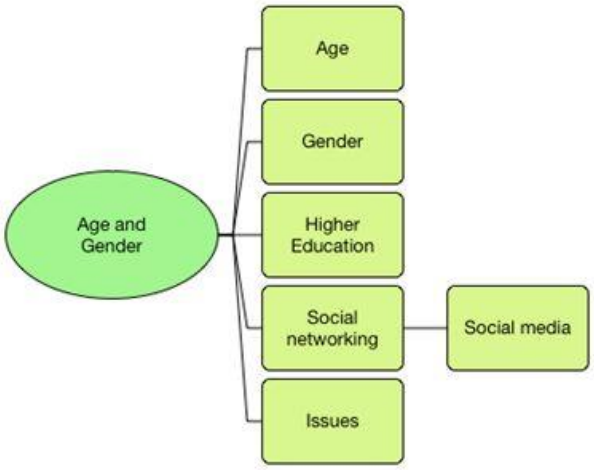


Figure 38: Mind Map of Age and Gender created by NVivo V12 (prepared by author)

5- Define themes for age and gender

The themes that were discussed in the previous step are further defined in this step. The defined themes are given in Table 49.

Table 49: Defined themes of Age and Gender

Themes	Define Themes
Social networking	SNS, Sites, social media
Higher education	Education, Undergraduate, graduate, Ph.D. students
Age	Young people, Old people, Aged, teenagers
Gender	Male, Female
Issues	Gender priorities Age differences Younger learn more quickly Old people take time in learning Cultural issues

6- Producing report for age and gender

The experts' comments confirmed the presence and importance of age and gender factors in the SNMHEP. Therefore, this factor is retained in the new model.

According to the expert interviewees' comments, in Pakistani culture, age and gender are important factors which have a substantial impact on the performance of users. Because of gender, in some rural areas of Pakistan, women are not allowed and not facilitated to use social networking sites as openly as men do. This could be a barrier for women in e-learning. The reason is their conservative and stereotypical culture. For the implementation of this model, it is essential to take this factor into consideration in both girls' and boys' colleges and universities.

The age factor is important because it is commonly thought that younger people learn more quickly than older ones. Also, mature people tend not to change. The interface, navigation, and usability should be designed to be as user-friendly as possible and easy to learn and remember.

6.4.4. Social Networking Model in Higher Education in Pakistan (SNMHEP)

To this point, some sub-factors of the model SNMHEP such as privacy (technological context), inspiration (psychological aspects), age and gender (social factors) have been re-confirmed from the data analysis of the interviewees' feedback. Now, this question and data analysis is for the confirmation of the proposed model SNMHEP. In chapter 2, section 2.10 the SNMHEP is explained in detail. It had five factors and each factor was further divided into sub-factors. From the responses of the interviewees to each factor and sub-factors, the refined model is obtained. The aim of this interview question (can you please give your feedback about my current Social networking model in higher education in Pakistan; do you think the current structure will match the higher education sector of Pakistan? If Yes why, and if no, why? Please give your answer in detail) was to re-confirm all factors in the current model at this stage and establish its authenticity and precision.

1- Become familiar with the data for SNMHEP

In this first step, to understand the data before initial coding, the experts' comments were read thoroughly. In this stage, the coding process was done manually, and answers related to the

proposed model (SNMHEP) were selected from the Qualtrics website and saved in a separate Word file.

2- Generate initial codes for SNMHEP

Initial codes from the interviewees' comments about the factors of the SNMHEP are presented in Table 50. All these codes were used to explore themes and their sub-themes in the next step.

Table 50: Initial coding of the SNMHEP

User	Data Item	Initial code
User 1	"Yes, I think that this module is the best fit because it has all the important aspects such as IT infrastructure and psychological contents like motivation and constructive feedback. Through this social network model, students can connect with learning groups and can get more useful and efficient information along with sound security of digital data."	Best fit Important aspects IT infrastructure Psychological Motivation Constructive feedback Digital data
User 2	"…. Design Aspects: From the given model Design aspect shows usability, Navigation and Interface. As I know the usability and navigation factor is far better in some social networks like Twitter and Facebook. Still it needs more advancement if better ideas came through. It is good. If we come to the privacy and security issue which is still in progress and not that good to keep someone or some confidential information secure. Still some loopholes are left behind which can breach the data. Organisational Support: social networking is best in terms of learning which provides good information to learn and train	Design Aspects Usability Navigation Interface Twitter, Facebook Privacy Security issue Progress Confidential information secure Organisational support Cultural aspects Psychological Aspects Effective Improved Encouragement

User	Data Item	Initial code
	people in many aspects. Social Factors: Social networks cover most of the cultural aspects in my opinion all kinds of cultural people accept it and use it. Psychological Aspects: Lot of awareness campaigns are carried out through social networks and results are most effective. It means social networks play an important role and it is best to be improved. In term of motivation and encouragement, Social networks play important role."	
User 4	"…. An awareness campaign is needed to motivate and make our youth know how powerful and useful these networks are and how, through this social media, we can prosper and make some mark or raise our voice, and can represent our country on different platforms."	Awareness Motivate Powerful Useful Networks Social media Prosper Represent Our country Platforms
User 5	"Yes, this model is great and covers all the important aspects such as psychological aspects which are related to motivations, creativity, awareness. Whereas, the technological context and other organisational supports also fit best in this model…In Pakistan, some security issues and top management of organisations cannot support the use of social media. And our social factor in educational institutes like gender and age issues will be the problem according to our culture."	Model Great Covers Aspects Creativity Awareness Technological context Organisational support Best fit Pakistan Security issues Top management Organisations Social media Social factor

User	Data Item	Initial code
		Educational institutes Gender and age issues Problem Our culture
User 7	"Yes, this current structure will match the higher education sector of Pakistan. You covered a lot of things in your study. These aspects are all basic needs for any social networking model."	Match higher education sector Social networking model
User 9	"I think this social networking model is enough for higher education in Pakistan."	Higher education
User 11	"Your research on Social Networking Model is a good idea. The SNMHEP matches the current needs of higher education sector in Pakistan."	SNMHEP
User 18	"It seems a good model…your system addresses a lot of important factors to be considered and I'd really like to see it being implemented, especially with improved services."	Good model System addresses Important factors Implemented Improved services

3- Search for themes for SNMHEP

Figure 39 depicts the word cloud created by the NVivo version 12 software. It shows all the keywords which were used for the answers to these questions. All key words, such as

technological, psychological, design, constructive feedback, social factors, management, awareness, motivation, security, age, gender etc. represent the level of relevance of answers for the model. These words are also used as themes for the analysis of this data.

Figure 39: Word Cloud of SNMHEP created by NVivo V12 (prepared by author)

4- Review themes for the SNMHEP

Three themes emerged: social networking, higher education, and SNMHEP. Figure 40 shows the mind map used to check the themes and its codes.

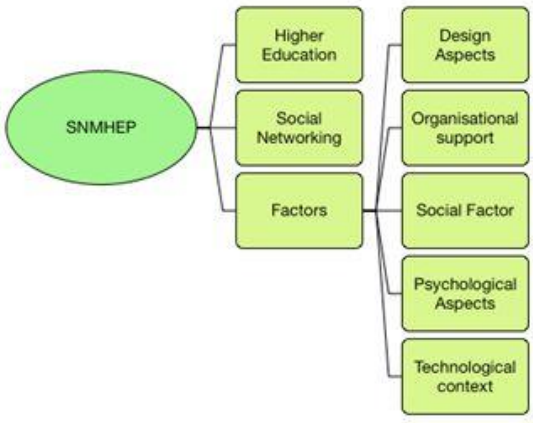


Figure 40: Mind Map of SNMHEP created by NVivo V 12 (prepared by author)

5- Define themes for the SNMHEP

The themes which were discussed in previous steps are more defined in this step. The defined themes are given in Table 51.

Table 51: Defined Themes of SNMHEP

Themes	Defined themes
Social Networking	Twitter, Facebook Social media
Higher education	Higher education sector in Pakistan
SNMHEP factors	Technological context Design aspects Social Factors Psychological aspects Organisational support

6- Producing the report for SNMHEP

According to the experts' comments, it was established that all factors of the SNMHEP are important to keep in the model. Every factor has its own significance which could not be ignored. Therefore, all factors will remain in the new model.

6.5. The final Social Networking Model in Higher Education in Pakistan (SNMHEP)

After the analysis of the survey and interview data, the final social networking model for higher education in Pakistan (SNMHEP) is presented. The factors and sub-factors of the model are confirmed by the outcomes of the survey and interview phases. According to the experts' comments, it is established that it is important to retain all factors in the SNMHEP. Every factor has its own significance which cannot be ignored. Therefore, all factors will remain in the new model. The SNMHEP is depicted in Figure 41 and a more specific version of the model is shown in Figure 42 below.

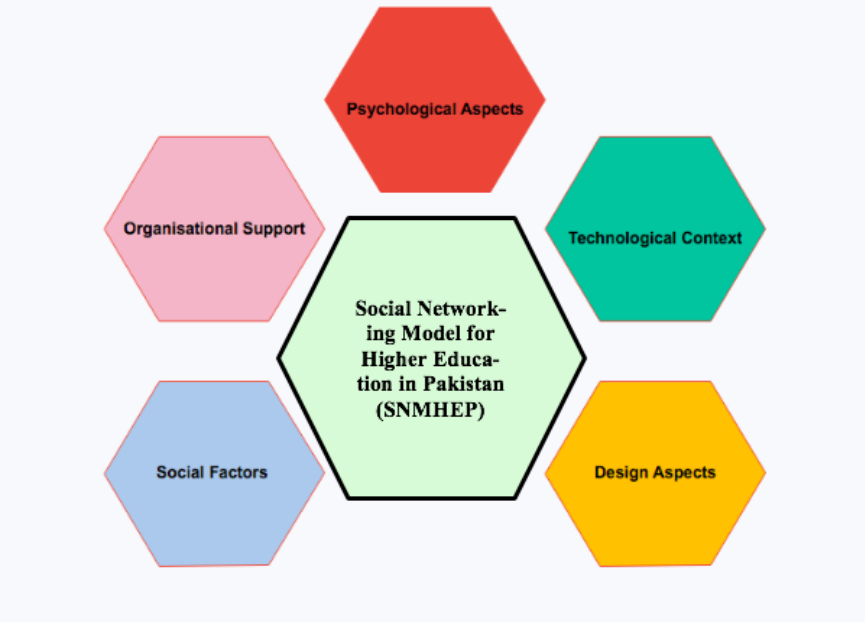


Figure 41: Social Networking Model for Higher Education in Pakistan (prepared by author)

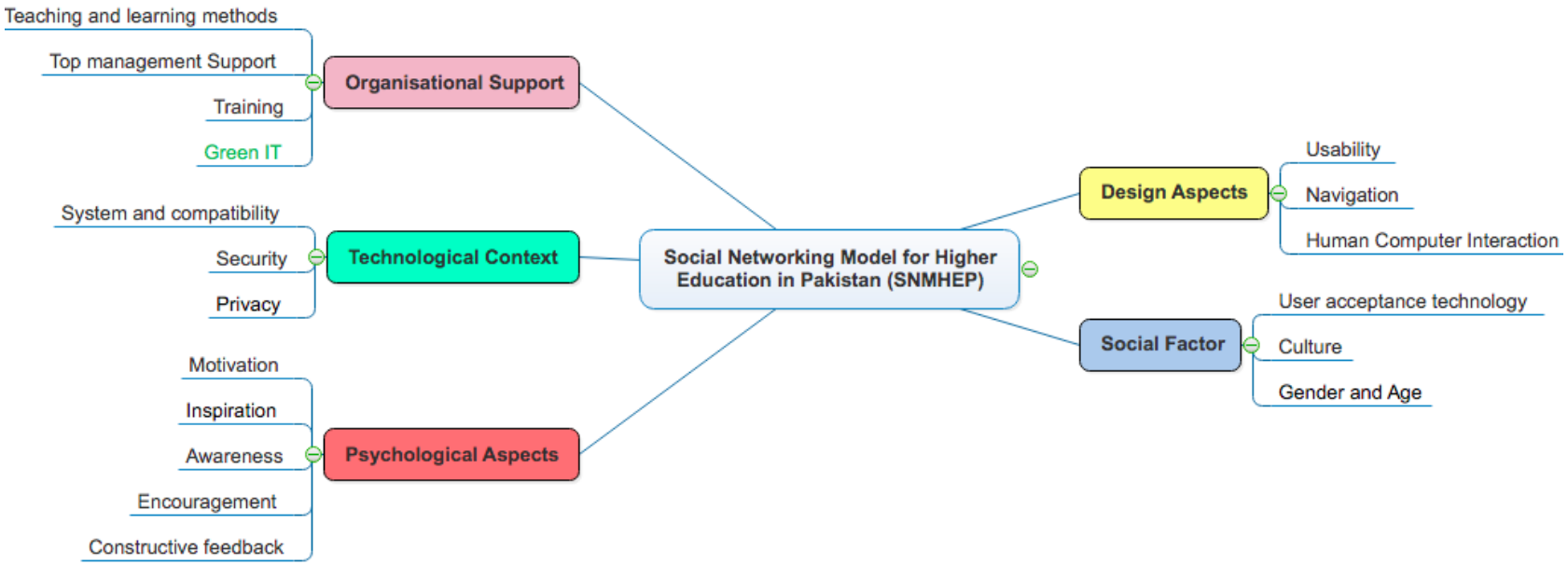


Figure 42: The final Social Networking model in higher education in Pakistan (SNMHEP) (prepared by author)

6.6. Conclusion

This chapter consists of three main sections: the interview data collection, data analysis and its findings. In the first section, the number of the participants and their gender were discussed with the help of a web-based interview designed and conducted on the Qualtrics website. The next section explained the data analysis process that follows a six-steps guideline. The NVivo version 12 software was used to design a word cloud along with mind map tools that help to search for and determine the themes. The questions discussed were not confirmed by the students' online survey data; therefore, this chapter included expert comments on the themes, that were analysed through manual and software coding. Findings showed that all the themes contained in the interview questions were fully endorsed by the experts and should be retained in the new model.

Chapter 7 - Research Findings and Conclusion

7.1 Introduction

This chapter presents the research findings and conclusion. Firstly, it gives a summary of the research, and then discusses the effect of the SNMHEP regarding the risks and advantages of social networking in Pakistan. The limitations of the research are acknowledged. After that, the research is concluded by answering the primary and secondary research questions drawn from the research findings. Lastly, the future research directions are suggested. Moreover, some statistics on the current situation in Pakistan regarding carbon emission, literacy rate and budget of the Higher Education Commission are presented. It is explained how this model can benefit the progress of Pakistan's education sector.

7.2 Summary of research

The literature review chapter consisted of five sections: history of the internet, social networking and its tools, social networking in different sectors, worldwide social networking models, the research gap and a social networking model for higher education in Pakistan (SNMHEP). Web 1.0 to Web 6.0 were briefly discussed in the second section. Social networking has many tools, one of which is social networking sites (SNS). As this research is mostly based on SNS, it discussed SNS in different sectors. After that, it focused on the higher education sector worldwide, specifically the higher education sector in Pakistan. The positive and negative impacts of social networking in higher education in developed and developing countries were discussed with the aim of exploring the effect worldwide of social networking; the focus then narrowed down to Pakistan and the risks and advantages of social networking in higher education in Pakistan. The worldwide social networking models were also explored as well as the research gap and the factors which should be included in a social networking model. With the help of the literature review, an initial social networking model for higher education in Pakistan (SNMHEP) was designed.

This initial model had five factors: technological context, psychological aspects, social factors and design aspects. Each factor was further divided into various sub-factors. All factors are fully explained in chapter 2, section 2.9. This research was based on the mixed-methods approach comprising quantitative and qualitative methods. The online survey was for quantitative research and the web-based interview for qualitative research.

The survey was conducted among students in Pakistani universities. The data was designed and collected through the Qualtrics website. The total number of participants in the survey was 681. The analysis of the survey data was based on two sections. In the first section, all information regarding participants was considered, whereas in the second section the survey responses were analysed. The reliability tests were performed by applying Cronbach's Alpha, KMO and Bartlett's Test, followed by the rotated component matrix and determining new factors. These tests were applied to every sub-factor in the model. Finally, new factors emerged and were added as new sub-factors of the model. The survey findings demonstrated that three sub-factors needed further confirmation: privacy, inspiration and age and gender. The new SNMHEP was established after the survey findings.

As mentioned above, the qualitative research data was collected through web-based interviews. Eighteen (18) experts, all university staff members, were interviewed and their responses recorded. The data analysis was done via a six-step analytical process in which manual coding and the NVivo version 12 software was used. The interview had four questions. The answer to each question confirmed the presence of that factor in the model, (i.e. privacy, inspiration and age and gender). Furthermore, all factors of the initial model were confirmed in the new model. Green IT as a sub-factor of organisational support is the new finding of the SNMHEP.

The advantages and risk of social networking in higher education are discussed in chapter 2 section 2.5 and 2.6 respectively. Table 52 shows how factors of the SNMHEP will mitigate risks of social networking in higher education in Pakistan and give solutions.

Table 52: Risk factors aligned with the model

Risks Factors	**Model**	**Mitigate Risks**
1. Inhibitor to socialising.	Organisational support.	Organisational support has sub-factors; teaching and learning methods, top management support and training sessions. These will increase communication and cause more socialising for the students.

2. Triggers anxiety and loss of interest (e.g. bores me, stresses me, depresses me).	Technological context, Psychological aspects, Design Aspects, Social Factors.	All these factors will increase the interest of the students and motivate them.
3. Cynicism on data security such as it increases security concerns, increases privacy concerns, increases intellectual property concerns.	Technological Context.	Technological context has sub-factors of privacy and security. This will mitigate the risk.
4. Inhibitor to developing cognitive skills such as prevents me from concentrating more on writing and reading skills, prevents me from remembering the fundamental knowledge and skills.	Psychological aspects, Organisational support, Design Aspects, Technological context.	All these factors will assist students regarding all these types of risks.
5. Decreases motivation to undertake intelligent exercises and easy loss of focus such as decreases deep thinking and distracts me easily.	Psychological aspects.	The psychological aspects have sub-factors, inspiration, motivation, encouragement, awareness and constructive feedback which is best solution of this risk.

The advantages of social networking in higher education in Pakistan are enhanced through the model. Table 53 below shows links between advantages and the factors of the model.

Table 53: Advantages aligned with the model

Advantages	**Factors of the SNMHEP**
Assist study, develop networking and professional skills also gaining awareness on environmental issues such as complete my study more quickly, understand and solve study problems easily, reduce carbon footprints, acquire new work related acquaintances, become more 'greener' in my activities, scrutinise my research study more easily and study independently.	All factors of the model such as social factors, psychological aspects, organisational support, design aspects, technological context together give this benefit.
Connect me with my peers and information from the past such as communicate with my peers frequently, collaborate with my peers frequently and remember facts/aspects of the past.	Organisational support and the social factor (user acceptance technology) will increase these opportunities.
Maintain current relationships and establish new networks such as communicate with different communities, communicate with my peers from different universities, and develop interconnected relationships with my peers.	The teaching and learning methods and top management support from organisational support will increase these opportunities.
Information and learning channels such as gain up-to-date information, learn new things.	Organisational support, Psychological aspects.

Moreover, this research has answered both questions. The primary research question was "what are the important factors which must be considered in developing a social network model for Pakistani higher education?" The answer to this question is a social networking model for higher education in Pakistan (SNMHEP) with five factors: organisational support, social factors, psychological aspects, design aspects and technological context. These five factors must be included when adopting social networks into Pakistani higher education.

The secondary research question was "what are student and staff perspectives and attitudes towards a social network model for Pakistani higher education?" According to the survey findings, all factors were confirmed by the responses of students in Pakistani universities.

The research findings not only confirm the five factors of this model but also provide further explanation of the sub-factors. Through survey outcomes 'Green IT' was obtained as a new factor of organisational support. This means that, according to Pakistani students, Green IT is an essential component of the social networking model. The interviewees' comments show that considerations of privacy, inspiration, age and gender are also indispensable for this model.

7.3 Research limitations

As this is a social networking model for higher education of Pakistan, it was designed according to the five factors (technological context, psychological aspects, social factors and design aspects) of Pakistan. This model is designed for developing countries like Pakistan; hence, a different approach would be required for developed countries.

In this research, the ratio of male and female participants was not equal. This is a clear indication that more males than females are enrolled in universities. Therefore, in this research, the male perspective is predominant. If it is possible to have more women in the survey it would give different factors more relevant to women that were not found in the current study.

The survey was conducted with university students, and the interviews were conducted with expert staff members (lecturers or professors) only. The technical staff of the universities did not participate in the study. Moreover, in Pakistan there are many universities in different provinces, but it was difficult to collect data from all of them. Therefore, only those universities in the Punjab province participated.

Despite these limitations, it is believed that this study provides an effective and useful perspective of factors which need to be considered in order to introduce social networking into Pakistani universities successfully. Moreover, the research findings could be applied and implemented in the higher education sector as a first milestone.

7.4 Conclusion from the analysis

The primary research question was "What are the important factors which must be considered to develop a social network model for Pakistani higher education?" The answer to this question is five factors: organisational support, social factors, psychological aspects, design aspects and technological context. These five factors must be included when developing a social network model for the Pakistani higher education sector.

The secondary research question was "What are student and staff perspectives and attitudes towards the developed social network model for Pakistani higher education?" According to the survey findings, which are discussed in detail in sections 5.4 and 6.5, all factors are confirmed by the perspective of Pakistani university students. The research findings not only confirm the five factors of this model but also provide further explanation of the sub-factors. Through survey outcomes 'Green IT' emerged as a new factor of organisational support. It implies that, according to the Pakistani students' perspective, Green IT is a mandatory part of the social networking model. The expert comments show that issues of privacy, inspiration and age and gender are also indispensable for this model. Finally, integrating the SNMHEP model in the education sector specially in Pakistan will allow the students to become more independent learners (face to face or online) based on the activities and assessments which will be completed by using the SNMHEP model. This will create a personal learning networking among the students to improve their learning and teaching and make students more in-charge of their own professional development as well as render their studies and workforce more effective and enjoyable.

7.5 Recommendations

Referring to the findings from both quantitative in chapter 5, section 5.4 and qualitative in chapter 6, section 6.5 the following recommendation can be drawn. The SNMHEP model was developed in order to implement social networking in Pakistan and to allow the students to

raise their awareness of the knowledge, skills, techniques and strategies required for social networking in the higher education sector in Pakistan. Therefore, to implement the SNMHEP in the higher education sector in Pakistan, the universities need to adopt the following recommendations.

Support Management in Pakistani universities

For the implementation, it is recommended that universities in Pakistan should consider top management support, awareness of culture and gender/age factors.

Improve ICT infrastructure in Pakistan

For the implementation, it is recommended that universities in Pakistan should provide computer devices and internet facilities to their staff and students.

Dedicated team (technical staff and designers) for Social Networking

The management of Pakistani universities have to assign a support team of technical staff and designers. The support team will provide insights required for social networking sites in the university portal.

Effective learning and advanced learning and teaching methods via social networking tools

This model will provide effective advanced learning and teaching methods through social networking tools. Therefore, students need to use the tools regarding teaching and learning perspectives. Moreover, according to the proposed SNMHEP, the social networks used must be easy to navigate, user-friendly, enhanced in performance, provide convenience, and deliver a stress-free experience to the students and teachers.

Creating an independent monitoring and controlling team for Social Networking

After the implementation of this model, there is a need for a monitoring and controlling team which will ensure the effectiveness, safety and efficiency of the model.

7.6 Significance and future research

The main purpose of this research was to propose a model that can be adopted by many stakeholders in order to advise and guide the implementation of social networking in the higher education sector in Pakistan. This research is an attempt to identify factors which must be taken into account when the adoption of social networking in Pakistan and other developing countries is being considered.

The outcomes of this research reveal that Pakistani students already benefit from social networking sites and endorse the main factors of the model for implementation of social networking in the higher education sector of Pakistan. There are many implications for future research that could expand on the insights acquired by this study.

This research evaluated and developed a social networking model for implementation. A useful extension of this research would be the formal implementation of social networking in university or universities of Pakistan in compliance with the factors in the SNMHEP to confirm whether the model is indeed comprehensive, or whether it needs additional factors to be addressed. In this manner, the efficacy of this model as a blueprint for implementation could be tested.

The sample size for this research was limited, particularly in regard to the interview phase. Another consideration for future research would be to conduct a study with a bigger pool of participants, thereby enhancing the qualitative aspect of the study. It is hoped that this study will attract a greater number of participants willing to contribute to future research.

This research was conducted mainly in the metropolitan areas of Pakistan. Yet another aspect of future research is to investigate the attitudes and perceptions of students in rural areas of Pakistan towards social networking. Undoubtedly, social networking could be of great benefit to students in remote areas provided sufficient technological infrastructure could be established. Hence, research into how social networking could be implemented in rural areas of Pakistan could create another type of success factor.

E-learning through social networking with proper implementation of the SNMHEP model is eco-friendly and economical. The Higher Education Commission of Pakistan may face up to

50% budget cut (Pakistan Today 2020). In this scenario, the implementation of this model could be a viable option to be considered. This model, along with other benefits, will also promote green IT and the savings could be redirected to other expenses such as student transport charges, the cost of building more classrooms, extending parking areas, building maintenance, and electricity bills of laboratories etc. The benefits are numerous. Additionally, "The country's total emissions are expected to increase by about 300% for the projected period (2015-2030)" (Umer and Vaqar 2018, Para 8). Green IT is ideal for such a situation. The successful implementation of the SNMHEP will not only reduce carbon emissions but will also provide a better and extended learning environment.

"Education Minister Shafqat Mahmood said…that the literacy rate in the country has fallen to 58 per cent from 60 per cent" (Pakistan today 2020, Para 2). Yet another significance of the implementation of the model is that it could improve the literacy rates in Pakistan because everyone would be able to access knowledge and attain education when and where it is most convenient.

7.7 Conclusion

This chapter consisted of four sections. Firstly, it presented a summary of the research including the literature review, survey and interview. Secondly, it acknowledged the limitations of this research mainly in terms of its budget, sample size and rural student participation. Thirdly, it concluded the research outcomes in order to answer the primary and secondary questions. Finally, a detailed discussion about the future significance of this research was presented along with recommendations for the model.

References

Abro, M., L. Zhenfang, A. R. Chhachhar, and S. A. H. Gillani. "Social Networking Sites' Usage Trends and Adoption Among University Students: A Descriptive Analysis." *New Media and Mass Communication* 23 (2014).

Aghaei, Sareh, Mohammad Ali Nematbakhsh, and Hadi Khosravi Farsani. "Evolution of the world wide web: From WEB 1.0 TO WEB 4.0." *International Journal of Web & Semantic Technology* 3, no. 1 (2012): 1-10.

Ahmad, Ateeq, and Mohammed Ahmed Elhossiny. "E-learning and Security Threats." *International Journal of Computer Science and Network Security (IJCSNS)* 12, no. 4 (2012): 15.

Ahmed, Abdelhamid. "Ontological, Epistemological and Methodological Assumptions: Qualitative versus Quantitative." *Online Submission* (2008).

Ali, Haider, and Sue Birley. "Integrating deductive and inductive approaches in a study of new ventures and customer perceived risk." *Qualitative market research: an international journal* (1999).

Allen, Peter M., and Liz Varga. "Complexity: the co-evolution of epistemology, axiology and ontology." *Nonlinear Dynamics, Psychology, and Life Sciences* 11, no. 1 (2007): 19.

Alshenqeeti, Hamza. "Interviewing as a data collection method: A critical review." *English linguistics research* 3, no. 1 (2014): 39-45.

Altbach, Philip G., Liz Reisberg, and Laura E. Rumbley. "Trends in global higher education: Tracking an academic revolution." (2009).

Alzahrani, Jumaan Abdulqader. "SUGGESTED FRAMEWORK TO OVERCOME PERCEIVED BARRIERS TO RESEARCH PUBLISHING IN SAUDI ARABIA." *International Journal of Academic Research* 3, no. 4 (2011).

Amundson, Lisa Jane. "Collaborating on Web 2.0 Technologies: The Best-Fit Model for the Behavioral Intentions of Preservice Teachers." (2014).

Anney, Vicent N. "Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria." *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)* 5, no. 2 (2014): 272-281.

Antoniadou, Nafsika, and Constantinos M. Kokkinos. "A review of research on cyber-bullying in Greece." *International Journal of Adolescence and Youth* 20, no. 2 (2015): 185-201.

Antwi, Stephen Kwadwo, and Kasim Hamza. "Qualitative and quantitative research paradigms in business research: A philosophical reflection." *European journal of business and management* 7, no. 3 (2015): 217-225.

Arif, Muhammad, and Khalid Mahmood. "The changing role of librarians in the digital world." *The Electronic Library* (2012).

Arquero, José L., and Esteban Romero-Frías. "Using social network sites in higher education: An experience in business studies." *Innovations in Education and Teaching International* 50, no. 3 (2013): 238-249.

Arthur, John Kingsley, Kofi Sarpong Adu-Manu, and Clement Yeboah. "A conceptual framework for the Adoption of Social Network Technologies (SNTs) in Teaching-case of Ghana." *International Journal of Computer Science Issues (IJCSI)* 10, no. 5 (2013): 70.

Ashley, Podcasting. "A teaching with technology white paper." *Collaborative Tools* (2009)

Ashoor, M. Saleh. "Planning the electronic library–suggested guidelines for the Arabian Gulf region." *The electronic library* (2000).

Baltaci-Goktalay, Sehnaz, and Zehra Ozdilek. "Pre-service teachers' perceptions about web 2.0 technologies." *Procedia-Social and Behavioral Sciences* 2, no. 2 (2010): 4737-4741.

Berkman, Elliot T., and Steven P. Reise. *A conceptual guide to statistics using SPSS*. Sage, 2011.

Biddle, Catharine, and Kai A. Schafft. "Axiology and anomaly in the practice of mixed methods work: Pragmatism, valuation, and the transformative paradigm." *Journal of Mixed Methods Research* 9, no. 4 (2015): 320-334.

Biesta, Gert. "Pragmatism and the philosophical foundations of mixed methods research." *Sage handbook of mixed methods in social and behavioral research* 2 (2010): 95-118.

Binsahl, Haifa, and Shanton Chang. "International Saudi Female students in Australia and social networking sites: what are the motivations and barriers to communication." In *ISANA International Academy Association Conference*, vol. 112. 2012.

Blair, Risa, and Tina M. Serafini. "Integration of education: Using social media networks to engage students." *Systematics, Cybernetics and Informatics* 12, no. 6 (2014).

Bogner, Alexander, Beate Littig, and Wolfgang Menz. "Introduction: Expert interviews—An introduction to a new methodological debate." In *Interviewing experts*, pp. 1-13. Palgrave Macmillan, London, 2009.

Boyatzis, Richard E. *Transforming qualitative information: Thematic analysis and code development*. sage, 1998.

Brace, Ian. Questionnaire design: How to plan, structure and write survey material for effective market research. Kogan Page Publishers, 2018.

Brady, Kevin P., Lori B. Holcomb, and Bethany V. Smith. "The use of alternative social networking sites in higher educational settings: A case study of the e-learning benefits of Ning in education." *Journal of interactive online learning* 9, no. 2 (2010).

Braun, Virginia, and Victoria Clarke. "Using thematic analysis in psychology." *Qualitative research in psychology* 3, no. 2 (2006): 77-101.

Brown, Timothy A. *Confirmatory factor analysis for applied research*. Guilford publications, 2015.

Button, Didy, Ann Harrington, and Ingrid Belan. "E-learning & information communication technology (ICT) in nursing education: A review of the literature." *Nurse education today* 34, no. 10 (2014): 1311-1323.

Carr, Diane, Charles Crook, Richard Noss, Patrick Carmichael, and Neil Selwyn. "Education 2.0? Designing the web for teaching and learning: A Commentary by the Technology Enhanced Learning phase of the Teaching and Learning Research Programme." (2008).

Castleberry, Ashley, and Amanda Nolen. "Thematic analysis of qualitative research data: Is it as easy as it sounds?" *Currents in Pharmacy Teaching and Learning* 10, no. 6 (2018): 807-815.

Cha, Jiyoung. "Factors affecting the frequency and amount of social networking site use: Motivations, perceptions, and privacy concerns." *First Monday* 15, no. 12 (2010).

Chan, Liew Lee, and Noraini Idris. "Validity and reliability of the instrument using exploratory factor analysis and Cronbach's alpha." *International Journal of Academic Research in Business and Social Sciences* 7, no. 10 (2017): 400-410.

Chen, Rui. "Member use of social networking sites—an empirical examination." *Decision Support Systems* 54, no. 3 (2013): 1219-1227.

Chen, Rui, and Sushil K. Sharma. "Learning and self-disclosure behavior on social networking sites: the case of Facebook users." *European Journal of Information Systems* 24, no. 1 (2015): 93-106.

Chen, Y., C. Liu, and Roman Wong. "The adoption of synchronous and asynchronous media in the teaching of a second language." *Issues in Information Systems* 3, no. 1 (2007): 217-223.

Cheng, Kun-Hung, Jyh-Chong Liang, and Chin-Chung Tsai. "University students' online academic help seeking: The role of self-regulation and information commitments." *The Internet and Higher Education* 16 (2013): 70-77.

Choudhury, Nupur. "World wide web and its journey from web 1.0 to web 4.0." *International Journal of Computer Science and Information Technologies* 5, no. 6 (2014): 8096-8100.

Chung, Kon Shing Kenneth. "A social network model for understanding technology use for knowledge-intensive workers." In *Social Network Mining, Analysis, and Research Trends: Techniques and Applications*, pp. 250-269. IGI Global, 2012.

Cohen-Almagor, Raphael. "Internet history." In *Moral, ethical, and social dilemmas in the age of technology: Theories and practice*, pp. 19-39. IGI Global, 2013.

Cohen, Louis, Lawrence Manion, and Keith Morrison. *Research methods in education*. routledge, 2013.

Colino Fernández, Alberto, Diana Benito Osorio, Marta Peris Ortiz, and Carlos Rueda Armengot. "Web 5.0: The future of emotional competences in higher education." (2013).

Collin, Philippa, Kitty Rahilly, Ingrid Richardson, and Amanda Third. "The benefits of social networking services." (2011).

Comrey, Andrew L., and Howard B. Lee. *A first course in factor analysis*. Psychology press, 2013.

Costello, Anna B., and Jason Osborne. "Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis." *Practical assessment, research, and evaluation* 10, no. 1 (2005): 7.

Creative Research Systems, “Sample Size Calculator”, Accessed 5 May 2020 https://www.surveysys- tem.com/sscalc.htm.

Crotty, Michael. *The foundations of social research: Meaning and perspective in the research process*. Sage, 1998.

Darwish, Ashraf, and Kamaljit I. Lakhtaria. "The impact of the new Web 2.0 technologies in communication, development, and revolutions of societies." *Journal of advances in information technology* 2, no. 4 (2011): 204-216.

Denscombe, Martyn. *The good research guide: for small-scale social research projects*. McGraw-Hill Education (UK), 2014.

Denzin, Norman K., and Yvonna S. Lincoln. "Introduction: The discipline and practice of qualitative research." (2008).

Dholakia, Utpal M., Richard P. Bagozzi, and Lisa Klein Pearo. "A social influence model of consumer participation in network-and small-group-based virtual communities." *International journal of research in marketing* 21, no. 3 (2004): 241-263.

Dillman, Don A. *Mail and Internet surveys: The tailored design method--2007 Update with new Internet, visual, and mixed-mode guide*. John Wiley & Sons, 2011.

Dillman, Don A., Glenn Phelps, Robert Tortora, Karen Swift, Julie Kohrell, Jodi Berck, and Benjamin L. Messer. "Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response (IVR) and the Internet." *Social science research* 38, no. 1 (2009): 1-18.

Dillman, Don A., Ulf-Dietrich Reips, and Uwe Matzat. "Advice in surveying the general public over the internet." *International Journal of Internet Science* 5, no. 1 (2010): 1-4.

Dillman, Don A. *The promise and challenge of pushing respondents to the Web in mixed-mode surveys*. Statistics Canada, 2017.

Doctor, Vanessa "Social media analytics and the health sector". *#Hashtags.org*. (2013). Assessed 5 May 2020 https://www.hashtags.org/how-to/search/social-media-analytics-and-the-health-sector/

Dorn, Jürgen. "Social software (and Web 2.0)." In *Social Computing: Concepts, Methodologies, Tools, and Applications*, pp. 305-311. IGI Global, 2010.

Driscoll, Margaret. "Blended learning: Let's get beyond the hype." *E-learning* 1, no. 4 (2002): 1-4.

Duffy, Mary E. "Methodological triangulation: a vehicle for merging quantitative and qualitative research methods." *Image: The Journal of Nursing Scholarship* 19, no. 3 (1987): 130-133.

Duke, Betsy, Ginger Harper, and Mark Johnston. "Connectivism as a digital age learning theory." *The International HETL Review* 2013, no. Special Issue (2013): 4-13.

Ebner, Martin, and Wolfgang Reinhardt. "Social networking in scientific conferences–Twitter as tool for strengthen a scientific community." In *Proceedings of the 1st International Workshop on Science*, vol. 2, pp. 1-8. 2009.

Ebner, Martin, Conrad Lienhardt, Matthias Rohs, and Iris Meyer. "Microblogs in Higher Education–A chance to facilitate informal and process-oriented learning?" *Computers & Education* 55, no. 1 (2010): 92-100.

Echeng, Razep, and Abel Usoro. "Enhancing the use of web 2.0 technologies in higher education: students' and lectures' views." *Journal of International Technology and Information Management* 25, no. 1 (2016): 6.

Echeng, Razep, Abel Usoro, and Isaiah Ewuzie. "Factors to Consider when Enhancing the Use of Web 2.0 Technologies in Higher Education: Students' and Lectures' Views for Quality Use." *International Journal of Digital Society* 7, no. 1 (2016).

Eisner, Elliot W. *The enlightened eye: Qualitative inquiry and the enhancement of educational practice*. Teachers College Press, 2017.

Ellison, Nicole B., Charles Steinfield, and Cliff Lampe. "The benefits of Facebook "friends:" Social capital and college students' use of online social network sites." *Journal of computer-mediated communication* 12, no. 4 (2007): 1143-1168.

Evans, Joel R., and Anil Mathur. "The value of online surveys." *Internet research* (2005).

Felder, Richard M., and Linda K. Silverman. "Learning and teaching styles in engineering education." *Engineering education* 78, no. 7 (1988): 674-681.

Field, Andy. "Factor analysis using SPSS." *Retrieved March* 17, no. 2019 (2005): 63-71.

Freeman, Becky, Sofia Potente, Vanessa Rock, and Jacqueline McIver. "Social media campaigns that make a difference: what can public health learn from the corporate sector and other social change marketers." Public Health Res Pract 25, no. 2 (2015): e2521517.

Fuchs, Christian, Wolfgang Hofkirchner, Matthias Schafranek, Celina Raffl, Marisol Sandoval, and Robert Bichler. "Theoretical foundations of the web: cognition, communication, and co-operation. Towards an understanding of Web 1.0, 2.0, 3.0." *Future internet* 2, no. 1 (2010): 41-59.

Fugard, Andrew JB, and Henry WW Potts. "Supporting thinking on sample sizes for thematic analyses: a quantitative tool." *International Journal of Social Research Methodology* 18, no. 6 (2015): 669-684.

Gallivan, M. J. "Value in triangulation: a comparison of two approaches for combining qualitative and quantitative methods." In *Information systems and qualitative research*, pp. 417-443. Springer, Boston, MA, 1997.

Ghobakhloo, Morteza, Tang Sai Hong, Mohammad Sadegh Sabouri, and Norzima Zulkifli. "Strategies for successful information technology adoption in small and medium-sized enterprises." *Information* 3, no. 1 (2012): 36-67.

Gliem, Joseph A., and Rosemary R. Gliem. "Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales." Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, 2003.

Golafshani, Nahid. "Understanding reliability and validity in qualitative research." *The qualitative report* 8, no. 4 (2003): 597-607.

Goldkuhl, Göran. "Pragmatism vs interpretivism in qualitative information systems research." *European journal of information systems* 21, no. 2 (2012): 135-146.

Grandon, Elizabeth E., and J. Michael Pearson. "Electronic commerce adoption: an empirical study of small and medium US businesses." *Information & management* 42, no. 1 (2004): 197-216.

Gray, David E. *Doing research in the business world*. Sage Publications Limited, 2019.

Greenhow, Christine, Beth Robelia, and Joan E. Hughes. "Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now?" *Educational researcher* 38, no. 4 (2009): 246-259.

Grosseck, Gabriela. "To use or not to use web 2.0 in higher education?" *Procedia-Social and Behavioral Sciences* 1, no. 1 (2009): 478-482.

Guest, Greg, Emily Namey, and Kevin McKenna. "How many focus groups are enough? Building an evidence base for nonprobability sample sizes." *Field methods* 29, no. 1 (2017): 3-22.

Gunn, Holly. "Web-based surveys: Changing the survey process." *First Monday* 7, no. 12 (2002).

Guo, Bin, Jing Gao, and Xiaoling Chen. "Technology strategy, technological context and technological catch-up in emerging economies: industry-level findings from Chinese manufacturing." *Technology analysis & strategic management* 25, no. 2 (2013): 219-234.

Halcomb, Elizabeth J., and Louise Hickman. "Mixed methods research." (2015): 41.

Hamid, Suraya, Shanton Chang, and Sherah Kurnia. "Identifying the use of online social networking in higher education." In *Ascilite*, pp. 6-9. 2009.

Harris, Albert L., and Alan Rea. "Web 2.0 and virtual world technologies: A growing impact on IS education." *Journal of Information Systems Education* 20, no. 2 (2019): 3.

Hendricks, Drew. "Complete history of social media: Then and now." *Small Business Trends* (2013).

Hill, Valerie, and Hyuk-Jin Lee. "Adoption of virtual worlds in libraries." *Proceedings of the American Society for Information Science and Technology* 47, no. 1 (2010): 1-3.

Hitt, Michael A. "The long tail: Why the future of business is selling less of more." (2007): 83-85.

Hoyningen-Huene, Paul. "Theories and Methods of Research." *Horticulture (mandatory)* 19, no. 26.1 (2011).

Huberman, Michael, and Matthew B. Miles. *The qualitative researcher's companion*. Sage, 2002.

Hussain, Irshad. "A study to evaluate the social media trends among university students." *Procedia-Social and Behavioral Sciences* 64 (2012): 639-645.

Hussain, Irshad, Naushaba Gulrez, and Shaheen Ashraf Tahirkheli. "Academic use of social media: Practices and problems of university students." In *International Conference on Education and Management Innovation*, vol. 30, pp. 189-194. 2012.

Ismail, Shahrinaz. "International students' acceptance on using social networking site to support learning activities." *International Journal for the Advancement of Science & Arts* 1, no. 2 (2010): 81-90.

Issa, Tomayess. "Development and evaluation of a methodology for developing websites." PhD diss., Curtin University, 2007.

Issa, Tomayess, Pedro Isaias, and Petrus AM Kommers. "Digital society and E-technologies." *Pacific Asia journal of the Association for Information systems* 5 (2013): i-ii.

Issa, Tomayess, Pedro Isaias, and Piet Kommers. *Social networking and education*. New York, Springer, 2016.

Issa, Tomayess. "Social Networking in Australia: Opportunities and Risks." In *Social Networking and Education*, pp. 17-39. Springer, Cham, 2016.

Issa, Tomayess, Sulaiman Alqahtani, Theodora Issa, Noorminshah A. Iahad, Peldon Peldon, Sooyoung Kim, Samant Saurabh, Sumaiya Pervaiz, and Sun Joo Yoo. "Asia–Pacific Students' Awareness and Behaviour Regarding Social Networking in the Education Sector." *Journal of Global Information Management (JGIM)* 27, no. 4 (2019): 119-146.

John, W., and Plano Clark Creswell. "Designing and conducting mixed methods research." SAG., 2000.

Johnson, R. Burke, Anthony J. Onwuegbuzie, and Lisa A. Turner. "Toward a definition of mixed methods research." *Journal of mixed methods research* 1, no. 2 (2007): 112-133.

Jucevičienė, Palmira, and Gintarė Valinevičienė. "A conceptual model of social networking in higher education." *Elektronika ir Elektrotechnika* 102, no. 6 (2010): 55-58.

Junco, Reynol. "Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance." *Computers in human behavior* 28, no. 1 (2012): 187-198.

Kambil, Ajit. "What is your Web 5.0 strategy?" *Journal of business strategy* (2008).

Kanwal, Faria, and Mariam Rehman. "Factors affecting e-learning adoption in developing countries–empirical evidence from Pakistan's higher education sector." *IEEE Access* 5 (2017): 10968-10978.

Kawulich, Barbara B. "Participant observation as a data collection method." In *Forum qualitative sozialforschung/forum: Qualitative social research*, vol. 6, no. 2. 2005.

Kelley, Kate, Belinda Clark, Vivienne Brown, and John Sitzia. "Good practice in the conduct and reporting of survey research." *International Journal for Quality in health care* 15, no. 3 (2003): 261-266.

Khan, Shahzad. "Impact of social networking websites on students." *Abasyn Journal of Social Sciences* 5, no. 2 (2012): 56-77

Khanzode, C. A., and Ravindra D. Sarode. "Evolution of the world wide web: from web 1.0 to 6.0." *International journal of Digital Library services* 6, no. 2 (2016): 1-11.

Kimbrell, Julia. "The impacts of web 2.0, web 3.0, and web 4.0 technologies used in distance education." (2013).

Kim, Yeonsoo, Jin Young Park, Sung Byuk Kim, In-Kyung Jung, Yun Sook Lim, and Jung-Hyun Kim. "The effects of Internet addiction on the lifestyle and dietary behavior of Korean adolescents." *Nutrition research and practice* 4, no. 1 (2010): 51-57.

King, Kathleen P. "Social media as positive disruption in education, e-learning and b-learning." In *Handbook of research on business social networking: organizational, managerial, and technological dimensions*, pp. 434-452. IGI Global, 2012.

Kivinen, Osmo, and Pekka Ristela. "From constructivism to a pragmatist conception of learning." *Oxford review of education* 29, no. 3 (2003): 363-375.

Kivunja, Charles, and Ahmed Bawa Kuyini. "Understanding and applying research paradigms in educational contexts." *International Journal of Higher Education* 6, no. 5 (2017): 26-41.

Kommers, Piet. "Social Networking in Higher Education: Students in The Netherlands." In *Social Networking and Education*, pp. 101-109. Springer, Cham, 2016.

Kuh, George D., Ty M. Cruce, Rick Shoup, Jillian Kinzie, and Robert M. Gonyea. "Unmasking the effects of student engagement on first-year college grades and persistence." *The journal of higher education* 79, no. 5 (2008): 540-563.

Kuhn, Thomas S. *The structure of scientific revolutions*. University of Chicago press, 2012.

Kundi, Ghulam Muhammad, Allah Nawaz, and Shadiullah Khan. "The predictors of success for e-learning in higher education institutions (HEIs) in NW. FP, Pakistan." *JISTEM-Journal of Information Systems and Technology Management* 7, no. 3 (2010): 545-578.

Kundi, G. M., and A. Nawaz. "From e-Learning 1.0 to e-Learning 2.0: threats & opportunities for higher education institutions in the developing countries." *European Journal of Sustainable Development* 3, no. 1 (2014): 145-145

Lalonde, Martin, and Juan Carlos Castro. "Amplifying youth cultural practices by engaging and developing professional identity through social media." In *Youth practices in digital arts and new media: learning in formal and informal settings*, pp. 40-62. Palgrave Pivot, New York, 2015.

Leiner, Barry M., Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts, and Stephen Wolff. "A brief history of the Internet." *ACM SIGCOMM Computer Communication Review* 39, no. 5 (2009): 22-31.

Leis, Adrian. "Encouraging autonomy through the use of a social networking system." *Jalt Call Journal* 10, no. 1 (2014): 69-80.

Levers, Merry-Jo D. "Philosophical paradigms, grounded theory, and perspectives on emergence." *Sage Open* 3, no. 4 (2013): 2158244013517243.

Lewis-Beck, Michael, Alan E. Bryman, and Tim Futing Liao. *The Sage encyclopedia of social science research methods*. Sage Publications, 2003.

Light, Ben, and Kathy McGrath. "Ethics and social networking sites: a disclosive analysis of Facebook." *Information Technology & People* (2010).

Lin, Han, William Tov, and Lin Qiu. "Emotional disclosure on social networking sites: The role of network structure and psychological needs." *Computers in Human Behavior* 41 (2014): 342-350.

Madge, Clare, Julia Meek, Jane Wellens, and Tristram Hooley. "Facebook, social integration and informal learning at university:'It is more for socialising and talking to friends about work than for actually doing work'." *Learning, media and technology* 34, no. 2 (2009): 141-155.

Magro, Michael J., Sherry D. Ryan, Jason H. Sharp, and Katie A. Ryan. "Using social networking for educational and cultural adaptation: An exploratory study." *AMCIS 2009 proceedings* (2009): 528.

Maguire, Moira, and Brid Delahunt. "Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars." *AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education* 9, no. 3 (2017).

Mathiyazhagan, T., and Deoki Nandan. "Survey research method." *Media Mimansa* 4, no. 1 (2010): 34-45.

Mazman, S. G., and Y. Koçak-Usluel. "Modeling educational usage of Facebook. Computers &Education, 55 (2), 444-453." (2010).

Mazuryk, Tomasz, and Michael Gervautz. "Virtual reality-history, applications, technology and future." (1996).

Mc Manus, Paul, Sue Mulhall, Mohamed Ragab, and Amr Arisha. "An Investigation in the Methodological Approaches used in Doctoral Business Research in Ireland." In *ECRM 2017 16th European Conference on Research Methods in Business and Management*, p. 233. Academic Conferences and publishing limited, 2017.

Mehmood, Saba, and Tarang Taswir. "The effects of social networking sites on the academic performance of students in college of applied sciences, Nizwa, Oman." *International Journal of Arts and Commerce* 2, no. 1 (2013): 111-125.

Mehmood, Sumara, Li Chong, and Mehmood Hussain. "Females Higher Education in Pakistan: An Analysis of Socio-Economic and Cultural Challenges." *Advances in Social Sciences Research Journal* 5, no. 6 (2018).

Metzger, Miriam J., Christo Wilson, Rebekah A. Pure, and Ben Y. Zhao. "Invisible interactions: What latent social interaction can tell us about social relationships in social network sites." In *Networked sociability and individualism: Technology for personal and professional relationships*, pp. 79-102. IGI Global, 2012.

Miah, Shah J., and John Gammack. "A Mashup architecture for web end-user application designs." In *2008 2nd IEEE International Conference on Digital Ecosystems and Technologies*, pp. 532-537. IEEE, 2008.

Miles, Matthew B., and A. Michael Huberman. *Qualitative data analysis: An expanded sourcebook*. sage, 1994.

Millard, E. "Up for debate: As blogs and social networking sites grow even more popular, is it up to schools to set the brakes." *District Administration* 42, no. 9 (2006): 60-61.

Mirani, Manzoor Ali. "Motives for students using social networking sites: Findings from Sukkur, Pakistan." In *Proceeding on the 2nd International Conference on Economics, Business and Management, Singapore*. 2011.

Moran, Mike, Jeff Seaman, and Hester Tinti-Kane. "Teaching, Learning, and Sharing: How Today's Higher Education Faculty Use Social Media." *Babson Survey Research Group* (2011).

Morgan, David L. "Pragmatism as a paradigm for social research." *Qualitative inquiry* 20, no. 8 (2014): 1045-1053.

Moyle, Kathryn. "Building innovation: Learning with technologies." (2010).

Mukherjee, Aroop, and Nitty Hirawaty Kamarulzaman. "Mixed Method Research: A Concept." In *Mixed Methods Research for Improved Scientific Study*, pp. 39-64. IGI Global, 2016.

Murphy, Robert J., Sarah A. Gray, Sorin R. Straja, and Meredith C. Bogert. "Student learning preferences and teaching implications." *Journal of dental education* 68, no. 8 (2004): 859-866.

Myers, Michael D., and David Avison, eds. *Qualitative research in information systems: a reader*. Sage, 2002.

Naik, Dhruvi A. "Organizational use of social media: The shift in communication, collaboration and decision-making." (2015).

Newman, Isadore. "A Conceptualization of Mixed Methods: A Need for Inductive/Deductive Approach to Conducting Research." (2000).

Nowell, Lorelli S., Jill M. Norris, Deborah E. White, and Nancy J. Moules. "Thematic analysis: Striving to meet the trustworthiness criteria." *International Journal of Qualitative Methods* 16, no. 1 (2017): 1609406917733847.

O'Connor, Henrietta, Clare Madge, Robert Shaw, and Jane Wellens. "Internet-based interviewing." *The Sage handbook of online research methods* (2008): 271-289.

Olivas, Angelica. "How age and gender can impact social media usage". *BigAZBIGMEDIA.* (2019). Assessed on 10 May 2020, https://azbigmedia.com/business/business-and-social-media/how-age-and-gender-can-impact-social-media-usage/.

Oliver, Martin, and Keith Trigwell. "Can 'blended learning 'be redeemed?" *E-learning and Digital Media* 2, no. 1 (2005): 17-26.

Ooko Mary, Collins Oduor. "The implementation framework of social media for distance learners in Africa Nazarene University, Kenya" (2013), Accessed 25 August 2017, http://formamente.guideassociation.org/wp-content/uploads/2013_3_4_Ooko_Oduo.pdf.

Opdenakker, Raymond. "Advantages and disadvantages of four interview techniques in qualitative research." In *Forum qualitative sozialforschung/forum: Qualitative social research*, vol. 7, no. 4. 2006.

Pakistan Today. "HEC may face up to 50% budget cuts". Accessed by June 2019 https://www.pakistantoday.com.pk/2019/04/19/hec-may-face-up-to-50-budget-cuts/

Paliszkiewicz, Joanna, and M. A. G. D. A. L. E. N. A. MĄDRA-SAWICKA. "Impression Management in Social Media: The Example of LinkedIn." *Management (18544223)* 11, no. 3 (2016).

Pallant, Julie, and SPSS Survival Manual. "A step by step guide to data analysis using SPSS for windows version 15." (2007).

Patokorpi, Erkki, and Marko Ahvenainen. "Developing an abduction-based method for futures research." *Futures* 41, no. 3 (2009): 126-139.

Paul, Elizabeth L., and Sigal Brier. "Friendsickness in the transition to college: Precollege predictors and college adjustment correlates." *Journal of Counseling & Development* 79, no. 1 (2001): 77-89.

Paul, Jomon Aliyas, Hope M. Baker, and Justin Daniel Cochran. "Effect of online social networking on student academic performance." *Computers in Human Behavior* 28, no. 6 (2012): 2117-2127.

Paulet-Crainiceanu, Laura. "Integrating the web 2.0 Technologies in Romanian Public Universities. Towards a blended learning model that addresses troubled student-faculty interaction." *Procedia-Social and Behavioral Sciences* 142 (2014): 793-799.

Pearson, Robert H., and Daniel J. Mundform. "Recommended sample size for conducting exploratory factor analysis on dichotomous data." *Journal of Modern Applied Statistical Methods* 9, no. 2 (2010): 5.

Pervaiz, Sumaiya. "The advantages and risks of using social networking in higher education in Pakistan." In *Social Networking and Education*, pp. 83-97. Springer, Cham, 2016.

Plonsky, Luke. *Advancing quantitative methods in second language research*. Routledge, 2015.

Preacher, Kristopher J., and Robert C. MacCallum. "Exploratory factor analysis in behavior genetics research: Factor recovery with small sample sizes." *Behavior genetics* 32, no. 2 (2002): 153-161.

Qureshi, Ijaz A., Khola Ilyas, Robina Yasmin, and Michael Whitty. "Challenges of implementing e-learning in a Pakistani university." *Knowledge Management & E-Learning: An International Journal* 4, no. 3 (2012): 310-324.

Radu, Roxana. *Negotiating internet governance*. Oxford University Press, 2019.

Rahman, Md Shidur. "The Advantages and Disadvantages of Using Qualitative and Quantitative Approaches and Methods in Language" Testing and Assessment" Research: A Literature Review." *Journal of Education and Learning* 6, no. 1 (2017): 102-112.

Reio Jr, Thomas G., and Brad Shuck. "Exploratory factor analysis: implications for theory, research, and practice." *Advances in Developing Human Resources* 17, no. 1 (2015): 12-25.

Reja, Urša, Katja Lozar Manfreda, Valentina Hlebec, and Vasja Vehovar. "Open-ended vs. close-ended questions in web questionnaires." *Developments in applied statistics* 19, no. 1 (2003): 159-177.

Rekhter, Natalia. "Using social network sites for higher education marketing and recruitment." *International Journal of Technology and Educational Marketing (IJTEM)* 2, no. 1 (2012): 26-40.

Revilla, Melanie A., Willem E. Saris, and Jon A. Krosnick. "Choosing the number of categories in agree–disagree scales." *Sociological Methods & Research* 43, no. 1 (2014): 73-97.

Roblyer, Margaret D., Michelle McDaniel, Marsena Webb, James Herman, and James Vince Witty. "Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites." *The Internet and higher education* 13, no. 3 (2010): 134-140.

Rønnow-Rasmussen, Toni. "Subjectivism and objectivism." *Rabinowicz W, Rønnow-Rasmussen T (2003) Patterns of Value. Lund: Lund Philosophy Reports* 1 (2003).

Rosmala, Dewi. "Study of social networking usage in higher education environment." *Procedia-Social and Behavioral Sciences* 67 (2012): 156-166.

Rouse Margaret. "Social search engine". (2011) WhatIs.com. Accessed 21 November 2017. https://whatis.techtarget.com/definition/social-search-engine

Rui, Jian Raymond, and Michael A. Stefanone. "Strategic image management online: Self-presentation, self-esteem and social network perspectives." *Information, Communication & Society* 16, no. 8 (2013): 1286-1305.

Sahri, Mohd Shah Bin, and Syed Ahmad Helmi. "Effect of Augmented Reality and Virtual Reality as Teaching Tools to Increase Spatial Knowledge for Students in STEM education-Literature Review." *Copyright© 2019 Universiti Teknologi Malaysia.* (2019): 112.

Salkind, Neil J. "Exploring research" *Seventh Edition. Canadian Psychology.* (2009):109-110.

Sánchez, R. Arteaga, Virginia Cortijo, and Uzma Javed. "Students' perceptions of Facebook for academic purposes." *Computers & Education* 70 (2014): 138-149.

Santos, Ieda M., Michael Hammond, Zenilde Durli, and Shiao-Yuh Chou. "Is There a role for Social Networking Sites in education?" In *IFIP World Conference on Computers in Education*, pp. 321-330. Springer, Berlin, Heidelberg, 2009.

Saunders, Mark, P. H. I. L. I. P. Lewis, and A. D. R. I. A. N. Thornhill. "Research methods." *Business Students 4th edition Pearson Education Limited, England* (2007).

Scheffler, Samuel. *The rejection of consequentialism: A philosophical investigation of the considerations underlying rival moral conceptions*. Oxford University Press, 1994.

Scotland, James. "Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms." *English language teaching* 5, no. 9 (2012): 9-16.

Sedek, Muliati, Rabiah Ahmad, and Nur Fadzilah Othman. "Motivational Factors in Privacy Protection Behaviour Model for Social Networking." In *MATEC Web of Conferences*, vol. 150, p. 05014. EDP Sciences, 2018.

Shafique, Farzana, Mushahid Anwar, and Mahe Bushra. "Exploitation of social media among university students: A case study." *Webology* 7, no. 2 (2010): 34-47.

Shaikh, Zaffar Ahmed, and Shakeel Ahmed Khoja. "Higher education in Pakistan: An ICT integration viewpoint." *International Journal of Computer Theory and Engineering* 5, no. 3 (2013): 410.

Sharif, Mohd Hisham Bin. "Social media adoption and impact in Australian local government." PhD diss., 2015.

Shek, Daniel TL, Rachel CF Sun, and L. Yu. "Internet addiction." Springer, 2013.

Shin, Dong-Hee. "The effects of trust, security and privacy in social networking: A security-based approach to understand the pattern of adoption." *Interacting with computers* 22, no. 5 (2010): 428-438.

Siemens, George. "Connectivism." *Foundations of Learning and Instructional Design Technology* (2017).

Singh, K. P., and D. I. P. T. I. Gulati. "Technological March from Web 1.0 to Web 3.0: A Comparative Study." *Library Herald* 49, no. 2 (2011): 146-157.

Solanki, Manishkumar R., and Abhijit Dongaonkar. "A Journey of human comfort: web 1.0 to web 4.0." *International Journal of Research and Scientific Innovation (IJRSI)* 3, no. 9 (2016): 124-134.

Soomro, Kamal Ahmed, Sajid Yousuf Zai, and Iftikhar Hussain Jafri. "Competence and usage of Web 2.0 technologies by higher education faculty." *Educational media international* 52, no. 4 (2015): 284-295.

Srinath, Aniruddha Mysore. "Design for Anything!."(2015). Accessed 5 May 2020, https://aniruddhams.com/2015/09/14/design-for-anything/.

Staff, W. D. D. "A brief history of blogging." *Web Designer Depot* (2011).

Stanciu, Andrei, Florin Mihai, and Ofelia Aleca. "Social networking as an alternative environment for education." *Accounting & Management Information Systems/Contabilitate si Informatica de Gestiune* 11, no. 1 (2012).

StatCounter, “Stat counter Global stats”. (2019) Accessed 5 May 2020. https://gs.statcounter.com/

Steinfield, Charles, Nicole B. Ellison, and Cliff Lampe. "Social capital, self-esteem, and use of online social network sites: A longitudinal analysis." *Journal of Applied Developmental Psychology* 29, no. 6 (2008): 434-445.

Stemler, Steve. "An overview of content analysis." *Practical Assessment, Research, and Evaluation* 7, no. 1 (2000): 17.

Stenbacka, Caroline. "Qualitative research requires quality concepts of its own." *Management decision* (2001).

Stoller Eric. "Using social media to inspire your students'. *Inside Higher ED.* (2015). Assessed on 28th May 2020, https://www.insidehighered.com/blogs/student-affairs-and-technology/using-social-media-inspire-your-students

Suris, Joan-Carles, Christina Akré, André Berchtold, Richard E. Bélanger, and Pierre-André Michaud. "Chronically connected? Internet use among adolescents with chronic conditions." *Journal of Adolescent Health* 46, no. 2 (2010): 200-202.

Tabachnick, Barbara G., Linda S. Fidell, and Jodie B. Ullman. *Using multivariate statistics*. Vol. 5. Boston, MA: Pearson, 2007.

Tariq, Waqas, Madiha Mehboob, M. Asfandyar Khan, and Fasee Ullah. "The impact of social media and social networks on education and students of Pakistan." *International Journal of Computer Science Issues (IJCSI)* 9, no. 4 (2012): 407.

Tavakol, Mohsen, and Reg Dennick. "Making sense of Cronbach's alpha." *International journal of medical education* 2 (2011): 53

Teddlie, Charles, and Abbas Tashakkori. *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage, 2009.

Tella, Samson Adekunle, Rose Alinda Alias, and Norafida Ithnin. "A Conceptual Framework for Knowledge Sharing in Higher Education Institutions Using Social Web Approach'." (2008).

Tess, Paul A. "The role of social media in higher education classes (real and virtual)–A literature review." *Computers in human behavior* 29, no. 5 (2013): A60-A68.

Thomas, David R. "A general inductive approach for qualitative data analysis." (2003).

Thompson, John. "Is Education 1.0 ready for Web 2.0 students?" *Innovate: Journal of Online Education* 3, no. 4 (2007).

Thompson, Lindsay A., Kara Dawson, Richard Ferdig, Erik W. Black, J. Boyer, Jade Coutts, and Nicole Paradise Black. "The intersection of online social networking with medical professionalism." *Journal of general internal medicine* 23, no. 7 (2008): 954-957.

Thornhill, Adrian, Mark Saunders, and Philip Lewis. *Research methods for business students*. Prentice Hall: London, 2009.

Tiene, Drew. "Online discussions: A survey of advantages and disadvantages compared to face-to-face discussions." *Journal of Educational Multimedia and Hypermedia* 9, no. 4 (2000): 369-382.

Tran, Ben. "The nature of research methodologies: Terms and usage within quantitative, qualitative, and mixed methods." In *Mixed methods research for improved scientific study*, pp. 1-27. IGI Global, 2016.

Tufekci, Zeynep. "Grooming, gossip, Facebook and MySpace: What can we learn about these sites from those who won't assimilate?" *Information, Communication & Society* 11, no. 4 (2008): 544-564.

Turan, Zeynep, Hasan Tinmaz, and Yuksel Goktas. "The reasons for non-use of social networking websites by university students." *Comunicar. Media Education Research Journal* 21, no. 1 (2013).

Turner III, Daniel W. "Qualitative interview design: A practical guide for novice investigators." *The qualitative report* 15, no. 3 (2010): 754.

Ul Haque, Nadeem, Mahboob Mahmood, Shahbano Abbas, and Ali Lodhi. 2018. "The University Research System in Pakistan ". Knowledge Platform and British Council accessed 5 May 2020.

Umer, Muhammad Awais, and Ahmed, Vaqar. "Carbon emissions in Pakistan likely to rise about 300% by 2030". *The express Tribune.* (2018). Accessed by 5 May 2020, https://tribune.com.pk/story/1877884/2-carbon-emissions-pakistan-likely-rise-300-2030/.

UniRank,"Top Universities in Pakistan 2017" Accessed 5 May 2020, https://www.4icu.org/pk/

Usoro, Abel, Razep Echeng, and Grzegorz Majewski. "A Model of Acceptance of Web 2.0 in learning in higher education: a case study of two cultures." *E-Learning and Digital Media* 11, no. 6 (2014): 644-653.

Veglis, Andreas. "Models for integrating social networking in higher education." *International Journal of Advanced Computer Science and Information Technology* 3, no. 3 (2014): 317-326.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D., 2003. User acceptance of information technology: Toward a unified view. *MIS quarterly*, pp.425-478

Wang, Ligang, Jing Luo, Wenbin Gao, and Jie Kong. "The effect of Internet use on adolescents' lifestyles: A national survey." *Computers in Human Behavior* 28, no. 6 (2012): 2007-2013.

Warren, Carol AB. "Qualitative interviewing." *Handbook of interview research: Context and method* 839101 (2002).

Wattenhofer, Mirjam, Roger Wattenhofer, and Zack Zhu. "The YouTube social network." In *Sixth International AAAI Conference on Weblogs and Social Media*. 2012.

Weaver, Alfred C., and Benjamin B. Morrison. "Social networking." *Computer* 41, no. 2 (2008): 97-100.

Weiss, Diana E. "The relationship between internet social networking, social anxiety, self-esteem, narcissism, and gender among college students." (2013).

White, Bebo. "Alternative worlds as teaching and learning environments." In *International Conference on Hybrid Learning*, pp. 1-8. Springer, Berlin, Heidelberg, 2010.

Welker, Heidi Stevenson. *Principal perspectives on social networking and the disruptive effects of cyberbullying*. Walden University, 2010.

Wiley, C., and M. Sisson. "Ethics, accuracy and assumption: The use of Facebook by students and employers." In *Southwestern Ohio Council for Higher Education Special Topics Forum, Dayton, OH*, pp. 227-238. 2006.

Williams, Brett, Andrys Onsman, and Ted Brown. "Exploratory factor analysis: A five-step guide for novices." *Australasian Journal of Paramedicine* 8, no. 3 (2010).

Wise, L. Z., Jason Skues, and Benedict Williams. "Facebook in higher education promotes social but not academic engagement." *Changing demands, changing directions. Proceedings ascilite Hobart* (2011): 1332-1342.

Wyse, Susan E. "Advantages and disadvantages of surveys." *Retrieved February* 20 (2012): 2014.

Yong, An Gie, and Sean Pearce. "A beginner's guide to factor analysis: Focusing on exploratory factor analysis." *Tutorials in quantitative methods for psychology* 9, no. 2 (2013): 79-94.

Young, Meredith, Lara Varpio, Sebastian Uijtdehaage, and Elise Paradis. "The Spectrum of Inductive and Deductive Research Approaches Using Quantitative and Qualitative Data." *Academic Medicine* (2020).

Yu, Angela Yan, Stella Wen Tian, Douglas Vogel, and Ron Chi-Wai Kwok. "Can learning be virtually boosted? An investigation of online social networking impacts." *Computers & Education* 55, no. 4 (2010): 1494-1503.

Zachos, Georgios, Efrosyni-Alkisti Paraskevopoulou-Kollia, and Ioannis Anagnostopoulos. "Social media use in higher education: A review." *Education Sciences* 8, no. 4 (2018): 194.

Zaidieh, Ashraf Jalal Yousef. "The use of social networking in education: Challenges and opportunities." *World of Computer Science and Information Technology Journal (WCSIT)* 2, no. 1 (2012): 18-21.

Zalaghi, Hasan, and Mahdi Khazaei. "The role of deductive and inductive reasoning in accounting research and standard setting." *Asian Journal of Finance & Accounting* 8, no. 1 (2016): 23-37.

Zanamwe, Ngonidzashe, Taurai Rupere, and Owen Kufandirimbwa. "Use of social networking technologies in higher education in Zimbabwe: A learners' perspective." *International Journal of Computer and Information Technology* 2, no. 1 (2013): 8-18.

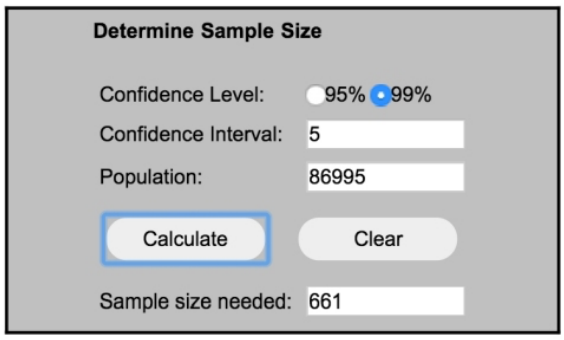
Zelick, Stacia Ann. "The perception of Web 2.0 technologies on teaching and learning in higher education: A case study." *Creative Education* 4, no. 07 (2013): 53.

Zhang, Chi, Jinyuan Sun, Xiaoyan Zhu, and Yuguang Fang. "Privacy and security for online social networks: challenges and opportunities." *IEEE network* 24, no. 4 (2010): 13-18.

Appendix A- Target Population

University	Classification	Number of students
National University of Sciences and Technology (NUST)	Private	9,999
COMSATS Institute of Information Technology	**Non-profit public**	34,999
National University of Computer and Emerging Sciences	**Non-profit public**	8,999
International Islamic University	**Non-profit public**	24,999
Quaid-i-Azam University	**Non-profit public**	7,999
	Total	**86,995**

Appendix B - Sample size calculator



Appendix C- Survey Phase Documents

Dear Sir/Madam

We are conducting this research to examine users' perspective towards a Social Networking model for the Higher Education Sector in Pakistan. Your assistance in this research would be greatly appreciated and would assist in the success of its findings.

This research involves a survey, which will take up to 10 minutes to complete. This survey contains five sections. Please read each statement and then circle the number or tick the box, which shows how you feel.

To complete the survey please click on…….

If you feel uncomfortable in answering certain questions, please feel free to disregard them.

We would appreciate it if you can complete this survey within a week if possible, however, if this is too short a space of time, please respond as soon as you are able.

Participation in this research is completely voluntary and your responses will be completely anonymous. Participants may withdraw at any time without prejudice or negative consequences, and do not need to provide a reason. By completing out the survey, you are consenting to participate.

Any information provided by you through the survey will be held as strictly confidential. Information will not be disclosed to any parties besides the researchers, unless required to do so by law. Finally, the researchers will ensure that published material will not contain any information that can identify you or your organisation.

We encourage you to participate because this research will provide valuable insights into users' perspective towards Green Information Technologies adopting in businesses. Please send this link to other work colleagues and friends with internet usage and interest. Your assistance in this research is greatly appreciated and is crucial for the success of its findings.

Your interest and consideration are greatly appreciated. If you need any additional information from us, please let us know by *14666661@*student.curtin.edu.au
Tomayess.Issa@cbs.curtin.edu.au.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HRE2018-0314). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au. Thank you in advance.

Yours faithfully,
*14666661@*student.curtin.edu.au
School of Management; Curtin University
Australia

A Survey for developing a Social Networking model for the Higher in Pakistan (SNMHEP)

Part 1: Background Information

1. Gender
a. Female
b. Male

2. What is your age?
a. 18-22
b. 23- 32
c. 33-42
d. 43-52

3.What is your job title?
……..

4. Please select your main field(s) of study:
• Accounting
• Business Law
• Economics and Finance
• Information Systems
• Information Technology
• Computer Science
• Management
• Marketing
• Health Sciences
• Humanities
• Science and Engineering
• Art and Design

Other(s) - Please specify……

5. Please select your highest level of education:
• Primary
• Higher Secondary/Pre-University
• Professional Certificate
• Diploma
• Advanced/Higher/Graduate Diploma
• Bachelor's Degree
• Post Graduate Diploma
• Master's Degree

6. How many hours do you spend daily on social networking, not including email?
• Less than an hour
• Up to five hours
• Five to ten hours
• Ten to twenty hours
• over twenty hours

7. How many hours do you spend on the internet for email, instagram, snapshot etc.…

- Less than an hour
- Up to five hours
- Five to ten hours
- Ten to twenty hours
- Over twenty hours

8. For what purposes do you use the internet? (You may choose more than one option.)

- Email
- Playing games
- Studying
- Working
- Shopping online
- Chatting
- Researching hobbies
- Banking online
- Buying goods or services
- Buying stocks or investing online
- Researching travel information and/or making reservations
- Others - Please specify …….

Part 2: Social Networking Model in Higher Education in Pakistan (SNMHEP)

Please indicate your level of agreement with each statement:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. In the higher education sector, the use of social networking sites has had psychological impacts on aspects such as motivation, inspirations, encouragement, awareness and constructive feedback. Therefore, it assists users					
To learn new information and acquire knowledge					
To acquire up-to-date information					
To understand and solve study problems easily					
To communicate with scholars, Students and Teachers Worldwide					
To improve work by sharing with peers					
More innovative					
To learn new things from peers' work					
To become more creative					
To share information with peers					
To study independently					
To overcome study stress					
To complete tasks more quickly					
To develop personal skills such as leadership, communication, problem solving, time management and motivation					
To develop professional skills such as reading, writing, decision making, critical thinking, teamwork					
To create logical conclusion more easily					
To become more aware of global/local issues					
To access knowledge easily					
To become more knowledgeable					
To develop cultural awareness					
To remember historical data					
To communicate with their peers from different universities					

Please indicate your level of agreement with each statement:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. In the higher education sector, the use of social networking sites has had psychological impacts on aspects such as motivation, inspirations, encouragement, awareness and constructive feedback. Therefore, it assists users					
To discuss issues with their peers from different universities					
To communicate and collaborate with their peers frequently					
To discuss issues with their peers frequently					
To cooperate with their peers from different universities					
To cooperate with their peers frequently					
To reduce mistakes					
To become more professional					
To solve problems easily					

Please add other comments regarding psychological aspects:

_____

Please indicate your level of agreement with each statement:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
2. In higher education institutes, the technology including hardware/software of the systems, compatibility, security and privacy in the usage of social networking sites allows					
Users to have no difficulty when working with those sites					
Users to meet their needs					
Users to use these sites from remote areas easily					
Users to have no compatibility issues with hardware					
Users to have no compatibility issues with software					

Users to access social networking trouble shooting					
Users to access helplines 24/7					
Security concerns					
Data ownership issues					
Data loss and manipulation					
Data theft					
Social engineering and malfunctioning of data					
Privacy issues					
Intellectual concerns					
Sharing of personal information issues					

Please add other comments regarding technological context:

_____

Please indicate your level of agreement with each statement:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
3. For the use of social networking sites the higher education sector must have organizational support whereby					
User can develop inter-crossing relationships with peers (for common interests)					
User can learn effectively from peers					
User can learn efficiently from peers					
User can communicate with peers easily					
User can benefit from the use of e-learning					
It increases productivity of users					
It ensures that users' personal information is secured					
It provides a good data management plan for users					
It satisfies user needs					
It attracts new opportunities regarding e-learning					

Please indicate your level of agreement with each statement:	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
3. For the use of social networking sites the higher education sector must have organizational support whereby					
It attracts quality employees for e-learning					
It meets stakeholders' expectations					
It devises and implements a quality management plan for e-learning					
Users have adequate knowledge through training enabling them to use these sites for study purposes					
Users know the pros of this technology					
Users know the cons of this technology					
Users can achieve their goal easily					
Users can enhance their professional attitude towards study and work					
Users can troubleshoot any problem					
It makes users "Greener" in their activities					
Users become more sustainable					
Carbon emissions are reduced					
Pollution is decreased					
Health hazards are reduced					

Please add other comments regarding organizational support:

_____

Please indicate your level of agreement with each statement:	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
4. The design aspects of social networking sites in higher education sector allows users					
To become more efficient					
To become more effective					
To accomplish tasks more easily					
To save time					

Please indicate your level of agreement with each statement:	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
4. The design aspects of social networking sites in higher education sector allows users					
To achieve all their goals					
To remember things more easily					
To learn things more easily					
To use these sites easily					
To navigate these sites easily					
To navigate these sites successfully					
To accomplish a task using a minimum number of steps					
To learn quickly					
To not become frustrated					
To have a user-friendly environment					
To encounter a pleasing text style, font and layout					
To be satisfied with its graphics and colour					
To become more relaxed and confident					
To navigate these sites without written instructions					
To accomplish study tasks more easily					
To use a computer more efficiently					

Please add other comments regarding design aspects:

_____

Please indicate your level of agreement with each statement:	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
5. The social factors in the use of social networking sites in higher education sector are associated with					
The system that satisfied your academic requirements for distance learning					
The learning system that is better than the classroom approach					
The distance learning system that can decrease the cost of learning					

Please indicate your level of agreement with each statement:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
5. The social factors in the use of social networking sites in higher education sector are associated with					
The team environment which inspires you to do your best work					
The team environment which encourages you to complete your work					
Your culture which inspires you to do your best work					
Your culture which encourages you to complete your work					
Your culture which provides you more opportunities by using this new technology					
Your culture that can adopt changes in society					
An environment which is gender-biased					
An environment where female face more difficulties than males					
An environment in which all users (i.e. disabled users) have no difficulties					

Please add other comments regarding social factors:

_____

Appendix D – Interview Phase Documents

Dear Sir/Madam

We are conducting this research to examine users' perspective toward a Social Networking model for the Higher Education Sector in Pakistan. Your assistance in this research would be greatly appreciated and would assist in the success of its findings.

This research involves an interview, which will take up to a week to complete. This interview contains four questions. Please read each question and then answer. Please do not click on the Submit button until you have completed the interview. Please do not click on the Submit button until you have completed the interview.

Participation in this research is completely voluntary and your responses will be completely anonymous. Participants may withdraw at any time without prejudice or negative consequences, and do not need to provide a reason. By completing out the survey, you are consenting to participate.

Any information provided by you through the interview will be held as strictly confidential. Information will not be disclosed to any parties besides the researchers, unless required to do so by law. Finally, the researchers will ensure that published material will not contain any information that can identify you or your organisation.

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Tomayess.Issa@cbs.curtin.edu.au.

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Thank you in advance.

Yours faithfully,
14666661@student.curtin.edu.au
School of Management; Curtin University
Australia

Interview

Following is a list of questions designed to collect information from experts about social networking sites use in the higher education sector of Pakistan. It will also assess a proposed initial model to be used in the higher education sector of Pakistan and other developing countries. Please answer each question to the best of your knowledge and ability. There is no word limit, you can write as much as you feel sufficient. Thank you for your time and co-operation.

Q1: Do you think use of social networking sites in higher education institutes causes data privacy issues? If yes, why and if no, why? Please give your answer in detail.

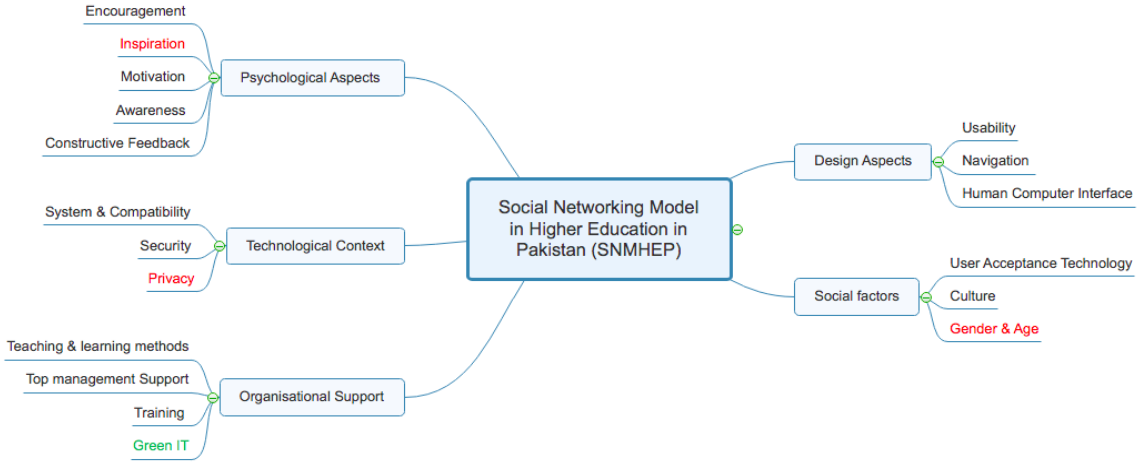
Q2: Do you think that use of social networking sites has had psychological impacts on various aspects in the higher education sector, such as inspirations to improve work by sharing with peers, to learn new things from peers work, to become more creative and innovative etc.…If Yes why and if no, why? Please give your answer in detail.

Q3: Do you think that social factors employed by social networking sites in higher education sector are associated with gender and age issues? If Yes why and if no, why? Please give your answer in detail

Q4: Can you please give your feedback about my current Social networking model in higher education in Pakistan; do you think the current structure will match the higher education sector of Pakistan? If Yes why, and if no, why? Please give your answer in detail.

N.B: The first images is the current social networking model in higher education in Pakistan (SNMHEP); while the 2nd image, is the current social networking model in higher education in Pakistan in details.


Psychological Aspects
Organisational Support
Technological Context
Social Networking Model in Higher Education in Pakistan (SNMHEP)
Social Factors
Design Aspects


Encouragement
Inspiration
Motivation
Awareness
Constructive Feedback
Psychological Aspects
System & Compatibility
Security
Privacy
Technological Context
Teaching & learning methods
Top management Support
Training
Green IT
Organisational Support
Social Networking Model in Higher Education in Pakistan (SNMHEP)
Design Aspects
Usability
Navigation
Human Computer Interface
Social factors
User Acceptance Technology
Culture
Gender & Age