Indian tertiary education students' perceptions about Internet use for their learning: a case of Punjabi teacher education students

Sandeep Kaur Sandhu

Master of Philosophy (Education) *India*

Master of Education *India*

Master of Arts (Economic) *India*

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ABSTRACT

This study was intended to understand and explain Indian tertiary education students' perceptions about using the Internet for their learning. The aim of this research is to examine the impact of Internet use on Indian tertiary education students' learning. The study explores the role of the Internet in teacher education students' learning and how students report the Internet to be useful for their studies. The purpose is to investigate whether better and increased Internet access links to better educational opportunities. The investigation is informed by the Social Construction of Technology (SCOT) theory of Bijker and Pinch (1986), which is used to explore the perceptions of the students about Internet use in their learning. The theory of SCOT suggests humans' perceptions are based on interactions and usage patterns of a particular technology, hence, in this study, Indian tertiary education students' perceptions about their Internet interactions and usage patterns are explored. In order to identify and interpret the different meanings of the Internet for male and female students, the relationship between gender and the use of the Internet is also investigated.

An embedded mixed methods study was conducted involving semi-structured interviews (five females and five males) and a survey (N= 1000) of Bachelor of Education students from eighteen different educational institutions in India. My personal narrative data was also used parallel to interview and survey data. The four components of the SCOT (interpretative flexibility, relevant social group, wider context and technological framework) were utilised to analyse data, and present and discuss the overall findings. The interview data and personal narrative data were analysed using content analysis where the patterns of themes guided by SCOT were compared and contrasted within and between cases. Statistical descriptive and comparative analyses were employed to analyse the survey data.

Of significance, this study showed that the participants perceived the Internet to be an online learning tool because it enabled them to access learning materials digitally. Particularly, the interpretative flexibility theme showed that the students' perceptions about the Internet use for their learning were based on their Internet usage patterns. The relevant social group theme highlighted that the poor Internet quality (including lack of Internet access, slow Internet speed and weak Internet signal quality) impacted on students' Internet use for learning. The wider context theme showed that the social beliefs (e.g., parental and teachers' negative attitude towards the Internet use stopped students from using the Internet), economic factors (e.g., high cost of the Internet), political factors (e.g., lack of provisions of the digital devices and appropriate electricity supply) and socio-economic background (e.g., educational and family background) also impacted adversely on students' Internet use for their learning. On the basis of relevant social group analysis and wider context analysis, the technological framework was utilised to provide some practical suggestions to improve the provision of the Internet resources into Indian tertiary education institutions in order to promote tertiary education students' learning through the implementation of new practices of the Internet in the Indian learning context.

ETHICS DECLARATION

The research for this thesis received the approval of the Monash University Human Research Ethics Committee (MUHREC).

MUHREC Project Number: CF13/2406 – 2013001271

CANDIDATE'S DECLARATION CERTIFICATE

I certify that the thesis entitled
Indian tertiary education students' perceptions about Internet use for their learning: a case of Punjabi teacher education students submitted for the degree of Doctor of Philosophy is my own work and this thesis has not already accepted for any other award, degree or diploma at any university or equivalent institution. It is also certified that this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Full Name: Sandeep Kaur Sandhu

Signature: 

Date: 12/02/2016

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CHAPTER 1: INTRODUCTION

Currently, many societies around the world use the Internet as a part of daily life. Societies have become more Internet-based, especially in developed countries, where highly advanced Internet-based infrastructures have been successfully introduced to tertiary education students (e.g., Ayub, Hamid & Nawawai, 2014; Lee & Woods, 2010; Kutoglo & Ozad, 2010; Penard, Poussing & Suire, 2013). The integration of the Internet into learning processes has resulted in new innovative and flexible learning opportunities. In the Indian context, Internet resources are not adequately integrated into students' academic life in comparison to the western context (e.g., ASER, 2013; Byker, 2014). If Indian tertiary education institutions can implement the use of Internet sources in the learning processes, they will be well positioned to take advantage of the perceived benefits for students' learning at the tertiary level.

For Indian tertiary education systems to realise the benefits of the implementation of the Internet into learning processes, it is necessary for the traditional education systems to query their practices. A traditional education system involves teacher-centred programmes that focus on the transmission of knowledge through lectures, printed textbooks, tutorials and assessment of students' learning based on end-of-semester examinations. The uptake of the Internet has the potential to increase the scope and variety of students' learning through accommodating them with new practices of Internet-based learning. This thesis focuses on exploring ways of using the Internet to promote Indian tertiary education students' learning. It analyses innovative use of the Internet and investigates the ways in which students use the Internet to develop their understanding and increase their learning.

This study was intended to understand and explain Indian tertiary education students' perceptions about using the Internet for their learning. The investigation was

informed by the Social Construction of Technology (SCOT) theory of Bijker and Pinch (1986), which is used to explore the perceptions of the students about Internet use in their learning. The theory of SCOT suggests humans' perceptions are based on interactions and usage patterns of a particular technology, hence, in this study, Indian tertiary education students' perceptions about their Internet interactions and usage patterns are explored.

In addition, the field of educational technology has not considered social aspects of technology use. One outcome of exploring the socially constructed aspect of Internet use in this thesis might be to deepen understandings of whether the Internet is an educational resource. The view presented in this thesis is that the design of the Internet does not make it educational technology; instead, the usage pattern makes the Internet an educational technology.

This chapter begins with an overview of the researcher's background and interests within the context of this research. The chapter then differentiates the concepts of *Information and Communication Technology, digital technology* and *the Internet*. Then the term 'Internet' is described, the history of the Internet is explored and use of the Internet is discussed. That section of the chapter draws upon a number of key studies that highlight the use of the Internet at world level and the Internet use in the Indian context. This chapter also identifies the aims of the study, discusses the significance of the research and presents the structure of the thesis.

1.1 Researcher's background in the context of the research project

This section describes the development of my particular interest in this research project. My background and dispositions, my theorising about the Internet and my practices on the Internet are integral to the conceptualisation of the research project. In this context, it is important for the reader to know something of my demographic and

educational background to understand why and how I came to conduct this research.

I am from a middle class family in a rural area of the Punjab state of India and I was schooled in the government education system during the 1990s. Except for my elder sister, none of my family members had gone to university and only a few of my year ten classmates had ambitions to pursue higher education. The rural background and lack of awareness about higher education always remained a barrier to people of my village undertaking higher education. My passion for studies and my father's awareness about higher education enabled me to achieve masters' degrees (Master of Arts in Economics, Master of Education and Master of Philosophy in Education) in the early 2010s.

During my first Bachelor degree (Bachelor of Arts) in 2003, I started to think about my life and questions like, what do I want to do in my life? What is the ultimate aim for my life? As time passed, I realised I had a deep passion for my studies and I wished to study for higher qualifications.

My excitement for using the Internet developed while doing a Bachelor of Education degree in 2007. Before the Bachelor of Education degree, I had not thought of using the Internet for learning. Moreover, my perception was that the Internet was an application for use in accountancy and clerical jobs only. I had assumed that the Internet had no benefits for students' learning. Without the Bachelor of Education year, I may never have experienced a change in my attitude towards the Internet. The Bachelor of Education is a one-year degree in India and there were a number of activities that students were required to do as part of the Bachelor of Education degree programme; for example, submitting assignments, attending teaching practices, passing annual examinations and many other co-curricular activities. Sometimes, I encountered many challenges and difficulties in completing my assigned activities, due to the shortage of learning resources. One of my teachers who taught 'Philosophy of Education' encouraged me to use the Internet resources for completing the assigned tasks. I was an

Internet-illiterate person, so I was not inclined to use the Internet, but I felt that the Internet might have some benefits for students, as suggested by the teacher. I then began to think of the Internet as a learning resource, although I had not yet used the Internet for this purpose. However, it was a positive shift in my thinking about the Internet as an educational resource.

My interest for my PhD research on *Internet use* grew during my Master of Philosophy year. As a tertiary education student, I had not used the Internet until the Master of Philosophy year. Moreover, computers or Internet facilities were not available to the students in my educational institutions. As I was enrolled in the Master of Philosophy degree, I had to write a minor thesis in the third semester of the degree. My guide (in India, a research supervisor is called a guide) suggested that I use the Internet to search for relevant material for my research project. I did not have Internet access at the University, so I accessed the Internet at a cyber café located near the university. I used the Internet for the first time in the Master of Philosophy degree in 2010. As I began to use the Internet, my interest developed. After my interaction with the Internet, I realised that Internet resources contain a large amount of useful information and learning materials for students' use. On the other hand, it raised new questions. If Internet resources are so useful for learning, why do educational institutions not provide Internet facilities to the students? I then decided that if I chose to study a PhD, I would conduct research on the use of the Internet. From the outset, I planned to investigate the educational benefits of the Internet in students' learning.

As described earlier, I was a completely Internet-illiterate person. The terms *Information and Communications Technology (ICT), digital technology* and *the Internet* were synonyms to me. However, as I reviewed the related literature, I found that these terms have different meanings. In the context of the study, to facilitate an understanding of the meaning and use of the Internet, it is appropriate to firstly describe what the

Internet is.

1.2 What is the Internet?

The use of the Internet increased exponentially (Internet World Stats, 2015). About 3.4 billion people (approximately 46.1%) around the world use the Internet in their daily lives (Internet Live Stats, 2016). People use the Internet in numerous ways for interaction and communication through emails, texts, chats and so on. Moreover, the Internet is used by people for information (e-mails and e-newspapers), education (e-library, e-books and e-journals), recreation (online games and browsing) and social networking (Facebook and Twitter) purposes (Global Digital Statistics, 2014).

The notion of the Internet is defined as a "global network" or the "network of the networks and world's largest and most widely used network" (Rehman & Shafique, 2011, p. 46). Evans, Pinard and Schneider (2006) described the Internet as a set of massive, globally linked protocol of network systems that can retrieve and convey advanced knowledge from all around the world. Hence, the Internet is a web of networks that connect the entire globe, and can be the fastest means to get in touch with the rest of the world. The Internet interconnects digital devices (computers, mobiles, notebooks and so on) globally and provides easy access to worldwide content.

The term 'Internet' covers approaches like accessing, collaborating and bridging the world and content. The adoption of the Internet in teaching and learning settings has expanded the usage area of the Internet and provided the catalyst for change in learning approaches. For example, the use of the Internet in the teaching and learning context established the Internet as an online learning and teaching tool. Implementation of the Internet in the teaching and learning process, as it does with other learning tools, may enhance students' learning opportunities and learning skills by providing students with current learning content (Bagnall & Meyers, 2015). The Internet communication modes, such as discussion forums, chat rooms, emails, instant messaging and video

conferencing, enable students to exchange information, share their ideas or experiences and obtain feedback from others (peers, tutor or teachers), which are also helpful in their learning. The use of the Internet also provides new options for accessing learning materials and for producing new knowledge. The access to information, sharing of knowledge with each other and development of insights through feedback create circumstances where online knowledge is facilitating the concept of learning (Restall, 2012). These kinds of practices also constitute how the Internet is shaped and perpetuates ongoing practices that continue to construct the Internet.

1.2.1 History of the Internet

The basis of the Internet was established in 1957 with the first satellite experiment, Sputnik-1 (launched by Soviet Union), for the Advanced Research Projects Agency (ARPA) for technological advancement in the United States' army (Cerf & Kahn, 1974). In 1962, Clark and Licklider contemplated the concept of a globally connected set of computers for quick access to data and programs from any site at ARPA. In 1965, computers were connected in mass and the first Wide Area Computers Network (WACN) was established (Cerf & Kahn, 1974). However, because the speed was low, the need for a packet switching component was recognised (Cerf & Kahn, 1974). In 1967, Robert introduced the 'packet switching' idea (invented by Baran, 1964) at ARPA and designed the first computer, called the 'Interface Message Processor'. In 1969, the Advanced Research Projects Agency Network (ARPAN) came into existence. ARPAN was relinquished by the National Science Foundation Network (NSFNET) in 1990. The NSFNET soon connected the North American universities through the Computer Science Network (CSNET), and provided research facilities to Europe through the European UNIX Network (EUNET). The original NSFNET was amplified as 'the Internet' after 1990 and the term 'the Internet' is still used.

1.2.2 Use of the Internet

Nowadays, the Internet has become an essential part of life. Internet World Stats (2015) reported that 48.20% of Asians use the Internet. Nearly 18.0% of European people use the Internet and about 10.2% of North Americans use the Internet. Moreover, Africa has 9.8% Internet users and 9.3% of Latin American use the Internet.

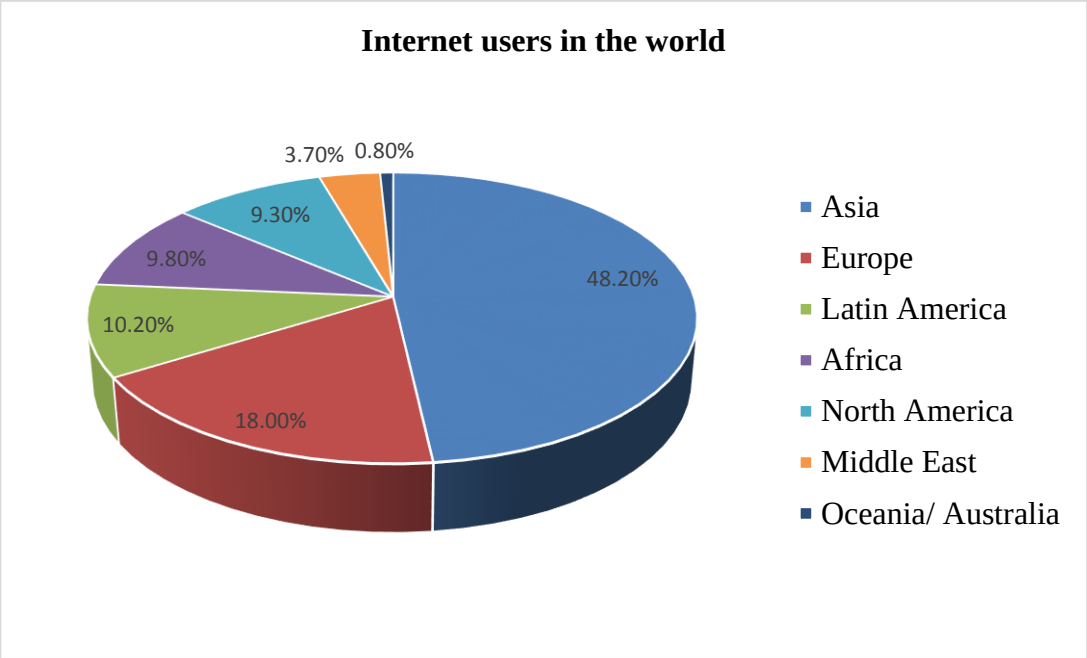

Figure 1.1: Internet users in the world distribution according to world regions (adapted from Internet World Stats, 2015)

Asia has the largest percentage of Internet users. In the context of India, India contributes 8.33% of the share of world Internet users (Internet Live Stats, 2015). In the next section, Internet use in India is discussed.

1.2.3 Use of the Internet in India

India is the second most populated country on the globe (World Population Statistics, 2016) with 1.3 billion inhabitants (World Population Statistics, 2016). However, only 375 million people (30%) use the Internet (Internet World Stats, 2015).

This figure indicates that few Indians use the Internet in their daily lives and approximately 70% of Indian people are non-Internet users (Internet World Stats, 2015).

It has been found that most Indians use the Internet generally for exchanging information (e-mails), browsing (web applications) and searching required materials (search engines) (Gnanasambandam, 2012) (a detailed discussion on the use of the Internet in India is provided in section 2.3.3). The preferred sites for Internet browsers in India are Yahoo, Google, Google India, Youtube, Rediff, Orkut, Blogger.com, Window live and Rapid share (Pamnani, 2013). All fields (business, economics, education and other sectors), but more specifically the tertiary education sector, seem to be influenced by the Internet. As the formation of the research topic was integrated into my experience as a tertiary education student back in India, it is important to review Internet use by tertiary students in India (the use of the Internet by Indian tertiary education students is discussed in detail in section 2.3.2). In order to do this, it is necessary to first understand the structure of Indian universities and the tertiary education system.

1.2.4 Tertiary education structure in India

Higher education has a powerful role in building a knowledge-based country. Higher education is imparted by Universities and other higher education institutions facilitated by both the government (centre and state) and private sectors in India (see Table 1.1 below).

Table 1.1: Higher education institutes in India

Type / Number of Institutions	Central	State	Private	Total
University and University-level institutions	152	316	191	659
Colleges	669	13024	19930	33023
Diploma awarding institutions	0	3207	9541	12748
Percentage Enrolment in 2012	2.6%	38.6%	58.9%	100%

Source: Ernst and Young (2012)

Table 1.1 shows there are a total of 659 universities, 33023 colleges and 12748 diploma-awarding institutions (central, state and private) in India (Ernst & Young, 2012). In terms of number of institutions, India has the largest higher education system and the privatisation of the educational sector has increased the number of higher educational institutions in India (Ernst & Young, 2012). Despite this, only 20 million students are enrolled in universities for higher education (among them 12% for postgraduate and 1% for research courses in different streams) (Kharas, 2010). These figures indicate that the tertiary education literacy rate is low in India. Few Indian people (only 7% population in rural areas) have a higher education (Chakraborty & Konwar, 2013).

Also, India has low Gross Enrolment Ratio (GRE) as compared to other developed countries as shown in Figure 1.2.

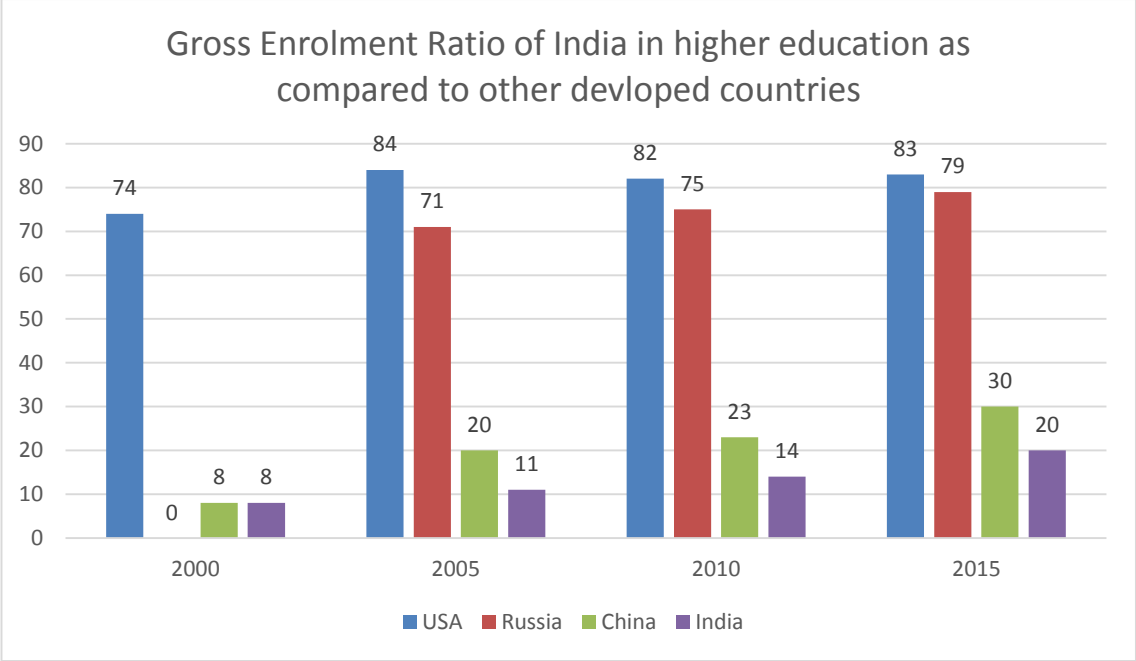

Figure 1.2: Gross Enrolment Ratio of India in higher education as compared to other developed countries (source: EY-FICCI report 2009, 2011)

The figure 1.2 shows that India is behind in gross enrolment ration in higher education as compared to other developed countries (USA, Russia and China). It was found that socio-cultural factors play a role here in preventing students from undertaking tertiary education (Battacharya & Sharma, 2007). In addition, Ernst and Young (2012) reported that the insufficient infrastructure facilities (e.g., deficient libraries facilities, out-dated curriculum and shortage of lecturers) lag India behind in the context of tertiary education. To remedy these kinds of mobility issues such as travelling, it has been suggested that online courses could make tertiary education accessible to all (Balakrishnan, 2010; Bostus, Mear & Williamson, 2015). For this purposes, the Internet-based technologies should be established in Indian higher educational institutions. The next section describes the changing role of higher educational institutions in students' learning through using the Internet.

1.2.5 Changing role of Indian higher education institutions in learning through Internet use

The higher educational institutions have always been known to produce and transmit new knowledge to students. For this purpose, the adoption of computerised and Internet based-learning management systems enable universities to deliver new knowledge to students. The flexible Internet-based teaching and learning aim to achieve a wide range of educational objectives to meet students' growing needs and requirements.

In the context of the improvement of tertiary education students' learning, Indian government has always aimed to establish Internet-based teaching and learning programmes in higher educational institutions. In 2004, University Grant Commission (UGC) of India launched a mega programme namely INFONET in order to provide the Internet facilities in Indian tertiary educational sectors. The 12th five-year plan (2012-2017) also recommended improving the quality of Internet facilities in Indian tertiary education institutions. However, in terms of access and quality of education, Indian tertiary education institutions are facing challenges. Therefore, the use and implementation of the Internet resources into higher educational system has always been a part of Indian policies and plans to improve the access and quality of the tertiary education.

Higher educational institutions in India have adopted Internet-based technologies for teaching and learning purposes, despite this, the usage of the Internet for students' learning was reported low. For example, Parameshwar and Patil (2009) demonstrated that Indian university students were aware of the use of the Internet, but they did not have an adequate knowledge to make appropriate educational uses of the Internet resources for their learning. Therefore, the higher educational institutions should provide the required knowledge to students about the effective use of the Internet

for learning. The growth and development of higher education is not simply the result of adoption and implementation of the Internet into tertiary education institutions, it also depends on students' knowledge about the Internet use for learning. Therefore, there is a need to access tertiary education students' perceptions about the Internet for learning.

This study focuses primarily on Indian tertiary education students' perceptions about *Internet use* in their learning. In the previous sections, the definition of the Internet, a history of the Internet and information on the use of the Internet were provided. The next section states the aims of the study. In order to provide a better understanding of the aims, the definitions of the main terms used in this thesis are provided first.

1.3 Definitions of the terminology used in this study

Learning is a process of construction of views and expansion of new knowledge (Bruner, 1966). The construction of views happens through interactions with people and other environmental objects in daily life that enrich personal experiences and result in addition of new knowledge. The notion of addition of experiences is strongly connected to learning, where the experiences are assumed to be the source of knowledge (Barron, Cleland, Fitzpatrick, Hauber, Hebets, & Stevens, 2015); as more experiences are gained, it adds to the knowledge level and learning happens. The socio-constructivism approach demonstrates that social environments are the best source of learning, where people share ideas and take benefits from others' experiences (Harris, 2007). A learner can learn through various learning tools (discussion, observations and other communication tools) and technologies (such as Internet) which enhance the concept of self-directed and self-regulating learning.

Learning can be formal, non-formal or informal. Formal learning follows a structured and pre-arranged system of learning (Eshach, 2007), where a teacher imparts knowledge through a specific medium of instruction. It is bounded to the determined

time and place. The trio of teachers, students and content matter are considered to be essential elements of formal learning. Formal learning is teacher-dominant learning and students are evaluated at the end of the learning process. Schools and other educational institutions are good examples of formal learning. On the other hand, non-formal learning happens in a planned but flexible manner in educational institutions (Celdran & Villar, 2013). It has some characteristics of formal learning, but primarily focuses on learners' needs and provides a flexible timetable for learning to the learners. Informal learning takes place in daily life situations spontaneously; for example, one can learn from families, the neighbourhood and so on (Eshach, 2007). This thesis focuses on the concept of formal learning and investigates the role of the Internet in improving participating tertiary education students' learning in formal educational settings.

Perceptions: In this study, *perceptions* refer to *the perceived meaning of the objects*. The meanings of the particular object are based on the individuals' organisations and interpretations about that particular object (Pinna, 2010). Individuals have interactions with objects and, on the basis of their experiences, which they gain through interactional processes, they organise and interpret the meaning of those objects accordingly. Therefore, perceptions are based on the experiences of the individuals that they gained through the interactions with the different objects (Mitev, 2005).

Internet access: Internet access refers to the availability and connectivity of computers, mobile phones and other digital devices to the Internet. In this study, Internet access is considered as the easy availability of the Internet at home and at educational institutions. Easy access to the Internet plays a positive role in developing the tertiary education students' interest towards the use of the Internet (Adekunmisi, Ajala & Iyoro, 2013; Mahmood, 2009). High Internet access helps to improve communication and information barriers and assists in providing quick information access (Adekunmisi et al., 2013; Ayub et al., 2014). For example, with good Internet

access, tertiary education students can connect with the rest of the world and they can benefit from online information and communication sites.

Internet quality: The quality of the Internet refers to the Internet speed, connectivity resources and signal quality. Internet cost, connections or networks are considered to be the main factors of Internet quality. Good quality Internet helps to develop positive attitudes towards Internet use among students (IIo & Ifijeh, 2010) as good Internet speed, connectivity resources and signal quality make it easy to access the online information and communication process. High-speed Internet access raises the confidence level of users (Hume & Mort, 2012) and motivates them to make effective use of the Internet.

Attitude: In the field of education, attitude is considered to influence behaviour (Albarracin, Johnson, & Zanna, 2005; Buttery, 1978; Cacioppo & Petty, 1986; Chaiken & Eagly, 2005; Haddock & Maio, 2010; Petty, Priester, & Wegener, 1994). The influence on behaviour causes liking or disliking towards an object. For example, if a person uses (or does not use) the Internet in their daily life, the Internet affects them in both positive and negative ways. The effect (positive or negative) shapes their 'attitude' towards the Internet according to the perceived influences on their behaviour. In this manner, the effect of the object on behaviour helps to develop the attitude towards that specific object. In addition, Chaiken and Eagly (1993) denoted attitude as "A psychological tendency that is expressed by evaluating a certain entity with some degree of favour or disfavour" (p. 1). They gave emphasis to the term 'evaluation' to explain 'the attitude'. In this regard, an attitude is evaluation of the favour or disfavour of a particular object. Furthermore, Chaiken and Eagly (1993) explained that attitudes are adaptive and a person can develop them with new adoption of a cognitive, affective or behavioural nature.

Gender differences in Internet use: The term gender difference is used when describing the different interests, habits and attitudes of males and females. "Conventional meanings of gender typically focus on difference, emphasizing how women differ from men" (Simiyu, 2007, p. 44). For example, men used the Internet differently for different purposes (Huang & Liu, 2008; Johnson, 2011; Jones et al., 2009). Gender differences never mean sex discrimination. Sex discrimination is based on biological features, for example, chromosomes, sex organs or physical features, whereas gender differences relate to social role, position, behaviours or identity of both males and females (Johnson, 2011). Apart from physical factors (sex organ, chromosomes and other physical features), gender differences are connected to social practices of both sexes related to an object; for example, the construction that girls like to play with dolls and boys prefer to play with cars.

In terms of using the Internet, gender difference is an interesting factor to explore. Gender influences have been observed in the use of the Internet (e.g., Gill & Nai, 2007; Khudair & Oshan, 2008; Komathi & Maimunah, 2009; Tutkun, 2010). Significant gender differences were found for Internet use (e.g., Gwung & Lai, 2013; Jones et al., 2009). For example, female students used the Internet for educational purposes and communicative activities more than their male counterparts (Delton & Huper, 2006; Tutkun, 2010). The gender differences are reported to be a debatable concept and both genders react differently towards Internet use (the relationship between gender and Internet use will be discussed in detail in Chapter 2).

In this study, the term **Indian students** refer to individuals who are Indian citizens and who study in Indian educational institutions. **Tertiary education** refers to higher degrees in any field, regardless of the specific subject area. Teacher education degree is one of the tertiary education degrees. This study mainly focuses on Punjabi teacher education students; Punjab state is one of 29 states of India. Therefore,

perceptions of **teacher education students of Punjab states of India** were studied as a part of **Indian tertiary education students** in this study.

1.4 Aims of the study

The aim of this research is to examine the impact of Internet use on Indian tertiary education students' learning. The study explores the role of the Internet in tertiary education students' learning and how students report the Internet to be useful for their studies. The purpose is to investigate whether better and increased Internet access links to better educational opportunities. Thus, the impact of Internet access on tertiary education in India is explored. Also, the thesis explores the socially constructed meaning of the Internet as an educational tool. In order to interpret the different meanings of the Internet for gender differences, the relationship between gender and the use of the Internet is also investigated. In light of these aims, the following research questions have been framed:

1. What perceptions do Indian tertiary education students have about the impact of the Internet on their learning?
2. How does the Internet impact on access to tertiary education in India?
3. What is the relationship between Indian tertiary education students' attitude towards the Internet and their gender?
4. How does the quality of the Internet impact on Indian tertiary education students' learning?

1.5 Significance of the study

Many studies have been done on the use of the Internet for learning purposes in developed countries, but this study is a unique contribution for less developed or developing countries that are similar to the Punjab state of India. The literature on Internet use by tertiary education students is dominated by Western contexts, with few

explorations of how non-Western students deal with Internet use. This study focuses on how students in a non-Western developing country (similar to India) interpret and describe the Internet with regard to their learning context.

By investigating Indian tertiary education students' perceptions about Internet use in their learning potential, this study is significant in highlighting the benefits of using the Internet for improving the learning potential of Indian students. This study helps in understanding ways of using the Internet to increase the learning opportunities of tertiary education students in the context of the state of Punjab in India.

From the theoretical perspective, the SCOT theory usually emphasises *the design of technology* rather than *use of the technology* (Bartis & Mitev, 2008). In this study, components of the SCOT theory are used for analysing the *use* of the Internet by Indian tertiary education students and how it impacts on their learning. In other words, this study extends the application of the SCOT theory to the Indian context and employs the components of the SCOT theory to focus on *the use* of the Internet instead of *the design* of the Internet.

1.6 Structure of the thesis

The current thesis comprises a total of six chapters, including the introduction chapter. The second chapter deals with the foundational concepts of the theory. The Social Construction of Technology (SCOT) theory was used as the theoretical framework in this research. The SCOT theory provided a lens for presenting and analysing the results for the data collected. The review of literature related to Internet use, and the relationship between socio-economic status and Internet use, and students' attitude towards Internet use are also discussed in Chapter 2.

The methodologies related to the research project are described in the third chapter. In this chapter, the research paradigm and research methods (mixed methods) are explained. The role of the researcher, sampling, data collection (interviews, personal

narrative account and questionnaire), data analysis (content analysis and descriptive analysis), validity and reliability and ethical issues are also discussed in Chapter 3. The matrix table prepared for data analysis is also provided in Chapter 3.

Chapter 4 and Chapter 5 deal with the theoretical analysis of the data along with the discussion of the results. The Chapter 6 presents the summary, technological framework analysis, limitations of the current research and suggestions for further research. A summary is provided at the end of every chapter.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

This chapter provides the review of the research literature that informs the theoretical foundation for the research problem discussed in Chapter 1. An overview of theories that focus on the implementation and impact of the technology on society is explored first. This is followed by the Social Construction of Technology (SCOT) theory of Bijker and Pinch (1986), which provides the conceptual framework for the study. This chapter also details the literature review of the Internet within society, the impact of the use of the Internet on tertiary education students' learning potential, socio-economic status and use of the Internet, and gender and attitude towards the Internet. The chapter concludes with a summary that captures the main points of the literature review.

2.1 Theories of technology

A number of theories have been put forward to explain the meaning of technology and impact of technologies on society. Two such theories are technological determinism (Veblen, 1920) and the Social Construction of Technology (SCOT) theory of Bijker and Pinch (1986). The former theory considers *technology* as an agent of social change. Technological determinism stresses that dominant technologies mould societies' behaviours and interactions. It contends that technologies exert an impact on the world independent of human choice, and people seem unaware of their technological choices (Dafoe, 2015). Furthermore, the theory tends to assert that new innovations come into existence autonomously in order to exceed the power and utility of the previous technology.

Technological determinism could provide a conceptual framework for this study, where the Internet can be seen as a digital technology resulting in development in the

field of learning; however, the development of any society or specific field does not rely on technology only (Bijker, 1995), as society plays a significant role in technological development. Technological determinism does not take societies' perceptions into consideration when explaining the development of the societies through technology. In this context, Barley and Leonardi (2015) suggested that the deployment of the new technology (as technological determinism theory stresses) is no guarantee that people will use it. The implementation of technology depends on people's perceptions about the technology that leads to further innovation of new technology.

Bijker (1995) argues that technological innovation is not an autonomous process based on designers' myths. Instead, it is a result of the implementation and use of technology by societies. The societies are the main actors that use the technologies and give meaning to the technology, which results in innovation of new technology. In this way, the study of different individuals' perspectives about technology enables a researcher to highlight the advantages/disadvantages of the technology, which can be useful in expanding the scope of that technology.

On the other hand, this study is able to draw upon the SCOT theory of Bijker and Pinch (1986) as the conceptual framework to explain tertiary education students' perceptions about Internet use in their learning. The SCOT framework suggests that both adoption and innovation of technology depend on an individual's perceived meaning about the technology, which further depends on the usefulness of the technology. A researcher should go beyond the internal functionalities of the technologies to consider the extent and manner in which the technology is being used by the societies (Carr, 2014). Hence, the SCOT theory presents an appropriate framework to examine the innovative uses of the artefact (e.g., the Internet, in this thesis) through analysing individual perceptions.

2.2 The Social Construction of Technology (SCOT) theory

The SCOT theory (Bijker & Pinch, 1986) stresses the *social shaping of the technology*- that societies' perceptions play a significant role in innovation of new technology (Carr, 2014). Different societies use technologies and interpret the meaning of technology accordingly, depending on their interactions with the technology. The interpretations about the technology enable manufacturers to focus on the advantages/disadvantages of the technology that result in new and improved technology. Thus, the SCOT theory emphasises that technical and social factors interact and interplay in a technology's development.

In the educational context, the use of technology is not a new notion. Technology has been used during school days in the form of a pen, pencil, and chalkboards. Technology has developed from chalkboards to smart boards and from paper, pen and notebooks to computers or laptops. In the educational framework, the focus has moved from basic technologies like paper, pen and chalkboards to digital or Internet-based educational technologies (Coughlin, Lemke & Reifsneider, 2009). There are numerous studies (e.g., Arthur & Barfi, 2013; Ayub et al., 2014) that focus on and explain that the use of the Internet in the educational context can bring a rapid change through its innovative use. For example, Byker (2014) advocated that if all students could be equipped with their own laptops and the Internet, they could connect to the entire world and improve their learning potential by accessing the online study content.

The tenet of the SCOT theory has grown from the social constructivist approach (Carr, 2014). Social constructivists believe that the use of technological tools and the Internet have brought development in the field of learning. The definition of learning given by social constructivism (that learning happens through the use of teaching techniques and technological tools) provides the theoretical basis for the current thesis, which explores the role of the Internet in the learning of tertiary education students.

In addition, the socially constructed aspect of the use of the Internet in education has not been explored extensively. One outcome of exploring the socially constructed aspect of Internet use in this thesis might be to deepen understandings of whether the Internet is an educational resource. The view presented in this thesis is that the design of the Internet does not make it educational technology; instead, the usage pattern makes the Internet an educational technology.

The SCOT theory provides a new approach to exploring relationships between societies and how the technology is established in a particular society. The SCOT theory is based on the notion that technologies are deeply embedded within societies and it (technology) cannot be developed separately from them (Klein & Kleinman, 2002). The content of technology is socially constructed and the technical working of machines (for example, 'computers') cannot be explained as being derived from nature, but are constituted in social contexts (Bijker, 1995).

Initially, the core formation of the SCOT theory consisted of four central concepts: *relevant social group, interpretative flexibility, closure or stabilization,* and *wider context*. In 1987, Bijker added and introduced the concept of *technological frame* for the first time. The components of the SCOT theory as a conceptual framework are explained in the next section.

2.2.1 Interpretative flexibility

The concept of *interpretative flexibility* is based on the first stage of the Empirical Programme of Relativism (EPOR) (Russell, 1986). The EPOR is an approach used in sociology of scientific knowledge that focuses on the social construction of scientific knowledge. The first stage of the EPOR demonstrates that there is a tendency for different interpretations of nature that provide determinant consequences to the scientific debates. The main characteristic of the EPOR that distinguishes it from the

SCOT theory is the focus on the empirical study of contemporary scientific development and scientific controversies.

In the SCOT theory, the first stage of the EPOR demonstrates that the technological artefact is socially constructed and interpreted. The SCOT framework postulates that there is no right or wrong technology; instead, all technological artefacts have the possibility of being interpreted differently based on actors' or social groups' perceptions (Prell, 2009). Different social groups may have different interpretations about the same technological artefact. In this context, Duit and Roth (2003) explained, "We take words and world to be interpretively flexible and therefore grant that they may be perceived in different ways (that they may have different ontologies for different actors)" (p. 875). A researcher examines all interpretations made by different groups in order to explain a specific meaning of that artefact.

Interpretative flexibility does not mean only to provide flexibility to individuals in describing how they think or interpret technological artefacts (Bijker & Pinch, 1987), but also there is flexibility in how an artefact is used differently by different social groups. There are different ways of using the same technology. For example, technological experts or skilled people use mobile phones differently to non-skilled people. Technologically skilled individuals may prefer to use mobile phones for online activities such as browsing, accessing e-mails, surfing on social networking sites and many more. On the other hand, technologically non-skilled people may prefer to use mobile phones for making phone calls and texting messages only. Thus, *interpretative flexibility* focuses on different use of the same technology.

Interpretative flexibility also demonstrates that there is flexibility in how technology is designed. "There is not just one possible way or one best way of designing an artefact" (Bijker & Pinch, 1987, p. 40). For example, interviews with different technologists who are engaged in a specific field may provide different

solutions to the same problem, and technology can be designed differently as a consequence. Thus, interpretations made by both technologists and social groups may lead to different designs of technology.

An essential step for a researcher is to study different social groups in order to describe the different meanings of the same technology. Whilst interpreting a technology, few members of different social groups may share the same set of meanings about the one artefact. Bijker and Pinch (1986) stated that all members who express the same meaning about the specific artefact are referred to as the relevant social group, which is also the second component of the SCOT theory. A brief description of relevant social groups is provided in the next section.

2.2.2 Relevant social groups

Bijker (1995) argues that an understanding of relevant social groups is essential to understanding a particular technology. The key requirement of *relevant social groups* is that all members of a certain social group have the same interpretation of an artefact (Bijker & Pinch, 1987). Each *relevant social group* interprets the perceived meaning in a similar way. These particular groups are considered to be agents imparting meaning to the artefacts (Klein & Kleinman, 2002). Furthermore, Klein and Kleinman explain that every social group negotiates the design of the artefacts and demonstrates the different views and perceptions about the objects. The different *relevant social groups* show their different meanings along with the artefacts' weaknesses and strengths, which help designers in improving the quality of the artefacts.

The selection of the *relevant social group* must be undertaken carefully. Bijker and Pinch (1987) demonstrated that "in deciding which social groups are relevant, we must first take whether the artefact has any meaning at all for the members of the social group under investigation" (p. 30). The homogenous meaning given to the artefact by

different social groups leads to the choice of relevant social groups. Relevant social groups can be the users and the producers of the technology.

After identification of the *relevant social group*, another task is to study relevant social groups in detail. A detailed description of relevant social groups provides a better understanding about the functions of the artefact and enables a researcher to analyse problems with regard to the artefact's use (Bijker & Pinch, 1987). Identification of the problems is assumed to be essential in the developmental process of the technology (Bijker & Pinch, 1987). Thus, without the relevant social group, the developmental process cannot be explained.

The original formulation of the SCOT theory has been criticised by many authors (for example, Russell, 1986; Edge & Williams, 1996; Winner, 1993) with regard to the power asymmetry between relevant social groups. Russell (1986) proposed that a relevant social group might consist of diverse subgroups, which could result in intergroup or intragroup conflicts. In 1987, Bijker introduced a new concept in the SCOT theory, known as the technological frame, which is intended to apply to the interaction among different actors of relevant social groups.

2.2.3 Technological framework

In the SCOT theory, *technological frames* play a role in linking the interpretations of the artefacts, the relevant social groups and interactions within and among relevant social groups (Stewart, 1986). For example, different relevant social groups may have their own perceptions and meanings about a particular artefact and they also highlight the common problems regarding the use of that artefact. The technological frame connects all the aspects, such as meanings of the aspects for different relevant social groups, definitions of the problems, and interactions of the group members in order to provide techniques for solving problems (Bijker, 1995). In

this manner, *technological frames* provide favoured pathways to the positive and technological development of the artefacts.

Moreover, the technological frame provides the problem-solving strategies. Problem solving is a broad concept that focuses on what counts as a problem, what strategies there are to solve the problem and what requirements there are to meet the solutions (Bijker & Pinch, 1987). Thus, the technological frame is a combination of theories, tacit knowledge, goals and using practice.

Another feature of the technological frame is to focus on the interactions among various groups. The technological frame does not study an individual's characteristics or a system's/institution's characteristics, but focuses on interactions between actors, not in or above actors. In this context Bijker (1995) argues:

> A technological frame describes the actions and interactions of actors, explaining how they socially construct a technology. But since a technological frame is built up around an artefact and thus incorporates the characteristics of that technology, it also explains the influence of the technical on the social. (p. 155)

Also, a technological frame can be used to describe the interplay of society and technology. By structuring interactions of the group members, a technological frame is useful in explaining how social environments structure an artefact design and also analysing how existing artefacts structure the social environment (Bijker & Pinch, 1987). The study of the interplay of society and technology can be useful in determining the problem-solving strategies.

Once the solution is provided to a problem, another essential task is to follow up the solution, whether the problem is solved or not. For this purpose, Bijker and Pinch introduced closure and stabilization, which is the fourth component of the SCOT theory. A brief description of this component is provided below.

2.2.4 Closure or stabilization

Closure in the SCOT theory involves the disappearance of the problem and the stabilization of the artefact is assumed (Bijker & Pinch, 1987). After arriving at the closure stage, relevant social groups report the problem has been solved and no further controversies or problems are found. Once the problem is assumed to be solved, then artefact design arrives at the stabilization stage and no further improvements in the design are made.

This thesis focuses on Indian tertiary education students' perceptions about Internet use for their learning rather than Internet design. In this study, it is also not intended to bring any innovative change in the formation or design of the Internet. Therefore, closure and stabilization have no significant contribution to this project.

2.2.5 Wider context

Another component of SCOT theory used in this thesis is the wider context. Wider context focuses on the socio-cultural and political aspects of the development of the artefacts (Klein & Kleinman, 2002). The socio-cultural and political situations make a significant contribution to shaping the values and norms of social groups (Bijker & Pinch, 1987), which, in turn, influences the meaning of the artefact. The socio-cultural norms impact on the interactions of different social groups with the technology.

On the basis of socio-cultural and political milieus, the social groups can be categorised into different groups. As socio-cultural background impacts on the use of the technology, resulting in different meanings of the technology, wider context is used in the SCOT theory to study the impact of the socio-cultural background on the development and use of the technology.

2.2.6 Criticisms of the SCOT theory:

Klein and Kleinman (2002) described that the one critiques of the SCOT theory is that it appears to limit on research methods. The SCOT theory argues to use snowball methodology, however Klein and Kleinman (2002) have criticised the use of snowball methodology and argued that SCOT's snowball methodology have the lack of accuracy and does not provide a comprehensiveness research methodology.

Furthermore, Klein and Kleinman (2002) explained that exclusion and involvement of relevant social groups seems inappropriate as the SCOT theory demonstrated that the selection of the relevant social group is made based on the similar views and opinions about the artifact, however, it was not clear who decides which social group is a relevant social group. Also the SCOT theory does not provide an explanation about social groups who have the lack of capacity and power of discussion, but that group may have an impact on the development of the technology (Prell, 2009). Furthermore, Prell (2009) highlighted that the SCOT theory fails to explain the situation when any of the relevant social groups express their disagreement to the design and artifact. The SCOT theory does not provide any explanation on how the disagreements raised the groups can be handled.

Also, Klein and Kleinman (2002) criticised that the SCOT theory does not discuss the post effect of the development of the technologies on societies. Bijker and Pinch (1987) demonstrated that the artifact is developed for a purpose, however, it has not been explained in the SCOT theory whether the societies use that particular artifact in the way as it was expected to use. In this context, Haard (1993) criticised the concept of interpretative flexibility when it reaches to the closure. Haard (1993) demonstrated that the SCOT theory does not provide any follow up technique for the future interpretations.

Despite having the above criticisms, the SCOT theory provides a theoretical and conceptual basis for this study because its framework includes the social perceptions of the technology for describing the socially constructed meaning and purposes of using the technology (e.g., the Internet in this thesis). The SCOT theory also maintains that the constructed meaning of the technology is based on the social use of the technology, thus, it helps to set the stage for analysing for what purposes Indian tertiary education students as a part of Indian society use the Internet. The comprehensive literature associated with use of the Internet within societies was reviewed. The following sections constitute the literature review that identifies the gap in the study and argues that the study is necessary.

2.3 Internet use within society

In a globalised world, it is difficult to think of daily life without the Internet. As the Internet is highly integrated into modern life, it is plausible that many people are engaging in online activities (e.g., surfing on social networking websites, emails and other online activities) (Bostus et al., 2015). The Internet is used extensively for routine-based household tasks. In 2013, research was carried out on household Internet use in Australia by Brien, Dane and Mason (2013) using a survey and telephonic interviews with 1178 people in New South Wales (Australia). The results found that 88.5% of participants used the Internet for various purposes, like seeking travel information, accessing e-mail accounts and for e-banking. Young people used the Internet for job searching, government services and online shopping as well, but participants 65+ years preferred to conduct face-to-face or in-person interactions for these services.

The Australian Communication and Media Authority (2010) stated in their quantitative report on young Australians' use of online social media that the Internet had become part of daily life and was used extensively in homes and educational institutions. The Internet is becoming popular amongst both young and older aged people. Younger people (8–17 years of age) prefer to use the Internet for playing games and social

networking sites (Australian Communication and Media Authority, 2010) and older people are interested in using the Internet for everyday functional purposes such as checking emails, seeking travel information, and so on (Ewing & Thomas, 2010).

Despite the positive impact of the Internet on society, the Internet has also had a negative impact on societies. A study by Blaszczynski et al. (2013) investigated the impact of Internet gambling on gambling problems. A total of 6682 Internet gamblers and other Internet users (here other Internet users refer to those who used the Internet for activities other than gambling) took part in the online survey. It was found that Internet gamblers faced more health and psychological problems than other Internet users.

Similarly, Ahmad et al. (2014) carried out an empirical study on the positive and negative impacts of the Internet on young adults of Malaysia. Data were collected through personally administered questionnaires from 200 adults and a cross-sectional research design was used for analysing the data. On the positive side, the results highlighted that the participants found the Internet useful in improving their skills for doing better in their daily lives. On the other hand, the adults who made extensive use of the Internet faced different kinds of problems in their daily life, such as interpersonal problems, behavioural problems, physical problems, psychological problems, and work problems. In this way, extensive use of the Internet influences the mental and physical health of the users. When considering the different Internet usage patterns among different age groups of people and the different impact of the Internet on societies, it is clear that the Internet has become an interesting topic for researchers to explore.

Students, and more specifically, tertiary education students, are an integral part of society; therefore, it is appropriate to explore how tertiary education students use the Internet. As this research project mainly focuses on Internet use in tertiary education, the section below discusses the relevant studies that have explored the use of the

Internet by tertiary education students.

2.3.1 Use of the Internet in tertiary education

The Internet is widely used in educational systems and is considered to be an online teaching and learning tool. By using Internet technologies as a learning tool, students can share, discuss, argue and negotiate their ideas in order to construct new knowledge. In this context, Lee and Woods (2010) carried out research on Griffith University's (Australia) students to assess the role of the Internet in tertiary students' learning. The students were taught to use the Internet appropriately for their study purposes. The results revealed that when students used the Internet for study purposes (accessing their learning material online) in their classroom settings, an overall improvement was found in students' results. After using the Internet, students felt more confident in the class presentations. The Internet provides a platform for tertiary education students not only to access information, but it also helps students in the construction of knowledge through exchange of information with others via emails, teleconferencing, chatting and surfing on social networking sites.

University students rely extensively on social media (blogs, social networking sites, podcast and wikis) and many are highly engaged in the virtual world. The term virtual world refers to the computer-based online environment, where people share and obtain information through online sources. Tertiary education students used the social media for their learning purposes. Much research (e.g., Josh, 2012; 2015; Tess, 2013; Selwyn, 2007) suggests that social media supports educational activities by providing active participation, information, communication, collaboration and sharing of learning content to the tertiary education students. For example, Josh (2012) conducted a study on international design collaboration and mentoring for tertiary students through Facebook. A total of twelve students from Adelaide University in Australia and ten students from Penn State University (United States) were selected. The participants were

asked to take part in an online mentor scheme and submit their work each week. The results revealed that Facebook was declared to be a host site of e-mentoring that strengthens the bond between universities, and Facebook was found convenient for accessing learning material from other educational institutions.

Similarly, Tinmaz and Yakin (2013) carried out research on using Twitter as an instructional tool in higher education at a private university in Turkey. A sample of forty-eight students enrolled in social science courses was selected and a quantitative method (online survey) was used for data collection. The results highlighted that participating students considered Twitter to be a plausible learning tool, and emphasised that Twitter should be integrated into both formal and non-formal university settings. In contrast, a few studies (Bozarth, 2010; Fox & Varadarajan, 2011) have pointed out that social networking sites distract and overwhelm the students. By considering the positive effects of the social networking sites, Tinmaz and Yakin (2013) suggested that new research should be conducted to find the numerous benefits of Internet use in tertiary education students' learning.

In today's age, university students use the Internet as help-seeking tool in learning context. For example, Dustman, Er, Kopcha and Orey (2015) demonstrated that through the integration of the Internet into university education system, students' help-seeking activities have been expanded beyond the classroom boundaries (e.g., peers and teachers). Further, Dustman et al. (2015) explained that university students can access any kind of information through internet-based resources (e.g. Wikipedia, e-mails, online chat and so on) and peers and teachers can also help students through using Internet-based technologies.

In the context of the tertiary education teaching and learning process, various websites and databases are used extensively as learning aids (Chang, Huang & Yueh, 2015). For example, Cress, Kimmerle and Moskaliuk (2011) found that Wiki (a server

program) is a beneficial programme that tertiary education students find useful for collaborative tasks. The higher education students used Wikis to accomplish their learning tasks. Furthermore, the use of Wikis in the learning process enhances both collaborative and individual learning (Chang et al., 2015). By using the Wikis, the learners upgrade their knowledge about any specific topic. In another study by Li (2015), tertiary education students considered Internet databases to be useful learning tools. In this way, the Internet improves the quality of learning and the learning potential of the students.

An extensive and widespread adoption of digital devices (smart phones, laptops, iPad, tablets, and other android-based devices) along with Internet facilities in higher education influences students' academic life. The easy access to the Internet on digital devices motivates students to use the Internet for their learning purposes. A number of studies (e.g., Gong & Wallace, 2012; Smith & Wakefield, 2012) reported that accessing the Internet on digital devices makes tertiary education students' learning easier. In this context, a recent study carried out by Barton, Nguyen and Nguyen (2015) on the use of iPads in higher education. A Systematic Literature Review (SLR) approach was used and a total of twenty papers were selected from different databases (Scopus, ProQuest academic research library, Google scholar and many more). The final results revealed that tertiary education students had a positive attitude towards the use of iPads for academic purposes, and the use of iPads in learning contexts enhanced the learning potential of the higher education students.

In addition, Kay and Lauricella (2010) conducted a study to examine the impact of laptop access equipped with Internet sources on tertiary education students' academic behaviour. A sample of 177 tertiary education students (89 males and 88 females) was selected from the University of Ontario Institute of Technology of Canada. The Laptop Effectiveness Scale (LES) was used to collect data. The results indicated that laptop

access in tertiary education institutions enhanced students' online learning experiences and improved their academic behaviour.

The use of the Internet has promoted the concept of self-directed and self-regulated learning among tertiary education students through the availability of online learning resources. In self-directed learning, the learners use their abilities to take responsibility for their learning contexts in accomplishing their learning goals (Kirmizi, 2015). As tertiary education students are considered to be at an advanced stage of learning, it is essential to promote the concept of self-directed learning to students at university level. Kirmizi found that online learning motivates tertiary education students to direct and accomplish their own learning requirements by using online learning tools. In this way, the Internet facilities help higher education students to be independent and learn at their own pace.

The numerous Internet applications and software enhance the concept of online learning and tertiary education students take benefit from such applications. . In this context, Josh (2015) carried out research on learning in the Café - a new e-learning application designed to meet the contemporary needs of tertiary education students and teaching staff by joining users to the online learning environments. It was a pilot study conducted on 48 tertiary education students at the University of South Australia. The selected students were asked to take part in an online learning environment through Café and fill out an anonymous survey. A positive correlation was found between participation in Café and participants' academic performance. In this way, Internet facilities offer beneficial online applications for tertiary education students' use that enables them to improve their learning potential.

Internet-based teaching and learning programmes enhance learning opportunities for tertiary education students. Tertiary education students are adopting the Internet facilities in order to gain maximum benefits from Internet sources. In this context, a

recent research conducted by Abdullah, Mamat, Razak and Yusoff (2015) on adoption of an Internet-based learning environment by pre-school trainee teachers. It was a quantitative study and a survey was used to collect data from seventy-six pre-school trainee teachers studying in a college located on the east coast of Malaysia. The results highlighted that research participants showed positive perceived ease of using the Internet for their learning potential and it (perceived ease of use) impacted positively on intention to use the Internet. Furthermore, the study suggested that Internet facilities should be provided to the teachers during training in order to get maximum benefits from the online teaching and learning resources.

The use of the Internet also enables teachers and teacher trainees (students under teacher training) to improve their teaching and learning skills. In a study by Attaran, Karami and Karami (2013), it was suggested that by using Internet facilities, the knowledge content and teaching skills of the trainee teachers could be enhanced. This thesis focuses on tertiary education students' perceptions about Internet use for their learning potential, so the above study formed a basis for exploring how Internet sources could enhance the knowledge area and teaching skills of students during pre-service teacher education. The pre-service teacher educators are tertiary education students (i.e., Bachelor of Education students in this thesis) who are considered as future teachers.

It was apparent from the above discussion that tertiary education students used different Internet resources for their learning and that students have become Internet savvy. Overall, use of Internet sources improves the quality of learning of the tertiary education students by providing them with a wide range of learning materials. The use of the Internet for learning improves students' academic performance. For example, Ogedebe (2012) conducted a study to measure the impact of Internet usage on University of Maiduguri (Nigeria) students' academic achievement. A total of 350 students had selected to take part in the survey. The findings suggested that use of the

Internet improved tertiary education students' overall learning performance. Bostus et al., (2015) suggested that online learning resources provide students with better learning opportunities over traditional teaching and learning systems, and are more helpful in improving students' overall academic performance.

The reviewed studies (e.g., Abdullah et al., 2015; Chang et al., 2015; Josh, 2015; Li, 2015) highlighted that Internet sources and numerous Internet applications were found useful by tertiary education students in their learning. However, the reviewed literature did not deal with the impact of Internet access on tertiary education students' learning. This gap is addressed in this thesis.

This thesis particularly focuses on Indian tertiary education students' perceptions about Internet use. Therefore, it is appropriate to discuss the relevant literature associated with the use of the Internet by Indian tertiary education students. The next section thus discusses studies that describe the Internet usage pattern of Indian tertiary education students.

2.3.2 Use of the Internet in tertiary education of India

India has a large formal education system (Ashish & Atanu, 2012) with around 659 universities all over India. However, the use of the Internet in the tertiary education system, and more specifically by university students, is insubstantial. Only 56% of university students use the Internet for their academic work (Chandran, 2007). Poor Internet access and insufficient Internet provision (high Internet cost, few computers and network errors) hinder tertiary education students from using the Internet for their studies (Kaur & Kumar, 2005). For example, if students do not have good Internet access and they experience frequent network errors, this creates problems in using the Internet for their studies. Indian students also have little knowledge of using the Internet to improve their learning (Kumar, 2010).

In Indian educational institutions (e.g., high schools and tertiary education

intuitions), especially public or government education institutions, students are not motivated to use the Internet for their studies (ASER, 2013). Moreover, students are not allowed to use computers in educational institutions (e.g., primary and high schools). In a study conducted by Byker (2014) in a school of Bangalore in India, a student reported "my teacher does not allow us to use the computer, sir she thinks we will break it. Sir I am not allowed to touch the computer at my school" (p. 19). Due to the non-provision of Internet facilities, students are not able to use the Internet in their studies. In this context, Kumar (2010) measured the Internet services provided in Indian universities. The study was conducted at the University of Agricultural and Technology in Meerut (India). The results showed that 30% of the research participants used the Internet for research purposes and to access their learning material. Furthermore, results indicated that all participants used the Internet for emailing and they (research participants) used Google for searching the study material in the library. However, in contrast, it was found that students exhibited a lack of knowledge about using the Internet to search their subject area. The study also found there was a lack of facilities (number of terminals, multimedia access and availability of the printers) in the library.

In contrast, Dange (2010) carried out research on Indian postgraduate students to measure the confidence level and abilities of using the Internet. It was a mixed methods study; ten interviews and 200 surveys were conducted to collect data from first-year postgraduate arts and science students at Kuvempu University of India. The results showed that the participants were very confident and they had the ability to use the Internet. Furthermore, the results also highlighted that Indian university students preferred to use the Internet for their educational purposes. Similarly, Arulchelvan and Viswanathan (2006) highlighted in their research that Indian higher education students used the computers and Internet facilities for their learning purposes. However, this research was limited to arts and science postgraduate students and graduate students,

respectively. The results of both studies indicated that tertiary education students used the Internet for study purposes, but it was not explained how Indian tertiary education students used the Internet for their learning. This limitation of both studies is the basis of the current research project and participants' perceptions about Internet use are explored through analysing their Internet usage pattern.

Some studies suggested that Indian university students are aware of the use of the Internet. For example, Nazim and Sanjiv (2006) conducted a survey to determine the awareness among university students at Banaras Hindu University (BHU) in India. The questionnaire and follow-up interviews were conducted in three different institutes and six faculties. The results declared that all respondents used the Internet for obtaining new knowledge and they reported that their universities provided the new and advanced databases to get all the required information. Google was considered to be the most popular research engine among students; however, they also reported problems related to Internet usage, such as slow speed, high Internet charges, lack of training and lack of organised information. As Nazim and Sanjiv conducted their research in 2006, nearly eight years has passed and this time lapse points to the need for a new study to be conducted on the problems faced by Indian university students in using the Internet. Through using the *relevant social group,* the current research also focuses on whether the problems mentioned by Nazim and Sanjiv still exist when using the Internet for the research participants.

Students from developed countries have used Internet applications for study purposes more efficiently (Chang et al., 2015; Josh, 2012, 2015; Tess, 2013; Tinmaz & Yakin, 2013) than developing countries (Dange, 2010; Gill & Li, 2007; Kumar, 2010). India is a developing country with a low literacy rate. It is assumed that the development of the developing country depends on its educational sectors (Dange, 2010). The number of people studying at the tertiary level is also very low in India

(Department of Higher Education, 2007). In this context, the Internet has the potential to improve the tertiary education system of India (Dange, 2010) and the current research focuses on the impact of the Internet on access to tertiary education in India.

Despite having large tertiary education system (as described in Section 1.3.4), women participation in tertiary education is low and women enrolment in tertiary education was reported only 41.5% of the total enrolment in the academic year 2010-2011 (Nath, 2014). In this context, Aneja (2015) described that there are many reasons that lag Indian women behind in terms of their participation in tertiary education. Firstly, Aneja (2015) described that gender disparity is an obstacle for women in achieving higher education. Gross Enrolment Ratio (GRE) of men in tertiary education is found higher (20.8%) than women (17.9%). Secondly, due to the lack of governmental higher education institutions, many women are unable to afford higher study expenses of private educational institutions. Therefore, the financial conditions of some families is a problem that leads to the less women participation in tertiary educations. Thirdly, due the lack of travelling facilities, many of rural and urban women cannot attend tertiary education institutions. Lastly, Aneja (2015) demonstrated that women are considered as the subject of sexual and social harassment and due to this, women are not encouraged to access higher education.

Besides this, rural people's participation in tertiary education is also low. GRE of rural people in higher education in India is only 7% of total enrolments (Chakraborty & Konwar, 2013). Also there are many reasons behind the low GRE of rural population. Firstly, Most of the higher education institutions are urban-centric (Chakraborty & Konwar, 2013) and secondly, the institutions situated in rural areas lack quality in their programmes. Thirdly, the inadequate mobility facilities are a huge problem for rural people to access tertiary education in urban areas (Aneja, 2015).

To enhance the access to tertiary education regardless gender, age and area, it has been suggested that online courses could make tertiary education accessible to all (Balakrishnan, 2010; Bostus, Mear & Williamson, 2015). For this purposes, the Internet-based technologies should be established in Indian higher educational institutions. Therefore, this thesis explores how Internet facilities can be used to enhance the access to tertiary education in India.

2.3.3 Use of the Internet in teacher education in India

The use of the Internet in teacher education in India is not substantial. Despite understanding the benefits of using Internet-based teaching and learning practices as a significant tool, the use of Internet has been neglected in Indian teacher education training programmes (Nautiyal & Sinha, 2015). The use of the Internet seems to have potential to improve the teaching skills of pre-service service teachers and make them competent to use Internet-based technologies for teaching purposes in schools. In this context, Kawar and Sain (2013) suggested that the use of online resources in teacher education programme could enable teacher education students to promote their learning and teaching skills through acquiring, sharing and utilizing online information. Some studies (e.g., Ajbani, 2014, Goel & Goel, 2013; Nautiyal & Sinha, 2015) suggested that Indian teacher education students have already started using the Internet for their skills development, however, further Nautiyal and Sinha (2015) reported that this phenomenon is still needed to be explored.

The use of the Internet by teacher education students can enhance their teaching and learning competencies and enable them to utilise the online learning practices in schools. For example, the use of the Internet by teacher education students can improve their skills like finding, creating, evaluating, analysing and applying new teaching pedagogies (Deb, 2013). Furthermore, Nachimuthu (2010) suggested that there is a need to promote the concept of online teaching and learning among teacher education

students, so that they could utilise new online pedagogies as provided during pre-service teacher training.

The above discussion shows that the Internet should be integrated in teacher education programmes, however a limited studies were found to show how the use of the Internet can promote teacher education students' learning. Moreover, in the context of Punjab state of India, a limited literature has been found that describe the need of the implementation of the Internet for teacher education students' learning. In the light of the background, this thesis focuses on the impact of the Internet on Indian Punjabi teacher education students' learning and explores their perceptions about using the Internet.

Beyond the use of the Internet in the tertiary education sectors, the use of the Internet in the daily lives of Indian people is explored. The Internet usage patterns of Indian people have been reviewed and this has enabled a view of the consumption rate of the Internet in different daily activities of people. The impact of the Internet on daily lives in India is explained in the next section.

2.3.4 Impact of the Internet on daily lives in India

The Internet influences the world's economy, financial, academic and entertainments industries extensively (Gnanasambandam et al., 2012), and developing countries are adopting advanced Internet facilities to help develop their nations. The Internet has a great impact on Indian society in different ways. For example, Indian people use the Internet in their daily life activities and Internet sources help people to obtain new information (Pamnani, 2013). The Internet has affected different fields like science, technology, economics, and education, and a range of research has been conducted to assess the role of Internet use in India.

Indian people use the Internet for various purposes; for example, a study conducted by Birader, Kumar and Rajshekhar (2006) at Rajashai University (India)

found that Indian people used the Internet for common activities like checking e-mails, browsing and reading e-books. Bisht, Mishra and Yadva (2005) performed a study to assess the Internet utilisation pattern of undergraduate students of G.B. Pant University of Agriculture and Technology, Patnagar (India). The findings showed that among Internet users, 67.7% were males and 32.3% were females who used the Internet for various purposes, like preparing assignments. Kaur and Kumar (2005) found that 97.7% of research scholars use the Internet as an information search engine. Kaur and Kumar reported that college students in India used the Internet for teaching, research and learning processes.

In 2007, Madhusudhan carried out a survey on Internet use by research scholars at Delhi University (India). The results revealed that research scholars preferred to use the Internet, and the Internet was considered to be the most convenient research engine. However, negative attitudes were found to be barriers to the optimum use of the Internet. There was a need to improve the online services. The demand for the Internet is increasing rapidly, but there are still some difficulties in using the Internet, for example, its high cost, weak Internet connection, poor Internet skills of the user, and poor management of Internet problems (Nazim & Sanjiv, 2006).

Indian people are demanding better and increased Internet facilities for their daily use (Mahajan, 2006) but little work has been done to find out the impact of the Internet on daily lives in India. The few studies (Birader et al., 2006; Bisht et al., 2005; Nazim & Sanjiv, 2006) included in this section are now out-dated. The reviewed literature did not answer questions about the quality and access to the Internet provided in India. The studies of Madhusudhan (2007), and Nazim and Sanjiv (2006) explored the use of the Internet for various purposes, like searching for new materials, obtaining new knowledge, and so on; however, they did not speak about the relationship between gender and use of the Internet. Furthermore, the above studies (Bisht et al., 2005; Kaur

& Kumar, 2005; Nazim & Sanjiv, 2006) were conducted on people in different faculties (agriculture, science and technology and engineering) but there was no study found that has been conducted on education faculty students' perceptions about the use of the Internet. Therefore, the limitations of the above studies provided a basis for future researchers to conduct more up-to-date studies about perceptions of Indian tertiary education students about the use of the Internet in their learning potential.

India is a country that has a low socio-economic status, which can affect one's use of the Internet. Although this study does not focus on the relationship between socio-economic status and Internet use, as the research participants in this thesis are from India, it was of interest to review the impact of socio-economic status on one's Internet use. The related literature revealed an interesting relationship between socio-economic status and the use of the Internet. It is found that socio-economic status has a positive relationship with the students' perceptions about Internet use. In the next section, the studies about the relationship between socio-economic status and students' attitudes towards the use of the Internet are included.

2.4 Socio-economic status (SES) and the use of the Internet

Socio-economic backgrounds have a strong positive relationship with computer or Internet experience (Bozionelos, 2004; Haseloff, 2005). For instance, Haseloff (2005) conducted a study in India and claimed that the lower socio-economic and lower income classes used the Internet less than high socio-economic and high income classes. Jonathan and Zhu (2002) conducted their study on diffusion, use and impact of the Internet in Hong Kong. The results revealed that high socio-economic status impacts positively on the use of the Internet. The participants with high income and high socio-economic status used the Internet more frequently than low income level participants. In addition, Bjorn (2009) described that the Internet was considered to be an expensive and high-priced technological tool, so people from high socio-economic

backgrounds used the Internet more than people from low socio-economic backgrounds.

There are several reasons behind the low use of the Internet by different socio-economic classes, for example, some individuals may have the lack of abilities to use the Internet and some may have lack of Internet access. It was found that people from low socio-economic classes cannot afford to purchase computers and the Internet and it leaded towards the less or no use of the Internet (Aerschot & Rodousakis, 2008). Education and skills and can denoted as another factor that impact on the use of the Internet. Roe and Broos (2005) demonstrated that digitally illiterate people lag behind in using the Internet and computers. Thus the lack of Internet skills and access to digital technologies impact adversely on the Internet use. Besides this, the age also impact on the Internet use, for example some elderly people may have the lack of skills for using the computers and the Internet in comparison to young people.

It was apparent that socio-economic status has positive impacts on the use of the Internet. People from developed countries have more positive opinions about the use of the Internet. In this context, in 2014, Silver conducted a study on the relationship between socio-economic status and Internet use on older adults in the United States. The survey was conducted on 11,035 older adults. The study showed a positive relationship between socio-economic status and opinion towards the Internet; furthermore, there was no relationship between age and Internet usage pattern. In addition, Andreassen et al. (2007) carried out quantitative research on the relationship between Internet use, socio-economic status and subjective health in seven different European countries. E-health trends and European social surveys were used to collect data from 11 248 people between the ages of fifteen and eighty. The results declared that there was a positive relationship between socio-economic status and Internet use patterns. The people with a high-income rate had a more positive opinion of the Internet, and it also revealed that the Internet had a positive relationship with social support and people's health. It was also

declared that the Internet helped to provide social awareness and support to the people about their health.

Socio-economic status has a positive relationship with the use of the Internet. The socio-economic status and tertiary students' opinions towards the use of the Internet are positively correlated to one another (Bjorn, 2009; Jonathan & Zhu, 2002). Most of the studies (Bjorn, 2009; Bozionelos, 2004; Haseloff, 2005; Andreassen et al., 2007) claimed that students from low socio-economic backgrounds had negative perceptions about the use of the Internet.

Gender is considered to be a socio-cultural aspect of a society. Gender divides societies into different groups, for example, males, females, and others. There was interest in examining the relationship between gender and tertiary education students' attitude towards Internet use for their learning potential. Related studies about the relationship between gender and attitude towards the Internet use were reviewed.

2.5 Gender and attitudes towards the Internet

Gender and attitudes towards the Internet is an interesting phenomenon to study. Males and females have different attitudes towards Internet use. Peng, Tsai and Wu (2006) conducted a study on 1313 students (860 males and 453 females) of three Taiwanese universities. It was a quantitative study and results revealed that male students had more positive attitudes towards the Internet than their female counterparts.

Similarly, in 2008, Jabreen and Jamal conducted research on the attitudes of tertiary education students towards the integration of the Internet as a channel of communication and a study tool in traditional teaching at the Hashemite University of Jordan. A survey was carried out with a sample of 502 university students. The study showed that there was a significant gender difference in attitudes towards Internet use in their study practices. Male students had more positive attitudes towards the Internet than

the female participants. The study showed that university students commonly used the Internet to check their emails and for Internet browsing.

It is important to acknowledge how the home environment affects males' and females' attitudes towards the Internet. McMillian and Morrison (2006) suggested that family environments can influence the use of the Internet among males and females. In their study, they found that males used the Internet more confidently at their homes than females. It has been found that females spent more time on their family responsibilities and household jobs at home, so they spent less time on the Internet compared to males (Cooper, 2006; Jones et al., 2009). As the males spent more time on the Internet, it helped them to develop their positive attitudes towards the Internet. In contrast, a study by Khudair and Oshan (2008) on 793 (532 male and 261 female) university students (King Saud University) provided the opposite results. Their study showed that female tertiary education students had more positive attitudes towards Internet use than males.

Other studies, however, have found no significant gender differences among tertiary students' attitude towards the Internet use. In 2013, a quantitative study by Abedalaziz, Jamaluddin and Leng was carried out on 289 postgraduate students enrolled in Master Degree programs at the University of Malaya in Malaysia. The results revealed no significant gender differences in attitude towards the use of the Internet for their study purposes. Both genders were equally interested in using the Internet. Similarly, Atan, Fung and Luan (2008) performed a study on gender differences in relation to attitude towards the Internet use among tertiary students. The participants in their study were 152 (80 female and 72 male) student teachers in a public Malaysian university. The results revealed positive attitudes towards the use of the Internet among students and found no significant gender difference in attitude towards Internet use. In another research conducted by Teo (2008) on 139 pre-service teachers enrolled in the National Institute of Education, Nanyang Technological University, Singapore also

found no gender differences among students in attitudes towards the computer and computers and Internet use. Similarly, in 2011, Adebayo, Madu and Otoka carried out a research on Nasarawa State University in Keffi to investigate the attitudes of tertiary education students towards the use of the Internet. The results revealed that most of the students had positive attitudes towards use of Internet. However, no significant difference between the attitudes of males and that of females were found in the study.

Another study by Hong, Kuek and Ridzuan (2003) was conducted on students' attitudes towards the use of the Internet for learning purposes. The sample was eighty-eight randomly selected second-year undergraduate students. Results from the study indicated that students had positive attitudes towards using the Internet as a learning tool. Though this study is useful in informing the research, the main limitation of this quantitative study is that the sample was small and it did not provide any gender-based attitudes of the students towards use of the Internet.

There is a discrepancy in the results about gender issues surrounding attitudes towards the use of the Internet. Some studies (Jabreen & Jammal, 2008; Peng et al., 2006) indicated that male students had more positive attitudes toward Internet use than female students. Khudair and Oshan (2008) reported that females had more positive attitudes towards the Internet than males. On the other hand, Abedalaziz et al. (2013), Adebayo et al. (2011), Atan et al. (2008), and Teo (2008) found no significant gender differences towards the use of the Internet. In this way, all the above studies formed the basis for investigation of 'What is the relationship between attitudes towards the Internet use and gender in Indian tertiary education students' learning potential?' In the next subsection, the role of gender surrounding Internet use is reviewed.

2.6 Gender and the use of the Internet

Of interest to many researchers are the differences between genders when using the Internet. For instance, in 2005, Winker conducted a mixed methods Internet research

on gender perspectives in the USA. The study revealed that both male and female participants used the Internet for different purposes and had significant differences in using the Internet. Huang and Liu (2008) supported this view in their quantitative study on gender differences in the online reading environment in China, and stated that a significant gender difference was found in Internet usage patterns. Further, Huang and Liu (2008) claimed females preferred to read printed material and they used the Internet less than their male counterparts.

Among tertiary students, gender is considered a significant predictor of types of Internet usage. Jones et al. (2009) conducted a qualitative study and found that male and female college students use the Internet equally, but often differently. Furthermore, the study revealed that male students use the Internet to read e-newspapers, games, sports, personal finance, computing, technology, politics, government and adulthood, while female college students generally use the Internet for communicating.

Males prefer to spend time on the Internet and they show less interest in peer-group relationships and student-teacher relationships than females (Johnson, 2011). Furthermore, males spend more time surfing the Internet than females. Cotten and Jelenewicz (2006) found that male college students use the Internet more for playing online games than female college students. In this context, there are significant gender differences in use of the Internet.

Komathi and Maimunah (2009) examined the gender influences on Internet use. Semi-structured interviews were conducted with five teachers in a private university in Malaysia. The results showed that males prefer to spend more time on the Internet than their female counterparts. Furthermore, Delton and Huper (2006) reported that women use the Internet for sending e-mails, chatting and seeking health information, while men use the Internet for business purposes. In contrast, Tutkun (2011) and Khudair and Oshan (2008) reported that female students were more likely to use the Internet for

educational purposes and activities than their male counterparts.

Omer (2011) conducted a study on Internet access and Internet use among tertiary students in their learning processes. Both quantitative and qualitative methods were used to collect data from 1292 Turkish university students. Quantitative data were collected using a questionnaire and qualitative data were also collected through a structured interview with twenty-four tertiary students. The results indicated that instances of knowledge access, use and sharing by students during their teaching and learning process ranked highly. Female students use the Internet in a more functional sense than males, and the levels of students accessing, using and sharing knowledge differed (Tutkun, 2011). The author highlighted that his study was limited by that fact that only one university was included in the research population. He suggested that the population might have been extended to include universities at different development levels and within different geographical regions. The current study addresses this issue by selecting samples from different tertiary educational intuitions of India.

On the other hand, in 2013, Gwung and Lai reported no gender differences in Internet usage among students. Both males and females showed the same interest in Internet use, and they spent equal time on the Internet for various purposes, like sending emails, for educational purposes and social networking sites (Kendall & Melton, 2012). Males and females both reported the same tendency to use the Internet and they preferred to use the Internet for social networking sites like Facebook (Calvert & Huffaker, 2005).

It can be concluded that gender has its impact on using the Internet, as gender differences were found in using the Internet (Johnson, 2011; Jones, 2009). The above studies showed both males and females used the Internet for different purposes and males spent more time on the Internet and felt more confident while using the Internet than their female counterparts (Delton & Huper, 2006; Gwung & Lai, 2013; Khudair &

Oshan, 2008). Other studies (Calvert & Huffaker, 2005; Johnson, 2011; Melton & Kendall, 2012) found no gender differences in using the Internet. Therefore, there is a need to further explore the relationship between gender attitudes towards the Internet.

2.7 Summary

This chapter provided a review of the Social Construction of Technology (SCOT) theory along with its five components: *interpretative flexibility, relevant social groups, technological frame, closure and stabilization,* and *wider context*. It was established that people of different age groups use the Internet for different purposes, like e-banking, governmental services, searching for jobs, and so on (Brien et al., 2013). Furthermore, the Internet has become most popular among people (Ewing & Thomas, 2010). In India, people are becoming more and more aware about the use of the Internet in their daily lives (Mahajan, 2006) and they prefer to spend more time on the Internet (Kaur & Kumar, 2005). It was found that in developed countries, the Internet is more easily accessed by the students than students in developing countries (IIo & Ifijeh, 2010) and the Internet has a positive impact on students' learning in both developing and developed countries (Lawal , 2008; Wei & Zhang, 2008).

The reviewed literature revealed that tertiary education students use the Internet for different education purposes, for example, searching their study material, educational research and accessing the learning content globally (Lee & Wood, 2010; Josh, 2012, 2015). Tertiary education students use social networking sites for study purposes (Ayub et al., 2014; Josh, 2012, 2015), and, furthermore, the latest digital devices are widely used by university students to access the Internet (Barton et al., 2015; Kay & Lauricella, 2010; Campbell & Kent, 2010). It has been shown that the use of digital devices makes the learning process easier than using traditional learning methods (Barton et al., 2015; Gong & Wallace, 2012; Smith & Wakefield, 2012). Also, the use of Internet databases expands the knowledge area and improves the academic

performance of tertiary education students (Bostus et al., 2015; Chang et al., 2015; Lee & Woods, 2010; Li, 2015).

The related literature also revealed that the socio-economic status and age are also important variables to be considered. The students from high socio-economic backgrounds were more positive about Internet use than students from low socio-economic backgrounds (Bjorn, 2009; Bozionelos, 2004; Haseloff, 2005; Jonathan & Zhu, 2002). Language also had a significant impact on the use of the Internet. The related literature revealed that the demand for the Internet is growing rapidly (IBIS world, 2011). In India, lack of good Internet quality, Internet access and Internet connectivity were found (Kumar, 2010; Nazim & Sanjiv 2006).

In the present literature review, a number of studies have provided support for gender difference in the attitudes towards the use of the Internet (Liu & Huang, 2008; Winker, 2005). Females were found to be less confident in using the Internet than their male counterparts (Khudair & Oshan, 2008). Both genders, however, viewed computers as a useful tool and believed equally that computers had positive effects on individuals and society (Komathi & Maimunah, 2009). Some studies, however, revealed the opposite views. The studies of Adebayo et al. (2011) and Omer (2011) showed that females used the Internet in more functional way than males. A few studies (Abedalaziz et al., 2013; Adebayo et al. 2011; Atan et al., 2008; Teo, 2008) reported results that showed no significant gender differences in the perceived usefulness of the Internet. These findings provided a basis to investigate how gender affects students' attitudes towards the use of the Internet.

CHAPTER 3: RESEARCH DESIGN

This chapter demonstrates the research design used to investigate participating Indian tertiary education students' perceptions about Internet use in their learning. The chapter begins with the discussion of the research paradigm and then justifies the reason for the selection of a mixed method design. The description of the sample and the data collection tool as well as discussion of the validity and reliability, are also provided. The data collection process and data analysis approaches are also discussed, followed by the presentation of the matrix table for the data analysis chapters (Chapter 4 and Chapter 5).

3.1 Research paradigm

Following after Kuhn (1970), Bijker (1995) advocates that paradigms be a guide for research designs that can provide a broader worldview to researchers. Researchers possess different views and perceptions when establishing networks with their environments (Kermode, Roberts & Taylor, 2007). All researchers adopt their own approach and choose their own ways to conduct a study. However, every researcher follows a set of rules and standards when conducting their research; such standardised rules and principles are denoted as paradigms. Christensen and Johnson (2012) have described research paradigms as "a perspective about research held by a community of researchers that is based in a set of shared assumptions, concepts, values, and practices" (p. 31).

In using the SCOT theory, Bijker and Pinch (1986) advocated using a triangulation approach (multiple research methods) and suggested both interpretive and positivist approaches may be used, particularly for research that "investigates a contemporary phenomenon in a real-life context when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used" (Yin, 2009, p. 23). Where interpretative paradigms endeavour to

understand the subjective nature of human experiences (Cohen, Manion & Morrison, 2011), positivist paradigms are based on logical measurements of the truth, absolute principles and predictions (Cohen et al., 2011). The use of both paradigms (interpretative and positivist) provides a better understanding about a specific educational phenomenon. Thus, Bijker and Pinch (1986) argue for employing a broad and interdisciplinary methodological approach in order to analyse the research questions instead of following one method. A mixed method approach is used in this study with a stronger emphasis on the qualitative approach to examine the research problem. The following section explains in detail why mixed methods were used in this research.

3.2 The mixed methods approach

The mixed methods approach is not a new approach in educational research. Its basic philosophical and methodological foundations have emerged since 1990 (Tashakkori & Teddlie, 2009). Mixed methods provide strength to the research as they provide two or more than two methods. In this context, Johnson and Onwuegbuzie (2004) advocate, "the goal of mixed methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both in single research studies and across studies" (pp. 14-15). Thus, using the mixed methods is not a case of compensating for one method with another, but it is the addition of investigations to the traditional approach (Christensen & Johnson, 2014).

The mixed methods approach has three forms. In the first form, both data (qualitative and quantitative) are merged by bringing them together. In the second form, both data are connected to one another, and the third form focuses on embedding both datasets (Clark & Creswell, 2007). In this thesis, the third approach of embedding both datasets was used (see Figure 3.1).

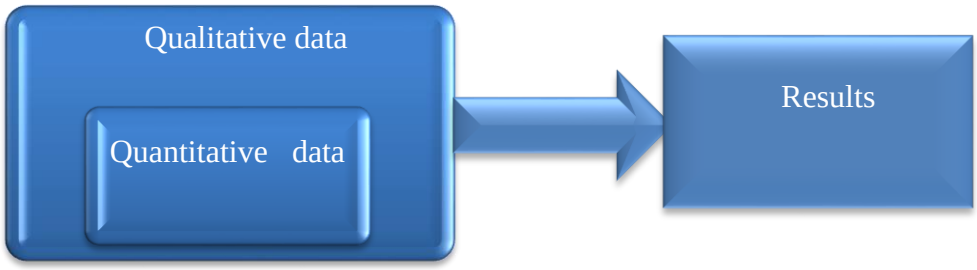

Figure 3.1: Embedded mixed methods (adapted from Clark & Creswell, 2007)

As Figure 3.1 shows, the quantitative data were embedded within the qualitative dataset to examine Indian tertiary education students' perceptions about Internet use. In embedded mixed methods, one dataset is embedded into the major dataset as a secondary data group to investigate the research questions with a broader or more closely focused lens. Sometimes it is difficult for a researcher to explain the research problem with only a single method, as more detailed information is needed to support the major findings. In that situation, a second dataset is used as a secondary design to provide strength and a more validated explanation of the research questions (Clandinin, 2007). In this study, the qualitative dataset was used as the major dataset and the quantitative data were used as the secondary data to support the qualitative findings.

Also, the use of multiple perspectives, theories and research methods provides more strength to the research (Christensen & Johnson, 2014). It helps researchers to provide strong grounds for their research. An embedded mixed method enables a researcher to include more than one purpose and conduct research in a scientific manner (Christensen & Johnson, 2014). In this context, Clark and Creswell (2007) state that embedded mixed methods research offers the research design philosophical assumptions and methods of statistical inquiry. Thus, philosophical and theoretical grounds of research are investigated through the scientific procedure.

Moreover, embedding one method into another enhances the objectivity, subjectivity, replicability and generalisability of the results (Conard & Serlin, 2011) and

also increases the reliability and validity of the research findings. For example, in mixed method research, qualitative methods focus on investigating and comprehending participants' experiences, perspectives and thoughts in a subjective manner (Conard & Serlin, 2011); embedding quantitative methods into qualitative methods focuses on the numerical data. The numerically based data analysis maximises the reliability and validity of the qualitative findings. Therefore, it was appropriate to use quantitative data to increase the reliability and validity of the qualitative findings.

Semi-structured interviews and my personal narrative were used as the qualitative dataset. The survey was employed as a quantitative data collection tool. As qualitative methods are major methods in this study, an explanation of the qualitative data collection tool is provided first.

3.2.1. Semi-structured interviews

Using the SCOT theoretical framework, interviewing the social groups is a most favourable tool for obtaining information about a phenomenon (Bijker & Pinch, 1987). The interview is a process of communication or conversation where the interviewee gives the needed information verbally in a face-to-face situation. Face-to-face conversations improve the response rate in the interview process (Cohen et al., 2011) and allow an interviewee to "move back and forth in time to reconstruct the past, interpret the present and predict the future" (Guba & Lincoln, 1985, p. 273). Creswell (2012) describes interviews as an effective method of data collection to obtain evidence that cannot be directly observed. Thus, interviews enable participants to have their voice to explain their personal experiences. Semi-structured interviews were used in the current study as the qualitative data collection tool.

Semi-structured interviews are a most favoured type of interview in educational research (Basit, 2010). These interviews included a series of semi-structured questions, and probing questions were also used to acquire additional in-depth information from

the interviewees. Semi-structured interviews do not require the interviewer to ask the same scheduled questions to all participants in the same order. Both scheduled and probing questions can be varied; however, interview questions seek to address research questions (Basit, 2010).

Individual interviews were conducted for the data collection because individual interviews help to get in-depth opinions and experiences from individuals (Kitzinger, 1994). In a focus group interview, the opinions of all participants are difficult to hear, and subjective opinions are collected (Casey & Kruerger, 2000). To collect objective opinions from the participants, individual interviews were organised.

The questions (also provided in Appendix A) that the interviewees were asked during the interview process are listed below.

- What do you mostly use the Internet for?
- Where do you mostly access the Internet? How do you most often access the Internet? How regularly and for how long?
- Describe the quality of your current access to the Internet. How does it impact on your learning experiences?
- Has the Internet enhanced the quality of tertiary education? Explain your views.
- Has the Internet enhanced access to tertiary education? Explain your views.
- Describe a positive experience where you use of the Internet enhanced the quality of your learning.
- Describe a negative experience where the Internet distracted you or limited the potential of your learning.
- Do you believe that better and increased Internet access links with better educational opportunities? Explain your views.
- What limitations, if any, are there with using the Internet to learn?

As explained in Section 1.1, my own personal experience in using (or not using) the Internet as a Bachelor of Education student back in India was a catalyst for the research problem in this thesis. Therefore, I used my personal account in parallel with

the interview data in order to answer the research questions. It was appropriate to choose the personal account because a personal narrative study is based on single or multiple episodes or private situations of the individual's life (Denzin & Lincoln, 1989). My personal account (based on my experience on the Internet) is documented below in a field text form to give it a data form that can be used to answer this study's research questions.

3.2.2 My story on Internet use (or non-use): A personal narrative

Bijker and Pinch (1986) demonstrate that the use and adoption of any technological artefact depend on an individual's perceptions about that artefact. The perceived meaning about the specific technology leads individuals to use or not to use that technology. Similarly, my perceptions and views about the Internet had a great role in not using the Internet as a Bachelor of Education student.

This story constructs a version of my journey with the Internet. My narrative consists of several ups and downs while learning to use the Internet and reminiscences about my college and university education. I hope to capture the scene of the multifaceted nature of my education.

3.2.2.1 My Bachelor of Education year and the Internet

As I enrolled in the Bachelor of Education, I felt that I was back at school again. We used to start our day with Morning Prayer (as we did do during school time) followed by a typical lecture structure system as a Bachelor of Education student. One teacher went out and another came in. There was no time for leisure and entertainment only studies. Every teacher gave us a number of assignments to prepare and submit. My bag was always full of textbooks, notebooks and assignment sheets. Whenever we were given an assignment, we used to run to the library to search material and borrow books. There were 200 students in our cohort and the number of books available in the college library was considerably less.

Our teachers used to recommend a minimum of four to five books to prepare an assignment. Sometimes I found it difficult to search different books on the same topic because of limited availability of books in the college library. Most of the students from our cohort had the same complaint regarding the availability of the books. One day, one of our teachers suggested we browse the Internet to access the required study material. I was surprised; how could I make use of the Internet to prepare my assignment? I had never heard about this. For me, the Internet was just a means of passing time and it had no educational purpose. I had never used the Internet for either entertainment or educational purposes.

I pondered about how to use the Internet. I did not have access to the Internet, I was not skilled and moreover, I did not have time to use it. I used to live in a village that is twenty to twenty-five kilometres away from the city. In my village, there was not a single cyber café or any other Internet access mode. I had one option, which was to go to the city and browse the Internet. However, that seemed impossible, too, as I was at college from 9 am to 5 pm, and it was about one hour away from my home, so I spent two hours each day travelling to college. Thus, from 8 am to 6 pm my time was spent on the Bachelor of Education course. In our timetable, too, we only had a thirty minute lunch break, therefore it was impossible for me to join computer classes and learn how to use the Internet. So, I dropped the idea of using the Internet for educational purposes and I relied on textbooks only.

There was one experience, however, when we were given project work by our class teacher, about preparing a model on the functioning of a volcano. I tried to collect different pictures to show the functioning of a volcano but it was difficult. So I just pasted headings on the thermocoal sheet and presented it in class. One of my classmates had prepared a very nice model; she explained it with pictures about the different stages of the volcano. I asked her how she had done this, because I had also tried to get

pictures, but I could not do so. She told me that she got these pictures from the Internet. This incident left a positive impression about the Internet in my mind. I realised that I should learn to use computers and the Internet, but it was not possible because of the tight schedule of my college.

I never tried to use the Internet during my Bachelor of Education, but I completed my assignments and examination and passed the Bachelor of Education with excellent marks. However, somewhere in my subconscious, I developed a deep urge to learn how to use the computer and the Internet. In the meantime, I decided to study for a Master of Education, as I had discussed with my father that I was not interested in school teaching, but instead I wanted to become a university lecturer. My father supported me and he motivated me to apply for admission to the Master of Education. The Master of Education admission procedure was very tough, and all candidates were required to appear in an entrance exam. The number of seats available for the Master of Education degree was limited, however, I sat in the Master of Education entrance exam and I qualified for it with a good ranking and was admitted to the Master of Education degree.

3.2.2.2 How I learned the basics of the computer: Master of Education experience

The Master of Education is a master's level degree after the Bachelor of Education and all Master of Education students were expected to show mature academic behaviour. At Bachelor of Education level, basic textbooks were easily available but now we were supposed to use advanced books rather than basic ones. In our Master of Education college, we did not have access to the Internet, but, we were being motivated by our teachers to do independent study to enhance our academic performance. I tried to make maximum use of educational technologies for my academic progress. For example, on one occasion our teacher divided the class into groups to give a presentation

in class on different topics from the syllabus. Two of my classmates and I were given a topic related to different types of research, and I chose to explain 'what is descriptive research'? I was not skilled with the Internet but I wanted to make use of any technology besides paper, pen and chalkboard for my presentation. In the Bachelor of Education, I had read about the overhead projector as a teaching aid, so I decided to use an overhead projector. I gave my presentation using the overhead projector and I found that all the students enjoyed my presentation because I did not do any reading from paper. However, computers and the Internet were still a phobia for me.

All my Master of Education classmates were being motivated by our teachers to use the Internet for our learning, but we were not so competent to use it. As we were studying 'Educational Technology' as a compulsory subject, we were supposed to learn how to use the computer as a teacher to teach our students in future. One day, we decided to request that our college principal provide us with Internet access in our computer labs so that we could learn how to use the Internet for educational purposes. Our principal acceded to our request and an extra class was arranged for us to learn computer and Internet usage. However, we were not permitted to use the Internet in the computer lab, as a few of our Master of Education teachers had a very negative attitude towards the use of the Internet and they thought students could misuse the Internet in the college. Hence, we were not given permission by our principal to use the Internet in the college computer lab. Our philosophy teacher taught us the basic uses of the computer including Microsoft Office use, and creating and saving folders on computers. In this way, I learnt the basics of computers in the Master of Education. Still, I could not consider myself as a person competent enough to use computers and the Internet and I needed more practice.

I decided to buy my own computer but I had limited money, so I asked my father to buy me a computer. Again, it was another difficult task to convince my father to buy

me a computer. I tried for a week and finally my father agreed to buy a computer for me with a condition that "there will be no Internet connection on my computer and I will not misuse it". I laughed and said "Dad without the Internet I cannot connect myself with the world, so how can I misuse it?" Finally I got my own computer. I have two brothers who always take advantage of my activities. I had convinced my father to buy me a computer but my brothers took it over and started to use it for downloading and listening to songs, watching movies, playing games and saving images, so my home computer became nothing more than a DVD and a games player. My brothers were always busy on my computer. Whenever, I got time, I practiced using Microsoft Word and making PowerPoint slides.

One day in our educational psychology class, our teacher came to our class and told us about a conference. She informed us that our college was going to organise a national conference on 'value crisis in education' and she suggested our class write a paper on it and present it at the conference. Again, she advised us to browse the Internet to find material relevant to the value crisis. As I was not skilled in using the Internet, I went to the library to get help from textbooks. However, again I questioned that if the Internet is such an important means of education, then why is it not being made available in educational institutions? Why were students not well versed with the Internet for their studies? Why is it not compulsory a subject in our schools? From the Bachelor of Education to the Master of Education, I had heard much about using the Internet, so why then do we not use it?

3.2.2.3 When I used the Internet for the first time: my Master of Philosophy year experience

In 2009, I undertook an entrance exam to gain admission to the Master of Philosophy (Education). It was a very tough time for me because there were only ten seats for the Master of Philosophy (Education) in the university and there were more

than a thousand candidates. If I was not selected for the Master of Philosophy (Education) then I would have to start teaching in any private school, and I was not yet ready for school teaching as I wanted to complete my studies first and then get a job. On the day that the Master of Philosophy entrance test results were published, I went to the university and checked the noticeboard. I was ecstatic to find that as I was ranked second in the Master of Philosophy entrance exam. It gave me new hope of being able to fulfil my dream of pursuing a Doctor of Philosophy.

In the Master of Philosophy course, there were three semesters. The first two semesters were theory-based and the third semester was for dissertation work. I was very excited while doing the Master of Philosophy, because I knew that the third semester would provide me with a new experience, which was 'how to conduct research', and after that I would be able to pursue a Doctor of Philosophy. Here, I would like to narrate another story that will explain why I had a deep passion for 'research work' or a Doctor of Philosophy.

When I was at school, I was a very bright student and I always used to get first position in my class, so my school teachers, especially my mathematics teacher, always appreciated my excellent performance in exams. Whenever my mathematics teacher asked me to solve any sum on the blackboard I thought myself to be superior to my classmates (I was quite young at that time so this silly superiority feeling often came to my mind). Teachers know their students' psychology very well. One day, my maths teacher called me and advised that "confidence is good but over confidence always harms you, so do not think yourself as the boss of your class. You are good in your studies but if you really wish to become a boss, then leave this superiority and become boss of yourself rather than others. You could do this only if you do something unique in any field". I was in tenth grade at that time, so I did not really understand the meaning of "unique". However, this word became permanently fixed in my mind. As I grew up, I

realised I could do something “unique” by achieving a higher level of education. In India, usually people complete their basic education and get a job and girls usually get married by the age of nineteen or twenty years. I did not want to go in for a job or marriage at an early age. When I was doing my first bachelor degree (Bachelor of Arts), I decided to get five degrees, and a Doctor of Philosophy was one of them.

In the first two semesters of the Master of Philosophy, I undertook theory-based examinations and passed them successfully. In the third semester, I was very excited about my dissertation work. I had read a lot about research and how to conduct research and now it was high time for me to apply all the theoretical knowledge that I had gained regarding research. Punjabi University does not provide an opportunity for students to choose their own supervisor in the Master of Philosophy degree. The head of the faculty allocated the supervisors to Master of Philosophy students and my supervisor was from the educational psychology and technology field, therefore I was going to be conducting research in one of these fields. I had never met my supervisor before, so I was excited to meet her as well.

When I met her for the very first time, we started our conversation on the research topic and she advised me to search for the research problem in the field of educational psychology. I wished to conduct research in the field of educational technology, but this decision was out of my hands at that time, as all Master of Philosophy students were dependent on their supervisors. Finally, I decided to conduct research on the topic “Stress and psychological hardiness among Indian college students in relation to type A/B behaviour patterns”. As my topic was finalised, my supervisor suggested I review the literature related to my research problem. It was another question for me to solve. I asked my supervisor how to do the review of related literature and she suggested I go to the Internet and explore the related websites. Again the Internet was in front of me and I realised that I could not avoid the Internet. I decided to learn the use of

the Internet. I shared this with one of my friends and she promised to teach me how to do a literature review using the Internet.

We appointed a day for our meeting and we met in a cyber café. It was July, 2010 when my friend and I went to a cyber café located in front of our university gate. I had the impression in my mind that I could never learn to use the Internet but I went there for a trial. My friend showed me "this is Internet Explorer and you open it first". I did the same and she then started teaching me how to use it, although she was not too competent in using the Internet either. She explained to me about that 'Google' is the boss of the Internet, and if you wish to explore or search anything then open 'Google', type your queries there and get the relevant material. I asked her to show me how to do a literature review using the Internet. When I learnt how to review related literature by using the Internet was one of the most interesting events of my life.

My friend opened 'Google' and typed my research topic there. A list of the relevant articles came on the computer screen and she opened one article and told me how to do a literature review. She opened the abstract of the article and applied the print command to it. She taught me that this 'abstract' was the 'related literature review'. Moreover, she explained that I should "just open any relevant article and take the abstract and add it in your literature review chapter". I thought it was a very easy job and I could finish my literature review chapter in just two or three days. Furthermore, she suggested, "there is no need to read the full article, just use the abstracts of relevant articles and add them in your related review chapter".

In this way I started to do a "so called" "related literature review" on the Internet. I took several articles' abstracts and re-wrote them on paper and presented my literature review chapter to my supervisor. When I showed this to my supervisor, she shouted at me and asked what this was. Most of the articles were ten to fifteen years old and did not exactly match my research area. My supervisor was very disappointed with my effort

and she suggested that I explore recent studies in my research area. I then realised that it was not as easy a job as I had expected. I started to spend most of my time on the Internet. I spent many hours in the university's cyber café, and paid them on an hourly basis, at ten to twenty Indian rupees per hour. I did not read full articles, but took relevant articles and printed out the first page, which covered the abstracts and re-wrote them for my literature review chapter.

During this time period, I started to develop my interest in the Internet. The negative image of the Internet had now completely vanished and a positive side emerged. By now, I started spending most of my time on the Internet, although I was not very well versed with its usage. I would to open Google, search my research topic and print the abstracts. Security concerns were on my mind, so I avoided using various social networking sites. I remember that in 2010, Orkut and Facebook were very popular among college students in India. My friends often talked about Orkut and Facebook. There were three friends in our group and we often discussed these sites and how bad these were to use. I had a very strong belief that only tramp people used these Internet sites, so I did not use these sites until the completion of my Master of Philosophy. I created my Facebook account after I was admitted to the Doctor of Philosophy degree.

I started using the Internet for educational purposes in the Master of Philosophy; however, I made no personal use of the Internet. I was aware that people did online shopping, video chatting, Internet surfing, email conversations and so on, but I did not know how to use the Internet for such entertainment purpose. I decided to learn how to use the computer from a professional. After I finished my Master of Philosophy and was waiting for the results, I enrolled for computer classes. I spent two months learning advanced use of the computer and the Internet. When I received my Master of Philosophy result, I decided study for a Doctor of Philosophy and by then, I had become well versed with Internet usage.

3.2.2.4 The Internet as a main variable in my research

When I was planning to do the Doctor of Philosophy, I had already realised the importance of the Internet for a research student. I continued to wonder why universities did not provide computers and Internet facilities to the students. I survived with the textbooks in my Bachelor and Master of Education degrees, but I strongly felt the need of the Internet for students. I decided to conduct research on Internet usage for educational purposes by Indian students.

Whenever I talked to my husband about doing a Doctor of Philosophy and shared my Internet experience with him, he often mentioned that people in Australia couldn't imagine their lives without the Internet. He (my husband) had spent two years in Australia, so he knew a bit about the Australian educational system. He appreciated the Australian educational system, especially for its Internet-based educational structure. By that time, I had decided to do a Doctor of Philosophy on the patterns of Internet usage. I realised that if I undertook a Doctor of Philosophy in any developed country, then I could explore my research problem in a more advanced manner. I discussed it with my husband and he suggested that if I was thinking of doing a Doctor of Philosophy in any developed country, then why not Australia. I liked his idea and decided to do a Doctor of Philosophy in Australia; I was fortunate to gain admission to Monash University.

As stated above, the first time I thought positively about using the Internet was during the Bachelor of Education course. The Bachelor of Education is a professional teaching course and students are considered to be future teachers. I realised that as a teacher, we should have knowledge of the Internet. Only when a teacher is an Internet-literate person can they motivate the students to use it for educational purposes. In this way, I decided to conduct my research on how Indian Bachelor of Education students use the Internet and what the reasons are for the lesser use of the Internet in Indian

tertiary educational sectors.

Moreover, as I had passed the Bachelor of Education in 2008, when I started the Doctor of Philosophy in 2012 almost four years had passed. Therefore, it was worth examining the current Bachelor of Education students' perceptions about Internet use for their learning. I collected my data from November 2013 to January 2014, so I have presented the updated 'perceptions of Indian tertiary education students about Internet use in their learning', in my research. Furthermore, I had made use of textbooks throughout my academic life in India and I did very well using textbooks, so it was another question to explore; should the Internet replace the textbooks in tertiary education? I have also encountered this question in my research. I intended to examine how the Bachelor of Education students find the Internet useful in their studies compared to textbooks.

In using qualitative methods, the legitimacy of inquiries is based on the ability of the research to obtain the objectives of the research. The notions of credibility and trustworthiness of the qualitative research depend on the rigor of methods used to meet the research objectives, the credibility of the researcher, and on the philosophical assumptions. I now move to explain terms *credibility* and *trustworthiness* to assure the quality of the qualitative methods used in this research.

3.2.3 Credibility and trustworthiness of the qualitative data

Seale (1999) stated, "trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability" (p. 467). The notions of trustworthiness and credibility are concerned with making decisions about the aims of the study, and selection of the data collection methods, participants and data analysis approaches (Guba & Lincoln, 1985). The use of a theoretical framework in determining research aims and the use of emerging theory in making choices of research methods increases the validity and reliability of the findings (Cutcliffe, 1995). The SCOT

framework provided the conceptual framework for this study, thus, the concepts of trustworthiness and credibility are ensured through checking the concepts of interview and personal narrative data along with the components of the SCOT theory (as provided in Section 3.5.1.3).

As a researcher, I cross-checked the codes in the textual data repeatedly to ensure the consistency of the data. Also, to increase the reliability of the coding of the qualitative data (interview and personal narrative), my both supervisors cross-checked the codes to ensure the consistency of the qualitative data. The accurate consistency of the data increased the reliability of the qualitative research (Cutcliffe, 1995). Hence, the process of checking codes repeatedly enabled me as a researcher to refine the interpretive process and it also increased the reliability of the content analysis (as described in Section 3.5.1.2).

My personal narrative story (see Section 3.2.2) is provided in order to enable readers to evaluate the findings using the readers' own perspectives. This avoids anecdotalism (Silverman, 2005), and the provided evidence supports the researcher's view and the interpretations made.

Also, the use of quantitative methods in qualitative inquiries establishes the validity of the findings (Cutcliffe, 1995). Employing quantitative methods increased the validity of the qualitative findings in this study. Bijker and Pinch (1986) demonstrated that the use of two paradigms (as interpretive and positivist paradigms are used in this study) in a single research enhances the validity of the findings. Thus, the use of embedded mixed methods increased the validity of the research findings of the thesis.

3.2.4 The survey: As a quantitative data tool

Bijker and Pinch (1987) state that mathematical-based data collection tools should be used when it is difficult to make direct observations of the inner experience, opinions, perceptions, interests and the like. The survey is considered to be one of the

most favourable data collection tools based on mathematical data (Borg, Gall & Gall, 2007). A survey is a device consisting of a series of questions dealing with some specific topic/s that is sent or given to an individual or a group of individuals with the objective of obtaining data with regard to some problems under investigation (Koul, 2008). In order to obtain a larger overview of the impact of the Internet use on Indian tertiary education students' learning, it was appropriate to use the survey method.

The survey instrument was a partially adopted survey consisting of forty-six items (see Appendix B). Some of the items were adopted from three scales: the 'Computer Anxiety Scale' (Glass, Heinssen & Knight, 1987), 'Internet Attitude Scale' (Nordin, Othman & Sam, 2005) and 'Students' Attitude towards Internet Use' (Brinson, Manuel & Slate, 2002). The first scale was used in a Western context, whereas the two latter scales were used on Malaysian (Nordin et al., 2005) and Pakistani tertiary education students (Hunjra, Rehman & Safwan, 2010), respectively.

Compared to those contexts of study, India has a different education system and socio-cultural background. The scale needed to be suitable for the Indian tertiary education students' needs, however, only a few items from the mentioned scales were found to be relevant to my study, and I used those items in preparing the questionnaire. Items 6 and 7 (in Appendix B) were adopted from the 'Computer Anxiety Scale' by Glass et al. (1987); items 3, 25 and 28 (in Appendix B) were selected from the 'Internet attitude Scale' of Nordin et al. (2005) and items 20, 33, 34 and 35 (in Appendix B) were adopted from 'Students' Attitude towards Internet Use of Brinson et al. (2002). Therefore, a total of nine items were adopted from the above scales and 37 items were self-constructed to prepare the full questionnaire, as shown in Appendix B.

3.2.5 Validity and reliability of the scale

Under the reliability analysis, the Cronbach's alpha reliability test was employed to measure the reliability of the survey items. The Cronbach's alpha values for each

item were computed between at .810 to .820 (as provided in Table 3.1). For example, items 13, 20 and 23 have the minimum Cronbach's Alpha value, which was .810 and item 46 has the maximum Cronbach's Alpha value (.820). The computed Cronbach's alpha values (0.810 to .820) were greater than 0.7, which indicated the high reliability of the items. The normality test showed that data was is not normal (nonparametric) (as provided in Table 3.5), therefore, Mean and Standard Deviation for each item were added in Table 3.1.

Table 3.1: Reliability of the survey items

Items	M	S.D	Cronbach's Alpha if item deleted
1	3.20	.893	.814
2	3.53	.618	.814
3	3.58	.730	.814
4	3.10	1.122	.812
5	2.99	1.061	.811
6	2.32	1.426	.812
7	2.59	1.372	.813
8	3.04	1.099	.812
9	3.13	.950	.813
10	3.29	1.047	.813
11	1.99	1.376	.813
12	2.81	1.232	.813
13	2.94	1.193	.810
14	2.85	1.193	.812
15	3.49	.815	.814
16	2.86	1.261	.811
17	2.92	1.191	.812
18	2.58	1.381	.813
19	2.18	1.416	.813
20	2.16	1.432	.810
21	3.17	.930	.813
22	2.77	1.316	.810
23	3.06	1.089	.813
24	2.30	1.440	.812
25	1.43	1.213	.818
26	2.79	1.380	.818
27	2.85	1.174	.811
28	1.20	1.155	.817
29	2.18	1.501	.821
30	1.75	1.263	.815
31	2.56	1.296	.819
32	2.03	1.321	.816
33	2.11	1.369	.817
34	1.99	1.219	.815
35	2.11	1.491	.815
36	3.17	1.077	.814
37	2.83	1.278	.812
38	2.83	1.216	.813
39	3.02	1.108	.811
40	3.00	1.124	.812
41	2.77	1.277	.812
42	3.11	1.049	.811
43	2.60	1.283	.812
44	2.48	1.379	.811
45	2.20	1.279	.818
46	2.29	1.343	.820

M = Mean

S.D. = Standard Deviation

3.2.6 Rasch analysis

The quantitative data obtained in this study from a partially adopted survey (as explained in Section 3.2.4), thus Rasch analysis was employed to measure the person and item reliability. Rasch analysis is implemented to enhance measurement precision and to estimate the co-relation between items and groups (Cheng, Wang & Ho, 2009). 37 items were new in the survey (appendix B) and Rasch analysis was employed to test the co-relation between items. Rasch analysis is based on an item response theory model (IRT), which examines uni-dimensional attributes (Bond & Fox, 2007).

The survey has three subtests. Each subtest measures a different latent trait, for example, first subset focuses on 'attitude towards the Internet for study use', second measures 'the Internet skills for study use' and, third deals with 'Internet resources (access and cost). The formation of subsets was based on the components of the SCOT theory and research question, for example, the first subset (attitude towards the Internet for study use) and second subset (the Internet skills for study use) of the survey were framed under the consideration of the *interpretative flexibility* component of the SCOT theory and data of these two subsets were utilised to answer research question one, two and three. The third subset (Internet resources) was formed with considering the relevant social group component of the SCOT theory and data of this subset was utilised to answer research question four. Rasch analysis was appropriate to measure the differences between these subtests as Rasch analysis is ideal to measure the distinct latent traits of several subtests which are consisted in a questionnaire (Cheng, Wang & Ho, 2009). Followings sections describe Rasch measurement results for each subset of the survey:

3.2.6.1 Attitude towards the Internet for study use subset

Attitude towards the Internet for study use was the first subset of Internet use Scale (Appendix B) and contained 27 items (1, 2, 3, 4, 5, 10, 11, 12, 14, 16, 17, 18, 19,

20, 23, 25, 26, 27, 28, 29, 31, 33, 34, 35, 39, 40 and 42). Rasch based reliability for items and persons were obtained. Table 3.2 shows the summary of item and person reliability.

Table 3.2: Summary of item and person reliability for attitude towards the Internet for study use

Measure Summary	Item	Person
Mean (S. D.)	0.00 (0.49)	0.31 (0.35)
Reliability	1.00	0.73

The item reliability for attitude towards the Internet use was 1.00, indicative of very good measure for item spread on the measurement scale. The person reliability was 0.73, whilst not high as item reliability, however was considerable to be within the acceptable range of person reliability index.

3.2.6.2 Internet skills for study use subset

Internet skills for study use were the second subset of the survey and it has 13 items (6, 7, 8, 9, 13, 15, 21, 22, 24, 30, 32, 38 and 41). Rasch based reliability for items and persons were obtained, as shown in Table 3.3. The item reliability was 0.99 and indicative of very good measure for item spread on the measurement scale. The person reliability (0.74) was also within the acceptable range of person reliability index.

Table 3.3: Summary of item and person reliability for Internet skills for study use

Measure Summary	Item	Person
Mean (S. D.)	0.00 (0.43)	0.39 (0.59)
Reliability	0.99	0.74

3.2.6.3 Internet resources (access and cost)

The third subset of the survey was Internet resources (access and cost) and has six items (36, 37, 43, 44, 45 and 46). Rasch based reliability for items and persons were

obtained, as shown in Table 3.4. The item reliability was 0.99 (see Table 3.4) and indicative of very good measure for item spread on the measurement scale. The person reliability (0.59) was also within the acceptable range of person reliability index.

Table 3.4: Summary of item and person reliability for Internet resources (access and cost)

Measure Summary	Item	Person
Mean (S. D.)	0.00 (0.31)	0.39 (0.72)
Reliability	0.99	0.59

3.2.7 Analysis of Normality

Many parametric tests (correlation, regression, t tests, and analysis of variance) assumes that the population or sample is normally distributed. In normal distribution, the data is presented by a smooth curve which peaked in the middle and having symmetrical tails. However, type 1 errors cannot be avoided in the assumption of normality (Myers & Well, 1995). Type 1 errors occur when the null hypothesis is true and researchers accept it.

The normality of the distribution could be substantiated by a test of normality such as Kolmogorov-Smirnov (K-S) test. The K-S test in which is the theoretical cumulative distribution function of the sample distribution is contrasted with the empirical distribution function (EDF) of the data (Ghasemi & Zahediasl, 2012). Factors of the survey were checked for normality. Table 3.5 shows the result of the normality tests.

Table 3.5 Normality statistics of the survey data

	Mean	S.D	Test	Level of significance
Attitude towards the Internet for study use	2.65	0.42	One-sample K-S	.006
The Internet skills for study use	2.70	0.52	One-sample K-S	.000
Internet resources (access and cost)	2.59	0.68	One-sample K-S	.000

Based on the assumption of null hypothesis (the sample distribution is normal), the normality test (the K-S test) was conducted. The level of significance was measured at $p \leq .05$. Using one-sample K-S test of normality, significant values for 'attitude towards the Internet for study use', 'the Internet skills for study use' and 'Internet resources (access and cost)' were computed .006, .000 and .000 respectively, which were significant at $p \leq .05$. As the test was significant, therefore the null hypothesis was rejected. The rejection of the null hypothesis showed that the sample distribution was not normal. For the context of non-normal data, Ghasemi and Zahediasl (2012) demonstrated that if the sample consists a large number of data, the assumption of normality can be ignored. Moreover, most of the education data are non-normal, therefore results should be interpreted cautiously (Tabachnick & Fidell, 2001). The survey results were interpreted cautiously and the percentages of each response (strongly agree, agree, not sure, disagree and strongly disagree) were computed and used to describe the survey findings.

3.3 Sample

In the SCOT theory, specific social actors or social groups play a key role in describing the usefulness/disadvantages of a technology. Thus, the selection of the sample is an essential task for research to follow the meaning of a technology to a social group. In this study, the students from eighteen Indian Bachelor of Education colleges

were selected to describe the meaning and benefits (disadvantages, if any) of the Internet in learning. Considering the critique of the SCOT theory for choosing snowball sampling, random sampling methodology was used in this thesis. These eighteen colleges yielded a random sample of 1090 survey participants and ten interview participants.

There were a number of reasons for choosing only Bachelor of Education students. Firstly, Campbell and Kent (2010) described that use of the Internet has the potential to improve both teaching and learning skills. The Bachelor of Education students play a dual role, as a student and as future teachers. It was appropriate to examine how Bachelor of Education students as future teachers use the Internet for learning.

Secondly, Bachelor of Education students are trained for teaching and by the end of the degree it is assumed they will be starting to teach in schools. Examining Bachelor of Education students' perceptions about Internet use provided an insight into how useful/not useful they find the Internet for learning. Lastly, it was an interesting stage of the study to investigate given my story on Internet use started from my Bachelor of Education year and before that I had never thought to use the Internet.

Participants in this study included enrolled students in the Bachelor of Education degree from different Bachelor of Education colleges of Punjab (India) and they were between 20-30 years of age. All participants lived in India and they had Indian citizenship. Bachelor of Education degrees runs in colleges under the affiliation of established universities in India. Colleges of Punjabi University, Patiala (India) and Punjab University, Chandigarh (India), were selected. Patiala is a city in Punjab state, and Chandigarh is the capital of both Punjab and Haryana States in India. As my experience with the Internet was integral to the formation of the research problem and I

come from the Punjab state of India, I selected two universities of the Punjab state for the research samples.

3.3.1 Interview participants

Table 3.6 provide the brief summary of the selected interview participants.

Table 3.6: Detail of interview participants

Name	Gender	Institute Name	University
Roop	Male	RIMT College of Education	Punjabi University
Suman	Female	RIMT College of Education	Punjabi University
Komal	Female	B.K.M. College of Education	Punjab University
Meena	Female	Jasdev Singh Sandhu College of Education	Punjabi University
Jot	Male	Jasdev Singh Sandhu College of Education	Punjabi University
Aman	Male	Jasdev Singh Sandhu College of Education	Punjabi University
Neha	Female	Guru Hargobind College of Education	Punjab University
Rahul	Male	Rayat and Bahara College of Education	Punjabi University
Mann	Male	State College of Education	Punjabi University
Raman	Female	State College of Education	Punjabi University

All names used for interview participants were pseudonyms and do not reveal the identity of any participant in this study. Neha and Komal were studying in colleges affiliated with Punjab University. Aman, Jot, Mann, Meena, Rahul, Raman, Roop and Suman were studying in colleges of Punjabi University. All interviews were conducted on the college campus during the college hours (between 9 am and 5 pm).

3.3.2 Personal narrative

In qualitative methods, the researcher is not required to set aside their experiences while analysing the qualitative data (Conard & Serlin, 2011). I used my personal narrative to analyse the research question. My personal narrative equipped me with more freedom of expression to share experiences with the Internet throughout my research journey. I documented my personal narrative into the field text form in Section 3.2.2 in order to prepare it for analysis.

3.3.3 Survey participants

Initially, data were collected from 1090 participants. However, while preparing data for analysis and during the data cleaning process, in 48 surveys students gave wrong responses (e.g., participants ticked more than one responses to the survey items) and 42 participants left the survey uncompleted. Thus, only 1000 surveys that had been accurately completed were used and analysed in this study. Table 3.7 shows the distribution of the survey participants on the basis of university name and gender.

Table 3.7: Number of survey participants

University name	Males	Females	Total
Punjabi University	155	435	590
Punjab University	40	370	410
Total	**195**	**805**	**1000**

A total of 590 students (155 males and 435 females) who participated were from Punjabi University, Patiala (India), and 410 students (40 males and 370 females) who participated were from Punjab University, Chandigarh (India). In this way, a total of 195 males and 805 females took part in this study.

3.4 Data collection

Six weeks from the end of November 2013 to mid-January 2014 were dedicated to completing the data collection phase. The initial phase of data collection resulted in only 443 students for survey and six students for interviews. The principals of two colleges had refused to allow students to participate in data collection because of the students' teaching practice sessions. Thus, the proposed sample size (10 interviews and 1000 surveys as mentioned in Ethics approval application) could not be obtained. In order to obtain the proposed sample size, another fourteen colleges affiliated under Punjab University and Punjabi University were approached for data collection.

Ethical approval for this study from the Monash University Human Research Ethics Committee (MUHREC), under project number CF13/2406 - 2013001271 was received. *An explanatory statement*, which also included *a consent form,* was given to students to describe to them the scope of the research (provided as Appendix C and Appendix D). The explanatory statement informed students that their participation was entirely voluntary, and they were free to withdraw from participating at any point during the research.

This section provides further detail of the procedure of data collection. The next sub-section describes the data collection procedure from interview participants, followed by the personal narrative. Then, the survey data collection procedure is described.

3.4.1 Interviews

The researcher visited each college prior to the data collection in order to brief participants about the nature and aim of the study and students' part in it. The briefing activity took about half an hour at each college. Potential participants were assured that their participation was valued and entirely voluntary. The interview data collection process was performed during students' college hours (9am to 5pm).

All students from eighteen colleges were invited to participate in interviews. More than twenty students from eighteen colleges consented to be interviewed. Only ten students were semi-randomly selected from six colleges. With consideration of gender ratio, five male and five female students were randomly selected. Each student who consented to be a part of an interview session participated in a thirty-minute interview session. A signed consent form was received at the end of each interview session.

Potential participants may have felt threatened by the motive of the research investigation. I was wary that the participants could have felt that I might make judgements on them. As I was from Punjab (India) and I sometimes used the Indian

language accent while speaking English, this helped to lessen any intimidation or feeling of judgement. The interviewees sometimes did not understand the questions or the words that I used and a few of them asked me to explain the questions or the words, while some participants just replied with "please repeat it again ma'am". In this situation, I explained and repeated the questions until they felt comfortable to answer them.

Each interview began as an informal chat about Internet use in daily life. Questions that constructed generic protocols were adapted into interviews according to students' response and mood. Each interview was audio recorded using the Voice Memos application on the smartphone.

3.4.2 Personal narrative

The personal narrative requires a researcher to collect field texts that document one's story in their own words (Creswell, 2008). For this, I documented my story in my own words (see Section 3.2.2) in a chronological manner showing my personal account of my own experiences with the Internet during my different academic courses. For the documentations of my story, I recalled my journey as Bachelor of Education year in 2007 when one of my teachers often motivated me to use the Internet for my learning. Before Bachelor of Education year, I never thought to use the Internet for learning. I set few questions to guide myself, (e.g., how did I get motivation to use the Internet? When did I learn to use the computer? When did I start using the Internet?). These questions helped me to recall my experience with the Internet and also guided me to pen down my journey of becoming an Internet user from non-Internet user.

3.4.3 Collection of the survey data

The researcher visited each college prior to the data collection in order to brief participants about the nature and aim of the study and students' part in it. The briefing activity took about half an hour at each college. Potential participants were assured that

their participation was valued and entirely voluntary. An explanatory statement (Appendix D) and survey (Appendix B) was given to the potential participants, who could choose to complete or not complete the survey. It was demonstrated to the participants that surveys were anonymous and their personal identity will not be revealed. As students agreed to be the part of the survey, then students were asked to complete the survey. A paper-based survey was provided to the participants. The survey data collection process was performed during students' college hours (9am to 5pm). Every participant took about fifteen to twenty minutes to complete the survey.

A total of 1090 students from eighteen colleges completed the survey. A number of students left the survey uncompleted. However, the completion rate of accurately completed surveys was still high (100% of completion rate). Simple English language was used in constructing the survey (see Appendix B); therefore, students did not have any complaint about the medium used in the survey.

3.5 Data analysis approaches

This section describes the technical detail and procedure of data analysis used in this study. Content analysis, which involved sorting of text data and processing methods, was used to analyse interview data and personal narrative data. Descriptive analysis and Analysis of Variance (*ANOVA*) were employed to describe the survey data gathered.

3.5.1 Qualitative data analysis

Interview data was used as a major dataset in this study. My personal narrative data were used to analyse and discuss interview data with more depth. The verbatim transcriptions of interview data were prepared and my personal narrative was documented into field text form. A coding and clustering approach was used for interviews and my personal narrative data analysis. The main aim of the qualitative data

in this study was to examine the impact of Internet use on Indian tertiary education students' learning.

The interview data gathered through conducting interviews were transcribed and QSR NVivo was used for management and collation of the data. Computer software applications such as QSR NVivo, Microsoft Office and SPSS provided an effective tool for management, collation and representation of this large dataset in different manners. The transcribed text data were imported into QSR NVivo and files were created for each interviewee under internal sources prior to the initial sorting of the collected data.

The qualitative data analysis involved a number of sequential stages with consideration of the components of the SCOT theory and research questions, starting with the preliminary stage where, the guided questions were formed for analysis. Interview data were reviewed repeatedly to capture the appropriate themes related to the research questions. The first stage included the coding of the themes and the second stage provided a close view of the patterns of the concepts to ensure the similarity (authenticity)/dissimilarity within each interview case. At the third stage, the themes were coded in the field text data (my personal narrative). The fourth stage provided further in-depth analysis of patterns of themes in relation to coding of the interview and the field text data. Figure 3.2 shows the plan for qualitative data analysis.

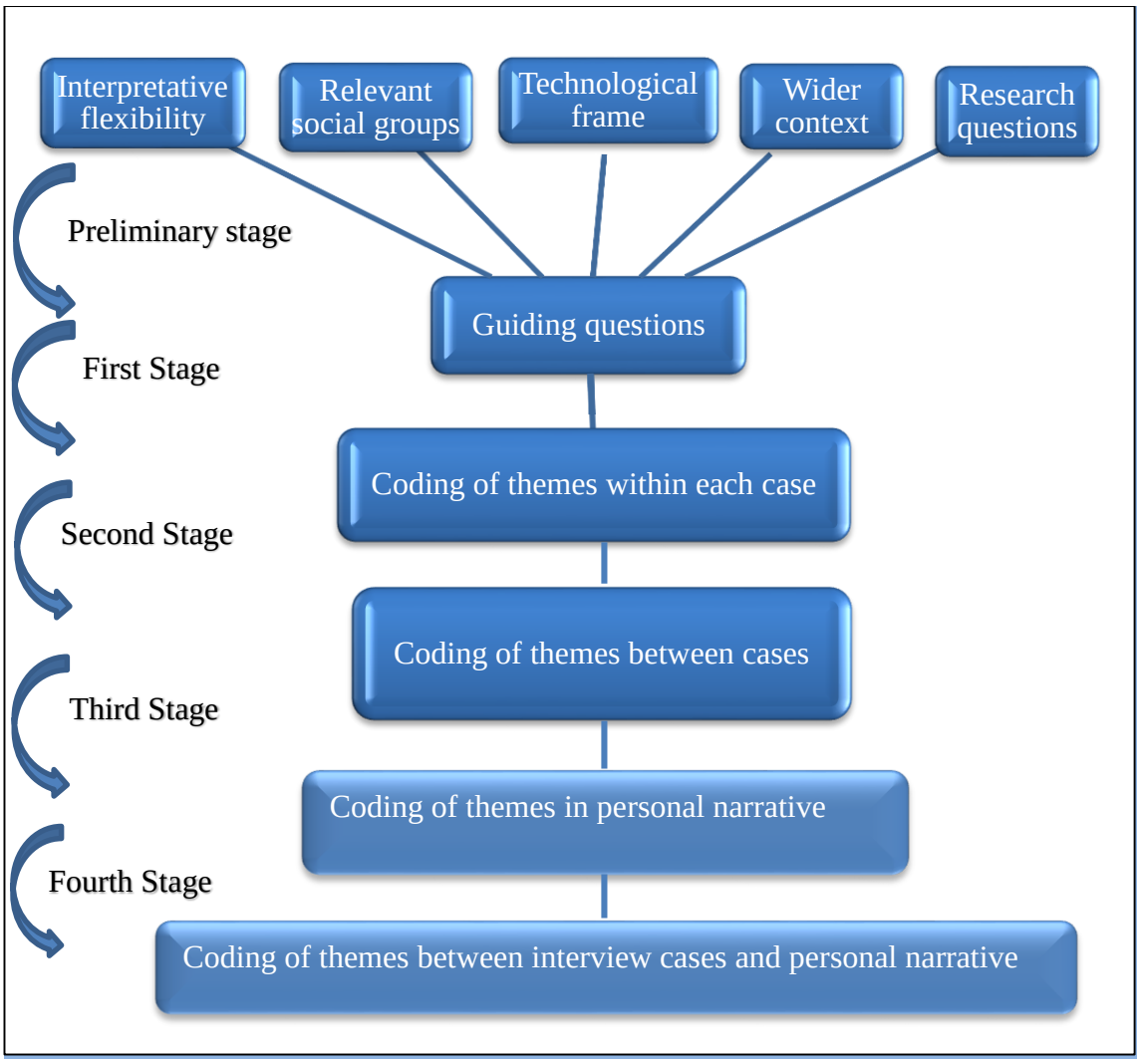

Figure 3.2: Plan for qualitative data analysis (interview and personal narrative)

3.5.1.1 Preliminary stage for qualitative data analysis

The preliminary stage for qualitative data analysis included listing the key themes of the components of the SCOT theory (interpretative flexibility, relevant social group, technological framework and wider context) used in this study. Based on these key themes of the components of the SCOT theory and research questions, the guiding questions for appropriate qualitative analysis were formed. The key themes of the components of the SCOT theory were mainly perceptions about the Internet, Internet usage pattern, impact of the Internet on learning, usefulness of the Internet for learning and issues (if any) related to Internet use for learning. All these themes also addressed

the research questions of this study. The guiding questions assisted the construction of themes for analysis. Table 3.8 provides the list of these questions.

Table 3.8: Guiding questions for interview and personal narrative data analysis

How do students describe the Internet?
For what purposes do students use the Internet?
Do students use the Internet for their learning?
How do students describe the usefulness of the Internet for their learning?
Where do students access the Internet?
What are students' views about the impact of the Internet on tertiary education?
How does the Internet impact negatively on students' learning?
What problems (if any) do students face while using the Internet?
How do students describe the Internet access at their colleges?
How do students describe the quality of the Internet provided to them?

3.5.1.2 First stage: interview analysis

In the first stage, the clustering approach was used where the themes were coded following a number of steps. First, all interview transcriptions were read one-by-one repeatedly to code themes that were found relevant to the guiding questions derived from the key themes of the components of the SCOT theory and research questions. Bijker (1995) demonstrated that every member of a society may have different interpretations, so for a researcher it is essential to read and analyse each interview case carefully. Each interview transcription was read repeatedly to code the content and themes. The themes were then listed as nodes (in NVivo codes are denoted as nodes). All coding and sub-coding were done in NVivo (see Figure 3.2).

Codes gave the descriptive meaning for the data analysis. Then codes were used to analyse the interview data to follow the key factors of the SCOT components and to determine the relationship between and within each interview case. The repeating themes were coded and sub-coded according to the frequency of occurrence of certain

words and phrases in the reviewed interview texts. After that, all codes were revised and connected to the key factors of the SCOT theory. It helped to establish a link between codes and the conceptual framework and evidence within the patterns of themes.

At this stage of the content analysis, it was necessary to ensure that all the codes had a coherent link to conceptual framework in order to provide a meaningful description of the data. The researcher cross-checked the allocated codes with the text data to ensure the coherence and meaning were associated with the theoretical framework.

3.5.1.3 Second stage: Comparative analysis

In the second stage, a comparative analysis was done of all interview cases. The comparative analysis of the cases enabled the researcher to identify any similar and opposite meanings among the actors of the social groups (Bijker & Pinch, 1986). The social groups that have the same meaning of the technology are considered to be *relevant social groups* in the SCOT theory. Thus, the second stage also involved the process of identifying the *relevant social group* in this study.

Variable searches were used for comparative analysis of the cases (Creswell, 2012). Variable searches focused on seeking concepts and themes that were connected to the codes formed. The case analysis aimed to ensure the systematic and coherent occurrence of the data analysis.

In the second stage of data analysis, within the components of the SCOT theory (interpretative flexibility, relevant social groups, technological framework and wider context) and research questions, the themes were coded on the NVivo sheet. Statements such as ‘use of the Internet for study’, ‘impact of Internet access on study use’, ‘the Internet links to better education’, ‘Internet impact on learning’, ‘Internet access location’, ‘Internet access mode’, ‘Internet usage time’, ‘quality of the Internet’, ‘impact of cost on Internet use’, ‘positive experience with the Internet’, ‘negative experiences

with the Internet', 'software uses for education', 'uses of the search engines', and 'limitations of the Internet' were categorised.

Alongside the above statements, I used my personal narrative account in order to answer the research questions. The third stage involved content analysis of my personal narrative.

3.5.1.4 Third stage: A personal narrative analysis

The third stage of content analysis was similar to the first stage. In this stage, I highlighted and coded the main themes in my field text data (my personal narrative). For example, in my field text where I narrated my Bachelor of Education experience and I described that I did not use the Internet, I coded it as 'no Internet use'. Similarly, I coded themes in my field text data.

3.5.1.5 Fourth stage: Analysis of themes

Similar to the second stage, in the fourth stage, all the coded themes in the interviews were compared and contrasted to the field text data. Variable searches were employed to ensure the similarity and differences among codes of the interview data and the personal narrative data. If there were similar themes in the interview coding and in my field text data, I coded them as 'same experience' and if there were opposite themes I coded them as 'opposite experience'. In this way, I checked all interview coding alongside the main themes of the field text data. The comparative analysis of the interview data and the field text data provided a comprehensive base to cross-case pattern of thematic relationships that existed in this study.

3.5.2 Quantitative data analysis

For the quantitative data analysis, statistical techniques have contributed greatly in gathering, organising, analysing and interpreting numerical data (Hartas, 2010). Using SPSS version 20.0, descriptive analysis and *ANOVA* were employed for the survey data analysis. Prior to analysing the survey data, the first step was to prepare it

for analysis. In this section, preparation for data analysis and the procedure for the quantitative data analysis are described.

3.5.2.1 Preparation for data analysis

Firstly, the scoring process was completed. While conducting the survey, participants were requested to respond to a scale with five-point Likert (strongly agree, agree, not sure, disagree and strongly disagree). The range of scores was zero to four. The high score (four) was indicative of 'strongly agree' to the given statement in the survey (as provided in Appendix B), the lower score (one) was indicative of 'strongly disagree' to the given statement, and the 'zero' score was given to the 'not sure' response. All survey data were first entered into a Microsoft Excel sheet. The Microsoft Excel sheet was exported to SPSS version 20.0 for analysis.

Proofreading of the entered data against the paper-based data was undertaken to eliminate the risk of errors in entering data from paper to computer. This proofreading ensured and verified the transferred data. All data were matched with paper data. Uncompleted surveys and surveys with missing responses were eliminated from the analysis. Using SPSS version 20.0, a missing value analysis was performed to identify the missing data. Data from total of ninety surveys were showing missing responses, and after elimination of the missing responses data, the final sample of 1000 was obtained for analysis. A descriptive analysis and *ANOVA* were performed using SPSS to describe the data.

3.5.2.2 Descriptive analysis

The descriptive analysis was mainly used in this thesis to analyse the relationship between gender and participants' attitude towards the Internet. Descriptive analysis is an effective tool for researchers to use when focusing on particular items in a survey (Hartas, 2010). Mean scores and standard deviation (S.D.) values of attitude towards Internet use were computed to determine participants' attitudes towards the

Internet. Mean scores were used to summarise the data; however, in large variances, the mean scores do not represent the data well. As 1000 survey participants took part in this study, a dispersion analysis was also performed. With the dispersion analysis, the standard deviation was used to analyse the spread of values around the central tendency (Hartas, 2010). Apart from the mean score and S.D. value, the survey participants' responses (based on the Likert scale responses in Appendix B) were also used to describe the findings. The percentages of each response (strongly agree, agree, not sure, disagree and strongly disagree) were computed and used to describe the findings in the results chapters (Chapter 4 and Chapter 5).

3.5.2.3 Analysis of Variance

In order to determine whether there was a significant difference between mean scores of gender and participants' attitude towards the Internet, a comparative analysis of variance (*ANOVA*) was used. The computed *F* value was taken as the value of comparisons between gender and attitude towards the Internet. Significant differences were evaluated at an alpha level of .05 and less. Using an alpha level of 0.05 meant that if any difference was found between both genders in relation to attitude towards the Internet, the *F* value would only be significant if $p<0.05$.

3.6 Triangulation of findings

As explained in Section 3.2, an embedded mixed method approach was used in this study and survey findings and personal narrative were embedded into interview data. Also, relating one set of findings to another is denoted as a type of triangulation and the purpose of triangulation of findings is to clarify multiple perspectives in order to expand and enrich the overall findings (Creswell, 2012). In this study, the triangulation approach was employed to gain in-depth knowledge of the concepts investigated. Figure 3.3 demonstrates the triangulation of findings in this study.

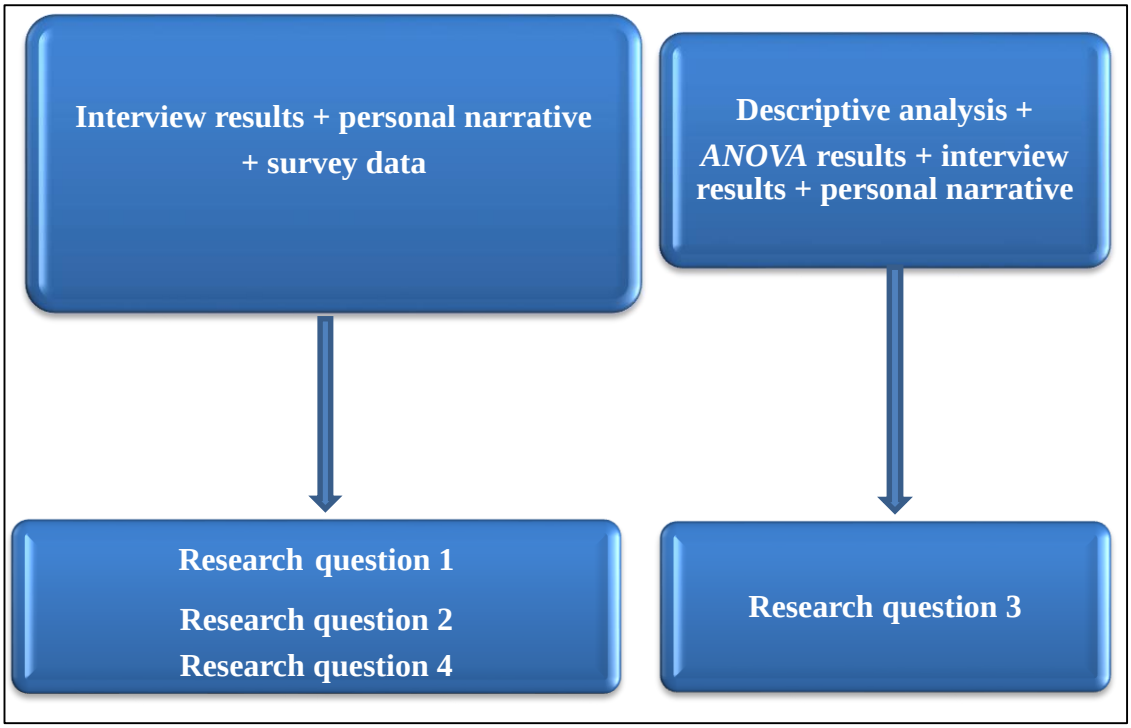

Figure 3.3: Triangulation of qualitative and quantitative findings of the study

The findings of the qualitative and quantitative datasets were used in a complementary way, where interview results along with the personal narrative and calculation of 'agree' and 'strongly agree' responses of some survey items were undertaken to examine research questions 1, 2 and 4. The results of the descriptive analysis, *ANOVA* results, interview data and personal narrative were employed in answering research question 3.

3.7 Matrix data analysis

To assist my data analysis, a matrix was prepared to systematically organise the data in response to this study's research questions. Table 3.9 provides a description of the themes that were I coded and used for analysing the collected data. My narrative story was used parallel to the interview and survey data.

Table 3.9: Matrix for data analysis

Research questions	**Data sources**	**Themes from findings**	**Themes using components of the SCOT theory**	
			Interpretative flexibility	Relevant social group and wider context
What perceptions do Indian tertiary education students have about the impact of Internet use on their learning?	Interview, Survey, Narrative	Helpful for assignment, preparation, Useful for PowerPoint presentations, Access to examination related study materials, E-textbooks and quality of learning	Internet as an online learning tool Internet as a teaching tool Internet as a knowledge provider	
How does the Internet impact on access to tertiary education in India?	Interview, Survey, Narrative	Enhance rural education, Enhance women's education		
What is the relationship between Indian tertiary education students' attitude towards the Internet and their gender?	Survey. Interview, Narrative	Gender differences: Female participants showed a more positive attitude towards Internet use	Interactions with the Internet and understanding of the Internet impact on the attitude towards the Internet	
How does the quality of Internet access impact on Indian tertiary education students' learning?	Interview Narrative Survey	Lack of Internet access Poor Internet signal quality, Slow Internet speed frustrating, High Internet cost affects use		Lack of latest digital devices, Parental negative attitude towards the Internet, Teachers' negative attitude towards the Internet, Effect of electricity cuts on Internet use

The themes in Table 3.9 were initially prepared based on interview data and survey responses were then used to support the interview data. My narrative story was used to compare and contrast my personal experiences with the collected data. The specific findings are presented in the findings chapters (Chapters 4 and 5), where the data are presented thematically as findings and discussion in relation to the relevant literature.

3.8 Summary of the research design

This chapter described the research paradigms for the study and the research methods used to collect and analyse the data. The discussion included the justification for using mixed methods and data collection procedures (qualitative and quantitative), followed by the description of data collection tools, along with their reliability and validity. The data analysis approaches were also discussed. A matrix table was presented as a basis for the result chapters (Chapters 4 and 5).

CHAPTER 4: Indian tertiary education students' perceptions about Internet use for their learning: a case of Punjabi teacher education students

In this chapter, the findings are presented and the participating Indian tertiary education students' perceptions about their Internet use are discussed. The chapter begins with a description of the Internet, using interpretative flexibility, and goes on to describe how Internet usage patterns influence the research participants' perceptions about the Internet. The analysis of the impact of Internet use on access to tertiary education is also discussed in this chapter. The relationship between gender and Internet use is also analysed and discussed, followed by a summary of the findings.

The basis for coding of the themes and the relationship of themes in the interview and personal narrative was a set of guiding questions (as provided in Section 3.5.1.1) and shown here again in Table 4.1 for ease of reference.

Table 4.1: Guiding questions for interview and personal narrative data analysis

How do students describe the Internet?
For what purposes do students use the Internet?
Do students use the Internet for their learning?
How do students describe the usefulness of the Internet for their learning?
Where do students access the Internet?
What are students' views about the impact of the Internet on tertiary education?
How does the Internet impact negatively on students' learning?
What problems (if any) do students face while using the Internet?
How do students describe the Internet access at their colleges?
How do students describe the quality of the Internet provided to them?

Specifically, this chapter attempts to address the following research questions:

1) What perceptions do Indian tertiary education students have about the impact of Internet use on their learning?
2) How does the Internet impact on access to tertiary education in India?
3) What is the relationship between Indian tertiary education students' attitude towards the Internet and their gender?

Key themes captured during the coding process are used as headings for discussion of the cases and relationships in analysing research questions one and two. The results are provided and discussed within *interpretative flexibility*, which is a component of the SCOT theory. The discussion is also supported by percentage ratios of 'agree' and 'strongly agree' responses in the survey data. Research question three is analysed through survey data using descriptive analysis and an *ANOVA* test. The findings are discussed in relation to the relevant literature. The findings in response to research question four (how does the quality of the Internet impact on Indian tertiary education students' learning?) are presented and discussed in Chapter 5. The findings and discussion of the results are presented in the next sections.

4.1 Perceptions about the Internet: An interpretative flexibility analysis

Carr (2014) demonstrated that in the SCOT theory of Bijker and Pinch (1986), societies' perceptions play a significant role in the adoption of a technology. Different societies may have different perceptions and meanings of the same technology. The perceived meaning of the technology leads societies towards using/not using that technology in future. Thus, before analysing the impact of the technology on a particular society, it is appropriate to first describe the meaning of the technology to that particular society. As this study focuses on participating tertiary education students' perceptions about Internet use for learning, before analysing the impact of the Internet

use on learning, it is essential to describe the meaning of the Internet to Indian tertiary education students.

For this purpose, the first component of the SCOT theory, namely, *interpretative flexibility* was used. The concept of *interpretative flexibility* provides flexibility to different social groups in describing the perceived meaning of the technology (Bijker & Pinch, 1986). The societies and social groups can be categorised as the users or non-users of the technology. It was found that every society and all members of the same society may have different perceptions and meanings of the same technology (Mitev, 2005). Similarly, the patterns of key variables within each interview were studied repeatedly in the data analysis process. To describe the meaning of the Internet to Indian tertiary education students, themes found across the interview cases highlighting the similar and different (if any) meanings of the Internet are discussed, including my personal narrative and participants' responses to some survey items.

Prior to this study, I had assumed that Indian tertiary education students do not use or make less use of, the Internet for their learning. This assumption was initially made based on my experience as a Bachelor of Education student back in India in 2007. During this time, the term 'Internet' was completely non-existent in my life. I never thought to use the Internet. Moreover, for me, the Internet was an 'official tool' that was used by clerks and other professional people. However, this assumption was something that I had eight years ago and I realise that the same might not apply to current Indian education students. In order to examine the current Indian tertiary education students' perceptions about the use of the Internet, it is essential to describe how these students use and describe the Internet for their learning.

The earlier assumption seemed not to apply to the participants in this study, as it was found from the interviews that all of the participants preferred to use the Internet for their study and considered the Internet to be an online learning tool. The survey

results also supported the interview findings, where 87.1% of survey respondents reported that they look forward to using the Internet for their study (results are based on 'strongly agree' and 'agree' responses to survey item 5 in Appendix B). Both the interviews and the survey results highlighted that participants used the Internet as an online learning tool. The next section provides a description of the Internet as an online learning tool as found from the interview and survey datasets.

4.1.1 The Internet as an online learning tool

The descriptions made by a particular social group about the meaning of the technology are initially based on the uses and non-uses of that technology (Bijker, 1987). Different social groups or all members of a social group could interpret the same technology as either useful or not useful. On the basis of the usefulness and non-usefulness of the artefact, different social groups or all members of a social group provide their own particular meaning to the artefact.

In analysing the data from the view of *interpretative flexibility*, it was found that the participants perceived the Internet to be an online learning tool because it enabled them to access learning materials digitally. For example, in her interview, Neha explained that "you have to complete your work on time and every time it is not possible to access the library and take the books, issue them, but Internet is always come in handy".

All interview participants described that by using the Internet websites, their learning process had become easier. Moreover, 85.9% (based on 'strongly agree' and 'agree' responses in the survey) of participants pointed out that the Internet sources help them to complete their academic work and studies in an easier way by providing them easy access to online learning materials. It indicated that easy digital access to learning material enabled students to use the Internet for their learning.

Also, Aman, Jot, Mann, Neha and Rahul expressed that the use of the Internet enabled students to connect to other parts of the world, and Internet resources helped them to collect their study material from anywhere in the world. For example, Aman described that "if the each individual will be provided with the Internet, then he or she can be able to access the Internet for their studies and they can learn from the other universities, which provide the content on the Internet". By using the Internet, students did not feel restricted only to the college boundaries to access their study material. Similarly, the survey results showed that 88.1% of the participants expressed that the Internet sources helped them to access their study material from other parts of the world.

Apart from easier access to online learning materials from different parts of the world, the Internet was also reported as being useful in providing beneficial online tutorials. The students reported that they used online learning tutorials to improve their learning. For example, Komal delineated her personal experience that "one day my brother showed me a video where the students of different countries are learning through a tutor on the Internet, so I think at a tertiary level the Internet helps the students a lot".

As an online learning tool, the Internet sources provided the participating students with an easy and wide range of access to learning content. Along a similar vein, when I conducted my own research for my Master of Philosophy in Education, it was hard for me to review the related literature without the Internet. My guide (in India a supervisor is called guide) suggested that I use the Internet for reviewing the related literature. As I did not have Internet access at my home or university, I used to go to cyber cafés to access the Internet. Though sitting in a cyber café for hours was not an ideal studying context, the Internet enabled me to access the different papers that reported on international research conducted on similar topics to my own research.

In this way, the Internet does help students to access their study material from anywhere in the world. This finding echoes the conclusions reached by Castano, Duart, and Vinuesa (2015), who suggested that tertiary education students benefited from the Internet by enabling them to access a wide range of online study materials to enhance their learning. In the Indian context, Kumar (2010) reported in his study that Indian university students considered the Internet to be a helpful tool for learning. However, the author did not explain in his study how students use the Internet as a learning tool. The knowledge about students' Internet usage pattern in the learning context could be used for elaborating the meaning of the Internet as a learning tool in a broader way. Carr (2014) demonstrated that societies give meaning to a technology according to the benefits and disadvantages of the technology, which further depends on usage patterns of that technology. The social groups interact with the technology and use the same technology in different ways. The different ways of using the same technology lead to different meanings of the same technology. Therefore, in order to understand the interpretation of 'Internet as an online learning tool' made by research participants, I explored how research participants used the Internet as an online learning tool.

4.1.2 Internet usage pattern in the learning context

In the Bachelor of Education programme in India, students are required to perform four major activities as a part of their course structure: submit assignments, give class presentations, attend teaching practice, and pass a written examination. Figure 4.1 shows that all interview participants used the Internet in three main areas (completing assignments, preparing PowerPoints and accessing examination materials).

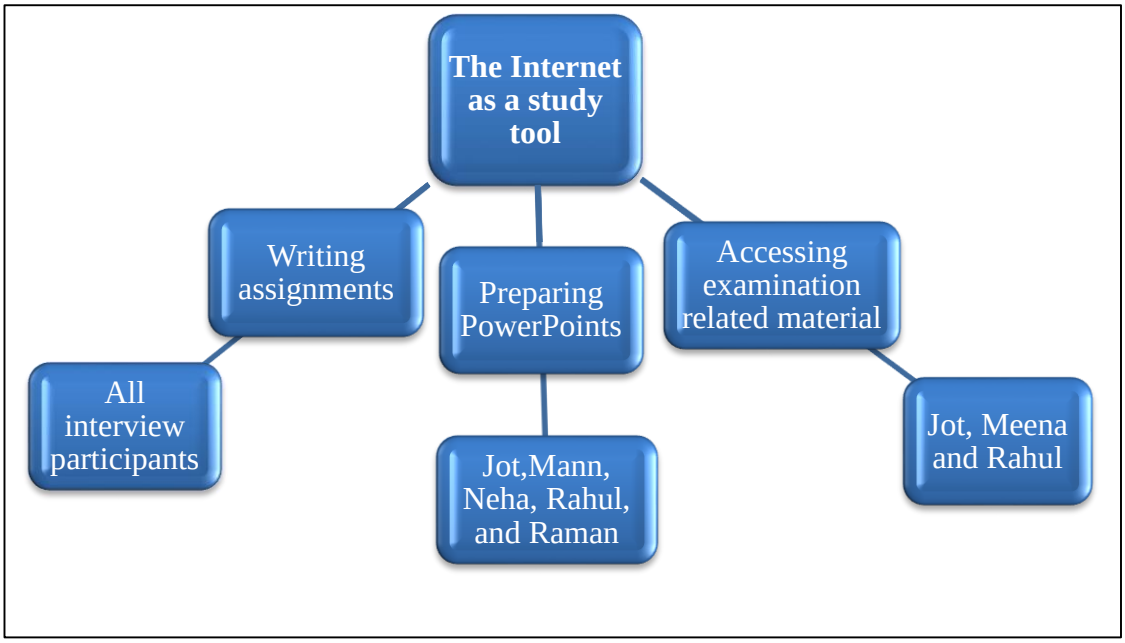

Figure 4.1: Structure of Internet use as s study tool by Indian participants

The assignment writing is a task that starts from the beginning of the course. All Bachelor of Education students are required to submit a number of assignments as part of the course. In the next sub-section, the concept of Internet use in writing assignments is discussed.

4.1.2.1 Internet use for writing assignments

As a Bachelor of Education student eight years ago, preparing and submitting assignments always remained a major concern for me. Students had to work on numerous assignments throughout the year, and I relied only on printed textbooks. Sometimes, I found the lack of suitable reading resources in my college libraries frustrating; however, I never thought to use Internet sources to complete my assignment preparations, mainly because I was not skilled in using the Internet.

Unlike my personal experience, it was found that all of the interview participants often used the Internet sites for accessing assignment-related learning material. For instance Roop, Komal, Meena, Neha and Raman described that the Internet sources are

very helpful for accessing and preparing their assignments. In this context, Komal stated,

> Once my psychology teacher, she gives an assignment that is on creativity or creative children provided to me. I try to find it in books but didn't get any good material from that book. I get just only a little one or two pages from them then I run towards the Internet and I typed my topic in Google and I got a sufficient and lot of material for my assignments.

The statement indicated that using the Internet for accessing assignment material provided participants with vast and efficient material instead of searching and accessing learning material from traditional learning sources. Meena shared a similar opinion, "there are many assignments to be prepared in the B.Ed. to upgrade our knowledge, to prepare that assignments, the topics are not properly available in the textbooks so we use Internet for that purpose".

Use of the Internet in assignments not only provided students with efficient material for assignments, but also enhanced students' knowledge. The interview participants seemed to believe that use of the Internet for accessing assignment materials instead of being dependent on a few traditional learning sources also opens new gateways of knowledge. When students accessed the Internet for obtaining assignment-related materials, it provided many links related to the topics. In this way, students accessed vast content and students. In this context, Rahul reported that, "when we use the Internet we can approach to different people, different age groups. They have a different view about that so they have vast knowledge on the Internet and we have different search engines". Similar to this, 94.5% of the survey participants stated that the Internet sources enable them to collect their required learning material from all around the world, which further increases their knowledge.

Also, all interview participants described that the Internet sources provide a wide range of learning material, and the diversity in the learning sources helped the students to complete work comprehensively and efficiently. It seems that the use of the Internet helped students in completing their assignments proficiently. As Internet sources provide access to a wide range of learning material, this study's participants were in favour of using the Internet in their academic activities. The findings indicated that the use of the Internet in assignment preparation enabled participants to improve their assignment work and enhance their learning.

4.1.2.2 Using the Internet in class presentations

Another task that the Bachelor of Education students have is to prepare and deliver class presentations. As Bachelor of Education students are considered to be future teachers, class presentations are considered helpful in raising students' confidence in delivering lectures in front of the class (Musa, Paul & Tulay, 2011). I remember when I did my B.Ed. degree that presenting to the class was one of my favourite tasks. It always made me feel like I was a real teacher (instead of a student) and that I was teaching in a real class. I often prepared notes related to the relevant topic and elaborated the key points in front of the class. Sometimes, I also used the overhead projector for making my presentation more clear and effective. In all these instances, I never once used the Internet to access any materials that would support my presentations. However, within six years (from my B.Ed. year in 2007 to my data collection time in 2013), much change had happened in the field of Internet use, as it was apparent that the participants in this study utilised the Internet sources in preparing for their class presentations as well. One of the participants, Jot highlighted the advantages of using the Internet for such a purpose and pointed out:

> During my B.Ed. course, I had to give a presentation; first I took a few books but I was not satisfied with the matter that was given in it so then I search on the

Internet and I found a very good PowerPoint presentation there so I downloaded that. I made a few alterations to that then I gave the presentation. The students were so much impressed with that.

Jot further added:

The students paid their entire attention throughout the period. The students were asking many questions, which otherwise if I delivered by the book the presentation level can be bad compared to the PowerPoint presentation.

Similarly, Neha, Rahul, Mann and Raman also stated that they used the Internet to make their PowerPoint presentations more effective. Echoing Jot's description, these participants' description of using the Internet in preparing a PowerPoint for class presentations suggested that the Internet sources were helpful in completing their presentations. It seems that these participating students accessed and utilised the Internet sources to improve their overall performances in their class presentations.

4.1.2.3 Internet use for accessing examination material

The participating tertiary education students also used the Internet to pass their written examinations. The interview data highlighted that participants were aware of making optimum use of the Internet to access their examination related materials. In this context, Meena expressed, "Only one book or lot of books are not sufficient to prepare exam material, so, the Internet is really helpful for that purpose". Furthermore, Meena added, "Now students are not only the bookworms, they now became self-dependent, they can get more knowledge by using the Internet". In contrast, during my B.Ed. years, I only read printed textbooks throughout the year to pass my written examinations.

Hence it seems that currently the Internet resources equip students with a wide range of learning content in a more independent way than traditional modes of learning. In using the traditional sources of learning, students need to be dependent on a few printed textbooks and lectures to access their examination reading material. Of

significance, Indian students view the Internet as an efficient tool for learning that helps them achieve in their annual examination. As Jot described, “the students are scoring more in their examination because they have a good access to the Internet connectivity”.

It was found that surfing on social networking websites was another activity that the interview participants did on the Internet to help with their preparation for examinations. Rahul, in particular, used social networking sites for a study group site; “I use Facebook, yes I have learning groups; my friends made a different kind of learning groups like Chat Science, Science Alert and Science Map my India, so different types of groups are there” However, it was found that most of the interview participants (Komal, Aman, Meena, Rahul, Neha, Mann and Raman) did not use social networking sites for their learning. These participants considered the Internet to be a good source of entertainment. Roop, Suman, Komal, Meena, Jot, Aman, Mann and Raman also used the Internet for amusement purposes, and they preferred to watch videos and news, listen to music, and to do online shopping on the Internet.

Contrary to my personal experience, as I had not used the Internet during my B.Ed. year, I found research participants used the Internet for their study. This information is supported by Dhamija and Panda (2007), who found that Indian tertiary education students used the Internet for educational purposes. However, Dhamija and Panda did not illustrate how their Indian participants used the Internet. Thus, this thesis goes further and shows how Indian students in the State of Punjab use the Internet, that is, for accessing learning material for assignments, preparing PowerPoints and getting examination material.

Carthy (2015) reported that tertiary education students in his study, which was conducted in a Western context, used social networking sites for educational purposes. The findings in my study in India, however, showed that all the participants (except one) did not use social networking sites to improve their learning. Interestingly, Carthy

(2015) pointed out that Facebook helped students in expanding their knowledge area through exchanging information with each other (Carthy, 2015). It seems that Indian students have not yet fully realised the potential of social networking as a learning community.

In using the Internet for educational purposes, students become more confident and perform better academically (Lee & Woods, 2010). In this way, I believe that the Internet has the capacity to improve the learning of the research participants. Despite the positive impact of Internet use on academic performance, it is important to note that using only the Internet does not guarantee academic improvement (Ogedebe, 2012). Instead, the author recommended that optimum educational use of the Internet could improve the learning of the students.

Nevertheless, the Indian participants in my study reported that Internet sources provided them with easy access to e-books. The research participants considered the online learning sources (e.g., e-books) useful for learning. Therefore, the next section explains how e-books were found to be useful in improving the quality of learning.

4.1.2.4 E-books and quality of learning

During the Bachelor of Education years, I was completely reliant on printed textbooks. In contrast, I am now completely reliant on the Internet; I am surprised how I could have survived all those years without the Internet. It is now impossible for me to rely on printed textbooks only. I believe that the Internet provides easier access to study material compared to paper-based textbooks. Meena and Rahul also believe that the online libraries and e-books are more convenient than paper-based textbooks. Similarly, Neha highlighted the benefits of e-books and described:

> Every time is not possible that you have the ready-made material, sometimes the text is not available, sometimes the text is incomplete, so, most likely information is always on the net. There are numerous sites like Google, Yahoo, where you can

> access the online library, also online books and journals that can be converted in the pdf and these things come in very handy, you can do things very quickly in a short span of time.

It seemed that Neha considered e-books to be convenient source of reading, as they are easily available on different Internet sites. In addition, Jot believed that online access to e-books increases the knowledge area of students because students are not confining themselves to the one type of genre like textbooks. Further, Jot expressed:

> If they (students) have to give a project assignment for any topic, then they just take their book and make assignments, thus their knowledge is just confined to the books only. If there is a student who has a good Internet connectivity then he can search all the project work related to that and according to this he can get direct access to that particular topic that is available on the Internet.

How times have changed! I remember when I did the Bachelor of Education, my bag always remained full of hardcopy textbooks. I bought printed textbooks, which were very expensive. In my college library, there was limited availability and quantity of the textbooks especially compared to the number of students needing them, so I preferred to buy my own books rather than access the library stock. However, it was not possible for me to buy many books. Similarly, a current Bachelor of Education student, Aman, reported:

> As a student, we can't afford too many books for the same subjects and through the Internet we access many books from the entire world, like from authors, from other countries and universities. We can take help and through the 'YouTube' we can watch videos for lessons, for our study and also we can download pdfs and take them as our study material.

This finding shows that the accessibility of e-books saves time and money for the Indian students, as they are not required to buy numerous books covering similar

topics. The Internet sources provide a wider range of reading material than a single printed textbook does. Most of the interviewees (Aman, Jot, Neha, Rahul, Meena and Raman) favoured using e-books and online libraries to access their study materials. Aman believed that if he used the Internet for his studies, he could get his study material in less time than searching paper-based textbooks. This finding indicates that participants considered the Internet sources better than paper-based textbooks for accessing learning materials.

Despite considering the Internet as a good source for accessing e-books and e-libraries, I found that the participants in my study used the Internet to access e-books only when they did not have sufficient reading material in printed textbooks. For example, Komal explained, "Mostly I use textbooks or printed materials but it never mean that I don't use Internet for learning, I use it but comparatively low". Further, Raman described, "When I was preparing and I need to prepare a topic then first of all I search that topic from my textbooks and if I don't find a suitable topic or material related to the topic then I go for Internet". Similarly, in response to the survey item 'I prefer to use the Internet rather than textbooks for learning' (survey item 11 in Appendix B), only 46.7% of students replied that they use the Internet sources for their learning instead of paper-based textbooks. Most of the survey participants (53.3%) also preferred using printed copies of the textbook to access their study material. Further to this, 65.9% of the survey participants reported that they only used the Internet if they did not have the reading material in a printed form (results derived from survey item 31 in Appendix B).

Marques (2012) reported that tertiary students in his study preferred to use traditional printed textbooks than e-books. In my study, I found that though participants considered e-books to be better sources of learning than printed copies of textbooks, only a few of them reported utilising e-books fully. In my own B.Ed. days, I had limited

access to e-books or the awareness of using online learning content. In this context, Marques reported that the biggest hurdle for students in using e-books could be basically not knowing how to use e-books, combined with eyestrain, and difficulty in reading on the screen. Marques' study found traditional sources of reading such as printed textbooks, to be safe and convenient sources of reading over e-books. It was noted that printed textbooks could be rather limiting. Abram (2010b) pointed out the benefits of using e-books, "When well-constructed, they become the framework for the entire pedagogy of a course, a grade, a subject, or more … If we were to not take steps to improve the learning experience and add additional features in the shift to an electronic format, we would be missing a remarkable opportunity" (p. 34).

The SCOT theory of Bijker and Pinch (1986) demonstrated that different societies perceive different meanings of the same technology based on the different usage patterns of that technology. The different usage pattern of the artefact allows social groups to highlight the benefits and disadvantages of the technology. Thus, the usage patterns impact on the meaning of the technology.

Using the interpretative flexibility component of the SCOT theory, this thesis showed that participating students' had different ways of using the Internet (e.g., preparing assignment material, making PowerPoints and accessing examination related material). As the Internet resources helped research participants to obtain a wide range of learning material easily and enhanced their academic performance, so they considered the Internet to be a convenient tool for online learning. Thus, Internet usage patterns and benefits of using the Internet in the learning context enabled participants to describe the Internet as an online learning tool.

My personal narrative (see Section 3.2.2) echoes this finding that use of the technology shapes meaning of that technology. In my Bachelor of Education year, I had not used the Internet as I considered the Internet to be a tool that was used by clerks and

accountants, because I saw the Internet being used in clerks' offices only. As I started using the Internet for learning purposes in the Master of Philosophy year, I developed meaning of the Internet as a useful learning tool. My Internet usage pattern altered the meaning I gave to the Internet.

Also, it was found in this study that the socially constructed meaning of the Internet was not based on the design; rather it depends on the usage patterns of the Internet. Section 1.3.1 (history of the Internet) described that the Internet was initially designed for the purpose of communication via computer networks (Robert, 1967), not for educational purposes. However, as Internet use has expanded, the meaning of the Internet has developed so that it has become not only a communication tool, but also an informative tool and world connector. Similarly, it was found in this thesis that the Internet was used by research participants for learning purposes. It showed that participating students defined the Internet as a set of practices for learning alongside other sources of learning. Thus, it can be concluded that the design of the Internet does not make it educational technology, but the use of the Internet makes it a learning tool.

4.1.3 The Internet as a teaching tool

As Bachelor of Education students are mainly preparing for the teaching profession, so they should be skilled in using new education technologies to be able to communicate knowledge to students (Campbell & Kent, 2010). In keeping with *interpretative flexibility*, it was found that the interview participants also considered the Internet to be a teaching tool. As 'future teachers', the participants reported that the Internet was a useful teaching tool. In this regard, Neha described her teaching experience when she was on teaching practice (in India, all Bachelor of Education students are required to undertake 45 days of teaching practice, where they go to schools and teach in the classes [from year 6 up to year 12 students]). Neha stated:

> Since, I am a B.Ed. student, I was on my teaching practice and I had to teach a telephonic conversation to 10th class students. It was about their writing and listening skills. I couldn't find some activities in their text, I wanted to make a telephonic conversation that could make them understand how you should take a call, how you should respond to a call. So I searched the market, I searched the text for it, I could not find the cassettes, I could not find the learning material. What came in handy was CBSE's (Central Board of Secondary Education) online module. They have the system where the lecture is delivered in the class that is provided you in online mode. So what I did that! I went and made an account; provided my essentials and they simply gave me an email and in that email they had recorded telephonic conversations. So, as a teacher, I have to learn and understand things and then teach it to my students.

In addition, Aman, Jot, Mann and Neha reported that they used the Internet in preparing their lesson plans and discussion lessons to present during their teaching practice. Aman explained that he got creative ideas from the Internet to make his teaching more effective. It seemed that the participants believed that Internet sources were helpful for teaching as well. Campbell and Kent (2010) claimed that the appropriate use of the Internet improves the teaching skills of the teacher educators, which supports the use of the Internet for teaching purposes, as highlighted by the participants in this study. Accordingly, the Internet sources are considered useful for teaching and enhancing the knowledge level of the teachers (Kaur & Kumar 2005). In this way, I found that the use of the Internet in tertiary education institutions (both by students and teachers) could improve the teaching and learning processes in the Indian context.

The concept of interpretative flexibility in the SCOT theory (Bijker & Pinch, 1986) demonstrates that the flexibility in meaning description does not mean only

different meanings to different social groups or different members of a social group, but also more than one meaning to a social group or a member of a social group, depending on the usage pattern. Similarly, it was found that there was more than one meaning of the Internet for interview participants, based on different uses of the Internet. For example, when interview participants described that they used the Internet for accessing learning material, they described the Internet as a learning tool. On the other hand, when they made use of the Internet for improving their teaching skills and took advantage of online tutorials, they considered the Internet to be an online learning tool. In connection with the SCOT theory, it can be said that the social group (the participating tertiary education students in this study) interpret the different meanings of the technology (e.g., the Internet) based on the benefits and usage patterns.

Apart from the impact of the Internet on the learning of tertiary education students, the integration of the Internet into the higher education sector also has the potential to improve access to tertiary education in India (Balakrishnan, 2010), as described earlier in Chapter 2. India has a large formal higher education system (Ashish & Atanu, 2012); however, the enrolment of students in universities is not substantial. Many socio-cultural barriers prevent people from accessing higher education in India (Balakrishnan, 2010). Hence, the next section explores how Internet facilities are useful for enhancing access to tertiary education in the Indian context.

4.2 Impact of the Internet on access to tertiary education

During my undergraduate period in India, there was no college or university near my village. Moreover, public transportation was not available. Usually, people walked twenty to thirty minutes to catch a bus or auto-rickshaw. Due to transportation difficulties, people avoided going to urban areas to pursue their studies. My father bought me a vehicle so that I could attend my college in the nearest large town. However, not all people can afford private vehicles. I had to travel one to two hours to

attend my college. To remedy these kinds of mobility issues, online courses could make tertiary education accessible to all (Balakrishnan, 2010).

Some people leave their studies because of their job priorities and sometimes, family responsibilities also do not allow them to continue their studies. In those cases, Internet sources can be used to provide them with online education. In line with my personal view, Neha expressed a similar opinion:

> In a country like India, you sometime across people who don't have access to higher education simply because of some restrictions of culture and some family norms don't allow to go to the place of study or maybe there are some privacy issues or safety issues. So in that case these online modules and this Internet has been a boon in a sense because you are sitting on your own place, the condition that you should not go outside and study is also been fulfilled because everything is given to you by sitting on one place. You are been provided with the text, you are been provided with the online lectures there are. Whatever is happening in the real classroom happens in that virtual classroom.

The access to tertiary education could be enhanced through using the Internet in India, regardless of time and place (Bhattacharya & Sharma, 2007; Dange, 2010). For example, Meena and Rahul reported that by using the Internet, they could get any relevant knowledge from any source at any time, which improved their learning. In this way, the students did not have to depend on the structured classroom teaching and learning system. The online courses require a different type of involvement from teachers, where delivery of the programmes happens in a flexible learning environment regardless of time boundaries (Bostus et al., 2015).

If I had had Internet access, knowledge and skills during my own studies in India, I would have overcome the disadvantage of being a student from the rural part of India. The participants in my study, accordingly, found the Internet to be very useful for

the people of rural areas and women to access tertiary education from the remote places they come from. The participants seemed to believe that Internet sources have the potential to improve tertiary education access among rural people. In the next section, the role of the Internet in enhancing rural people's access to tertiary education is explained.

4.2.1 Internet use and access to tertiary education in rural areas

According to The World Bank (2015), 68.70% of India's population live in rural areas. When I was studying my degrees in India, higher education was not adequately accessible to the rural population. As described earlier, I was born and grew up in a rural area of India. I remember that in my village, most of the people were illiterate and only a few of them had primary school education also only a few of my peers had a secondary school education. Gross Enrolment Ration (GRE) in higher education in Indian rural areas is only 7% (Chakraborty & Konwar, 2013), which indicates that India has a low level of the tertiary education. If we examine the reasons behind this scenario, it is possible that inadequate tertiary education facilities contribute to this situation. In line with this argument, Chakraborty and Konwar (2013) reported that in India, most of the higher education institutions are urban-centric, whilst the institutions situated in rural areas lack quality in their programmes. This statement reflects the policy changes in India where the twelfth five-year plan of India (2012 - 2017) envisages improving the quality and access of higher education in rural areas (Shaguri, 2013).

It seems reasonable to suggest that if Internet facilities are provided in rural areas, it is more likely that rural students will have better opportunities to continue their higher education. Echoing this suggestion, this study's participants (Aman, Jot, Komal, Mann, Neha, Raman and Roop) had the opinion that the provision of Internet facilities could create pathways to access tertiary education in rural areas. As the

members of a social group, interview participants provided their different opinions on how the Internet resources could be used in enhancing access to tertiary education. For example, Neha stated:

> Educational opportunities are opening up, plus when you are living in a remote area, you cannot go to the place to the educational institute far off. In remote areas if you provide such facilities like Internet or some online system definitely increase the educational opportunities.

On how rural students could access tertiary education with the help of the Internet, Aman said that in rural areas, students could join online classes in order to pursue their studies. In addition, Jot articulated:

> Here are many tuition centres, which are providing online lectures. So, if a student is living in a remote area, he can very easily get access to the lecture of a very eminent person, which otherwise infeasible for him who is living in a remote area.

In this study, participating tertiary education students as a social group interpreted that the efficient use of the Internet in imparting tertiary education to people who dropped out of their studies due to barriers (rural background, family responsibilities, job priorities and so on) could make tertiary education accessible to them. It appeared that the participants had the strong belief that the rural tertiary education level might be upgraded through online distance learning. Online distance learning or online correspondence learning enables people to pursue their education without attending the educational institutions on a regular basis (Deane, Galyen & Moore, 2011). The students can complete their studies at their home. Rural students, especially women, could enrol themselves in online teaching-learning classes to accomplish their tertiary education. How the Internet can play a role in enhancing tertiary education among women in India is another pertinent issue in my study, which follows next.

4.2.2 Women's participation in tertiary education through the Internet

The level of women's tertiary education needs to be improved, as the enrolment of women in tertiary education was only 41.5% of the total enrolment in the academic year 2010 - 2011 (Nath, 2014). This is not surprising, as I witnessed in my village that girls were not permitted to go to urban areas for their higher education. There were several reasons underlying this phenomenon, including lack of transportation and negative parental attitudes towards female education. Girls were generally very protected so that they would not bring shame to the family. There are whole sociological and cultural beliefs attached to this stigma that is beyond the scope of this thesis; however, it is important to note that creating opportunities for women to learn and earn qualifications in the safe confines of their homes is a way around this issue. Thus, I believe that Internet facilities in targeted rural areas have the potential to improve the level of tertiary education among women.

In line with my belief, all of the interview participants agreed that the Internet could have a great impact on tertiary education levels among women in India. For example, Aman articulated that in India, most of the parents did not allow their girls to attend educational institutions because of security concerns. Moreover, Neha described, "the Internet makes easy access for those girls, for those people, who cannot go through the normal process". The participants in this study voiced that an online education system could be very helpful in enhancing women's literacy in India.

Meena believed that if good Internet facilities were available at their home, then the girls and women could enrol themselves in online courses and accomplish their studies. Most women drop out of their studies because of their family responsibilities and due to the lack of provision of higher education institutions near their home (Gupta & Rao, 2006). I argue that Internet resources could enable women to pursue their higher

education whilst simultaneously allowing them to fulfil their obligations and responsibilities as home-makers. Beyond their study aspirations, they can develop career opportunities by using the Internet. For example, Rahul explicated:

> Women in our country, or everywhere in the world, they have more work at home. So, if they remain at home, they can't get the knowledge about their personality, career and all things. If you make them accessible to the Internet at home they can easily attach to the world, they can easily grow.

Similarly, Aman explained if the Internet is available to women, they could update their educational level in order to enhance their knowledge area. Furthermore, Jot pointed out, "if they have a good Internet connection at their home then they can do the entire learning process in their homes than give an examination in corresponding course". Based on my own experience in obtaining an education, especially coming from a rural background, I am of the strong belief that Internet literacy is essential for women in order to enhance their educational standing. Like me, Komal has a strong opinion about educational opportunities available through the Internet for rural women:

> I live in a village and there are many girls in my village who want to go for higher education, but because of expensive and old mentality of the people of villages or their parents, they are not permitted to go outside from their houses to have the higher education. The online education system or the Internet can help those girls to gain their Bachelor and Master degrees in their homes. So, online tertiary education can be promoted through the Internet.

However, furthering Komal's voice, the interview participants also added that optimum use of the Internet is key in enhancing access to tertiary education for rural people and women in India. In this regard, Goria (2012) described the Internet as having the potential to improve tertiary education in India by providing online distance learning opportunities to people, though this access needs to be used wisely.

Also, the concept of interpretative flexibility enables manufacturers to study the different perceptions of different social groups, which can result in improving the design of the technology so that all societies could benefit from the technology (Bijker & Pinch, 1987). The improved designs and provision of the technology to all societies could allow people to benefit from the technology. Therefore, the study of individuals' opinions on how a specific society can benefit from a specific technology is useful for manufacturers when analysing societies' needs. Similarly, with analysing the impact of Internet use on access to tertiary education, it can be concluded that the interview participants pointed out the need to establish Internet resources in rural areas and provide online Internet facilities to people who wish to continue their tertiary education (e.g., women and people who dropped out of their studies due to family responsibilities). It indicates that the integration of the Internet into tertiary education systems and into rural areas could enable many more people to engage in tertiary education online.

In addition, Bostus et al., (2015) described that "online classes can prove to be less intimidating, and those students can experience a sense of flexibility when facing overwhelming daily challenges such as work or family demands" (p. 138). Bostus et al., made an interesting comment as they have highlighted issues around the intricacies of accessing online education. Whilst this study's participants considered online courses to be helpful in improving tertiary education access to women, they did not consider that online education itself has complexities that need specific knowledge and skills. Male Internet users are said to be better at handling these complexities than women (Jabreen & Jammal, 2008).

Moreover, Bijker and Pinch (1987) suggested that the meaning of a technology could be different to both genders (males and females). The notion is that the use of technology is gendered and technology is regarded as being masculine (Johnson, 2011).

Hence, it is important to see how men and women differ in their interpretation and use of the Internet in India. In the next section, the relationship between gender and attitude towards the use of the Internet is explored.

4.3 Gender differences in attitude towards Internet use

During my undergraduate studies, I often noticed that most of the male students in my class were busy on their mobile phones and they often talked about their Facebook friends. It left an impression that the Internet was a male dominated digital technology, because only a few of my female classmates had mobile phones and fewer of them had Internet connections on their mobile phones. Naturally, I presumed that male students would have a positive attitude towards Internet use. Nevertheless, a previous study reported no gender difference at all among tertiary education students in using the Internet (Abedalaziz et al., 2013). The authors claimed that both male and female participants had a positive attitude towards the Internet and both genders were equally concerned about using the Internet for their learning. However, this study was conducted in a Malaysian university, and the authors recommended that a similar study should be carried out in other international universities to analyse the relationship between gender and attitude towards the Internet. Hence, it was fitting to explore gender difference in my study. The interview results indicated that participants of this study used the Internet for study purposes. However, the survey results showed that male and female Indian students have different attitudes towards Internet use for educational purposes. Table 4.2 presents the distribution of male and female students' attitudes towards use of the Internet for their learning.

Table 4.2: Gender differences in attitude towards the Internet use for study purposes.

Gender	N	M	S.D.
Males	195	2.59	0.41
Females	805	2.66	0.42
Total	1000	2.65	0.42

N = Number of participants, M = Mean, S.D. = Standard Deviation.

The above table shows the mean score (*M*) of attitude towards Internet use of male participants is 2.59, with a standard deviation of .41. The females' mean score of attitude towards the Internet was slightly higher at 2.66, with a 0.42 standard deviation (S.D.) value. Both genders showed a positive attitude towards Internet use for learning. In order to determine whether there was a difference between these mean scores, comparative analysis of variance (*ANOVA*) was used, where significant differences were evaluated at an alpha level of .05 and less. A significant difference was found for attitudes towards the Internet between males and females [F (1, 998) = 4.60, $p < .05$]. The results showed that male and female students had different attitudes towards the Internet. Females showed more positive attitudes towards the Internet (M = 2.66) than their male counterparts (M = 2.59). The assumption of Bijker and Pinch (1987) regarding the gender differences in using the technology proved to be correct, as this thesis showed female participants had a more positive attitude towards the Internet use than male participants. The more positive attitude of female students in this study demonstrated that female participants preferred to use the Internet more for study purposes than the male participants.

Another study conducted by Jabreen and Jammal (2008), however, found male tertiary education students had a more positive attitude towards Internet use compared to female students. In contrast, similar to this thesis finding, Khudair and Oshan (2008) found female tertiary education students had a more positive attitude towards Internet

use for study purposes than male students. It was indicated that the female participants of the study were more aware of the educational uses of the Internet than male students.

Along this line of thought, Bijker and Pinch (1986) highlighted that the understanding of the technology, interpretations of the technology and interactions with that particular technology shape the attitude and awareness of the social groups towards that technology. If I consider my own case, it was apparent that due to the lack of interaction with the Internet and inadequate understanding of it, I possessed a negative attitude towards the Internet as an educational tool. I was not in favour of using the Internet in a learning context. I believed that Internet use wasted students' valuable time, as I was of the opinion that it carried no educational benefit to the students. However, when I started spending time on the Internet for my research in my Master of Philosophy year, I realised the usefulness of the Internet in educational contexts. In this way, the interactions with the Internet impacted on my knowledge and skills about the Internet, which, in turn, modified my attitude towards the Internet and its usefulness.

Similarly, the survey results of this study highlighted the positive attitude of the participating students towards the Internet and both datasets (interview and survey) indicated that current Bachelor of Education students used the Internet for study purposes. I believe that as students have more interaction with the Internet, it helps them to develop their positive attitude towards the Internet. The interactions with the artefact and understanding about the specific technology impact on individuals' attitude towards that specific artefact (Bijker, 1995).

Interpretative flexibility stresses that technological artefacts have different meanings to different social groups, especially considering the ways the artefact is used by each social group (Bijker, 1995). For example, the users of touch-screen mobile phones might consider those mobile phones as better than keypad mobile phones. In applying this interpretation to the context of the research, previous studies have

described that both male and female students used the Internet for different purposes (e.g., Komathi & Maimunah, 2009). Komathi and Maimunah found that female participants used the Internet to seek family-related information, while males used the Internet to obtain sports, news and automobile-related information. In my study, I found that both male and female participants used the Internet for similar purpose for example, to access study material, surf social networking sites and for their entertainment. However, male participants preferred spending more time on social networking sites and used the Internet for other than study purposes, for example Mann described:

> I use the Internet for many purposes, firstly I use the Internet for networking sites like Facebook and even than before it I was using Orkut and it made my far away friends more closer to me. I use YouTube, which is very informative site for me. I have certain interest in political issues like the Iran issue, the palatine issue. I do watch documentary movies on that things and on the famous people like Mahatma Gandhi, Jawaharlal Nehru or the independence scenes. So for all of the things I use you tube much. Thirdly I have deep interest in wildlife so I use wildlife geography sites to see the scenes specially African Safari etc. So it is very useful for me using the Internet.

Similarly, other male participants (e.g., Roop, Jot, Aman and Rahul) highlighted that they used the Internet more for surfing on social networking sites, listening music and watching online videos, whereas, female students preferred to use the Internet for study purposes. For example, Raman pointed out, "mostly I use the Internet for my study purposes to search any kind of topic". This finding could be the underlying reason for female participants' positive attitude towards Internet use in their learning than male counterparts.

4.4 Summary

In this chapter, three research questions have been discussed and to some extent answered 1) what perceptions do Indian tertiary education students have about the impact of the Internet on their learning? 2) How does the Internet impact on access to tertiary education in India 3) what is the relationship between gender and Indian tertiary education students' attitude towards the Internet.

In response to research question one, this study's participants reported that they used the Internet for study purposes and interpreted the Internet as an online learning tool. Furthermore, they described that the Internet sources enabled them to get their learning materials beyond the college libraries. With a wide access to learning material, participants reported that they could complete their academic work more efficiently and enhance their learning. The Internet was also considered to be a knowledge enhancing tool by the research participants. Besides highlighting Internet use in the learning context, the participants in my study also described the Internet as a teaching tool, which showed that the Internet could be used to improve Indian students' teaching skills.

Also, in alignment with the SCOT theory that demonstrated that people interpret the technology based on the uses and non-uses of the technology, this thesis showed that the usage pattern impacted on the perceptions about the Internet. The research participants acknowledged the positive impact of Internet use in their learning. It was found that as a study tool, participants used the Internet for writing their assignments, preparing class presentations and accessing examinations-related learning material. As Internet sources provide the learning material in a broader form, so student participants highlighted that Internet use in their academic matters helped them to improve their overall academic performance. The interview participants declared e-books to be a better source of learning over traditional formats of learning, however, due to the low

provision of Internet facilities, participants were prevented from using e-books and they were obliged to use traditional sources of learning. It indicated that as research participants made use of the Internet for their learning and for improving their teaching skills, therefore they interpreted the Internet as an online learning tool and teaching tool. My personal narrative echoes these findings, where I described how I became a user of the Internet from being a non-user and how it alerted my provided meaning of the Internet from non-useful learning tool to useful learning tool.

Research question two was answered by analysing the impact of the Internet on access to tertiary education. It was found that the research participants were of the opinion that through a wider application of the Internet, tertiary education could be made accessible to all. The participants in this study seemed to believe that the online courses had the potential to enhance tertiary education levels in rural areas. It was also suggested that the participation of women in tertiary education could be enhanced by using Internet sources for online learning purposes. In connection with interpretative flexibility, this study indicated the desirability of integration of the Internet into tertiary education systems and the establishment of Internet resources in rural areas as online learning courses were found to be more convenient for providing education without students needing to physically attend educational institutions on a regular basis.

In response to research question three on the relationship between gender and attitude towards the Internet, it is apparent that both genders showed a positive attitude towards Internet use for learning. As Bijker and Pinch (1987) demonstrated that there could be a significant gender difference in the use of the technology, similarly, in this study, a significant gender difference was found in the positive attitude towards the Internet; female participants showed a more positive attitude towards Internet use for their learning than their male counterparts.

In the context of attitude towards the technology, it was found that the interaction and understanding of the technology impacted on attitude. I had a negative attitude towards Internet use based on my lack of interaction with the Internet. However, this thesis showed that as research participants had more interaction with the Internet than I had, it might explain why they showed a positive attitude towards the Internet. Experience with the Internet can only come from having proper access to the Internet. I had no Internet access during my Bachelor of Education year at my home or at my college. Due to the lack of Internet provisions, I remained distant from using Internet facilities. It raises questions related to the Internet provisions available to the students and its impact on students' learning. For this reason, I explored the impact of Internet quality on students' learning, the findings of which are presented and discussed in the next chapter.

CHAPTER 5: FACTORS AFFECTING TERTIARY EDUCATION STUDENTS' INTERNET USE FOR THEIR LEARNING

As advised in the final comment in Chapter 4, this chapter adds to the discussion of the fourth research question, that is, how does the quality of the Internet impact on Indian tertiary education students' learning? The chapter begins with a description of patterns found across cases (including the personal narrative), highlighting the similarities that were found among the cases. The findings are presented and discussed using two components of the SCOT theory: the *relevant social group* and the *wider context*.

The findings in Chapter 4 indicated that all interview participants and 83.6% of survey participants (survey result of item 27 in Appendix 2) used the Internet for their learning and also considered the Internet to be an important learning tool for tertiary education students. Despite the perceived positive impact of the Internet on participants' learning and on access to tertiary education, the Internet was not widely used by the participating Indian tertiary education students. The interview participants mentioned "certain limitations" to effective use of the Internet for their learning. There were several reasons that prevented participating Indian tertiary education students from using the Internet for their learning which prevented them from gaining maximum benefits from the Internet in their learning context. These reasons are explained and discussed in the next sections.

As described in the earlier chapters, the SCOT theory demonstrated that the technologies are constructed in laboratories; however, different social groups use those technologies and give meaning to them (Bijker, 1995). While defining the meaning of

the technology, some members of social groups or some social groups, may have the same opinions and views about that particular technology that is based on their interactions and experiences. The members of a society or social groups that have the same opinions and views are considered to be *relevant social groups* in the SCOT theory. Thus, in a relevant social group, all members share the same meaning about the technology (Bijker & Pinch, 1986). The relevant social groups interpret the meaning and understanding of the artefacts according to their experiences, and experiences can be positive or negative. If any social group has a negative experience, it results in a negative meaning about that artefact and that social group avoids using the technology (Bijker, 1995). In order to improve the use of the technologies, the problems should be identified. Meanings interpreted by the relevant social groups help to highlight the problems faced by that particular group while using the particular artefact.

In the stage two, qualitative data analysis (as described in Section 3.5.1.3), it was found that all interview participants had the same opinions about the Internet quality provided to them. On the basis of the similar themes found in the interview data, the relevant social group (from interview participants) was identified and themes were used to answer research question four. The concept of the relevant social group was employed to discuss the impact of the Internet quality on students' learning, because all interview participants shared the same story about the Internet quality provided in India. In stage four (Section 3.5.1.5), when qualitative data were compared to my personal narrative data, it was also found that both datasets (interview data and personal narrative) had some similarities and differences. Therefore, the personal data were also used parallel to the interview data, along with survey data.

5.1 Impact of Internet quality factors on students' learning: A relevant social group analysis

The interview participants stated that they used the Internet for their learning purposes for a limited time each day. It was found that most of the interview participants (Jot, Meena, Neha, Rahul, Raman, Roop and Suman) spent an average of one to three hours a day on the Internet for study purposes, as shown in Table 5.1. Also, Aman, Mann and Raman stated that they used the Internet according to their work requirements.

Table 5.1: Average time spent on the Internet in a day

Name of the participants	Time spent on the Internet/day
Aman	Not specific, depends on workload
Jot	2-3 hours
Komal	Only in the evening
Mann	Not specific, depends on workload
Meena	3-4 hours
Neha	2-3 hours
Rahul	1-2 hours
Raman	Not specific, but maximum 3 hours
Roop	2-3 hours
Suman	Average 2 hours

However, all of the interview participants reported that they kept themselves away from the Internet during their college hours. For example, Komal stated she used the Internet only in the evening after college hours. Various reasons were found behind the low use of the Internet in students' educational context; for example, Suman said she did not use the Internet in college and, apart from her studies, she had to look after her family, so Suman had limited time to spend on the Internet. Raman and Komal expressed similar views, and stated that they remained in college from 9 am till 5 pm,

therefore, Raman could barely get one to two hours on the Internet, and Komal used the Internet only after college hours. It was interesting to observe that all the interview participants interpreted the Internet as a significant source of knowledge that enhanced their learning, but yet they made such little use of the Internet for their study. Why did they not spend time on the Internet during college hours? What are the factors that keep them away from using the Internet?

It seemed that the Internet quality impacted on the Internet use of the research participants. There are several factors that make up the quality of the Internet: the Internet access, Internet speed, and good signal quality of the Internet. All these factors were found to impact on Internet use in participants' learning. Before analysing the impact of the Internet quality factors on students' Internet use, it was appropriate to capture the scene of the Internet access options available to the participants. The discussion begins by analysing the Internet access options available to the participants in the next section.

5.1.1 Impact of Internet access on learning

Access to the Internet impacts on Internet use (Mahmood, 2009) and students with good Internet access make optimum use of Internet resources for improving their learning (Barton et al., 2015). Therefore, before explaining other factors of Internet quality on students' learning (Internet speed, good signal quality and available Internet connections), I begin with the Internet access available to the participating Indian tertiary education students.

In this context, if I consider my case, not having Internet access at my home or my colleges kept me away from using the Internet. On the basis of my experience, I presumed no or low provision of Internet access at students' homes and colleges. However, the time leap of six years (from my B.Ed. year, 2007, up to my data collection period, 2013) brought a rapid change in the field of the Internet use. For example, as

described in Chapter 4, unlike my personal experience, all interview participants reported that they used the Internet for their studies; therefore, it was appropriate to explore current Bachelor of Education students' Internet access location and modes to analyse the impact of Internet access on Internet use. Here, Internet access location indicates the place where participants most often use the Internet. Moreover, Internet access location also enabled an exploration of the quality of the Internet provided in participating educational institutions and at students' homes.

Table 5.2 highlights the Internet access location (home, college and cyber café) and Internet access mode (mobile phones and laptops) of the interview participants. In contrast to my presumption about the availability of the Internet at participants' home, from the interview data, it was found that all of the interview participants had Internet access at their homes. All interviewees reported home as their most preferred place to access and use the Internet. Moreover, 67% (results derived from survey item 44 in Appendix B) of survey participants reported they used the Internet conveniently at their homes. It indicated that unlike me, students had Internet access at their homes. Convenient access to the Internet at home might be a reason for the participants' positive perceptions about Internet use in their learning context.

Table 5.2: Interview participants' Internet access location and mode

Name of the participant	Internet access location	Internet access mode
Roop	Home	Mobile phone
Suman	Home and college	Mobile phone and laptop
Komal	Home	Mobile phone and laptop
Meena	Home and cyber café	Mobile phone
Jot	Home, college and cyber cafe	Mobile phone and laptop
Aman	Home and college	Mobile phone
Neha	Home and college	Mobile phone and laptop
Rahul	Home and cyber café	Laptop
Mann	Home and cyber café	Laptop
Raman	Home	Mobile phone and laptop

However, my assumption regarding ‘no’ or ‘less provision of Internet access’ in educational institutions proved to be correct as only four participants (Suman, Jot, Aman and Neha) stated that they accessed the Internet at their colleges. Most of the student participants (Roop, Komal, Meena, Rahul, Mann and Raman) said that they did not have Internet access at their colleges. In the selected educational institutions, no Internet and computer provisions were found for the students’ use. For example, Komal expressed her view, “I can’t access Internet in my college library, because there is not even one computer for students’ use”. Similarly, Aman reported, “we have only one PC at our college, there is a lot of traffic; we are 200 students and only one PC cannot accommodate to all students”. It indicated that the majority of interview participants (Roop, Komal, Meena, Rahul, Mann and Raman) did not access and use the Internet at their colleges.

The interview data indicated that students wanted to use the Internet at their college; however, the lack of computers in their college made participants unable to access the Internet at their colleges. Moreover, I asked Meena, “why do they not ask their principal to provide them with more computers for students’ use in their college?” She replied that their college had a total of 200 Bachelor of Education students and it was not possible to arrange computers for all students because of their (colleges) financial limitations. It seemed that Meena was pointing out towards the poor infrastructure facilities of their colleges. Roop and Komal reported that in their colleges, there was not even a single computer for students’ use, so, due to the non-availability of the computers and Internet facilities, the participants were unable to use the Internet during college hours.

The lack of Internet access in educational institutions was found to be a limitation that forced students to use traditional sources of reading. In this context, Rahul explained, “in our college library, there is no computer, basically, there are

textbooks in the library". In this situation, students are left with only one option, which is making use of the available material in the libraries that are in the traditional formats of reading (for example hard copies of textbooks). I do believe that printed textbooks are a good source of learning; however, as I discussed earlier in Chapter 4 printed textbooks are restricted to the limited content. There are no provisions to get updated content; moreover, sometimes it is hard to a buy number of books. In this regard, the Internet resources are more convenient for tertiary education students to access a wide range of study material (Lee & Woods, 2010).

During college hours, if it was needed to use the Internet, then four participants (Meena, Jot, Rahul and Mann) stated that they accessed the Internet in cyber cafés (as shown in Table 5.2). Okafar and Ugah (2008) highlighted how cyber cafés were the most preferable option for accessing the Internet. However, the cyber cafés charge a high amount of money to use the Internet, which was an issue for most of the participants, who described the Internet charges as "very high" (Aman, Jot, Meena, and Rahul) and elaborated on it. For example, Mann reported, "I am using it on the cyber café that is the paid one". Furthermore, Meena exposed:

> The cost of the Internet is very high. To prepare our assignments we go to café and to prepare our notes we search our topic and we call him to print out that topic he said that "ma'am one page is for 100 rupees"; cost is very high. The topic cannot be completed only with one page. So, high cost of the Internet affects the learning process.

Students had to pay a large amount to use the computers and the Internet in cyber cafés and every student could not afford these charges. It seemed that due to the high charges of the cyber cafés, the students avoided accessing the Internet there. Furthermore, the interview participants expressed that they used the Internet in cyber cafés only in an emergency. For instance, Mann said if he needed to check his important

emails and the Internet did not work on his mobile, only then did he access the Internet at the cyber café.

Moreover, an inadequate Internet quality was found in cyber cafes that further impacted on Internet use. In this context, Meena revealed her personal experience:

> For assignments, I use the Internet. Once I went to cyber café and the man said that "ma'am the Internet is not working". I said that tomorrow I have to submit my assignment, you please do anything. He said "okay ma'am come after one hour, I will correct the all-technical problems". So, technical problems affect my learning.

Similarly Aman and Jot pointed out that technical errors are very common when accessing the Internet in cyber cafés, therefore they avoided going to cyber cafés. Moreover, public cyber cafés are available for all, so the appropriate study environment is not possible due to the public rush in the Internet cafés. In this way, high charges of the Internet and inadequate Internet quality in cyber cafés impact adversely on using the Internet for study purposes.

Participants reported that they spend most of their daytime (about 9 am to 5 pm) in their colleges and colleges do not provide Internet access. It seemed that non-availability or lack of Internet access in colleges restricted participants' Internet use for educational purposes. Similar to this finding, Adekunmisi et al. (2013) found that the lack of Internet access in educational colleges prevents students from using the Internet for their learning. In this context, Kumar and Kaur (2005) reported that students could not get optimum benefits from the online learning resources due to the lack of Internet access in Indian educational institutions.

The next factor that was of concern for participants while using the Internet on their mobile phones and computers was 'Internet speed'. It seemed that participants were not satisfied with the available Internet speed and they (interview participants) felt

frustrated with the inadequate Internet speed quality. A detailed analysis and discussion of the impact of Internet speed on students' learning is presented in the next section.

5.1.2 Impact of Internet speed on students' learning

In December 2015, the global Internet speed increased 23 % to 5.6 megabits per seconds, however, Internet speed has risen only 2.8 megabits per seconds in India (Global Internet, 2016). In the context of this study it seems that the slow speed of the Internet impacts on participating students' use of the Internet for their learning, for example, Jot reasons, he could not get optimum benefits of the Internet sources in his learning context because of the slow speed of the Internet. Further, Jot added, "The speed is very slow and if I am watching a video on that then it hangs for a while and also during downloading, if there is a heavy file like, if it should take generally 5 to 10 minutes but it takes 1 or 2 hours". Similar to this, Aman also reported that the slow speed of the Internet made him frustrated sometimes and he avoided using the Internet for learning. Similarly, Meena expressed that sometimes she could not utilise the Internet facilities for her learning because of its slow speed. Further, she explained if she went to a cyber café to access learning materials for her assignments, the slow speed of the Internet consumed more than two hours. Further, she added, it also increased the Internet bills and raised the frustration level. In this way, participants avoided using the Internet for their learning. In this regard, Aqil and Ahmed (2011) reported that with slow Internet speed, students felt frustrated and they avoided using it for learning.

In the context of the Internet speed, I found the location and area has an impact on the Internet speed. For example, Neha revealed that in the rural areas, the Internet speed was slower than in urban areas. Neha lives in an urban area and her college is situated in the rural area. In her college, she reported that there is no Internet access for students' use and she used the Internet on her mobile during college hours. However, she avoided using the Internet in her college because of the very slow speed. She

reported that she preferred to use the Internet at her home because she experienced good Internet speed at her home. It seems that the educational institutions situated in rural areas may experience slow Internet speed that further prevents students from using the Internet, even on their mobile phones.

Besides the Internet speed, the interview participants pointed out the poor Internet signal quality. The Internet signal strength impacts on the Internet speed. The Internet with good signal quality strengthens the Internet speed. In relation to my study, the interview participants reported poor signal quality of the Internet that further adversely influenced their (participants) Internet use for their learning. In the following section, the impact of the poor Internet signal quality on Internet use is described in more detail.

5.1.3 Impact of the Internet signal quality on learning

Another factor that affects the Internet quality is 'poor signal quality'. The poor Internet signal quality refers to the number of bars on mobiles phones, computers, laptops, iPads and so on. All interviewed participants reported bad experiences with the Internet because of poor Internet signal quality. In this context, Aman, Komal and Rahul described that when they used the Internet for their study, they experienced poor or weak Internet signals. Further, they explained, bad signal quality impinged on the Internet speed and they could not do work on the Internet with poor signal quality. In this regard, Neha explained that the poor signals quality of the Internet affected her Internet use adversely. Further, she explained:

> The connection breaks, it snaps suddenly and you stuck there and you irritated because your work is stuck, you cannot do that. So cost is a factor and too much information and those bad connections when it snaps. It is very frustrating when you are doing some serious business on the Internet.

The current Internet signal quality was not found appropriate in selected Bachelor of Education colleges in this study. Similar to this finding, Kumar (2010) found a lack of Internet facilities in Indian higher education institutions. In this study, the lack of Internet sources and poor Internet quality adversely influenced the Internet use of the participants for their learning.

As described before, analysis of the relevant social groups enables a researcher to identify the hidden aspects of the artefact that influence the use of the technology (Bijker & Pinch, 1986). For a more in-depth analysis of the problems related to the artefact, the relevant social groups provide appropriate lenses to highlight and describe the weaknesses of the artefact. The relevant social group shares the same set of experiences, including the positive and negative impacts of the technology.

In connection to the relevant social group, the interview participants were identified as a relevant social group because all of the participants interpreted the same problems regarding Internet use. In explaining the meaning and benefits of the Internet in Chapter 4, all of the participants reported that they use the Internet for study purposes; however, they used the Internet differently, as shown in Figure 4.1 (as provided in Chapter 4). Bijker and Pinch (1986) demonstrated that in a relevant social group, all members of the group should have the same opinions and the same ways of using the artefact; if there are differences in using and explaining the artefact then there will be no relevance within the group. The interview participants defined the quality of the Internet in a similar way and highlighted the same issues with using the Internet for learning, therefore the notion of relevant social group was employed in describing the problems related to Internet use. Despite considering the Internet as a useful tool for online learning, the lack of basic Internet facilities (Internet access with appropriate Internet speed and signal quality) prevented research participants from using the Internet for their learning. The poor Internet quality is a cause of low Internet use for

study purposes by tertiary education students (Adekunmisi et al., 2013). In the Indian context, no recent related study was found that discusses the impact of the Internet quality on tertiary education students' learning. However, in 2005, Kaur and Kumar reported in their study that due to the lack of Internet access in educational institutions, Indian tertiary education students were unable to use the Internet appropriately for their learning.

5.2 A wider context analysis of factors that impact on Internet use for learning

An appropriate understanding of the perceptions of the relevant social group will enable a researcher to highlight the problems related to the design and use of an artefact (Bijker, 1995), and it also allows a researcher to analyse the common social issues that create a hindrance in using that particular artefact. The relevant social groups represent a society or social group that experiences the same set of problems and issues in using a particular technology. In the SCOT theory where the major consideration of the relevant social group is to focus on issues related to the use of the technology so that the design of the technology could be improved, the current study used the concept of the relevant social group to highlight other social, economic and political issues, as well those that impact on the use of the Internet for students' learning.

For analysing the social, economic and political aspects of Internet use, another component of the SCOT theory, called *wider context*, is used. The concept of wider context demonstrates the impact of the socio-cultural, economic and political factors on the development of the technology (Klein & Kleinman, 2002). The socio-cultural, economic and political situations make a significant contribution to shaping values and norms of social groups (Bijker & Pinch, 1986), and those norms and values, in turn, influence the use of the technology.

Besides analysing the impact of Internet quality on Internet use in terms of Internet speed and Internet signal quality, the factors that are closely related to Internet use are articulated. It was found that some other factors, for example, Internet cost, provision of digital devices in educational institutions, teachers' attitude towards Internet use, parental attitude towards the Internet and electricity facilities, also influenced the participants' Internet use for their learning. Using the concept of the relevant social group, along with the personal narrative, the impact of the wider context on the students' Internet use for learning was analysed.

As described before (in Section 5.1.1), cyber cafés charge a high amount of money for using the Internet and a few interview participants (Meena, Komal, Jot and Aman) spend their money on accessing the Internet data. Therefore, Internet cost was a problem revealed by participants that affects Internet use. The participants reported their consideration about the high Internet cost while using the Internet. How the Internet cost affects participating Indian tertiary education students' learning will now be explained.

5.2.1 Impact of Internet cost on Internet use for learning

Jot and Meena indicated that due to limited financial resources, their colleges were unable to provide their students 1:1 computers equipped with Internet facilities. The interview participants revealed that they spent their pocket money to access the Internet in colleges, in cyber cafés or at their homes. The Internet cost always remained a concern for the interview participants while using the Internet.

As described earlier, all participants had Internet access at their homes, so I asked students, if it is affordable for them to access the Internet at their home? All of the interview participants responded that they could afford the Internet at their home, and in the survey, 67.5% (results based on agreed response of survey item 43 in Appendix B) of respondents expressed that they can easily afford Internet access at their home. However, they remained concerned about the Internet cost while using the

Internet. Mann said that his parents did not provide him with Internet access at home because of high Internet bills. Komal reported that she used her pocket money to have an Internet connection on her mobile phone. As Komal paid the bills from her pocket money, she further explained, "I get limited GB (Gigabyte) in a limited price, so I use the Internet very, very carefully because of its high cost". Similar to this, in the survey results, 54.5% of participants reported that they use the Internet for a limited time because of the high Internet cost. It seemed that cost concerns prevent participants from making optimum use of the Internet for their learning. Jot expressed the same opinion, stating that "most of the time I daily use that but the time is very limited because the data charges are very high.

On the contrary, Neha expressed a different story about the Internet cost. It seemed that the high Internet cost did not impact on her Internet use because she could easily afford the Internet expenses. For instance, she explained, "ma'am as far as the cost is concerned, touchwood! I have not been having such problem, so the cost is not the consideration for me". Her parents provided her with financial help to access the Internet at her home, therefore she felt free to use the Internet at home. This observation indicated that access to the Internet at home depends on the financial conditions of the users. If students can easily afford the Internet cost, then they will make maximum use of the Internet. However, sometimes parents do not provide their children with Internet facilities at home (as all interview participants reported except Neha). In that case, provision of free Internet access to the students in higher education institutions could motivate and enable their students to make maximum use of the Internet for their learning.

Another factor that limited the potential of Internet use for study purposes by Indian tertiary education students was 'online payments'. The participants reported that sometimes they were required to make online payments to use the online study content.

In this context, Jot exemplified, “the matter that is available online gives a very general viewpoint but if you want to get very deep knowledge or a research paper that is a paid version, so the online payment version is also a big problem right now”. Further, he shared his personal experience:

> I have to buy a research paper, so, when I access it I could read the first page only but I also wanted to get the entire graphs and all data was there. So I had to buy that. But when I checked the methods to get that, it was through a credit card. So, that facility is not available right now in India.

It seemed that online payments restricted Jot from using the Internet for his learning. In contrast, Neha preferred to buy online study material and she revealed:

> Sometimes you have to make some payments or some monetary has to be given to them. So more or less, I think this process of accessing the Internet for this online usage of books and text material this has been very beneficial in my case, I would agree.

The online learning content was found useful for tertiary education students (Gong & Wallace, 2012); however, as free Internet access was not provided to the participating students, so students were prevented from using the online learning resources. It showed that Internet cost and having online paid versions of learning material impacted adversely on students’ Internet use for their learning. As participants paid their own Internet bills and they got limited Internet data with the limited charges, they used the Internet only if the learning content was not available in the printed textbooks. However, both survey and interview participants considered the online learning material better than traditional paper-based textbooks (as described in Chapter 4). The high Internet cost was found to be a barrier that restricted participating students from obtaining optimum benefits from online learning sources.

As in the interviews, participants highlighted that they accessed the Internet on their mobile phones. The limited Internet data on their mobile phones did not allow them to use the Internet for reading purposes. Therefore, students preferred to borrow books from the libraries and read those books. During college hours, if participating students felt a need to use the Internet, then they used it on their mobile phones.

5.2.2 Lack of latest digital devices

As was discussed in the earlier sections, research participants accessed the Internet mainly on their mobile phones, PCs and laptops. No students spoke about the iPad, tablets and other portable devices, as shown in Table 5.2. This indicated that participating students in this study did not use the latest portable digital technology for their learning. All of the participants (in the interviews) used mobile phones to access the Internet during their college hours. However, the small screen of the mobile phones did not provide comfortable reading for the readers. On the other hand, portable computer devices (iPads, tablets and other android devices) equipped with Internet facilities provide easy access to learning content (Gong & Wallace, 2012; Smith & Wakefield, 2012) with a bigger screen than mobile phones. In this context, Barton et al. (2015) found in their experimental study that the use of iPads enhances the learning opportunities for tertiary education students. The use of the latest digital technologies (tablets, iPad, laptops and other android devices) in the tertiary education sector makes the learning process easy and convenient (Cismaru & Cismaru, 2011; Kay & Lauricella, 2010). In comparison with developed countries, developing countries like India are lacking in equipping their students with the latest Internet facilities (IIo & Ifijeh, 2010). In developed countries, higher education students are equipped with the latest Internet facilities that provide them easy access to online learning materials (Barton et al., 2015). Furthermore, Barton et al. (2015) reported in their study that easy online access to learning sources increases learning opportunities for the higher education students.

Apart from the lack of Internet access and Internet access modes in colleges, the interview data and my experiences highlighted how teachers' perceptions about the Internet impact on students' Internet use. The next section describes how teachers' opinions about Internet use influence students' Internet use.

5.2.3 Impact of the teachers' perceptions about the Internet on students' Internet use

As mentioned before in my personal narrative (in Section 3.2.2.2), when I was in my Master of Education year, we requested our college principal to provide us with an extra class to learn the basic use of the computers. Our principal allowed us to use computers only, but we were not allowed to use the Internet on the computer, because a few of my teachers had negative opinions about the Internet and they believed that we would misuse it. Due to my teachers' negative perceptions about the Internet, I could only learn the basics of computers in my Master of Education year. In this way, sometimes teachers' negative opinions about the Internet impact on students' Internet use. Similar to this, in the interviews, Komal, Meena, Jot, Neha and Raman described how a few of their teachers put restrictions on using the Internet during college hours. As Neha reported:

> Sometimes the aggressive attitude of your own teaching faculty is a problem. In my case, I felt that the teachers from the older generation, they are not well versed with the computer technology and then again for them it is like pressing a button and something is happening. They have this attitude that time wastage.

The positive attitude of the teachers towards Internet use helps to improve teaching skills (Ercan & Tekerek, 2012), and teachers with a positive Internet attitude motivate their students to use the Internet for their learning (Bozdogan, Usta & Yildirim, 2007). In developed countries, Internet-based programmes such as online classes, certificates and degrees are increasingly provided to teacher trainees to make

their teaching more effective (Bostus et al., 2015). It is apparent that the Internet is useful for raising and improving the quality of the teaching and learning processes.

The interview results also indicated that parents' perceptions about Internet use also affect their children's Internet use. In the next section, how parents' attitude towards the Internet influences to their children's Internet use is discussed in detail.

5.2.4 Internet access at home and parents' perceptions about Internet use

As Table 5.2 showed that all the interview participants accessed the Internet at their home and 67% (results derived from survey item 44 in Appendix B) of survey participants used the Internet conveniently at their homes. However, it was found that interview participants faced some problems while using the Internet at their homes. In this regard, Aman, Jot, Mann, Meena, Neha, Raman and Komal explained that their parents did not allow them to access the Internet because their parents thought they wasted their time on the computers. For example Neha revealed:

> Sometimes you are sitting on the Internet, parents general have the view he is sitting on the Internet, he is not studying, they have this attitude for the screen that you waste your time, you are chatting on the screen, but somehow they realize that Internet such an important part of our lives.

Meena and Komal expressed as their parents did not allow them to use the Internet, so they used their pocket money to get an Internet connection on their mobile phones and laptops. It seemed from their responses that the parents' regressive attitudes towards Internet use stop their children from using the Internet. Aman said that when he used the Internet at his home, his parents thought he was surfing on the Internet and wasting his time. Komal had the same experiences, and she said, "my parents think I waste my time on using the Internet".

My story was also similar to this as my father was not in favour of using the Internet at home. I was not allowed to access the Internet at home, and I did not even have a computer at my home. My father always said that the Internet wasted students' time. My father had negative attitudes towards the Internet and it impacted on me. The lack of Internet skills and poor knowledge about the Internet among parents interferes with their children's Internet uses (Boniel, 2010; Dor & Saks, 2013). The parents with a positive attitude towards the Internet may help their children to gain maximum benefits from Internet sources in order to improve their (students') learning (Ang et al., 2008).

Besides these difficulties, Indian tertiary education students reported 'electricity cuts' as another limitation that affects their Internet use for their learning. Due to unreliable electrical sources, students were unable to use the Internet. In the next section, the impact of electricity cuts on tertiary education students' Internet use is explained in detail.

5.2.5 Electricity cuts and Internet use

When we use the Internet on our computers, it requires electricity to operate it. From my personal experience, the poor electricity service is a big problem in India. I remember when I was in India that I often experienced electricity cuts. It always made me frustrated, especially if it happened while I was watching television or listening to music. As I used printed textbooks as my reading resources, it did not influence my learning very much. However, when I interviewed the participants I collected a new story about how electricity cuts could influence the online learning of the students.

Komal seemed to be very frustrated with the electricity cuts. She explained that if she was using the Internet to search for her study material and the electricity powered-off, then she lost her content, so she preferred to read printed textbooks. She shared her experience:

> One day I was searching a topic on the Internet that is of guidance and counselling and I got one page. I got a concept there and because of electricity cut I lost my concept there. So it created hindrance for the students to use Internet freely.

I presumed that in the cyber cafés, they used substitutes for mains electricity for example, batteries, inverters or electrical generators. However, the analysis showed that the electricity cuts affect the cyber cafés as well. Mann preferred to use the Internet in the cyber cafés and he reported the same issues with the electricity while using the Internet in the cyber café. He expressed that the cyber café was also not a reliable place to use the Internet. He further explained that when he used the Internet in cyber cafés; he experienced electricity cuts there many times.

The electricity cuts were considered very common everywhere. Rahul expressed his opinion that if the electricity went off while he was reading anything important, it gave him very bad experiences, so he avoided using the Internet for his learning. Also, Raman revealed the same story:

> There is an issue with the electricity. When I use the Wi-Fi Internet sometimes it happened with me the electricity gone and my topic vanished with it. Once, I was using the Wi-Fi connection and I was doing very important bank transaction and in the meantime the electricity gone and the transaction left between that was a bad experience.

She continued:

> Once I was preparing my discussion lesson; it was kind of my exam and I searched the topic on the Internet and I just half done the topic. I was using the Wi-Fi and in the meantime the electricity gone and my topic also vanished. That was the bad experience even I had shortage of time.

I believe that Internet sources have the potential to bring about reforms in the tertiary education sector but Internet sources need electricity or power. The lack of

electricity creates a hindrance in using the Internet facilities appropriately (Chinn & Fairlie, 2010). It seemed the electricity cuts discouraged participants from using the Internet for their study. Moreover, they favoured textbooks rather than the Internet. As Neha expressed, she felt much more secure with textbooks because it involved no electricity. The electricity cuts frustrated the interview participants when using the online resources for their learning.

As a relevant social group, participating Indian tertiary education students in this study described that besides the quality factors of the Internet (e.g., Internet access, Internet speed and Internet signal quality), other factors, for example lack of digital devices, negative attitude of the teachers and parents towards Internet use and electricity cuts also impacted negatively on students' Internet use for learning. The analysis of the wider context indicated that the social, economic and political factors also influenced students' use of the Internet for learning. Besides the design of the technology, the social beliefs (e.g., parental and teachers' negative attitudes towards Internet use stopped students from using the Internet), economic factors (e.g., cost of the Internet) and political factors (provision of the basic facilities that are required in using the technology, e.g., provision of digital devices and appropriate electricity supply) also impacted on the technology use.

Apart from the above discussed themes, it was presumed that individual's socio-economic background may also influence to their Internet use. This assumption was initially made based on my personal experience. This assumption was also made based on a study conducted by Haseloff, (2005) which found that people with high socio-economic backgrounds made more use of the Internet than those with a low socio-economic status. In addition, Bjorn (2009) explained in his study that the Internet is considered a high priced technological tool, so people with a high socio-economic status used the Internet more than people with a lower socio-economic status.

In order to discuss the impact of socio-cultural background on Internet use, the concept of *wider context* was used along with my personal narrative. The *wider context* explains the socio-cultural and political aspects of users and producers (Klein & Kleinman, 2002). Bijker and Pinch (1986) assigned a minor role to the wider context because they did not explain the socio-cultural background of the development of the artefact. Later, it was realised that to study the perceptions of the relevant social groups, it is essential to consider the socio-cultural background of the social groups in developing the artefact (Haard, 1993). In my research, the social-cultural background of the participants was not focused on; however, in this study I used my personal narrative. Therefore, the wider context was used to discuss the impact of socio-cultural background on Internet use.

5.2.6 Impact of socio-economic background on Internet use: A personal narrative analysis

As explained previously during my Bachelor of Education year, I had no preference to use the Internet. The meaning of the computer to me was 'just a machine used in offices'. The terms '*Internet*' and '*computer*' were both similar to me. I had a strong belief that only professional people (clerks and accountants) used the Internet. There was nothing to benefit students on the Internet. Thus, I had a negative attitude towards the use of the Internet, especially for study purposes.

If I now rethink the situation to analyse the reasons behind this attitude, I can explore several reasons: the background of my educational institutions, my family background and time constraints. I realised that my school background imparted an important role in forming my negative attitude towards the Internet. The discussion begins with my school background and goes on to describe how the background of my educational institutions influenced my attitude towards the Internet.

5.2.6.1 Impact of educational institutions' background on Internet use

I did my schooling (up to year 10) in a government school with a Punjabi medium of instruction (Punjabi is one of the regional Indian languages). My school was located in a rural area that was twenty kilometres from the main city. In my school, we had a traditional blackboard system and there was no computer. I remember that there was also no cyber café near my school. The term 'Internet' did not exist in my school life. Our school teachers never told us about the use of computers or the Internet. The textbooks were the only source for accessing knowledge, getting reading material and passing our annual examinations.

Due to the lack of Internet access and lack of awareness about Internet use, it was impossible for me to use the Internet while I was at school. In this context, Byker (2014) reported the absence of computers and the Internet in Indian schools as a major cause of school students not using the Internet in educational settings. If I compare my present situation (where I do everything on the Internet and conduct research about the use of the Internet) to the past, I realise that the Internet should be introduced to children in their school lives. In the age of digital technology, the Internet impacts in a positive way on students' learning and improves students' academic performances (Lee & Woods, 2010; Ogedebe, 2012). Moreover, I believe that schools shape the children's future. The background of my schooling impacted on my perceptions about the use of the Internet. I believe that in Indian schools, the use of the computers and the Internet should be taught like other subjects in order to improve students' learning. If a student is equipped with the Internet skills in their schooling period, it will help to shape their positive perceptions about the Internet.

I began tertiary education in 2002, when I enrolled in my first bachelor degree, which was a Bachelor of Arts (BA). The BA was a three-year degree and I took admission in a college. This college was located in an urban area. I saw computers for

the first time at my college. Clerks and other professional staff used the computer to manage their accounts. Students were not allowed to use the computers. There were a few students in my class who were studying the computer as an optional subject and only those students (who were studying computer subject) were allowed to use the computer laboratories. As an Arts student, I never used the computer. My life was going on smoothly with the absence of computers and the Internet. I and my other friends often discussed the importance of the Internet in our life and I always made a statement that "the Internet is nothing and it is just a mode for wasting your time". I remember that the father of one of my friends was a university lecturer and she always favoured the use of the Internet by saying that "her father told her, as a tertiary education student we should learn to use the Internet because it contained very useful learning material". However, I was reluctant to use the Internet and I always argued that "no, I believe, textbooks are a very easy and convenient tool for learning over the Internet". In this way, I tried to avoid the Internet. Even in my college life, the Internet did not exist. Moreover, I did not even have computer access at my college, which emphasised the poor infrastructure of the college where I studied. In Indian degree colleges, the lack of computers and the Internet was very common during my college time. I believe that the Internet should be provided to the students in Indian colleges then it could help to enhance their learning.

I was admitted to Punjabi University (India) in 2005 to complete my first Master degree, which was a Master of Arts (MA) in Economics. During my Master of Arts year, I met three new friends. Among them, one lived in an urban area and she did her schooling at a convent school. She was an expert in operating computers and using the Internet. Moreover, she preferred to use the Internet for downloading and accessing reading material. She often talked about Orkut and Facebook with us. These two terms were completely new to me. Once I asked her about Orkut and Facebook and she

replied “These are sites to make online friends and to chat with them”. This explanation left a very negative impact on me about social networking sites. I believed that only useless people used these Internet sites because they did not have any other job to do. I was a very studious type of girl, so I never tried to use these Internet sites because I thought “I do not have spare time to waste on these useless activities”. At this stage (where I am now conducting research on Internet use), I think about my friend who used the Internet and had a very positive opinion about social networking sites. I realise that she had a computer education and she learned the use of the Internet during her schooling, and this early exposure positively influenced her opinion about Internet use. If a person starts to use an artefact (for example ‘the Internet’), there are likely to be more chances to show a positive attitude towards that artefact.

A big change came to my life when I enrolled in the Bachelor of Education in 2007. As described in Chapter 3, the Bachelor of Education is a professional degree to become a teacher in India, so I considered that Bachelor of Education year as a professional year in my academic life. That year changed my attitude towards my life and I start to think professionally about my academic life. I now really wanted to become a teacher. During my Bachelor of Education year, our teachers taught us the importance of the use of advanced educational technology in the life of a teacher. As all Bachelor of Education students were considered to be future teachers, we were always motivated to use the Internet for our learning. As I expressed earlier in my narrative story, I had to spend eight hours a day in my college and two hours a day of travelling during my Bachelor of Education year. I wanted to learn about computers and the use of the Internet to enhance my learning experiences but due to time constrains, I could not learn it. I did not get back home until 6 pm and after that I felt very tired. Moreover, to learn the computer I would have to go to the city because, in my village, there was no computer training centre. I had the opportunity to learn the basics of the computer

during my Master of Education year, and in the Master of Philosophy in Education year, I implemented the Internet in practical terms for my study.

The wider context emphasises that in the development of the artefact, the socio-cultural background enables the manufacturer to focus on the basic needs of the relevant social groups (Klein & Kleinman, 2002). In my story, I narrated that I had negative perceptions about the Internet because I did not have access to the Internet, however, during my Master of Philosophy in Education year, I realised the importance of the Internet for tertiary education students. The Master of Philosophy year completely changed the image of the Internet in my mind and I started to favour the use of the Internet for my learning. The Internet became 'the magic click' to me that provides me with knowledge about any required topic. Bijker and Pinch (1986) explained how any person's past experience and socio-cultural background impacts on the use of the artefact, which further influences the development of the artefact. However, this thesis goes beyond the 'development' of the artefact and focuses on the impact of the socio-cultural background on the 'use' of the Internet.

5.2.6.2 Impact of family background on Internet use

I lived in a small village and my village people were not very aware or literate about technology. My parents were also not literate in using digital technology. My father always pushed me to read printed textbooks and I was not allowed even to use a mobile phone during my Bachelor of Education year. My father always stated that mobile phones and computers were destroying the lives of young people, who wasted their time on the Internet. My father's attitude affected me and I always avoided using the Internet. I analysed that parents' attitude towards the Internet influences their children's attitudes towards the use of the Internet. Internet-literate parents motivate their children to use the Internet for their learning (Ang et al., 2008).

I now explain the access to the Internet at my home. As I explained earlier, my father did not allow me to use the Internet, so he did not provide me with Internet access at my home. I could only get a computer without Internet access in 2007, when I was doing the Bachelor of Education. I came from a middle-class family and my father always said he could not afford the extra expenses of the Internet. Moreover, I was doing full-time study, so I was not earning during that time, and I was completely dependent on my family. The socio-economic conditions played a role (although a minor one) in keeping me away from using the Internet to improve my learning.

I lived in rural area, which in India meant that there was often a lack of basic facilities (including the Internet). No cyber café or Internet cafe was available in my village. Similar to Adekunmisi et al. (2013), I believed that the lack of access to the Internet influences people's attitudes towards the use of the Internet. In rural areas, the lack of Internet facilitates restricted the potential of rural students. I am of the opinion that in rural areas, Internet facilities should be provided, so that the level of tertiary education could be enhanced in these areas by providing them online access to higher education (Deane et al., 2011).

From the above discussion, I concluded that the socio-cultural background of a person impacts on the attitude towards the artefact. If I had started to use the Internet during my school life, it could help me to possess a positive attitude towards the Internet. Similar to the study of Adekunmisi et al. (2013), it was found that the Internet was considered to be a good tool for learning by the participating Indian tertiary education students and it was found in other studies (Bhattacharya & Sharma, 2007; Dange, 2010; Goria, 2012) that the Internet enhanced access to tertiary education and the optimum use of the Internet can make tertiary education accessible to all. It indicated the need for Internet provisions in Indian educational institutions and

highlighted that Internet facility should be introduced in Indian schools or tertiary education institutions in order to improve the quality of tertiary education.

My narrative showed how my socio-cultural background impacted on my opinion of the Internet transferred from a negative to a positive one. It indicated that when a person does not use the Internet, then they may have a negative attitude towards an artefact. As we start to use any object and gain experience, it helps to develop our attitude towards that object. It pointed out that 'an attitude' can be shaped and developed through the experience and it is not an inborn concept (Thomas & Znaniecki, 1918).

5.3 Summary

Based on interview data, the survey results and my narrative, this chapter has further discussed the last research question: what is the impact of Internet quality on students' learning? The relevant social group and wider context components of the SCOT theory were used to analyse and discuss the results. I analysed that the quality of the Internet is mainly attributed to three factors: Internet access, Internet speed and Internet signal quality. From my narrative, it was apparent that I had no Internet access at my home and this kept me away from using the Internet. In contrast to this, interview data highlighted that all of the interview participants and 67% of survey participants reported that they had Internet access at their homes. It indicated that research participants preferred to access the Internet at their home and they felt it was convenient to use the Internet at their homes.

In the context of Internet access at educational institutions, similar to my personal experience as a Bachelor of Education student back in India, I found that all of the interview participants stated that their colleges did not provide them with computers and Internet access during their college hours. In the interviews, all participants reported

that during their college hours, they accessed the Internet on their mobile phones or went to cyber cafés to access the Internet. Moreover, it was found that students bought the Internet data on their mobile phones and paid cybercafé bills with their pocket money. It indicated that no free Internet access was found in selected educational institutions for students' use. The lack of Internet access in higher education institutions restricted students' learning (Adekunmisi et al., 2013). In the Indian context, the non-availability of the Internet in Indian educational institutions prevents students from gaining maximum benefits from the online learning materials (Kaur & Kumar, 2005).

Another factor that impacted on Internet quality was found to be Internet speed. In regard to Internet speed, Jot, Aman and Meena reported that they often experienced slow Internet speed which further frustrated them while using the Internet. Jot stated that slow Internet speed consumed a lot of his time while downloading any heavy file, so he avoided using the Internet for his reading. Moreover, Neha highlighted that area and location affected the Internet speed. Further, she explained that she lived in an urban area, so she experienced a good Internet speed there rather than at her college, which is situated in a rural area. In this context, Ahmed and Aqil (2011) found that slow speed of the Internet makes students frustrated and it impacts adversely on Internet use in learning.

Poor Internet signal quality was found to be another factor that impacted on students' Internet use for their learning. Aman, Komal, Rahul and Neha reported that due to the bad signal quality, they could not utilise Internet resources in their learning. The poor signal quality of the Internet creates a hindrance to the students in accessing the online learning materials. Similar to a study conducted by Kumar (2010), in this thesis, the poor Internet quality was found in selected higher education institutions. Furthermore, it was found that poor Internet quality created hurdles for the research participants while using the Internet for their learning. In this context, Adekunmisi et al.

(2013) reasoned that poor Internet quality is a cause of low use of the Internet for study purposes by tertiary education students.

All interview participants reported that mobile phones, laptops and personal computers were their Internet access mode; however, all interview participants reported the high Internet cost of using the Internet for learning. As students spend their pocket money to access the Internet on their mobile phones and computers, Internet cost always remained a concern while using the Internet. In this context, Jot, Meena and Komal stated that they got limited Internet data for a certain amount of money, so they used the Internet very carefully and accessed the online learning material in rare situations. In contrast, Neha described that she did not consider the Internet cost as a big issue as her father paid her Internet bills. It seems that the students who accessed the Internet with their pocket money, considered the Internet cost to be a barrier while using the Internet for their learning. Similar to this, 54.5% of the survey respondents stated that due to the high Internet cost, they used the Internet for a limited time. It indicated that Internet cost prevents students from using the Internet for their learning.

There was found to be a lack of the latest digital devices (iPads, tablets and other android devices). The portable digital devices provide an easy and convenient access to online learning materials (Gong & Wallace, 2012; Smith &Wakefield, 2012). Thus, the lack of the latest digital devices might be a cause of low use of the Internet for learning.

Teachers' perceptions and attitudes towards the Internet are regarded as another factor that can positively or negatively impact on students' Internet use in their learning. A teacher with a positive attitude towards the Internet motivates their students to use the Internet (Bozdogan et al., 2007). Unfortunately, I found that the negative attitude of the teacher towards the Internet demotivated participants from using the Internet. Komal, Meena, Jot, Neha and Raman said that their teachers did not allow them to use the

Internet in their colleges as they (teachers) thought that the Internet just wasted students' valuable time. Therefore, negative attitudes of teachers towards the Internet can impact on students' Internet use for their learning.

Similar to this, another factor that impacted negatively on students' Internet use was their parents' negative attitudes towards the Internet. Aman, Jot, Mann, Meena, Raman and Komal expressed that their parents did not allow them to use the Internet and did not provide them Internet access at their homes. However, participants spent their pocket money on getting Internet access on their mobile phones and personal computers. It indicated that the negative attitude of the parents towards the Internet prevented their children from using the Internet for their learning. In this context, Dor and Saks (2013) found in their study that the lack of Internet skills and poor knowledge about the Internet among parents interfered with their children's Internet use.

The lack of electricity supply was also reported by participating students to be a barrier while using the Internet. Komal, Rahul and Raman reported that sudden electricity cuts made them irritated while working on the Internet. In order to operate computers and access the Internet, electricity is required. In the absence of electricity, it becomes difficult to use the Internet. One interview participant (Mann) also reported that even cyber cafés experienced sudden electricity cuts. An inadequate electricity supply creates a hindrance in using the Internet (Chinn & Fairlie, 2010). It indicated that poor electrical facilities may also be a cause of low use of the Internet by participating tertiary education students.

In some related studies (Bjorn, 2009; Haseloff, 2005), it was found that socio-economic status has a positive impact on Internet use and it was also reported that people with a high socio-economic background used the Internet more than people with a low socio-economic background. Therefore, wider context, which is one component

of the SCOT theory, was used to discuss and analyse the impact of one's socio-cultural background on Internet use for learning. I used my narrative, and realised that the lack of Internet access in my educational institutions kept me away from using the Internet. Moreover, my family background also impacted on my Internet use. I belong to a middle-class family and my parents were not aware of the uses of the Internet. My father considered the Internet to be a useless tool, so he never allowed me to use the Internet. My father did not even want to buy a computer. It indicated that my school and family background impacted adversely on my attitude towards the Internet. Attitude is not inborn but is shaped and developed through interactions with the environment (Haddock & Maio, 2010). When I started to use the Internet for my study in my Master of Philosophy year, it helped me to develop my positive attitude towards the Internet.

CHAPTER 6: CONCLUSION

This study was based on my keen interest in the use of the Internet for learning, which was largely influenced by my experience with the Internet, where I became an Internet user after being a completely Internet-illiterate person. This experience was integral to the selection of the research topic. After starting to use the Internet, I realised that the integration of the Internet into tertiary education students' academic lives could enhance the learning opportunities of students. However, in the Indian context, limited studies were found that describe and highlight the integration of the Internet into tertiary education institutions, and particularly into Indian tertiary education students' learning. This study has involved a detailed investigation of student participants' perceptions about Internet use, the impact of the Internet on access to tertiary education, gender differences in attitudes towards the Internet, and the impact of Internet quality on students' learning.

The SCOT theoretical perspective was utilised to analyse participating Indian tertiary education students' perceptions about Internet use for their learning. As a theory of social shaping of the technology, the SCOT theoretical lens has allowed in-depth investigation and analysis of the impact of the Internet on tertiary education students' learning. After consideration of the reviewed related literature gaps, the following research questions were framed:

1. What perceptions do Indian tertiary education students have about the impact of the Internet on their learning?
2. How does the Internet impact on access to tertiary education in India?
3. What is the relationship between Indian tertiary education students' attitude towards the Internet and their gender?
4. How does the quality of the Internet impact on Indian tertiary education students' learning?

The above research questions were answered and discussed using three components of the SCOT theory: interpretative flexibility, relevant social groups and wider context. One component of the SCOT theory, technological framework, is utilised to present some practical implications rising from the findings in this chapter. This chapter also provides suggestions and areas for possible future research.

Each of the research questions will be answered and discussed in turn to succinctly synthesise the findings of this study. While the following information is not new, it presents a concise description of what has been presented in the results chapters (Chapter 4 and Chapter 5).

6.1 Research question one

What perceptions do Indian tertiary education students have about the impact of the Internet on their learning?

Bijker and Pinch (1986) demonstrated in the SCOT theory that social perceptions and interpretations make a significant contribution to the development of a technology. Technology development is a social process, where the different societies give different meanings to the technology. Thus, before analysing the impact of the technology on societies, it is essential to examine societies' perceptions about that technology.

From the related literature, it was found that in developed countries, the Internet is more extensively used by tertiary education students for learning (Chang et al., 2015; Josh, 2012; 2015; Tess, 2013; Tinmaz &Yakin, 2013) than in developing countries like India (Dange, 2010; Gill & Li, 2007; Kumar, 2010). The integration of the Internet has the potential to promote tertiary education students' learning through implementing new practices of Internet-based learning. However, Bijker and Pinch (1986) demonstrated that the adoption and implementation of any particular technology (e.g., the Internet in

this study) depend on the social groups' perceptions about that technology. For this, it was appropriate to firstly analyse Indian tertiary education students' perceptions about the Internet.

Under the consideration of *interpretative flexibility*, which enables different social groups or different members of a social group to interpret and describe the technology, interview participants' perceptions about the Internet were analysed. It was found in this study that the perceptions of the research participants about the Internet were that it is a useful tool for online learning and teaching.

This study described that research participants used the Internet for learning. Similarly, Dhamija and Panda (2007) reported that Indian tertiary education students used the Internet for learning, however, Dhamija and Panda did not illustrate how Indian tertiary education students used the Internet for their learning. The current thesis went beyond and described ways of using the Internet: for accessing learning material for doing assignments, preparing PowerPoints and getting examination material. The participants in this thesis reported that when they used the Internet in academic activities (e.g., writing assignments, making PowerPoints and accessing examination related material), it enabled them to access a wide range of learning material from anywhere in the world that further enhanced students' academic performance.

The interview participants in this thesis also described the Internet as an online teaching tool that they utilised to improve their teaching skills. Campbell and Kent (2010) echoed this finding and reported that teacher educators used Internet resources to improve their teaching skills. It was also described that the use of Internet resources enhanced the knowledge level of the teachers (Kaur & Kumar 2005), which could also be useful in making teaching more effective. Accordingly, this study found that the

integration of the Internet into tertiary education institutions (both for students and teachers) could improve the teaching and learning processes in the Indian context.

These findings also suggested that the perceptions of research participants were based on the usage patterns of the Internet as described by Bijker and Pinch (1986), who stated that individuals' usage patterns of the technology determined their perceptions about that technology. As research participants used the Internet for learning and teaching purposes, it enabled participants to interpret the Internet accordingly. My personal narrative echoed this finding and described how I realised the benefits of the Internet after starting to use the Internet and it shifted my perception about the Internet from it being a clerical tool to an online learning tool.

It was also found in this study that the use of the Internet has shaped it to become educational technology and the socially constructed meaning of the Internet had not been determined by the design of the Internet. For example, Robert (1967) reported that the Internet was initially designed for communication via computer networks. As the usage area of the Internet has expanded, the meaning of the Internet has also grown to not only be a communication tool but also a source of information and world connector. Similarly, this study found that as research participants used the Internet for learning and teaching, they gave meaning to the Internet as a set of practices for learning and teaching. Thus, the findings suggested that the design of the Internet did not determine the meaning of the Internet as an educational technology, but instead, the uses of the Internet in the educational field had made the Internet an online learning and teaching tool.

6.2 Research question two

How does the Internet impact on access to tertiary education in India?

In India, enrolment in the tertiary education sector is not substantial (Ashish & Atanu, 2012) and it was reported that there were socio-cultural barriers that prevented people from obtaining higher education (Balakrishnan, 2010). From my own narrative, I described how some of my school mates wanted to attend tertiary education, but due to their family responsibilities and job priorities, people dropped out of their education. The interview results indicated that participants were of the opinion that providing online courses to people would enable them to obtain a university education. The online courses provide opportunities for people to complete higher education regardless of time and place (Balakrishnan, 2010), as in an online course, students are not required to follow a structured classroom teaching and learning system. In online courses, teachers deliver learning content in a flexible environment, regardless of time boundaries (Bostus et al., 2015).

Moreover, in India most of the universities and colleges are mainly urban-centric, whilst the institutions located in rural areas lack quality in delivering learning programmes (Chakraborty & Konwar, 2013), which results in a low level of university education in rural areas of India. In Indian rural areas, the gross enrolment rate in university education was reported to be only 7% (Chakraborty & Konwar, 2013). In this context, it was found that interview participants were of the opinion that the provision of Internet resources could increase the level of tertiary study among rural populations. The results also highlighted that the integration of Internet resources could enable rural students to obtain higher education from home. The interview results indicated that participants believed that appropriate use of Internet resources to provide tertiary education to people who dropped out of their studies due to barriers (rural background, family responsibilities, job priorities and so on) could make tertiary education accessible to them.

The participation of women in the tertiary education sector also needs to be upgraded, as only a 41.5% participation of women was found in the total enrolment of the academic year 2010-2011 (Nath, 2014). In my narrative story, I described that in my village, girls were not permitted to go to urban area for their higher education because of lack of transportation and negative parental attitudes towards female education. In this context, Gupta and Rao (2006) reported that most females drop out of their studies because of family responsibilities and due to lack of the provision of higher education institutions near their homes. In those cases, I believe the online distance courses and online teaching and learning programmes could allow women to enrol in an online course to obtain tertiary education. In line with my belief, the interview participants reported that the provision of online teaching and learning programmes could bridge a gap between women and tertiary education.

Also, in Chapter 4 it was shown that interpretative flexibility analysis provides social perceptions about the technology that enables manufacturers to improve the design of the technology so that all societies can use and benefit from that technology (Bijker & Pinch, 1986). Therefore, the study of social groups' perception about the technology allows designers to focus on societies' needs and expectations from new improved technology. Similarly, the analysis of the impact of Internet use on access to tertiary education pointed out the need to establish Internet resources in rural areas, and also highlighted the need for provision of online Internet facilities to people who wish to obtain tertiary education. It indicated that the integration of the Internet into tertiary education systems could increase the level of tertiary education in India.

6.3 Research question three

What is the relationship between Indian tertiary education students' attitude towards the Internet and their gender?

Bijker and Pinch (1986) assumed in the SCOT theory that the concept of use of technology can be gendered, and males and females may tend to define technology differently. The gender difference in relation to attitude towards the Internet was focused on in this study. Using the descriptive analysis of the survey data, it was found that both genders (males and females) had a positive attitude towards the use of the Internet for learning. It indicated that both males and females favoured using the Internet for their learning.

Unlike previous studies (Abedalaziz et al., 2013; Adebayo et al., 2011; Atan et al. ; Teo, 2008) that claimed there were no gender differences in attitude towards the Internet, this thesis showed that there was a gender difference in relation to attitude towards Internet use for learning. Females showed a more positive attitude towards the Internet, with a 2.66 mean value, than their male counterparts, who had a 2.59 mean value. It indicated that female participants favoured using the Internet for learning more than male participants. In contrast to Jabreen and Jammal (2008), whose study reported that male students showed a more positive attitude towards Internet use for learning, the results found in this thesis echo the findings of Khudair and Oshan (2008), who claimed that females' positive attitude towards Internet use for learning showed that female students were more aware of the education uses of the Internet than male students.

Therefore, the presumption made by Bijker and Pinch (1986) that technology is gendered proved to be correct as this thesis showed female participants had a more positive attitude towards Internet use for educational purposes than male participants. Also, another assumption of Bijker and Pinch was that individuals' interaction with the technology impacted on the attitude towards that technology and this assumption was also proven to be correct in this study. The results in this study indicated that research participants used the Internet for their learning and as participants had interaction with the Internet, it might be a reason for participating students' positive attitude towards

Internet use. My personal narrative supported this discussion, as it was apparent in my personal narrative that due to the lack of interactions with the Internet and inadequate understanding of the Internet, I had a negative attitude towards the Internet. However, as I started to use the Internet for learning in the Master of Philosophy degree, my attitude towards the Internet also shifted to the positive side and I began considering the Internet as an online learning tool.

6.4 Research question four

How does the quality of the Internet impact on Indian tertiary education students' learning?

Despite interpreting the Internet as a useful tool for learning that provided a wide range of easy access to online learning material, the research participants reported that they used the Internet on average for one to three hours in a day. It was found that participants did not use the Internet during college hours. The reasons behind the low use of the Internet were described using the second component of the SCOT theory, namely, the relevant social group.

Bijker and Pinch (1986) described in the SCOT theory that different social groups define the positive and negative aspects of the technology, and the social groups that show the same set of meanings are considered to be relevant social groups. Similarly, in this study, interview participants expressed the same opinions about the Internet quality provided to them. Therefore, the interview participants were considered to be a relevant social group in this study who used the Internet for learning and described the similar views about the impact of the Internet quality on their learning.

It was found that Internet quality impacted on student participants' Internet use for their learning. The main factors of Internet quality were Internet access, Internet speed and Internet signal quality. Considering the interview participants as a relevant

social group, it was found that participants were not satisfied with the Internet quality provided in India.

Interview data highlighted that all participants accessed the Internet at their homes and 67% of survey participants stated that it felt convenient to use the Internet at their homes. In the selected tertiary education institutions no Internet access was found for students' use and due to the lack of Internet access in educational colleges, student participants were obliged to use traditional resources of learning such as printed textbooks. However, the printed textbooks provided limited content bounded to limited years and authors (Abram 2010b), so use of online learning material was reported to be more beneficial than paper-based textbooks.

As Internet access was not provided in participating educational institutions to students, if access to the Internet was needed during college hours, student participants went to cyber cafés to use the Internet. Due to the high Internet charges in cyber cafés and overcrowding of cyber cafés, participants did not often access the Internet in cyber cafés. Although cyber cafés were reported to be a preferred place to access the Internet according to Okafor and Ugah (2008), this study found that cyber cafés do not provide an appropriate learning environment for students.

Similar to the thesis findings, some studies (Adekunmisi et al., 2013; Kaur & Kumar, 2005; Kumar, 2010) reported that due to the lack of Internet access in education institutions, tertiary education students could not benefit from online learning materials. In agreement with previous studies (Barton et al., 2015; Mahmood, 2009), it was found that Internet access impacted on Internet use. In this context, Barton et al. (2015) suggested that good Internet access allows students to use the Internet appropriately for learning.

Also, an adverse impact of the slow Internet speed was found on students' Internet use for learning. Interview participants reported that the Internet speed in India

is slow and, similar to the findings of Aqil and Ahmed (2011), participants described that slow Internet speed made them frustrated when using the Internet for learning. It was also reported that the Internet speed was better in urban areas, than the rural areas. Poor Internet signal quality was also found to be a reason for low use of the Internet by participating Indian tertiary education students.

Using *wider context*, another component of the SCOT theory, along with relevant social group, it was found that social, economic and political aspects of societies also impacted on the use of the Internet. As tertiary education colleges did not provide students with Internet access, research participants revealed that they spent their pocket money to access the Internet on their mobile phones and to access the Internet in cyber cafés. Thus, the Internet cost was reported to be another factor that impacted on students' Internet use for learning. The high Internet cost and paid versions of the online learning materials prevented students from using the Internet for learning.

From the interview results, it was found that students accessed the Internet on their mobile phones during college hours and they accessed the Internet at home on computers and laptops. However, mobile phones have small screens and students could not use them for reading. A lack of portable digital devices (e.g., tablets, iPad, laptops and other android devices) was also found in education institutions. In this context, a few studies (Barton et al., 2015; Cismaru & Cismaru, 2011; Kay & Lauricella, 2010) reported that the use of portable digital devices for learning made the learning process convenient and it also motivated students to make efficient use of online learning materials.

It was also found that teachers' negative opinions about the Internet impacted adversely on students' Internet use. Similar to my experience, interview participants reported that sometimes their teachers did not allow them to use the Internet at college, as teachers thought the Internet had no benefits for students. A number of studies

(Bozdogan et al., 2007; Ercan & Tekerek & 2012; Bostus et al., 2015) reported that teachers with a positive attitude towards the Internet motivated their students to make efficient use of the Internet for learning. Thus, teachers' negative attitudes towards the Internet could be another reason for student participants' low use of the Internet.

Parents' negative approach towards the Internet was reported to be another factor that impacted on students' Internet use for learning in this study. In the Indian context, a little work has been done in explaining the impact of the parents' attitude towards the Internet on their children's Internet use, hence this study contributed to the field and described that the negative opinion of the Parents about the Internet use prevented students from using the Internet and students felt restricted while using the Internet for their learning. In contrast, Internet skilled parents helped their children to use the Internet for their learning (Ang et al., 2008).

It was found in the study that the supply of the electricity also impacted on the Internet use. The poor electricity supply was reported as a hindrance that prevented students from using the Internet in this study. All digital devices and Internet resources require electricity to be operated and the lack of electricity was found as a barrier in using the Internet facilities appropriately. Therefore, it is recommended that the electricity provisions should be improved so that students could be benefited from Internet resources appropriately.

Thus, through the wider context analysis, it was found that social beliefs (e.g., parents' and teachers' negative attitudes towards Internet use stopped students from using the Internet), economic factors (for example, cost of the Internet) and political factors (for example, provision of the basic facilities that are required for using the technology, and provision of the digital devices and appropriate electricity supply) also impacted on student participants' Internet use. Apart from the above discussed themes,

using my personal narrative, it was discussed that one's socio-economic background also impacted on Internet use. By providing my school background, it was shown that in my school and college life, the terms computer and Internet were completely absent. Computer and Internet access were not available in my school and colleges. In this context, Byker (2014) reported that the lack of Internet facilities in Indian schools is a major cause of students' low use of the Internet for learning.

It was also explained that my family background was another factor that prevented me from using the Internet. The rural background and lack of awareness of Internet use for learning of my parents influenced my attitude towards the Internet. As described earlier, Internet-literate parents motivate their children to use the Internet (Ang et al., 2008). It was described that the lack of understanding of Internet use of my parents demotivated me from using the Internet for learning. I now believe that if I had had Internet access, knowledge and skills during my own studies in India, I would have overcome the disadvantage of being a student from the rural part of India.

The review of related literature described that many studies (Chang et al., 2015; Josh, 2012; 2015; Tess, 2013; Tinmaz &Yakin, 2013) have been done on the use of the Internet for learning purposes in developed countries, but this study contributes to developing countries that are similar to the Punjab state of India. This research set out to contribute the knowledge about the use of the internet in tertiary education in India. On the basis of findings discussed in Chapter 4, where research participants considered the Internet as a learning tool, it is recommended that the Internet resources can be used as a learning practice in tertiary education system.

Indian government always aimed to establish Internet-based teaching and learning programmes in higher educational institutions to improve students' learning. In this context, in 2004, University Grant Commission (UGC) of India launched a mega programme namely INFONET (Information Network) to provide the Internet facilities

to higher educational institutions. The 12th five-year plan (2012-2017) also recommended improving the quality of Internet facilities in Indian tertiary education institutions. However, in terms of access to the Internet and quality of the Internet facilities, Indian tertiary education institutions are facing challenges (as described in Chapter 5). It indicated that there is a need to improve Internet facilities in Indian tertiary education institutions to improve students' learning. In the age of advanced technology, it has become essential for the policy makers to address the future needs and requirements of students and provide them (students) updated facilities to run parallel with the technological based era. On the basis of the results (as described in Chapter 4 and 5), in the next section, the technological framework analysis provides some implications and recommendations for Indian tertiary education institutions and Indian tertiary education policy makers that can be implemented in improving Internet facilities in Indian tertiary education institutions.

6.5 A technological framework analysis

The technological frame links the interpretative flexibility and relevant social groups and provides suggestions for the improvement of the technology (Bijker, 1995). As described earlier, the relevant social groups enable a manufacturer to diagnose the problems faced by the relevant social groups while using the particular artefact. In this research project, Indian tertiary education students highlighted the issues related to Internet use, including Internet quality that impacted on Internet use for learning. Using the technological framework analysis, on the basis of the interview data, some suggestions are provided that could be implemented to solve the issues related to Internet use for learning.

6.5.1 Implications for tertiary education institutions

The discussion starts with the Internet access issues in Indian Bachelor of

Education colleges. As described before, a lack of access to the Internet was found in Indian Bachelor of Education colleges. The interview results indicated that only one or two computers existed in every college, and students were not allowed to use those computers. In this way, without the computers, it was difficult to access the Internet. It pointed out students' need for Internet access, as the findings in Chapter 4 revealed that participating students interpreted the Internet as an online learning and teaching tool and use of the Internet for learning could enhance students' academic performance by providing them a wide range of access to learning material. This study also highlighted that participants favoured using online resources, such as e-libraries and e-books, rather than textbooks. It shows that tertiary education students need change in their traditional educational structure. The tertiary education policy makers should address students' needs and introduce Internet-based technologies into Indian tertiary education institutions. Therefore, it is recommended that computers equipped with Internet facilities should be provided to students so that students can use the Internet facilities efficiently to enhance their learning.

The findings revealed that while accessing the Internet at homes, colleges and cyber cafés, students had to pay high Internet bills. Due to the high Internet cost, it was found that student participants avoided using the Internet and participants were obliged to use textbooks. However, the applicability of textbooks remains limited. In order to get the latest knowledge about a specific content, the findings suggest that the Internet is regarded as a more convenient tool than textbooks. As access to the Internet enables tertiary education students to connect with the rest of the world and helps them to get their study material from all around the world, it is recommended that free Internet facilities should be provided to tertiary education students.

Also, the findings showed that all of the interview participants use the Internet on their mobile phones during their college hours and they lack portable digital devices

(tablets, iPads and other android digital devices). No students spoke about the iPad, tablets and other portable devices. This indicated that participating Indian tertiary education students did not use the latest portable digital technology for their learning. All of the participants used mobile phones to access the Internet during their college hours, but mobile phones have a small screen and students cannot use them for reading. The portable computer devices (iPads and tablets) provide easy access to learning content with a bigger screen than mobile phones. In this way, Indian tertiary education students should be equipped with the latest digital technology so that they can benefit from the Internet resources. The appropriate use of portable digital devices in academic matters enhances students' learning experiences (Barton et al., 2015). Therefore, there is a need to introduce and provide digital devices to Indian tertiary education students, in order to promote the concept of online learning among them. The Indian government should introduce and promote projects like 'Akash tablets'. Akash tablet project was procured by Indian government to provide low-cost tablet computers equipped with Internet connection to promote education (Sarkar, 2016).

The results highlighted that teachers' negative attitudes towards Internet use prevented students from using the Internet for learning. To change this situation, teachers' attitudes towards the Internet need to be changed. Therefore, teacher education programmes (including pre-service and post-service training programmes) that promote the use of the Internet as an educational tool should be provided to teachers. It may help to enhance students' learning through using the Internet. Internet resources also equip the teacher to enhance their teaching skills from the online training programs.

6.5.2 Implications for education policy makers

Indian tertiary education policymakers are recommended to equip tertiary education institutions with upgraded and free Internet facilities. The free access in tertiary education institutions can motivate students to use the Internet as an online

learning practice.

Indian tertiary education policy makers always aim to enhance the education level among rural population. For this, Internet resources can be used. The tertiary education policy makers are recommended to provide Internet facilities in rural areas which can solve travelling issues of rural population which they face to attend tertiary education institutions located in urban areas. In addition, the provision of good Internet facilities in rural areas can help rural students to access the updated learning materials from online resources. In this way, online learning facilities can open new gate ways of learning to rural students.

In India female participation was found less as compared to males (Nath, 2014) and education policy makers aimed to enhance women tertiary education level in India. Policy makers can provide special Internet provisions to female students who wish to accomplish higher education. The Internet provisions can enable women to complete their education from homes without sacrificing their family and other responsibilities.

It was also found that sometimes, parents' regressive attitudes towards the Internet restrained their children from using the Internet for their learning. As described in my narrative (see Chapter 3), my father had a misconception about the Internet. For him, the Internet wasted people's time and people used it for entertainment purposes only. This impression kept me away from the Internet. Also, most of the research participants revealed that their parents did not allow them to use the Internet, so, the students could not use the Internet for their learning. It is suggested that there is a need to change parents' attitude towards the Internet, as the Internet does not always mislead their children. Therefore, seminars on the benefits of the Internet use should be organised for parents to make them aware about the educational uses of the Internet. Easy Internet access at home could enhance the tertiary education students' learning experiences with the Internet.

The analysis of my personal narrative showed that the absence of Internet access in my schools impacted on my attitude towards the Internet. It indicated that one's school background makes a significant contribution to the formation of students' attitude towards an object. In Indian government schools, Internet facilities are not provided to students (Byker, 2014). It is recommended that the Internet as a learning tool should be integrated into schools to provide access for school aged children. It may enable students to promote their learning.

6.5.3 Implications for Internet service providers

As a relevant social group, interview participants reported that slow speed and poor signal quality are barriers to using the Internet for learning. It shows that Internet services are poor in India and Internet service providers should pay attentions towards it. Internet service providers should upgrade Internet services, as slow Internet speed and poor signal quality demotivated students from using the Internet for learning (Aqil & Ahmed, 2011). The provision of Internet services with good speed and good signal quality may enhance students' positive experience with the Internet for their learning.

Internet provisions were reported more inadequate in rural areas as compared to urban areas. The establishment of new Internet networks in rural areas is recommended. The Internet services providers should provide excellent Internet facilities with adequate Internet connections in rural areas. In addition, the Internet quality needed to be upgraded in urban areas as well, as Internet quality was reported poor in urban areas also.

6.6 Limitations

A number of limitations placed constraints on this research and these limitations were taken into account throughout the research. The sample for both the qualitative and quantitative data in this study was selected from tertiary education students who were

doing a Bachelor of Education degree from education colleges in the Punjab state of India. The results of this study had to be cautiously interpreted against the educational colleges of India, as the bigger context of the study.

The relationship between gender and attitude towards the Internet was examined using survey data. Attitude towards Internet use was studied as a small factor in this study, whilst perceptions about Internet use were the main variable. Careful interpretations were made of the findings to discuss participating students' perceptions about Internet use and attitude towards the Internet.

Using my personal narrative, the impact of socio-economic background on Internet use was discussed. The interview data and survey data were not employed to analyse the socio-economic impact on Internet use for learning. The use of a personal narrative meant that the results of this study had to be cautiously interpreted against interview and survey data.

6.7 Suggestions and areas for further research

In association with the limitations of the study, future research could extend the current study to include other states of India that encompass different contexts of Internet use. Moreover, future research could include other faculties (engineering, commerce, medicine and so on) besides education students to explore the impact of Internet use on university students' learning. Furthermore, a comparative study of the perceptions of students from different developing and developed countries (for example, India and Australia) about Internet use could be conducted to explore the impact of the Internet on university students' learning.

Bijker and Pinch (1986) provided a component named wider context in the SCOT theory to analyse the impact of socio-cultural background on technological

development. The impact of socio-economic background on Internet use could be studied through interview and survey data to provide more evidence for the role of socio-cultural background in perceptions about Internet use for learning. The future researcher could also examine the attitude towards the Internet in relation to socio-economic factors.

Another area for further research could also be how Internet facilities may enhance the literacy rate of women in India, whether Indian women are literate to use the Internet, or whether Indian women have Internet skills or not. I am also interested in exploring how Internet facilities may improve rural education in India, and whether Indian rural people are sufficiently Internet skilled to benefit from online distance courses.

6.8 Summary

Indian tertiary education students favoured using the Internet for their learning. Research participants used the Internet to access their learning content, prepare their assignments and make PowerPoint presentations. Internet facilities could be used to improve the quality and access to tertiary education in India. The level of rural education and women's education could be enhanced by providing online courses.

The poor quality of the Internet with its slow speed, bad signal quality and connection errors restricted Indian tertiary education students' potential to use the Internet in their learning. The high Internet cost also affected students' Internet use. A lack of portable digital devices was also found in this study. The negative attitude of teachers and parents towards the Internet prevented students from using the Internet for their learning.

It is recommended that Indian tertiary education students should be provided with Internet facilities and portable digital devices equipped with good quality Internet access free of cost in order to promote learning. Also, it is recommended that workshops for teacher educators should be organised to increase teacher educators' awareness about the potential and use of the Internet for students' learning. Policy makers are recommended to provide special Internet provisions (e.g., easy and free Internet access with good Internet connection) to rural people and women to enhance access to tertiary education. Besides this, Internet service providers are recommended to improve the Internet quality in terms of Internet signals and Internet connectivity. The establishment of new Internet networks in rural areas and improvement of the Internet facilities in urban areas are also recommended.

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APPENDIX A:

Interview questions for Individual Interviews

1. What do you mostly use the Internet for?
2. Where do you mostly access the Internet? How do you most often access the Internet? How regularly and for how long?
3. Describe the quality of your current access to the Internet. How does it impact your learning experiences?
4. Has the Internet enhanced the quality of tertiary education? Explain your views.
5. Has the Internet enhanced access to tertiary education? Explain your views.
6. Describe a positive experience where you use of the Internet enhanced the quality of your learning.
7. Describe a negative experience where the Internet distracted you or limited the potential of your learning.
8. Do you believe that better and increased Internet access links with better educational opportunities? Explain your views.
9. What limitations, if any, are there with using the Internet to learn?

APPENDIX B:

Internet Use Scale

Dear Student,

There are no right or wrong answers to the questions in this survey.

Since everyone is different, it is important that your responses reflect your personal views.

Your responses are confidential and these surveys are anonymous. Please respond to all items inserting an X in the box that states whether you strongly agree, agree, not sure, disagree, or strongly disagree with each statement.

This survey should take from 15 – 20 minutes to complete. Thank you for your time!

Date:

Gender: *(Please insert an X in the box)*

Male	
Female	

Item-No.	Survey items	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
1.	The Internet has a great impact on tertiary students' studies.					
2.	The Internet helps to students in their studies.					
3.	The Internet is a fast and efficient means for gaining information.					
4.	The Internet provides a wide range of study materials to tertiary students.					
5.	I look forward to using the Internet for my studies.					
6.	I have full command of using the Internet.					
7.	The Internet learning challenges are very exciting.					
8.	I think it is easier to do academic work and studies with the help of the Internet.					
9.	I believe that the Internet helps me a lot in my studies.					
10.	I think the Internet is one of the best information sources.					

11.	I prefer to use the Internet rather than textbooks for learning.					
12.	I think that the Internet is a necessary educational tool**.**					
13.	If given the opportunity, I would like to learn more about the use of the Internet for my studies.					
14.	The Internet helps tertiary students in their studies.					
15.	The Internet helps to collect study materials from around the world.					
16.	Knowledge of the Internet is essential for tertiary students.					
17.	Internet is as important as other educational tools.					
18.	Using the Internet is more comfortable than being in the Library.					
19.	I have found the Internet to be as informative as lecturers.					
20.	I feel overwhelmed using the Internet in my studies.					
21.	The Internet helps me in finding the study material.					
22.	I do not hesitate to use the Internet in my studies.					
23.	The Internet is an effective learning tool for educational research.					
24.	I become curious when using the Internet in my studies.					
25.	I feel intimidated by the Internet.					
26.	The overuse of the Internet may be harmful and damaging to tertiary students.					
27.	The Internet is a very important tool for tertiary students.					
28.	The complexity of the Internet intimidates me.					
29.	I think textbooks provide better content for learning than the Internet.					

30.	I am not skilled in using the Internet for study purposes.					
31.	I use the Internet only if I don't have reading material in printed form such as books.					
32.	I never use the Internet because it requires technical skills to use it.					
33.	The Internet contains useless information.					
34.	I am insecure about using the Internet for educational purposes.					
35.	I have security concerns about using the Internet.					
36.	I have a computer at home.					
37.	I can connect to the Internet from my home computer.					
38.	I often use the Internet for my study purposes.					
39.	The Internet is an effective tool for learning.					
40.	Internet access at home helps enhance learning opportunities for students.					
41.	The Internet provides diversity of learning materials.					
42.	Using the Internet is very helpful for university students' learning.					
43.	I can easily afford having the Internet at home.					
44.	It is convenient to use the Internet in my home.					
45.	I often depend on my university library for using the Internet.					
46.	I use the Internet for a limited time in my home because of its cost.					

You are requested to return the form after completing it. The form should be returned in person to the student researcher.

APPENDIX C:

EXPLANATORY STATEMENT: Indian tertiary education students

Project: Australian and Indian tertiary education students' attitudes towards the Internet.

Chief Investigator's name: Dr Nicola Johnson
Faculty of Education
[redacted]

Student's name: Sandeep Kaur Sandhu
[redacted]

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

What does the research involve?

I am conducting this research to find out Australian and Indian tertiary education students' attitudes towards the Internet. The main aim of the current research project is to compare Australian and Indian undergraduate education students' attitudes towards the use of the Internet in their learning experiences. The study will explore the relationship between Australian and Indian undergraduate education students' attitudes towards Internet usage, their socio-economic status and their gender. The impact of Internet access and Internet quality on Australian and Indian undergraduate education students' learning experiences will also be the focus of the current project.

You are invited to take a part one x 30 minute long interview. You are welcome to ask any question about the study before and during the interview. You will be provided with a list of questions prior to the interview. You can choose not to answer any question without penalty. The session will be audio recorded so that the discussion can be transcribed accurately. It will be conducted during your time on campus at a time convenient to you.

Why were you chosen for this research?

The current research project will focus Australian and Indian tertiary students' attitudes towards the Internet. You are a first year undergraduate education student and in my research project, I am looking for a sample of first year undergraduate education students. You completed the quantitative survey in stage 1 and expressed interest in being involved in stage 2, thus, you meet the selection criteria.

Consenting to participate in the project and withdrawing from the research

After reading the explanatory statement in full, if you agree to participate in this research, please sign the consent form and return it back to student researcher. However, participation is voluntary, that you can choose not to participate in part or all of the project and that you can withdraw at any stage of the project prior to having approved any interview transcripts.

Possible benefits and risks to participants

This study will help to understand Australian and Indian undergraduate education students' attitudes towards the Internet use. The results will be helpful for policy makers, educators and students. Furthermore, it will be a comparative study of two countries. There is no inconvenience or discomfort beyond the normal life experiences to the participants. There is no risk of harm, or side-effects involved in the research.

Services on offer if adversely affected

We anticipate that there will be no inconvenience and/or discomfort for you outside of what you might normally expect in everyday life. If you are concerned or worried about anything to do with the research, counselling services can be recommended for you.

Payment

No payments or reward will be provided to the participants.

Confidentiality

Results will be completely de-identified and you will be given a pseudonym in any publications that arise from the research. Please note that your data will not be used for other purposes, will not be seen by anyone other than the researchers on this project and will not be used on any other projects.

Storage of data

Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. All data from the project will be destroyed after 5 years.

Complaints
Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the

Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Building 3e
Research Office
Monash University VIC 3800

[redacted] [redacted] Fax: +61 3 [redacted]

Thank you,

[redacted]

Nicola F. Johnson

Consent Form

Group 3: Indian tertiary undergraduate education students

Project: Australian and Indian tertiary education students' attitudes towards the Internet.

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project named above. I have had the project explained to me, and I have read the Explanatory Statement, which I have kept for my records. I understand that agreeing to take part means that:

I consent to the following:	Yes	No
I agree to be interviewed by the researcher	☐	☐
I agree to allow the interview to be audio-recorded	☐	☐

and

I understand that my participation is voluntary; that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project prior to having approved any interview transcripts.

and

I understand that any data that the researcher extracts from the interviews / individual interviews for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

and

I understand that I will be given a transcript of data concerning me for my approval before it is included in the write up of the research.

and

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

and/or

I understand that data from the interviews/individual interviews/transcripts/audio-recordings will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period.

Name of Participants _____

Participant Signature _____ Date _____

APPENDIX D:

EXPLANATORY STATEMENT: Indian tertiary education students

Project Title: Australian and Indian tertiary education students' attitudes towards the Internet.

Chief Investigator's name: Dr Nicola Johnson
Faculty of Education
[redacted]

Student's name: Sandeep Kaur Sandhu
[redacted]

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

What does the research involve?
I am conducting this research to find out Australian and Indian tertiary education students' attitudes towards the Internet. The main aim of the current research project is to compare Australian and Indian undergraduate education students' attitudes towards the use of the Internet in their learning experiences. The study will explore the relationship between Australian and Indian undergraduate education students' attitudes towards Internet usage, their socio-economic status and their gender. The impact of Internet access and Internet quality on Australian and Indian undergraduate education students' learning experiences will also be the focus of the current project.

You are requested to complete the survey. A total of 15-20 minutes will be given to you to fill the questionnaire. You are free to ask any question related to the survey and if you feel uncomfortable, you can refuse to take part in the survey and return it back to the student researcher uncompleted without any penalty. You consent to participate in this project by completing and returning the questionnaire to the student researcher.

Why were you chosen for this research?
The current research project will focus on Australian and Indian tertiary students' attitudes towards the Internet. In my research project, I am looking for a sample of first-year undergraduate education students from Australian universities and you are one of them. You can withdraw the survey prior to its submission. Once you have returned the questionnaire to the student researcher, you can't withdraw it.

Possible benefits and risks to participants
This study will help to understand the Australian and Indian undergraduate education students' attitudes towards the Internet use. The results will be helpful for policy makers, educators and students. Furthermore, it will be a comparative study of two countries. There is no inconvenience or discomfort beyond the normal life experiences to participants. There is not any risk of harm or side-effects involved in this research.

Payment
No payments or reward will be provided to the participants.

Storage of data

Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet and password-protected hard-drive for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Complaints
Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the

Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Building 3e
Research Office
Monash University VIC 3800

[redacted] [redacted] Fax: +61 3 9905 3831

Thank you,

[redacted]

Nicola F. Johnson