E-learning Implementation Barriers: Impact of Student's Individual Cultural Orientation on E-learning Device Acceptance

Henley Business School

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Declaration

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Dedication

This Ph.D. thesis is dedicated to my benevolent Elders for their endless prayers, care, support and encouragement.

Abstract

E-learning has been emerging for more than a decade, and institutions are increasingly adopting it to provide a better learning experience to their students. E-learning is the use of electronic means to deliver and receive education. E-learning offers a wide range of benefits (flexibility of time and space, cost effectiveness etc.), it also overcomes the shortcomings of traditional learning which has resulted in its vast adoption by the institutes. Despite its vast growth i.e. 17% per annum, the failures of e-learning are still at large. Whilst reviewing the literature concerning e-learning failures, it was identified that numerous barriers, which are hindering the promised benefits of e-learning, are openly discussed in the literature. To understand these factors, the TIPEC framework, which structures e-learning barriers, was developed; to consolidate literature from the past 26 years (1990-2016). 259 papers concerning e-learning barriers, was included in the framework, to better understand the barriers that hinder e-learning implementation. TIPEC framework comprises of 68 unique e-learning implementation barriers, which were grouped into 4 main categories, i.e., Technology, Individual, Pedagogy and Enabling Conditions. This thesis focuses on understanding the impact of the e-learning student's individual culture orientation on technology related barriers within the Individual Category. The TIPEC framework highlighted e-learning failures and motivated this thesis to provide explanations and recommendations to support more successful e-learning implementation and technology adoption, i.e. by accommodating student's individual preferences. The objective of this thesis is to identify the role of individual cultural orientation in determining student's expectation of services being offered in an e-learning setup and his/her preference and acceptance of technological component concerning which device he/she prefers to receive specific e-learning services. For that reason, data was captured from 560 higher education students of Pakistan; where there have been a lot of initiatives taken up by the government of Pakistan in past years to improve the state of education in the country.

A study was carried out using a mono method approach and quantitative methodology, using structured questionnaire, to answer three research questions. Research question 1 explains the role of education as a service and assessment of students' perception about the quality of higher education on the basis of services being offered by the institutions. After a detail review of literature, 8 Higher Education Service (HES) quality indicators (i.e. Course content, Lecturer's Concern for Students, Facilities, Assessment, Social Activities, Communication with University,

Counselling Services and People), proposed by Kwan and Ng (1999), were selected to serve as the basis of my research experiment for question 1. These higher education services are checked for students' preference, i.e. whether they prefer to receive these services through traditional/face to face education or via one of the six identified e-learning devices i.e. TV, Radio, Desktop, Laptop, Mobile and Tablet. Overall preference results showed that for 5 out of 8 higher education service indicators, students preferred two devices i.e. Laptop or Mobile. This suggests that students may be willing, for some services, to use e-learning devices instead of traditional face-to-face interaction.

Literature suggested that attitudes towards adoption and preference of technological devices are influenced by cultural orientation. After the review of different concepts of culture i.e. national, organisation and individual culture, the phenomena of technology preference and acceptance was explored with reference to the culture at the individual level. This led to the development of second research question, i.e. does culture at the individual level play a significant role in device preference? An experiment was performed to analyse technology preference of students against the HES quality indicators proposed by Kwan and Ng, based on the cultural setting of the respondents at an individual level. Culture at the individual level was investigated by applying the Cultural Value Scale (CVSCALE), which is based on the Hofstede's five cultural dimensions (Power Distance, Uncertainty Avoidance, Masculinity/Femininity, Individualism/Collectivism and Long term/Short term Orientation) enhanced for measurement at the individual level. Three significant clusters of culture at the individual level were found. Cluster 1 was highest in Power Distance and highest in Masculinity, and they preferred face to face learning. Cluster 2 is the highest in Uncertainty Avoidance and lowest in Power Distance preferred Mobile for learning activities. Cluster 3 students were lowest in Uncertainty Avoidance, highest in both Collectivism and Long-term Orientation, they preferred Laptop for most of the higher education service quality indicators. This answered the second research question i.e. to improve student satisfaction with his university experience, we have to keep in view their culture orientation, as their preference varies across the multiple HES quality indicators and the devices available to receive them. If we do not accommodate their individual cultural preferences, we risk reducing the student satisfaction towards the e-learning experience.

Second research question led to the formulation of third research question which investigates the role of culture at the individual level in determining the factors predicting technology acceptance. The extended model of Unified Theory of Acceptance and Use of Technology (UTAUT2) was developed by Venkatesh, Thong and Xu (2012) using 8 previous technology acceptance models. This model was adapted for this study. Based on individual culture based cluster segmentation, acceptance of Laptop and mobile (the two preferred devices) for 3 significant clusters were checked. Results showed that acceptance for Laptop and Mobile significantly varied across the three cluster segments. For Cluster 2 and Cluster 3, which preferred Mobile and Laptop respectively, different combinations of variables were found to be statistically significant determinants of the student's behavioral intention towards the use of their preferred device. Conclusion is drawn on the basis of results of three research questions and future recommendations and limitations are then mentioned in detail.

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Chapter 1

Introduction

1.1. Introduction

This chapter gives the overview of the thesis entitled “E-learning Challenges: Impact of student culture at the individual level on e-learning device acceptance”. First of all, a brief review of literature is written to identify the research gaps related to the research problems of my study. After that the research questions are introduced, the research objectives and aims are mentioned which will be achieved after answering the three research questions. Finally, the structure and a brief introduction of all chapters is mentioned.

1.2. Theoretical Background

Education and its role in the development of individuals and society is one of the key factors to the economic prosperity of any nation. Education is primarily delivered using the traditional approach, i.e. face to face learning, however, learning is increasingly delivered via use of technology devices i.e. e-learning or blended learning. Understanding the role of e-learning, as a tool for rapid and broad development of higher education, is a basic requirement; especially for developing countries. E-learning has gained much attention from researchers across a range of diverse cultures and contexts (Lin, 2010); with many researchers extolling e-learning over traditional learning for its advantage of being used in a blended mode (Zengin, Arikan, & Dogan, 2011). E-learning facilitates remote students with the opportunity to interact with experienced teachers or professors (Wang, Zhu, Chen, & Yan, 2009), which has resulted in significant demand; especially in developing countries.

The robust growth of e-learning is making academicians and practitioners focus on antecedents and consequences of its successful implementation (Lee, Yoon, & Lee, 2009). Undoubtedly, e-learning has numerous advantages like interactivity, personalised instruction and independent learning (Flores, Ari, Inan, & Arslan-Ari, 2012), but at the same time, there are many issues/problems in the adoption of e-learning (Park, 2009). Despite the wide range of features and

benefits, e-learning is facing a lot of implementation barriers. The dropout rate of e-learning students is around 20-40%, whereas traditional face to face teaching has a dropout rate of only 10-20% (Lykourentzou, Giannoukos, Nikolopoulos, Mpardis, & Loumos, 2009). Accordingly, there is a need to identify the barriers that hinder the successful implementation of e-learning. There are a good number of studies which proposed different barriers that led to the failure of e-learning in the respective cases.

Like higher education, e-learning is also deemed as a service, and like all other services, it has a prospect customer, i.e. student or individual. The perception of quality of education being delivered will be determined by the student. There are different studies in literature explaining the factors to determine the quality of education provided by institutions (Kwan & Ng, 1999; Watson, Saldaña, & Harvey, 2002; Levy, 2008; Lee, Yoon, & Lee, 2009; Jung, 2011). To check the quality of education of e-learning institutes, these studies propose certain factors which are to be measured and checked. In the case of e-learning, the student perception of quality towards these factors will help us understand why e-learning is a success or not. As student is the key stakeholder in education, success and failure of education delivered will depend on his/her perception (Tao, Cheng, & Sun, 2012). Also, individual attributes like self-direction, motivation, and perception towards technology being employed in e-learning, are reasons mentioned in the literature resulting in high dropout rates (Martinez, 2003; Mysirlaki & Paraskeva, 2010).

Culture plays a very significant role in the development of these attributes. Triandis (2000) reported that choice of an individual related to anything including the perception and acceptance of technology will also be influenced by cultural orientation. Culture is defined as the set of values, beliefs, morals and laws of society (Tylor, 1871). There are various concepts of culture, i.e. national culture, organisational culture and culture at the individual level. National culture explains the cultural variation based on nations and countries, whereas the organisational culture explains on the basis of behaviour exhibited in an organisational setting. Both of these concepts have been applied in literature and been used widely in different fields. However, when it comes to explaining cultural variations of individuals, both national and organisational culture lack the questions and constructs to explain the phenomena (Srite & Karahanna, 2006; Straub et al., 2002). A study in 2011, by Yoo, Donthu, and Lenartowicz, proposed a scale to overcome the shortcomings of

national culture and organisational culture. They modified the constructs of each of Hofstede's national culture dimensions and explained the cultural variance at the individual level. The primary user of technology is an individual, which means we cannot use the dimensions of national or organisational culture to assess the behaviour and attitude of the student towards technology.

Technology used to deliver e-learning can be categorised into two categories, i.e. Devices and Applications. This research focuses on consideration of device use, i.e. the physical tool used to host the applications and support information transfer. The researcher believes that use of the device is critical and fundamental to the user (i.e. student) engaging and adopting e-learning applications and content. Devices used to support e-learning include: TV, Radio, Mobile, Desktop/computer, Laptop and tablets. As e-learning depends on a technology component (e.g. a device), student's perception and acceptance of a certain device play a significant role in understanding/explaining e-learning dropout rates.

Technology acceptance is a widely used concept when it comes to explaining the behaviour of people about technology, whether they want to use it or not. There are a number of models explaining the concept of technology acceptance, including DOI, SCT, TRA, TPB, TAM, TAM2, A-TAM, UTAUT and UTAUT2. The UTAUT2 model helps to explain the behavioural intention towards the technology combining all the previous eight models of technology acceptance. The assessment of technology acceptance while considering the influence of culture is also an important topic of discussion in recent studies (Baptista & Oliver 2015; Tarhini, Hone, Liu, & Tarhini, 2017).

Based on the above discussion, the problem statement for this research can be stated as ***"If we can understand factors impacting the individual student, i.e. that are impacting his/her decision to use or not to use a certain e-learning device, we can improve student satisfaction towards e-learning."***

1.3. Research Questions

Brief review of literature leads us to develop the following research questions

RQ1: *Is a student willing to switch to e-learning from a Traditional i.e. Face to face setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services?*

RQ2: *Does e-learning student's individual culture impact his/her device preference across the higher education services?*

RQ3: *Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?*

1.4. Research Aim and Objective

Looking at the background domain of the current study, it is evident that engagement of individuals, i.e. students, is key to the success of e-learning. The aim of the study therefore to identify the role of individual cultural orientation in shaping student's expectancy of services being presented in an e-learning format, and to explore the impact of student's culture at the individual level in determining the preference and acceptance of devices being used for e-learning. If a researcher wants to check how people will respond to a new technology, should culture be considered routinely in e-learning implementation projects? Does culture play a significant role in the formulation of behaviour and decision making? In order to investigate the role of culture, the three research questions will be answered, and evidence will be provided whether or not individual culture impact preference and acceptance of e-learning devices? In other words, the three research questions would be answered if the following objectives are achieved.

1.4.1. Research Question 1 (RQ1) Objectives

- Review of the literature concerning higher education services, in order to define the factors that determine higher quality e-learning education.
- Description of different technologies in e-learning. Justification concerning the selection of user preferred categories of technology, so the current study is designed for application in higher education services and focuses on the student's preference.

- Identifying higher education services that student prefers to use and define an understanding of the selected technology category for e-learning; in comparison to those higher education services for which the student wants to have a face to face/traditional interaction.

If results show that students prefer to receive the higher education services using selected categories of technologies, compare preference of technology against face to face structures for receiving the services. This would answer the first research question by identifying whether a student is willing to switch from the traditional format of learning to technology based e-learning.

1.4.2. Research Question 2 (RQ2) Objectives

- Consider different concepts of culture, and define and justify the selection of a certain concept of cultural assessment for the current study.
- Use the selected concept of culture to differentiate amongst the students/individuals and create groups based on cultural orientation.
- For these cultural orientation based groups, check user/student preference. A comparison of both preferences, i.e. without cultural orientation (research question 1) and with cultural orientation, should be performed.

If the difference is found as a result of considering cultural orientation based preference, this would answer the second research question.

1.4.3. Research Question 3 (RQ3) Objectives

- Consider existing technology acceptance models and/or produce an explanation of the different concepts and models of technology acceptance.
- Provide a justification and critique concerning which technology acceptance model should be selected to be used in the study; ensuring discussion of limitations of other models.
- Using the selected technology acceptance model, this work will see if there is a difference of acceptance, with reference to cultural orientation, for the selected technology categories.

If the difference in acceptance is based on cultural orientation, this work will validate it, which will answer the third research question.

The research findings will help researchers and policy makers of higher education to see whether cultural values need to be carefully considered and managed whilst introducing any new reform in the field of education.

1.5. Structure of the Thesis

Chapter 2: The detailed review of literature will be explained. This chapter explains and provides literature based evidence and justifies the three research questions from literature. Firstly, literature concerning education, modes of education, e-learning, technologies in e-learning, benefits and case studies (i.e. both failure and success), and consideration of e-learning implementation barriers, will be explained and a framework will be proposed that will organise those barriers. Discussion concerning categorisation of barriers will lead us to identify research gaps, which would logically justify the three research questions in detail.

Chapter 3: This chapter will provide detail of the research methodology that will be used to investigate the three research questions within this study. It will critically justify the most appropriate research philosophy, research strategy, research design, survey strategy, population selection, sampling, method of data collection, and data analysis for the current study. Chapter 3 will also provide the theoretical justification concerning the methodology and techniques adopted for the three experiments based upon the three research questions. Each of the research questions, one by one, is discussed and justified on the basis of results in chapter 4, 5 and 6 respectively.

Chapter 4: This chapter will expand research question 1, and will describe the first experiment of the study. This chapter will justify that education and e-learning are services and the student is the prospective customer of the higher education services provided by the Higher Education Institutions (HEIs). Then it will elaborate factors to measure the quality of higher education and justify their use for this study. Then the discussion about different technologies available in e-learning will lead towards the selection of technological devices for my data collection. After data

collection and analysis, the conclusion will be presented based upon the results reported. This will answer the first research question.

Chapter 5: This chapter will start with a discussion of culture and will include consideration of different concepts of culture that have evolved over time. Then critique on each culture will be explained. Selection of culture at the individual level and the concept of selected culture measure will be justified. Lastly, data collection and analysis will be explained. Comparison of culture based preference and simple over all preference is drawn. This will answer the second research question.

Chapter 6: Results of chapter 5 will tell us which technological device is preferred by the different types of students, and this chapter will investigate the acceptance of those preferred device(s). This chapter will talk about different models of technology acceptance. The evolution of concepts of technology acceptance will be explained along with the limitation of each concept. After that, selection of the most relevant technology acceptance model will be justified by providing supporting literature evidence. Then data collection, analysis and cluster based acceptance will be checked. At the end, results of technology acceptance will be compared considering the cultural orientation. This will answer the third research question.

Chapter 7: This chapter will conclude the findings of all three experiments performed and discussed in chapter 4, 5 and 6. It will explain the answer for each of the 3 research questions, and provide a collective justification, implication and future research options based on the overall results of this study.

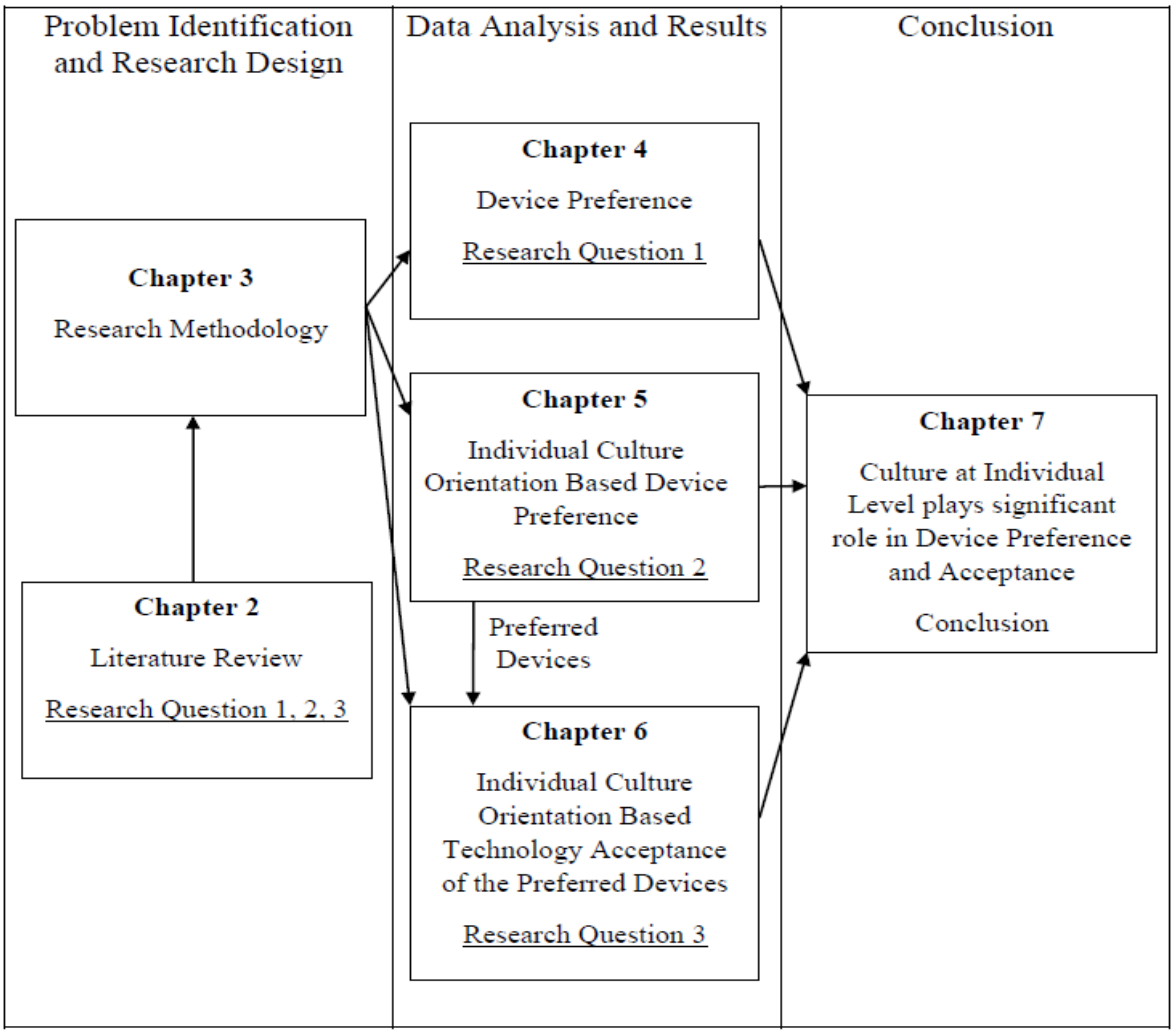

Figure 1.1 Structure of Study

Chapter 2

Understanding E-learning Implementation Barriers

This chapter provides a detailed review of literature related to the fields of education, e-learning, barriers of e-learning, technologies in e-learning, case studies concerning the implementation of e-learning in different countries, and importance of culture in determining technology adoption and acceptance. Firstly, education and its role in the society is reviewed. This review leads us to a comparison of traditional education vs e-learning, which is followed by consideration of the various benefits of e-learning. After discussing the benefits, different case studies are mentioned to assess the implementation of e-learning and the benefits achieved. This led the discussion towards the barriers faced in e-learning, which resulted in the formulation of the TIPEC (Technology, Individual, Pedagogy and Enabling Conditions) framework which categorises 26 years (1990-2016) of published literature related to barriers of e-learning implementation. Later on, a detailed discussion of the individual (student) related barriers is expanded, and the impact of culture, at the individual level, on e-learning student technology acceptance is considered. Research questions based on the identified research gaps are mentioned at the end of the chapter, which logically creates a pathway towards investigating the majority of the technology based barriers being faced by an e-learning student.

2.1. Education

Economists have measured and recognised the education as an important factor effecting an individual's own lifetime earnings (Heckman, 2008). Education is a fundamental right of all human beings and is crucial for both individuals and nations that wish to excel (Sandkull, 2005). Education has also been stated as the highest year of schooling completed by an individual (Wang, An, Chen, Li, & Alterovitz, 2015; Freedman, Kaner, & Kaplan, 2014). Education is referred to as the preparing of an individual for his/her better life through systematic design schooling and teaching (Bleyer, Chen, D'Agostino, & Appel, 1998; Crawford, 1987; Dantas, Aguillar, & dos Santos Barbeira, 2002). Education is often seen as a means to accumulating human capital, which can later be used in the marketplace (Martín-García & Baizán, 2006), and is deemed as the crucial factor in

the development of the human work force; preparing them to compete in every aspect of life and also has a direct impact on national development (Christou, 1999; Tomusk, 2002; Machado & Lussana, 2008; Alhasan & Tyabo, 2013; Shah, 2015).

2.2. Role and Impact of Education in Society Development

Population is an asset of the country because economic growth of a nation is not only dependent upon the physical assets but also on the human resource available to that nation; and education is the most globally accredited tool that helps in the development of human capital (Javed, Khilji, & Mujahid, 2008). Ungku (1997) argued that education is very important in order to produce a literate and knowledgeable human force. Another study states that on average there is an approximate increase of 5% to15% in individual's future earning, after an extra year of education (Temple, 2001).

Exploring the impact and benefits of education beyond the economic perspective, more recently, attention has been paid towards the impact of education on other social and personal aspects, such as criminal behaviour, health and mortality, and voting and democratic participation (Lange, 2006). Education has been shown to lessen crime, health improvement, lesser mortality, and increase political participation (Lochner, 2011). Education improves the living standards, develops industrial projects and resultantly gives high financial benefits (Javed, Khilji, & Mujahid, 2008; Outreach, 2005). Education and economic development are positively interlinked and give benefits to individuals and collectively to society as well (Stevens & Weale, 2004; Kakar, Khilji, & Jawad, 2011). Countries with high enrolment rates in schools incline in terms of per capita income (Hanushek & Kimko, 2000).

The overall impact of education is due to a combined effect of benefits provided by education; categorised in table 2.1.

Table 2.1 Benefits of Education

	Benefits Related to Wages	**Broader benefits**
Individual/Personal benefits	Higher Incomes	Healthy individuals. Better life satisfaction
Social/Community benefits	Higher national income	More Healthy population, Improved functioning society

So, both individual and social impacts can be attributed to education, such as: improved health, reduced levels of crime, better-quality of public participation, and better satisfaction in life (Johnston, 2004). It is essential for countries that desire high economic growth to achieve high literacy rates (Kiani, 2010). Higher education is a leading factor when preparing an individual with the appropriate skills for future job requirements (Outreach, 2005). Higher education facilitate personal benefits, such as: higher rates of employment, higher salaries, and an improved living standard (Aziz, Khan, & Aziz, 2008). The benefits identified in the literature indicate that investment in the education sector will subsequently lead to improvement in the economic development of the country. Education delivery, however, has various formats. The most commonly used format (i.e. face-to-face teaching) is known as traditional learning.

2.3. Traditional Learning

Traditional, i.e. face-to-face-learning, has advantages of being familiar, close, and comfortable for both instructors and students (Baloian, Pino, & Hoppe, 2000). Traditional or face-to-face instructional environments encourage passive student learning, however, and ignore individual differences and needs of the learners, and do not pay attention to problem solving, critical thinking, or other higher order thinking skills (Banathy, 1994; Hannum & Briggs, 1982). Traditional learning incorporates different modes of leaning, i.e. distance learning, online learning and e-learning. Distance education and technology enhanced online learning, however, are not a new concept in the education industry. The origin of e-learning is not universally agreed (Harasim, 2000), however since the development of the world wide web, we see a shift from traditional education (e.g. lecture, discussion, and project based), to blended/hybrid educational strategies (e.g. case study,

mentorship, and small group work), with many institutions using total online educational strategies (e.g. self-directed learning, collaborative learning, and Forum) Lushnikova, Chintakayala, & Rodante, 2012). As we move from a traditional model of study to an online/blended model of study, we risk losing factors like: physical interaction, instructor personalised interaction/support, opportunity of instructor to learn about their students, etc. This shift from traditional learning to e-learning has led to certain other factors, as the students enrolled for online education are unique individuals, coming from different countries, having different incentives, etc. (DeBoer, et al., 2013). E-learning has become common and is described as use of electronic information system for confirming and creating knowledge. The aim of e-learning is to form an independent community from time and location by the means of information and communication technology. It has emerged as a challenge to many developing countries. It is a revolution rather than replacement in the field of education (Alkhateeb, AlMaghayreh, Aljawarneh, Muhsin, & Nsour, 2010; Kwofie & Henten, 2011).

Learning is the most vital activity in the current knowledge-based new economy characterised by industrial change, globalisation, increased intensive competition, knowledge sharing and transfer, and information technology revolution. The increasing use of networked computers, and achievement of telecommunication technology, i.e. the Internet, has been widely recognised as a medium for network-enabled transfer of skills, information, and knowledge in various areas (Carswell, 1997). The traditional context of learning is undergoing a drastic change. Individuals now commonly change careers, and move employers, several times throughout their lives. The notion of traditional education does not suit the new world of lifelong learning, in which the roles of instructor, students, and course are shifting. Teaching and learning are no longer limited to customary classrooms (McAllister & McAllister, 1996; Marold, Larsen, & Moreno, 2000).

Comparing Traditional Learning to e-learning, we can see that traditional learning has the benefits of students being physically present in a classroom in front of the instructor, but a few disadvantages, like ignoring the demands of individual learners, or lack of customisation or consideration concerning the preference of the individual student. These drawbacks are better handled in an e-learning environment.

2.4. What is E-learning?

- E-learning can be defined as the deliberate use of communication and networked information in coaching and learning (Naidu, 2006).
- E-learning includes electronic systems, i.e. internet, computers, multimedia CDs in order to lessen the amount of expenses and save time (Mohammadi, Ghorbani, & Hamidi, 2011).
- E-learning is an advanced product of information technology, which has evolved within the rapidly changing environment of education, to transfer knowledge and skills via network-enabled systems (Manochehr, 2006).
- E-learning uses the internet, and other technologies, to provide a wide range of solutions that can increase performance and knowledge (Liaw, Huang, & Chen, 2007).

In summary, we can see that e-learning is technology based learning which involves different technology components, e.g. E mail, CD ROM, TV, Internet, Mobile Devices (Laptop, Mobile and Tablets) etc. in order to facilitate/enhance the learning exchange between instructors and students. Hence e-learning can be viewed as the learning that takes place through some technological component (both software and hardware), in which the individual student becomes the user/learner of the e-learning system. As the instructor and student have less physical interaction in e-learning, as compared to the traditional format of learning, it becomes increasingly important to ensure e-learning student satisfaction, as the student has the option of getting this learning from a wider range of remote education providers.

2.4.1. Applications of E-learning:

There are mainly two modes of e-learning that are: Asynchronous and Synchronous. Asynchronous e-learning involves media like e-mail and discussion boards that support learning between teacher and students even when participants are not online. Asynchronous e-learning, which does not require the simultaneous participation of learners and instructors, refers to a learning situation where the learning event does not take place in real-time, i.e. people can learn at any time and in any location. Asynchronous e-learning is an “on-demand delivery” of learning, which gives learners more control over the learning process and content (Zhang & Nunamaker, 2003). Literature, however, implies that asynchronous learners feel isolated; sometime frustrated because

of the lack of intimate support and feedback (Gisondi, et al., 2010). Synchronous mode is different from asynchronous because it involves video conferencing and interactive interaction. Synchronous learning in literature is often seen as being sociable, as it avoids the frustration caused by isolation, and facilitates learners with systems that allow the learner to see the response of the instructor (Hrastinski, 2008). Synchronous e-learning, however, requires the simultaneous participation of all learners and instructors at different locations, which limits the participation of those who are not available at the time of the meeting.

E-learning courses can be broadly categorised into these types:

- **Online distance learning courses**: The majority of, if not all, instruction takes place online. Accordingly, there is minimal face-to-face meetings between students and instructor, either in the classroom or via video conferencing during the duration of the course.
- **Hybrid courses**: In these courses, the instructor combines elements of online distance learning courses with traditional face-to-face learning. Online forums, web-based activities, multimedia simulations, virtual labs, and/or online testing may replace or augment a portion of classroom sessions. (Dabbagh, 2005).

2.4.2. Benefits of E-learning

E-learning helps individuals to overcome most of the hurdles that they face in traditional learning modes and provides an easy way to learn. E-learning's key advantages are flexibility, convenience and the ability to study at one's own pace at any time and any place with an internet connection.

1. Cost is a very significant factor to evaluate that whether new technology is appropriate or not (Bartley & Golek, 2004). Online learning is seen to be cost effective as it can be delivered to a large number of students at the same time without any increase in the personal cost and achieves favourable outcomes. If higher education institutions can direct their attention towards online learning benefits and its potential in the educational sector, then it could be cost effective as compared to traditional educational models. Universities are still using technology in education but it is very limited. Courses for students should be well-designed and these new courses substantially minimise the cost of delivery (per student) by use of technology (Meyer, 2006).

It is no doubt true that start-up cost of online learning may be high, but the ongoing costs are much lower and the number of students attending the class is not limited by class size and/or timetabling (Bartley & Golek, 2004). E-learning environments have many advantages that have been observed globally and accepted as well. Cost is a very influential factor for the adoption of e-learning because it reduces the salaries of teachers, rent of buildings and the travelling expenses of the student. E-learning tends to be cheaper than traditional classrooms (Kruse, 2002).

2. Student engagement in online courses was measured by calculating the amount of time students spent on the course Web-site. Students generally showed a fairly high level of perceived learning (Arbaugh, 2000).
3. E-learning provides more opportunities for human development and improves educational level. After secondary education, people look for more educational opportunities that align with their professional life. However, due to limited time, strict working hours, and cost, traditional learning does not commonly allow individuals to pursue the higher education (Kwofie & Henten, 2011). In these constraints, e-learning serves as a good solution towards further human development.
4. In an e-learning environment, learners obtain online guidance and help from instructors. They usually perceive greater opportunities for communication than those in a traditional classroom (Hiltz & Wellman, 1997; McCloskey, Antonucci, & Schug, 1998)
5. One major benefit of e-learning is ubiquity because individuals can enrol anytime; instead of being bound to the temporal structure of a semester. Ubiquity eliminates the barriers of time and geographical distance. Also, e-learning activity can accommodate diverse learning environments. (Koller, Harvey, & Magnotta, 2008).
6. Temporal flexibility is a very beneficial aspect of e-learning, as students do not need to be at the university on a certain time/date, or search for teachers and classrooms; but can instead study whenever they feel free and they have internet access (Björk, Ottosson, & Thorsteinsdottir, 2008). E-learning gives opportunity to students to complete training at their own homes and can provide quick reference, which reduces the stress on learners (Kruse, 2002).
7. Consistent content is a benefit of e-learning because in traditional learning different teachers teach different material on the same subject (Cantoni, Cellario, & Porta, 2004).

8. There is a wide list of available interaction opportunities, especially in synchronous learning, i.e. between the learners and teacher; with students in large classes feeling that they can interact more intimately with teachers in an online environment (Kim, Liu, & Bonk, 2005).
9. E-learning media serves as a transport for knowledge delivery, and reduces the cost of the student travelling to reach an institute in order to benefit from education (Kaur, 2013).
10. According to the students, online learning is very beneficial for the development of virtual teaming as it is very important in today's global business environment (Kim, Liu, & Bonk, 2005).
11. Learning through technology not only helps in education but also helps in professional life to increase their expertise (Kiani, 2010).
12. E-learning students have the flexibility of time available to them. They are not constrained to reach the classroom at a certain fixed time. This flexibility leads to achieving a better balance between personal life, study, and work commitments (Radović-Marković, 2010).
13. All students do not have the same-learning style. As a consequence of different options available as a combination of different modes and applications of e-learning explained above, the student can have room for various learning styles through different teaching activities (Banciu, Gordan, & Stanciu, 2012).
14. E-learning provides a high level of interactivity among students and instructors (Radović-Marković, 2010).

In short, e-learning is shaping up as a low cost and high access alternative for traditional education. However, in spite of all these benefits of e-learning, it would be unjust to call it the best alternative for every university or country, unless we discuss and analyse the practical cases of e-learning implementation, whether it is as successful as its above mentioned benefits or not.

2.5. Case studies of E-learning

Thomas Pollack (2003) reported that over 95 percent of colleges and universities now use some form of e-learning system. There are many case studies of e-learning currently being used in higher education, yet it is noteworthy that many of the implementations face significant problems during implementation/adoption. For example:

- National University of Singapore is currently providing education to more than 9,000 graduate and 23,500 undergraduate students in multi-disciplinary courses. Integrated Virtual Learning Environment (IVLE), an e-learning system has been used by the university since 1997 to deliver education (Bashar & Khan, 2007). The study showed that IVLE system has positively contributed towards the increase in human capital, productivity and skills in the labour force.
- Ntinda et al. (2014) studies the deployment of the M-learning system in the University of Namibia and Rhodes students. Despite a low number of faculty, 800 students were enrolled to use the e-learning Mathematics system. Interestingly the programme pass out rate was low, which result in the development of a blended solution, i.e. the m-Learning System Enhancing Mathematical Concepts (m-LSEMC). This resulted in better administration and yielded better pass out rates (Ntinda, Thinyane, & Sieborger, 2014).
- Motaghian et al. (2013) carried out in Iran collecting data from 115 universities to measure adoption of e-learning systems. Results showed that there is an increase in the adoption of the e-learning system among the instructors (Motaghian, Hassanzadeh, & Moghadam, 2013).
- Saudi Arabian Higher Education Institutions have been promoting the use of e-learning systems within the country for quite some time. The aim is to improve the quality of education in order to benefit the students via the use of a technology component. Results of adoption studies, however, have shown that students are consistently reluctant to participate in e-learning courses/programmes preferring traditional face-to-face methods (Alenezi, Karim, & Veloo, 2010; Al-Jarf, 2007; Alenezi, Karim, & Veloo, 2011).
- Munyangeyo (2009) conducted a study in the Leeds Metropolitan University (UK) to access the e-learning system effectiveness. The results show that students and teachers were having problems using e-learning system due to a lack of resources, poor delivery of courses, and a lack of time (Munyangeyo, 2009).
- E-learning system of Limkokwing University in Malaysia was developed in 2009. Salem and Salem (2015) used e-learning success model to measure the success of the e-learning system through PLS (Partial Least Squares), and reported that satisfaction amongst e-learning students is higher which makes this system effective.
- Universities in developing countries especially sub-Saharan Africa are progressively adopting e-learning technologies for teaching, research and supporting students' learning so as to reap the same benefits harnessed by the developed economies (Aguti, Walters, & Wills, 2014).

- "Education for All" was a vision proposed by the Government of Pakistan at the end of the 20th century, but the government soon realised that access to education could not be achieved without investing in the technological infrastructure and/or embedding this in education systems (Kashif, 2005; Anwar, Greer, & Brooks, 2006). Sadly, however, E-learning is not very popular in Pakistan and only a few institutions have focused on developing e-learning programmes (Nawaz, Hussain, & Zaka, 2013). Only two universities have specifically tried to adopt the model of e-learning; i.e. Allama Iqbal Open University (AIOU) and the Virtual University (VU). Allama Iqbal Open University (AIOU) was the first, in 1974, providing education via radio, television, (and later) online and offline workshops (AIOU, 2007). In the beginning, radio was used to deliver content, yet in 1999 computer, teleconferencing, and network options were added. Sadly, due to the issues of power shortage, poverty, lack of development funding, a lack of content development, and most importantly poor programme development, AIOU is the least preferred university in the country (Iqbal & Ahmad, 2010). The problems implementing e-learning systems has irrevicably impacted public perception concerning online solutions. In response to this, a second initiative was taken in 2002, with the establishment of a Virtual University (VU), to provide distance education inside and outside the country (Hussain, 2007), however with a literacy rate of only 56.2% (Malik, et al., 2015), e-learning has failed to deliver the Pakistan government's promise of 'Education for All'. The reason of these failures has been stated in literature as being:
    - Technical Difficulties (Bakari, Tarimo, Yngström, & Magnusson, 2005)
    - A lack of Computer knowhow (Reddi & Mishra, 2005)
    - Internet and Connectivity issues (Qureshi, Ilyas, Yasmin, & Whitty, 2012)
    - Load shedding of electricity (Sana & Mariam, 2013; Abdulaziz, Shah, Mahmood, & e Haq, 2012)

These cases show that implementation of e-learning is a complex mix of failure and success factors, and that e-learning implementation is not 'simple'; as sometimes perceived by HEI managers. Though e-learning courses are increasing in demand across the globe, at the same time e-learning students have a high dropout rate; 20-40% in normal course, and as high as 95% in MOOCs, compared to 10-20% in traditional learning (Lykourentzou, Giannoukos, Nikolopoulos, Mpardis, & Loumos, 2009) This increasing demand, yet failure to maintain the standard of education, has

focused the attention of researchers to find out the root causes behind e-learning system failures (Lee, Yoon, & Lee, 2009). Although e-learning seems to be the right theoretical answer to many of the problems and limitations of traditional learning, the real challenge is to identify and address the barriers that are faced when implementing e-learning systems; i.e. the factors that hinder students and educators from reaping the benefits promised in its conceptual application.

2.6. Barriers of E-learning

To understand failure, it is important to identify the barriers that limit successful implementation of e-learning systems. Looking at the published literature, numerous papers were found that talked about different barriers; however, the focus of the individual papers was mostly restricted to discussing a very limited range of issues. There are number of studies explaining the barriers to e-learning (Bakari, Tarimo, Yngström, & Magnusson, 2005; Croxall & Cummings, 2000; Kwofie & Henten, 2011) to name a few. However, to better understand the range and interaction of e-learning implementation barriers the researcher sought out to find/develop a framework that could structure the e-learning barriers mentioned in the published literature to date.

Andersson & Grönlund (2009) aimed to develop a framework to summarise e-learning barriers available in the published literature. Their study draws a comparison between developing and developed countries and proposed four dimensional conceptual framework of barriers in e-learning and made a comparison of barriers that exist in developing and developed countries through a literature review of sixty research articles. Their framework categorised these sixty articles into four broad categories, i.e. *Technological issues, Content issues, Individual issues and Context issues*. There are numerous limitations of this study, since Andersson and Grönlund (2009) proposed the framework after viewing only sixty papers, which is not enough to effectively review the range of factors identified to date, and/or draw identify any significant conclusions.

For the Technological category in Andersson and Grönlund (2009) framework, there are four barriers discussed i.e. Access, Cost, Software and Interface Design and Localization. Cost is not just a barrier related to technology as it can also effect students, teachers and instiutions alike. Furthermore, other barriers like Technology Infrastructure, Technical Support, Bandwith and Connectivity Issues, Software and Interface Design, Compatible Technology, Poor Quality of

Computers and Virus attack, which are related to Technology are missed by Andersson and Grönlund (2009).

"*Content* Issues" which referred to the barriers related to the material provided for learning including Curriculum, Subject Content, Localization, and Flexibility. This category, however, also includes those barriers which do not fall into the domain of content material i.e. teaching and Learning Activities, Pedagogical Model, Support Provided for Students and Support Provided for Faculty. This category did not address other barriers like, mode of delivery (Saadé, 2003), reliability of online measuring instrument i.e. online assessment process (Arnold, 2014; Oh & Park, 2009; van't Hooft, 2008; Inglis, 2007), weak learning management system (Pratas & Marques, 2012), hard to access digital libraries (Sana & Mariam, 2013; Berryman, 2004), lack/absence of real time feedback (Guy, 2012; Arbaugh, 2002; Thurmond, Wambach, Connors, & Frey, 2002; Kim, Liu, & Bonk, 2005) and learning material accessibility (Roy & Raymond, 2005) which are highlighted in the published research across 1999 to 2016.

When considering individual related barriers, Andersson and Grönlund mentioned 12 barriers relating to 'individual', out of which eight barriers are related to students. The student related barriers are: Motivation, Conflicting priorities, Economy, Academic confidence, Technological confidence, Social support (i.e. support from home and employers), Gender and Age. Teacher related barriers found by Andersson and Grönlund (2009) include: Technological Confidence, Motivation and Commitment, Qualificaition and Competence and Time. Barriers related to faculty/staff should be placed in Pedagogy category because it is a bigger term encapsulating both the course related barriers and the faculty delivering the course. So for the individual (i.e. student), only eight challenges are left. Additional barriers specific to the student that were not listed in the individual category in Andersson & Grönlund's framework include: Prior Knowledge, Computer Anxiety, Social Loafing, Awareness and Attitude Towards ICT, Student's Support, Student's Individual Culture, Computer Anxiety, etc.

The last category, i.e. Context issues, covers two aspects (organisational and societal/cultural barriers). Some of these barriers can be categorised into the broader terminologies. For example, in the societal/cultural context "Attitude towards Technology" is mentioned as a barrier, but the

attitude of both teacher and student can be separately considered as barriers. Also another barrier "Rules and Regulations" can have an impact on the technological component, the individual student, teaching methodology and also the institution in which e-learning is being implemented.

Due to the limitations of the Andersson and Grönlund framework, the researcher felt that there is a need for a more extensive framework, to accommodate the e-learning system implementation barriers in the published research till date.

2.7. TIPEC Framework

In order to develop an extensive framework, of e-learning related issues/challenges/barriers, a detailed literature review of the published research was performed. This was a two-step approach. Firstly, well-established International journals - including EmeraldInsight, IEEE, Jstor, ScienceDirect, SpringerLink and Wiley journals - were accessed and related papers were identified based on the Title and Abstract of the papers. In the second step, additional papers were taken from Google Scholar to further increase the database of papers. Search keywords used for this step, included: e-learning, Technology Based Learning, Technology Mediated Learning, Technology Enhanced Learning, Virtual Learning, Online learning, Distance learning, Distance Education, Virtual Education, ICT based Learning; in combination with: Issues, Barriers, Hurdles, Success Factors, Obstacles, Challenges, Technological Difficulties, Individual Issues, Institutional Difficulties, Causes of Failure and Successful Implementation. These words were used in different combinations. Firstly, renowned journals - mentioned above - were accessed and the articles that came up in search results on the website of the journals by using a combination of the defined keywords were studied in two steps. In the first step, only abstract and introduction of the articles were reviewed. Articles which were found not directly related to the barriers of e-learning were discarded. In the second step, related articles, which were left after the first screening, were thoroughly studied. The barriers that appeared in the articles were discussed in detail with other faculty members, whose research related to failure in the e-learning domain; to produce an initial list of barriers. After reviewing maximum articles from the famous databases, the initial list included a number of barriers. It was found that multiple barriers were reported repeatedly across different publications. This step led towards reaching a total of 74 barriers. In order to further

extend the database of e-learning barriers, Google Scholar was used for maximum coverage of the published literature till date. Same two step approach as before was used to study the articles. A screening criterion was also used for selection of papers that came across as result of the second step. Those articles in which discussion was full of technical jargons and was more focused towards the barriers faced in algorithms, coding and protocols of e-learning systems were discarded. All those articles were pruned out from the bank of literature in which the debate of barriers was closely related to a single formula, application, or e-learning system, e.g. Blackboard, Moodle etc. Finally, a detail list of 104 barriers, along with the reference of author and description was compiled.

A Microsoft Excel database was created to list all the research papers and their mentioned barriers. Each of the barriers was discussed and reviewed by the author using hermeneutics analysis and Content Analysis Method (Babbie, 2010). Content analysis is a qualitative research method used to interpret text data to develop subjective inferences through a systematic process of identifying patterns or themes (Hsieh & Shannon, 2005; Abbott & Monsen, 1979). It was observed that there are a number of barriers listed that relate to the same theme, but used different vocabulary or terms. After careful examination, and subsequent removal of duplicated barriers, 68 unique barriers impacting e-learning were highlighted (see Tables 2.2-2.5).

Eventually, the list of 104 barriers was reduced to a set of 68 unique barriers of e-learning. Similar barriers were identified in multiple papers (see tables 2.2-2.5 AUTHOR column), which allowed us to highlight the overlap of existing literature; thus, providing an explicit understanding of how research, to date, has focused on e-learning barriers.

The timeline of published research review was limited to the years starting from 1990 till 2016. This funnelled down the existing database to 259 papers, which were written between 1990 and 2016. The reason to have a twenty-six year wide review is to ensure that most of the published literature is taken into account. The reviewed research studies included articles related to both qualitative and quantitative research. The search timeline was limited to between 1990 to 2016; since the existence of the world wide web was deemed essential to most modern e-learning solutions.

After producing a detailed review of published literature (1990 till 2016), an effort was made to fit these barriers within the four categories defined by the Andersson & Grönlund framework. Numerous barriers, however, did not easily fit into the four categories defined within the Andersson & Grönlund framework. In order to accommodate all the updated sixty-eight unique barriers into a comprehensive framework, the following four categories were proposed, which thematically encapsulate all e-learning barriers of published between 1990 till 2016, these are: Technology, Individual, Pedagogical, and Enabling Conditions

2.7.1. Technology

Whenever we talk about e-learning, technology is always an important aspect that comes in the delivery of e-learning. Literature has pointed out different barriers related to technology, a detailed review is presented in Table 2.2. A brief summary of some of the technological barriers are provided below, however detailed references for each of the technology related barriers are available in Table 2.2.

Lack of proper technological infrastructure creates hurdles in the proper delivery of e-learning and also affects the effectiveness (Stansfield, et al., 2009). Slow speed of internet is another discouraging factor that hinders implementation of e-learning. The bandwidth capacity of the internet is not sufficient for e-learning purposes and during peak hours downloading large multimedia files could be disrupted (Nagunwa & Lwoga, 2012). Virus attack on computers is another reason that is defined as a challenge to the adoption of e-learning technologies. As a result of viruses, people feel that their data is not safe, and that, if users go on-line, viruses will attack their data and they will lose it (Qureshi, Ilyas, Yasmin, & Whitty, 2012; Nikoi & Edirisingha, 2008).

Table 2.2 Barriers in literature related to e-learning: Technology (1-7)

Barriers	AUTHOR	DESCRIPTION
1. Technology infrastructure	Davie & Wells, 1991; Soong et al.,2001; Wild et al., 2002; Little,2003; Vrasidas, 2004; Surry et al.,2005; Voogt, 2009; Goyal et al., 2010; Meyer & Barefield, 2010; Purohit & Bhagat,2010; Waycott et al.,2010; Shelton, 2011; Teo, 2011; Alshwaier et al., 2012; Chang'ach, & Sang, 2012; Guy, 2012; Kipsoi et al., 2012; Qureshi et al., 2012; Reeves & Li, 2012; Alsabawy et al., 2013; Graham et al., 2013; Nwabufo et al., 2013; Gutiérrez-Santiuste & Gallego-Arrufat, 2016; Güllü et al., 2016; Ozudogru & Hismanoglu, 2016	Refers to the hardware, software, facilities, and network capabilities within the college/institution.
2. Technical support	Venkatesh, 2000; Soong et al.,2001; De Freitas & Oliver, 2005; Pagram & Pagram, 2006; Sife et al., 2007; Nwabufo et al., 2013; Poon & Koo, 2010	Unavailability of technical staff and lack of facilities to perform various activities (installation, operation, maintenance, network administration and security).
3. Bandwidth Issue and Connectivity	Ali,2004; Homan & Macpherson,2005; Poon & Koo,2010; Mahanta & Ahmed,2012; Reilly et al.,2012; Nor & Mohamad,2013; Gutiérrez-Santiuste & Gallego-Arrufat,2016; Vencatachellum, & Munusami, 2006	Slow speed of Internet and high internet traffic during e-learning experience.
4. Software and interface design	Swan,2004; Andersson & Grönlund,2009; Kwofie & Henten,2011; Marzilli, et al.,2014	Less user-friendly software and interface design during e-learning experience.
5. Compatible technology	Koller et al.,2008; Gudanescu,2010; Marzilli, et al.,2014	Incompatibility of content with a variety of learning management systems/technology.
6. Poor quality of computers	Radijeng,2010	Low quality computers that freeze frequently and outdated computer systems.
7. Virus attacks	Nikoi & Edirisingha,2008; Qureshi et al.,2012; Prakasam,2013; Shonola & Joy,2014	Virus attacks on e-learning systems during e-learning experience.

2.7.2. Individual

Individual barriers are related to an individual/student and these barriers restrict people adopting e-learning. Individual category only enlists the barriers related to the student of e-learning. There are a total of 26 unique individual based barriers that were identified. Table 2.3 presents the list of individual barriers in detail. A brief discussion on a few of these barriers is mentioned below.

Learners with no technical skill get frustrated towards e-learning because it's an unconventional way of learning for them (Jarvis & Szymczyk, 2010). Lack of student confidence, whilst handling computer, also referred to as self-efficacy (Joo, Bong & Choi, 2000), is seen as an issue for not adopting e-learning. Response to change is a very big issue in adoption of e-learning as people find it difficult to work in fully electronic environments (Jager & Lokman, 1999; Song & Keller, 2001). Lack of student funding is a major reason of student dropout from e-learning programme (Kwofie & Henten, 2011). Social loafing is the phenomenon that is observed when e-learning student becomes less focused on personal interactions (Koller, Harvey & Magnotta, 2008). Inequality in access to internet connectivity is a main component for e-learning, and for those with low incomes, e-learning is still unaffordable/costly. Individuals with lower incomes still face this barrier. (Okine, Agbemenu, & Marfo, 2012; Farid, Ahmad, Niaz, Itmazi, & Asghar, 2014).

Awareness of e-learning among masses and about its benefits to people. Lack of awareness leads to a low rate of adoption because people are unaware of the effectiveness of e-learning use. Similarly, computer literacy is also one of the facts that affect the e-learning implementation. Computer literacy makes it very difficult to engage learners online, because they are having to deal with an abstract/virtual environment. (Nagunwa & Lwoga, 2012; Mahmoodi-Shahrebabaki, 2014; Datuk & Ali, 2013).

Table 2.3a Barriers in literature related to e-learning: Individual (8 -14)

Barriers	AUTHOR	DESCRIPTION
8. Prior knowledge	Hölscher & Strube,2000; Brusilovsky,2003; Paul & Chen,2003; Gutiérrez-Santiuste & Gallego-Arrufat,2016	A student having Background knowledge related to course.
9. Student Motivation	Bates,1990; Pintrich & De Groot,1990; Ostwald,1992; Mason & Weller,2000; Alexander,2001; Wu & Hiltz,2004; Pagram & Pagram,2006; Johns & Woolf,2006; Andersson & Grönlund,2009; Lanzilotti et al.,2009; Blignaut & Els,2010; Kwofie & Henten,2011; Miliszewska,2011; Bozkaya & Kumtepe,2012; Yoo et al.,2012; Medárová et al.,2012; Hepworth & Duvigneau,2013; Nwabufo et al.,2013; Alajmi, 2014; Callinan,2014; Gutiérrez-Santiuste & Gallego-Arrufat,2016;	Students' Motivation on the basis of their skills, attitudes, interest, behaviour and activity.
10. Technological difficulty	Schrum & Hong,2002; Arbaugh,2002; Thurmond et al.,2002; Ocak,2011; Pituch & Lee, 2006; Gutiérrez-Santiuste & Gallego-Arrufat,2016	Students facing technological difficulty in using e-learning technologies.
11. Technology experience	Schrum & Hong,2002; Gutiérrez-Santiuste & Gallego-Arrufat,2016	Students lacking technology experience in solving problems and accomplishing basic tasks.
12. Awareness and attitude towards ICT	Becking, et al.,2004; De Freitas & Oliver,2005; Inglis,2007; Klasnić et al.,2008; Anwar & Niwaz,2011; Bozkaya & Kumtepe,2012; Nagunwa & Lwoga,2012; Alajmi,2014; Nwabufo et al.,2013	Students lacking awareness of internet skills and the reluctance of students in taking responsibility for their own e-learning.
13. Computer literacy	Eisenberg & Johnson,1996; Fyfe,2000; Sharma,2003; Andersson & Grönlund,2009; Kwofie & Henten,2011; Nor & Mohamad,2013; Karaman, Kucuk, & Aydemir,2014	Lack of computer literacy in students.
14. Perceived usefulness and ease of use perceptions	Venkatesh,2000; Wong, Nguyen, Chang, & Jayaratna,2003; Cantoni et al.,2004; Lu & Chen,2007; Liao, Liu et al.,2011; Digión & Sosa,2012; Tao et al.,2012	Students' intentions to carry on e-learning lifelong and his/her usage behaviour of ICTs)

Table 2.3b Barriers in literature related to e-learning: Individual (15-22)

Barriers	AUTHOR	DESCRIPTION
15. Students Support	Galusha,1998; Elango et al.,2008; Lewis & Chen,2009; Chen,2009; Stansfield, et al.,2009; Yaghoubi et al.,2008; Anohina-Naumeca & Grundspenkis,2012	Support provided by students in successful implementation of e-learning system.
16. Computer anxiety	Wiksten et al.,1998; Venkatesh,2000; Piccoli et al.,2001; Sun et al.,2008; Gutiérrez-Santiuste & Gallego-Arrufat,2016	Students' early misperceptions about the ease of use of an e-learning system.
17. Sense of isolation due less Face to Face Interaction	Bates,1990; Galusha,1998; Daugherty & Funke,1998; Campbell et al.,2000; Schott et al.,2003; Vonderwell,2003; Sweeney et al.,2004; McInnerney & Roberts,2004; De Freitas & Oliver,2005; Tham & Werner,2005; Jensen et al.,2009; Anwar & Niwaz,2011; Chatzara et al.,2012; Reynolds et al.,2013; Callinan,2014; Muhammad et al.,2015	Absence of face to face/social interaction between individual learner and instructor endorsing sense of isolation.
18. Conflicting priorities	Andersson,2008; Andersson & Grönlund,2009; Kwofie & Henten,2011	Time devoted to e-learning makes individual's priorities conflict.
19. Social support	Andersson & Grönlund,2009; Kwofie & Henten,2011; Gutiérrez-Santiuste & Gallego-Arrufat,2016	Support from family and employers for e-learning, conducive environment and devoid of distraction during e-learning sessions.
20. Social loafing	Rutkowski, Vogel et al.,2002; Koller et al.,2008; Wheeler et al.,2008; Gudanescu,2010; Loh & Smyth,2010; Ryu & Parsons,2012	Students working less diligently because of the relative absence of instructor- learner and learner-learner interaction.
21. Student's economy	Andersson & Grönlund,2009; Iqbal & Ahmad,2010	Financial difficulty for taking up e-learning courses.
22. Academic confidence	Andersson,2008; Andersson & Grönlund,2009	Academic experience and qualification of student.

Table 2.3c Barriers in literature related to e-learning: Individual (23-32)

Barriers	AUTHOR	DESCRIPTION
23. Self-efficacy	Joo et al.,2000; Andersson & Grönlund,2009; Liaw,2008; Bozkaya & Kumtepe,2012; Maki & Charalambous,2014; Gutiérrez-Santiuste & Gallego-Arrufat,2016; Ozudogru & Hismanoglu,2016	Student's confidence in using e-learning technologies and believe in completion of e-learning course.
24. Lack of ICT skills	Carr,1999; Voyler & Lord,2000; Oliver,2001; Jarvis & Szymczyk,2010; Qureshi et al.,2011; Qureshi, Ilyas, Yasmin, & Whitty,2012; Nagunwa & Lwoga,2012; Gutiérrez-Santiuste & Gallego-Arrufat,2016	It includes training in multimedia related skills and Impact of technology on learning.
25. Family commitments	Schott et al.,2003	Family commitments taking up most time and resources of the e-learners
26. Work commitment	Schott et al.,2003	E-learners giving excuse of their work commitments for skipping exams, assignments etc.
27. Student readiness	McCausland,2005; Goyal et al.,2010; Ünal et al,2013	Students possessing inconsistent e-learning readiness over time, among institutions or instruments.
28. Response to change	Jager & Lokman,1999; Song & Keller,2001	Students' slow response to changing e-learning.
29. Inequality in access to internet connectivity	Mackintosh,2005; Salaway et al.,2008; Gudanescu,2010; Okine et al.,2012; Farid et al.,2014	Inequalities in access to the Internet & few people have an internet connection.
30. Inequality in Access to technology	Nwabufo et al.,2013; Anderson et al.,2005; Salaway et al.,2008; Pegrum,2009; Gudanescu,2010; Kipsoi et al.,2012; Guy,2012; Pegrum, et al.,2013; Dudeney et al.,2013	Inequality of access to the technology itself by all the students.
31. Technophobia	Nwabufo et al.,2013	Students' feeling afraid of operating e-learning systems/technologies.
32. Cost of using technology	Sambrook,2003; Andersson & Grönlund,2009; Nor & Mohamad,2013; Becker et al.,2013; Callinan,2014;	Students facing high cost of using technologies.

Table 2.3d Barriers in literature related to e-learning: Individual (33)

Barriers	AUTHOR	DESCRIPTION
33. Individual Culture	Pratt,1991; Alavi & Leidner,2001; Kolb,2005; McCausland,2005; Chroust,2007; Economides,2008; Joy & Kolb,2009;; Adeoye,2012	Student's overall individual culture distresses attitude towards distance learning. Each individual has different learning style and expectation, which should be considered while designing e-learning.

2.7.3. Pedagogy

This framework proposes Pedagogy as *an umbrella term that encapsulates teaching methodology related issues and faculty/staff related barriers. The proposed framework* not only includes the eight course related barriers highlighted in Andersson & Grönlund's paper but also amalgamates additional barriers found in research that were not categorised previously. The total count of pedagogy related barriers is twenty-eight. This category addresses an umbrella term encapsulating teaching methodology related barriers and faculty/staff related barriers. Some detail of the barriers is mentioned below, however, Table 2.4 presents the complete list of pedagogy barriers:

Course Content is a big component of e-learning, which is why content developers should be able to develop specific content for each system, and why content must be redesigned if needed (Koller, Harvey, & Magnotta, 2008; Kwofie & Henten, 2011; Voogt, 2009). An important barrier to be considered for e-learning implementation is the selection of a proper and suitable pedagogical model, and approach, for the delivery to the student (Stansfield, et al., 2009). Quality of the material has significance in e-learning because material should be relevant and objective in nature and designed according to the allocated budget and timeframe (Tricker, Rangecroft, Long, & Gilroy, 2001; Drago, Peltier, & Sorensen, 2002; Mtebe & Raisamo, 2014). Lack of teacher acceptance of innovative technologies, for the content development and delivery of online courses, is a barrier faced in e-learning (Weaver, Spratt, & Nair, 2008; Teo, 2011; Parrish, Klem, & Brown, 2012). Absence of real-time feedback is another barrier. Students found that online learning is deficient in receiving feedback in real-time because students have to wait for the answer to the query from the instructor via email. According to survey 8% of students found delayed feedback a barrier in

the adoption of online learning (Kim, Liu, & Bonk, 2005; Arbaugh, 2002). Localisation of content is also a hurdle of e-learning as developers have to develop content according to the need of the native people; so that they can easily understand and learn (Andersson, 2008). The interface is also an important thing to ponder, as - before starting e-learning course – the content designed has to decide what software they are going to use in order to support the chosen e-learning model (Kwofie & Henten, 2011). Engaging students in the online course is same as the student engagement of offline courses, but both differ in terms of mode of delivery. In the online mode, the physical presence of student is not compulsory but in the offline mode students should be present in campus and have to take synchronous learning experience. E-learning is the way in which instructions can be delivered through different tools like webpages, chat rooms, e-mails and video conferencing. In these forums, learners can interact with instructors or with other learners to discuss their problems (Lester & Perini, 2010; Guy, 2012). Weak learning management system and systems that lack interactivity and have vague features are considered as prominent barriers too (Timmerman & Kruepke, 2006; Pratas & Marques, 2012).

Table 2.4a Barriers in literature related to e-learning: Pedagogy (34-35)

Barriers	AUTHOR	DESCRIPTION
34. Faculty effort	Black,1992; Miller & Schlosberg,1997; Surry et al., 2005; Inglis,2007; Bailey & Card,2009; Meyer & Barefield,2010; Teo,2011; Pegrum, et al.,2013; Teo & Wong,2013; Güllü, et al.,2016	Lack of effort and support being put by faculty members in use of e-learning.
35. Faculty development	Willis,1994; Higgs,1997; Sife et al.,2007; Inglis,2007; Kaleta et al.,2007; Collopy & Arnold,2009; Lareki et al.,2010; Lim et al.,2011; Reilly et al.,2012; Yaakop,2015	Lack of training and development in faculty and limited change in teaching methodology of faculty in response to ICT developments.

Table 2.4b Barriers in literature related to e-learning: Pedagogy (36-42)

Barriers	AUTHOR	DESCRIPTION
36. Lack of ownership	Forman & Nyatanga,2002; Ertmer,2005; Mayo eet al.,2005; Omwenga,2006; Sife et al.,2007; Naismith,2007; Chua,2009; Masalela,2011; Qureshi et al.,2011; Duveskog et al.,2014	Faculty not taking ownership of successful implementation of e-learning technologies and lack of interest in meeting e-learning challenges.
37. Lack of feedback	Hiemstra,1994; Andersson & Grönlund,2009; Guy,2012	Faculty putting little effort in giving feedback, making students drop out or fail.
38. Quality Course Content	Tricker et al.,2001; Drago et al.,2002; Saadé,2003; Ali,2004; De Freitas & Oliver,2005; Stahl et al.,2006; Picciano & Seaman,2007; Rhode,2009; Voogt,2009; Veeramani,2010; Meyer & Barefield,2010; Masoumi,2010; Mtebe & Raisamo,2014	Course content having less quality in terms of interactivity.
39. Engaging Students Online	Ali,2004; Lester & Perini,2010; Guy,2012	Faculty facing difficulty in engaging students online.
40. Pedagogical model	Burge & Lenksyj,1990; Andersson,2008; Kwofie & Henten,2011; Bozkaya & Kumtepe,2012; Ngimwa & Wilson,2012; Parrish et al.,2012; Pegrum et al.,2013; Güllü, et al.,2016; Govender & Chitanana,2016	Use of instructor / learner centred approach in teaching.
41. Localization of content	Pagram & Pagram,2006; Hylén,2006; Andersson,2008	Lack of Customisation/Adaptability of course content according to local culture, language and religious beliefs.
42. Flexibility in delivery mode	Gibson & Graff,1992; Andersson,2008	Lack of student empowerment concerning the decisions related to taking the exam, selection of medium of content delivery, etc.

Table 2.4c Barriers in literature related to e-learning: Pedagogy (43-51)

Barriers	AUTHOR	DESCRIPTION
43. Course content	Kelly,1990; Saadé,2003; Ivergård & Hunt,2005; Inglis,2007; Voogt,2009; Lester & Perini,2010; Kwofie & Henten,2011; Ozudogru & Hismanoglu,2016	Lack of relevance, accuracy of course content and misalignment of course content with future employers' need.
44. Faculty Training	Trippe,2002; Kosak, et al.,2004; Muir-Herzig,2004; Keramidas et al.,2007; Gulati,2008; Eliason & Holmes,2010; Ray,2009; Kipsoi et al.,2012	Lack of teaching material and courses for teachers in the fields of learning technology.
45. Lack of Credibility	Gudanescu,2010; Kwofie & Henten,2011	Less likely to hire someone with a TBL certificate unless provided by an accredited institution.
46. Additional time needed to communicate with students	Arabasz et al.,2003	Increased communication time principally on e-mail.
47. Insufficient computers	Mokhtar,2005; Park & Son,2009; Radijeng,2010; Tedre et al.,2010; Nagunwa & Lwoga,2012; Nwabufo et al.,2013; Qureshi et al.,2012	Few computers available as compared to the number of students.
48. IT skills of Faculty members	Hackley,1997; Levy,2003; Darabi et al.,2006; Lopes,2007; Gulati,2008; Iqbal & Ahmad,2010; Radijeng,2010; Nawaz & Khan,2012; Webster et al.,1992	Weak IT skills of faculty members.
49. Hard to access digital libraries	Berryman,2004; Sana & Mariam,2013	Problems faced in having access to digital libraries.
50. Cost of multimedia learning materials	Sambrook,2003; Attwell,2004; Elloumi,2004	Cost of producing high quality multimedia learning materials.
51. Mode of delivery	Gibson & Graff,1992; Saadé,2003	Issues related to the mode of delivery selected for e-learning.

Table 2.4d Barriers in literature related to e-learning: Pedagogy (52-61)

Barriers	AUTHOR	DESCRIPTION
52. Weak Learning Management System	Timmerman & Kruepke,2006; Pratas & Marques,2012; Güllü, et al.,2016	Learning management systems lack interactivity and have vague features.
53. Reliability of online measuring instrument	Inglis,2007; van't Hooft,2008; Oh & Park,2009; Arnold,2014	Lack of reliability of online assessment process.
54. Lack of top-level commitment	Tusubira & Mulira,2004; Shaikh,2009; Marshall,2010; Ocak,2011	Insufficient support from top-level management.
55. Material accessibility	Roy & Raymond,2005	Reach of the student to material.
56. Pre-course orientation	Frank, Kurtz, & Levin,2002; Ashby,2004	Lack of Pre-course orientation sessions by the instructor.
57. Tutor support counselling sessions	Ashby,2004	Lack of support/counselling sessions conducted by the instructor.
58. Absence of real-time feedback	Davie & Wells,1991; Arbaugh,2002; Thurmond et al.,2002; Kim et al.,2005	Students lacking immediate/prompt response from instructors to get an answer to the query.
59. Less focus on technical requirements of Content	Kay,2006; Alvan et al.,2013	Technical requirements of course content available online (e.g. size of web pages, font, colours, quality of images) are not met.
60. Faculty's acceptance of e-learning technologies	Weaver et al.,2008; Teo,2011; Ocak,2011; Parrish et al.,2012	Teachers' lacking Technology Acceptance.
61. Level of knowledge of teacher	Sharma,2003; van Leusen & Millard,2013; Marzilli, et al.,2014; Dogan,2015	Teachers lacking grip on course content while delivering an e-learning session.

2.7.4. Enabling Conditions

This category includes those barriers that do not report to a single category of the barriers (mentioned previously); instead enabling conditions support all three categories, i.e. Technology, Individual and Pedagogy. Table 2.5 presents the detail list of enabling conditions, descriptive detail of some of these barriers is available below:

Privacy and security is the major concern of individuals in e-learning. If systems are infected, vulnerable to a virus attack and/or have a risk of being hacked, then all stakeholders may suffer (Qureshi, Ilyas, Yasmin, & Whitty, 2012). Language barrier is another barrier that creates hindrance in an e-learning environment. The excessive use of English language in the content writing or e-learning purpose develops disturbance in the success of e-learning (Anuwar, 2008; Ali, 2004). Students with no excellence in English are not able to use eLearning medium of education (Qureshi, Ilyas, Yasmin, & Whitty, 2012). The setup cost/limited funds incurred in the implementation of e-learning infrastructure is considered to be the hurdle in the success of e-learning (Andersson & Grönlund, 2009; Tedre, Ngumbuke, & Kemppainen, 2010).

Table 2.5a Barriers in literature related to e-learning: Enabling Conditions (62-63)

Barriers	AUTHOR	DESCRIPTION
62. Administrative support	Garrison & Kanuka,2004; De Freitas & Oliver,2005; Sife et al.,2007; Boezerooij et al.,2007; Cook et al.,2007; Holt & Challis,2007; Inglis,2007; Weaver et al.,2008; Jara & Mellar,2009; Czerniewicz & Brown,2009; Ocak,2011; Mahmoodi-Shahrebabaki,2014; Gutiérrez-Santiuste & Gallego-Arrufat,2016	Lack of Administrative support in crafting e-learning related policies, incentives and resources. Institutional policy and organisational culture are crucial to the way e-learning is adopted or embedded in universities.
63. Setup Cost/Limited Funds	Timmerman & Kruepke,2006; Selim,2007; Sife et al.,2007; Sun & Cheng,2007; Andersson & Grönlund,2009; Liu et al.,2009; Kukulska-Hulme,2009; Gudanescu,2010; Tedre et al.,2010; Kwofie & Henten,2011; Kipsoi et al.,2012; Callinan,2014; Marzilli, et al.,2014; Dogan,2015	High cost of setting up the e-learning system and unavailability of low-cost ICT alternatives.

Table 2.5b Barriers in literature related to e-learning: Enabling Conditions (64-68)

Barriers	AUTHOR	DESCRIPTION
64. Security	Brown & Snow,1999; Ong et al.,2004; Cárdenas & Sánchez,2005; Sharples et al.,2005; Aïmeur et al.,2007; van't Hooft,2008; Pachler et al.,2009; Stahl et al.,2009; Gudanescu,2010; Traxler,2010; Veeramani,2010; Mircea & Andreescu,2011; Zamzuri et al.,2011; Bryer & Chen,2012; Levy et al.,2013; Saxena & Yadav,2013; Yang et al.,2013	Openness of e-learning systems challenging security of personal information of students/staff/faculty.
65. Language Barrier	Sharma,2003; Ali,2004; McCausland,2005	Lack of conversion of e-learning content in other languages.
66. Rules and regulation	Valcke,2004; Traina et al.,2005; Selwyn,2007; Andersson & Grönlund,2009; Kwofie & Henten,2011; Güllü, et al.,2016	Surety that all relevant laws are taken into consideration while crafting policies related to e-learning to prevent government regulations. Limitations in national and institutional policies and management practices.
67. Load shedding of electricity	Pedrelli,2001; Hussain,2007; Sangi,2008; Voogt,2009; Nagunwa & Lwoga,2012; Sana & Mariam,2013; Nwabufo et al.,2013	Problems related to Power cuts, power fluctuations, and Power distribution while having e-learning experiencing.
68. Ethical issues	Olt,2002; Scanlon,2003; Baruchson-Arbib & Yaari,2004; Foulger et al.,2009; Pachler et al.,2009; Staats et al.,2009; Stahl et al.,2009; Bozkaya & Kumtepe,2012; Esposito,2012; Bryer & Chen,2012; Sana & Mariam,2013; Levy et al.,2013; Pegrum et al.,2013; Egi et al.,2014; Bhat & Shetty,2015; Muhammad et al.,2015	Lack of written permission from participants and absence of maintaining confidentiality by the e-learning services providers.

As a result, a four-dimensional conceptual framework is created, which the researcher entitled 'TIPEC' (Technology, Individual, Pedagogy and Enabling Conditions) (see Figure 2.1).

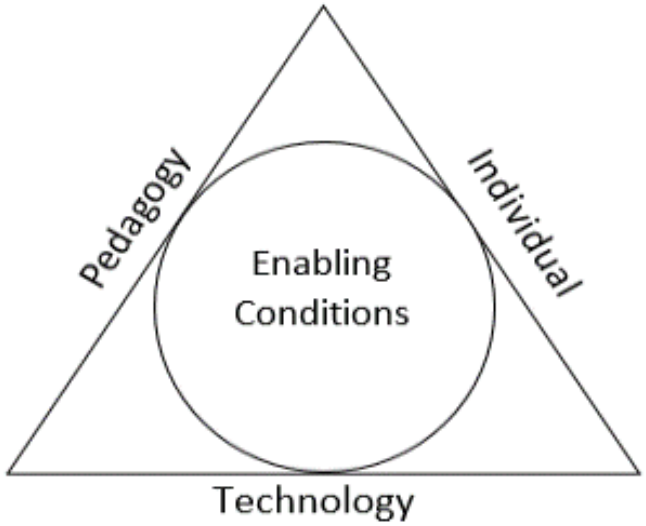

Figure 2.1. TIPEC framework – Structuring consideration of Technology, Individual, Pedagogy and Enabling Conditions

TIPEC framework consolidates the wide range of 68 unique barriers into four categories and hence combines the published literature concerning e-learning implementation barriers ranging from 1990 till 2016 (see Figure 2.2).

Now that we have a framework of barriers, the next step is to figure out how to solve these barriers. It would be impossible to focus on all the barriers together, as it requires a lot of time and resources to investigate and propose solutions for each of the barriers. More importantly, we have to focus on a specific research domain within the four proposed categories.

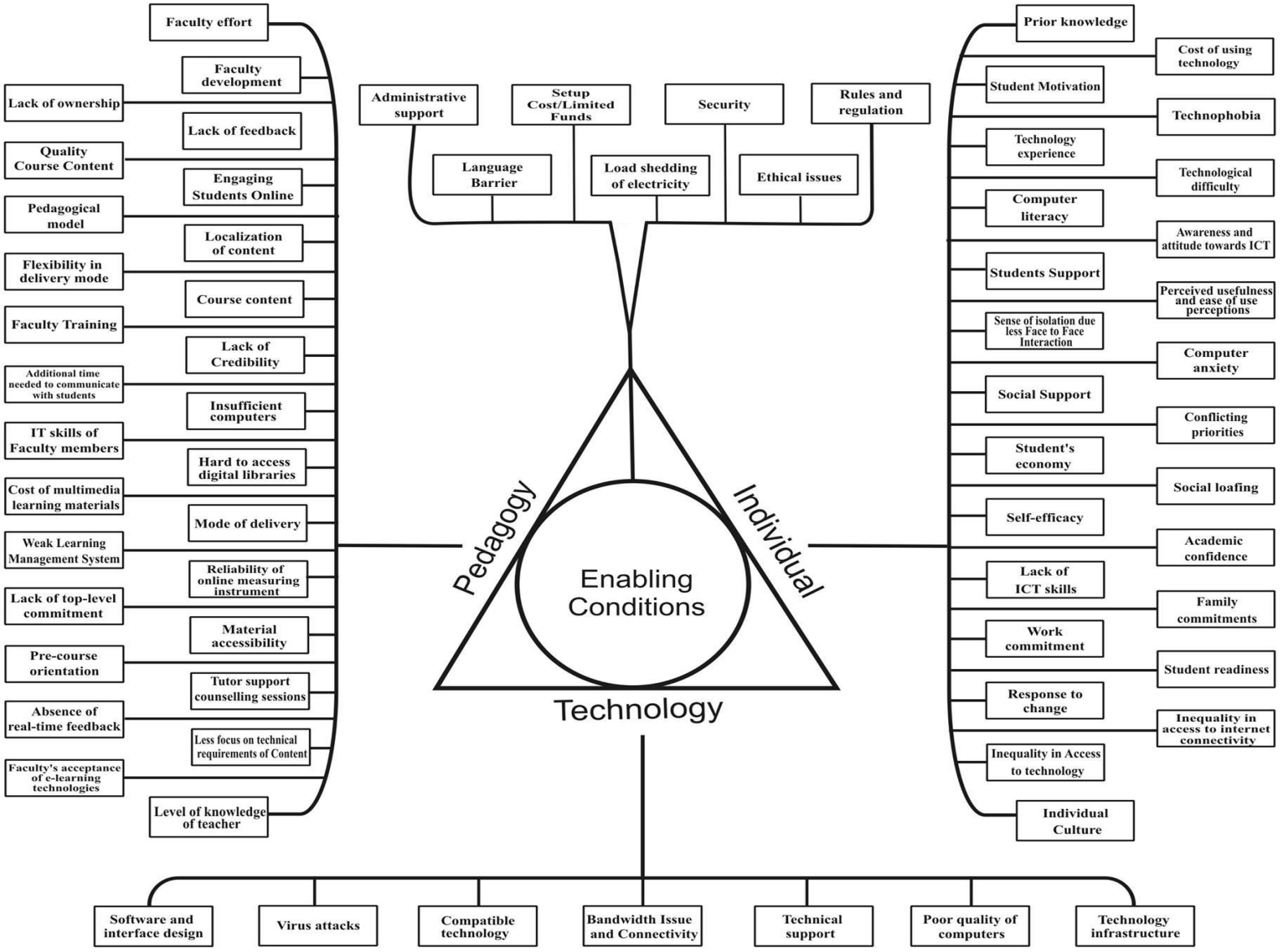

Figure 2.2. 68 barriers in TIPEC framework (Technology, Individual, Pedagogical, and Enabling Conditions)

2.8. Focusing on ‘Individual’ barrier category

This thesis focuses on ‘individual’ category barriers. According to Tayar (2013) research in e-learning is limited to identifying intentions in e-learning at the institutional level. Tao (2012) highlights the need to focus on student perception when evaluating challenges and barriers in e-learning. The individual, i.e student is the ultimate user of e-learning and his/her satisfaction will determine the success or failure of the e-learning system. Accordingly, student perception concerning the education system will determine its good or bad quality.

Technology barriers can be overcome by either increasing investment and/or effective management. However until the student is motivated, has a positive attitude towards using the technology, and is willing to use the technology for educational purposes, e-learning success can not be achieved. Student expectation and satisfaction should be managed carefully because an e-learning student works mostly in isolation from the teacher, the other students and the educational institute, which makes him/her more subject to dissatisfaction towards e-learning, and increases the chances of dropout (Anagnostopoulou, Mavroidis, Giossos, & Koutsouba, 2015).

2.9. Focusing on Technology related Individual Barriers

Within the individual category, there are 26 barriers. By considering these, in turn, nine individual barriers were identified that related to individual attitude, use, and access to technology (highlighted in Table 2.6).

Table 2.6 Individual Barriers

Individual Barriers		
Prior knowledge	Sense of isolation due less Face to Face Interaction	Work commitment
Student Motivation	Conflicting priorities	Student readiness
Technological difficulty	Social support	Response to change
Technology experience	Social loafing	Inequality in access to internet connectivity
Awareness and attitude towards ICT	Student's economy	Inequality in Access to technology
Computer literacy	Academic confidence	Technophobia
Perceived usefulness and ease of use perceptions	Self-efficacy	Cost of using technology
Students Support	Lack of ICT skills	Individual Culture
Computer anxiety	Family commitments	

If individual student perception is better understood, allowing us to appreciate how technology impacts user perception of e-learning quality, then it should be possible to suggest some practical guidelines to improve individual's satisfaction; hence resulting in a lower student drop out rate. The nine barriers to be considered in this research are as follows:

1. **Technology experience:** Student experience, relating to the use of a specific technology, is a strong predictor of student perception and the use of that technology. More experienced students have a less difficulty in using e-learning system (Wan, Fang, & Neufeld, 2007). Arbaguh and Duray (2002) quoted in their findings that satisfaction of students with more experience in the online course was greater than the ones who did not have any prior experience.
2. **Computer Literacy:** Belanger and Jordan (2000) stated that low student literacy and lack of familiarity with technology used in e-learning will lead to 'diffculty in use' and 'dissatisfaction'. Computer literacy is the knowledge of the various essential aspects of computer and skills required to operate a technology for the the purpose of learning.

3. **Lack of ICT Skills:** This barrier explains the students incapibility to use multiple technological modes for the use of learning. Lack of ICT skills is a major barrier to integration of technology into education (Bingimlas, 2009). As students are not skilled enough to use multiple mediums which leads them to dissatisfaction and increaed dropout.
4. **Cost of Using Technology:** The cost of using technology is more prominent in developing nations, as students are less able to access technologies (i.e. computers, technological infrastructure, internet connectivity, etc.) within the institutions. When students are required to buy technology devices for themselves it can, for some, become quite an issue due to resource limitations. Cost – resulting in lack of access - is said to be the reason that most developing nations have failed in the successful implementation of e-learning system (Nor & Mohamad, 2013). Another consideration towards the cost of technology depends on the price value perceived by the student towards the technological component required for e-learning. If the student believes that for a certain price, the cost of technology is worth it, as it will increase his performance and bring more results with less effort, the barrier of cost of technology can be taken care of (Andersson & Grönlund, 2009).
5. **Technophobia:** Technophobia is the existence of resistance to the technology components and their use, and is one of the major challenges faced while implementing e-learning system for the first time in any institiutes, or where users do not have the prior knowledge about the newly developed technology. Technophobia is a growing problem with the rapid development of technology around the globe (Juutinen, Huovinen, & Yalaho, 2011), and still exists because individuals do not understand the benefits of the technology in learning outcomes (Chigona, 2015).
6. **Technological Difficulty:** The deployment of e-learning system is a big success for the institution, but making the system easy and user frendily is the key. However, in most of the cases, students report that they are facing diffuclties when using e-learing systems (Williamson, Maramba, Jones, & Morris, 2009; Cai, Yang, & Yang, 2004).
7. **Awareness and Attitude towards Technology:** Awarness, and positive attitude, of students towards the technology, is an important varaiable leading to satisfaction and the very first varaible to grasp the interest of the student. If the attitude of students is negative, the intention of using the technology will decrease (Elias, Smith, & Barney, 2012). Hence in order to improve the odds for studnets to utilise the technology, awareness and attitude should be

considered. Positive attitude and better awareness towards technology would help improve student satisfaction towards e-learning.

8. **Perceived Usefulness and Ease of Use:** Perceived usefulness, and ease of use, are key determinents of technology acceptance. Perceived usefulness is the degree to which one believes that using an e-learning system will increase his/her performance. Easy of use relates to the effort that must be invested to make the technology work effectively. In most cases students' reluctance to use technology is due to a reduced preceived usefulness and ease of use (Wong, Nguyen, Chang, & Jayaratna, 2003), i.e. they don't see the benefit and/or believe that using the technology will be hard.
9. **Computer Anxiety:** Fuller, et al. (2006) states that computer anexity of the student is negitively related to the-learning results. Computer anxiety is conceptualised as a transitory condition, which fluctuates over time. It is effected by the other demographic varabiles, i.e. gender, age and academic qualification.

This clearly shows that if student attittude and behavior, towards the use of a technology, is managed successfully then chances of e-learning success can be increased. Hence there is a need to identify different technologies in e-learning and discuss them.

2.10. Technologies in E-learning

In the field of education, technology is considered as the use of technological components (both soft and hard) in order to facilitate teachers, administration and specially students; as part of the learning experience. There are two basic types of technologies defined in the literature, namely "Device" and "Application". Device is that technological component which has the physical existence, i.e. Computer, Laptop, Mobile etc. and it helps run the application which is the soft component of the technology. Both are integral parts for delivering eduation. However, applications have many types, all of which face daily functional innovations/updates. Due to this, research done at the application level can become quickly out of date, as a better commercial app/solution, or as a newer version of the app, becomes available. Also, one app can be used easily on different devices. It has also been noted that sometimes the apps are customised for a specific institute/LMS/audience. Hence investigating e-learning technologies at the application level will not give a generic solution to individual barriers identified in the TIPEC framework.

It will, however, be interesting to see how student's preference differs across various devices, because the basic types of devices will remain the same as newer applications are developed for each of them. So, it would be more practical/useful to do research on the devices being used in e-learning rather than the application level. The literature identifies six main devices that have been involved in e-learning (to date):

- TV (Sife, Lwoga, & Sanga, 2007; Park, 2009)
- Radio (Hong, Kim, Kim, & Shin, 2008)
- Desktop / Computer (Katz, 2000; Wong, Aggarwal, & Beebee, 2005; Ouamani, en Saoud, & Ben Ghézala, 2013)
- Laptop (Pilgrim, Bledsoe, & Reily, 2012)
- Mobile (Schneider, 2013; Neri, Lopez, Barón, & Crespo, 2013)
- Tablet (Atkinson, 2008; Bradley & Holley, 2010; Hussein & Nassuora, 2011)

2.10.1. Investigating E-learning Student's Technology based Barriers within Higher Education

Higher education (HE) is considered as a set of services (Ng & Forbes, 2009), and high-quality education facilitates the generation of a skilled workforce and contributes towards a well-paid career for the student (Janowski, Sobieraj, Szulwic, Wróblewska, & Wieczorek, 2014). Quality of education is positively related to the student retention and satisfaction of the services provided by the HE institutions (Sorey & Duggan, 2008). Despite the rapid adoption of e-learning by the educational institutes around the globe, student retention and satisfaction is still a huge barrier (Jones, Jones, & Packham, 2009). For educational institutes, in case of both e-learning and a traditional setup, the student is the key stakeholder and his/her perception about the quality will ultimately determine the institutional performance.

In order to measure the higher education service quality, there are a number of studies explaining the different factors of higher education service quality. Higher education service (HES) quality indicators, proposed by Kwan and Ng (1999), have been used in a number of studies. These HES indicators were adopted from the study of Hampton (1993), which was based on the study of the

SERVQUAL model. The HES quality indicators can be used to investigate and compare an e-learning student's preference across different devices of e-learning, versus the student's preference towards the face to face-learning. The overall results of both, i.e. face to face based learning and device based learning, can be critically compared in order to answer the first research question

Is a student willing to switch to e-learning from a Traditional, i.e. Face to face setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services?

2.10.2. Role of Individual Culture in Technology Implementation

There is an argument that attitude of people, towards any technology, is effected by their cultural orientation; and it varies within the population (Van de Vijver & Tanzer, 2000). It is, therefore, necessary to adopt a strategy that incorporates cultural dimensions of the respondents to determine their true choice preference (Triandis, 2000). Successful implementation of information technology is dependent on the receiver's cultural ability to assimilate technology (Winschiers-Theophilus, 2009). Bytheway et al. (2015) states that incorporation of ICT in education requires effective consideration of culture (Bytheway, Bladergroen, & Bangui, 2015); supported by the fact that the last barrier in the 'individual' TIPEC category is termed 'Culture' (Karahanna et al., 2006).

Culture is the set of combined beliefs, knowledge, morals, arts, law and habits of society as a whole. Culture is presented as national, organisational and at the individual level. The concept of culture at the individual level has been in discussion for quite some time; with arguments stating that culture, defined by the concepts of national and organisational level, do not account for the disparities at the individual level. National and organisational culture explain cultural variations at the macro-level, yet technology (device) preference, and adoption, is a micro level concern (Srite & Karahanna, 2006).

So, if individual culture is incorporated as a basis of this research, it will not only help in investigating the nine technology barriers within the individual barriers category, but it will also help us to see if e-learning student individual culture plays any significant role in preference towards e-learning devices across different HES. This will be the 2nd research question

Does e-learning student's individual culture impact his/her device preference across the higher education services?

2.10.3. Role of Individual Culture in Student's Technology Acceptance

Last, but not least, in order to practically enrich the findings, it would be really interesting to investigate the independent factors that lead to device preference of e-learning students. In order to do so, this research will be looking in detail towards the technology acceptance of e-learning students for their prefered devices.

Technology acceptance is defined as "an individual's psychological state with regard to his or her voluntary or intended use of a particular technology (Gattiker, 1984), factors which can affect the technology acceptance include: perceive enjoyment (Venkatesh, 2000), attitude towards technology (Fishbein & Ajzen, 1975), perceived ease of use (King & He., 2006), performance expectancy (individual perception about using technology will increase his/her performance), cultural orientation (Srite & Karahanna, 2006), etc. We can also see if technology acceptance variation occurs as a result of the student's individual culture orientation. This leads us to the last research question.

Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?

So, the designed research experiments will not only help to find out if there is any shift of student preference towards e-learning setup, from a traditional format of higher education, but also it will help to identify the student's preferred devices when undertaking e-learning. This study will also be investigating the role of culture in this device preference, with the eventual aim is to see if culture impacts upon the e-learning student's technology acceptance of his/her preferred device(s).

As a result, the researcher expects to identify the factors that lead to device preference, and suggest some practical ways to improve student's attitude towards technologies in e-learning; hence increasing student e-learning satisfaction. This increase in student satisfaction would hopefully

reduce the student drop-out rate in e-learning, and hence play its vital role in practically realising the literature based promised benefits of e-learning.

2.11. Context of Study

After considering the three research questions, the next aim is to identify the context of data collection. The researcher has selected Pakistan as a test bed for the following reasons. Pakistan is a developing country in Asia with a population of over 190 million. 60% of this population is living in rural areas, which have no access to basic facilities e.g. medical, infrastructure, education etc. Furthermore, the overall literacy rate of Pakistan is 56.2% (Malik, et al., 2015). Literacy rates amongst females is only 43.5%, due to the social, cultural and religious values of the country, which do not allow females to leave the house for education purposes (Latif, 2011). The increased terrorist threat in the country has also caused fear amongst the people, resulting in less people sending their children to educational institutes. Additionally, Pakistan faces a lot of administrative and legislative issues (i.e. Poor Policy making, Political instability, Budget allocation, and Lack of Administrative Support). As a result, the educational standard is not improving in Pakistan (Iqbal, et al., 2013). The government of Pakistan has made an effort to implement e-learning programmes to overcome the barriers of time, space, gender disparity and low budgets. Two e-leaning institutions - Virtual University and Allama Iqbal Open University - were formed to implement e-learning in order to reap the benefits promised in the literature. However, both ventures have failed to fulfil their purpose, which elucidates that e-learning is facing many problems in Pakistan. Few universities with good infrastructure and facilities are available in the country, and students from multiple cultural backgrounds get to share them. This brings a huge diversity of students with a wide range of cultural backgrounds. Since this research will be measuring the individual cultural orientation, i.e. in order to answer research question 2 and 3, Pakistani students will provide a good data set due to the cultural diversity available amongst the university students.

Chapter 3

Research Methodology

3.1. Introduction

Discussion within Chapter 2 helped the researcher to model e-learning implementation barrier literature, i.e. the TIPEC framework, leading to the following three research questions:

1. ***Is a student willing to switch to e-learning from a Traditional i.e. Face to face setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services?***
2. ***Does e-learning student's individual culture impact his/her device preference across the higher education services?***
3. ***Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?***

In this research, the main aim is to explain the role of culture in technology preference and acceptance when undertaking e-learning activity. The aim of this chapter is to explain and justify the appropriate research paradigms, approaches, strategies, choices and time horizons to answer my research questions. Next, explanation and justification about the target population, sampling types, sample frame, and sample size is discussed. Then, instrument development for each research question is explained. Finally, the techniques and procedures that will be used for data analysis in the coming chapters are mentioned, and an explanation of the research design in this study is provided.

Figure 3.1 shows the concept of research onion proposed by Saunders et al. (2009), which will be followed throughout the chapter to justify each step of research methodology for the three research questions. The elements in bold, are critically chosen for use within the current study.

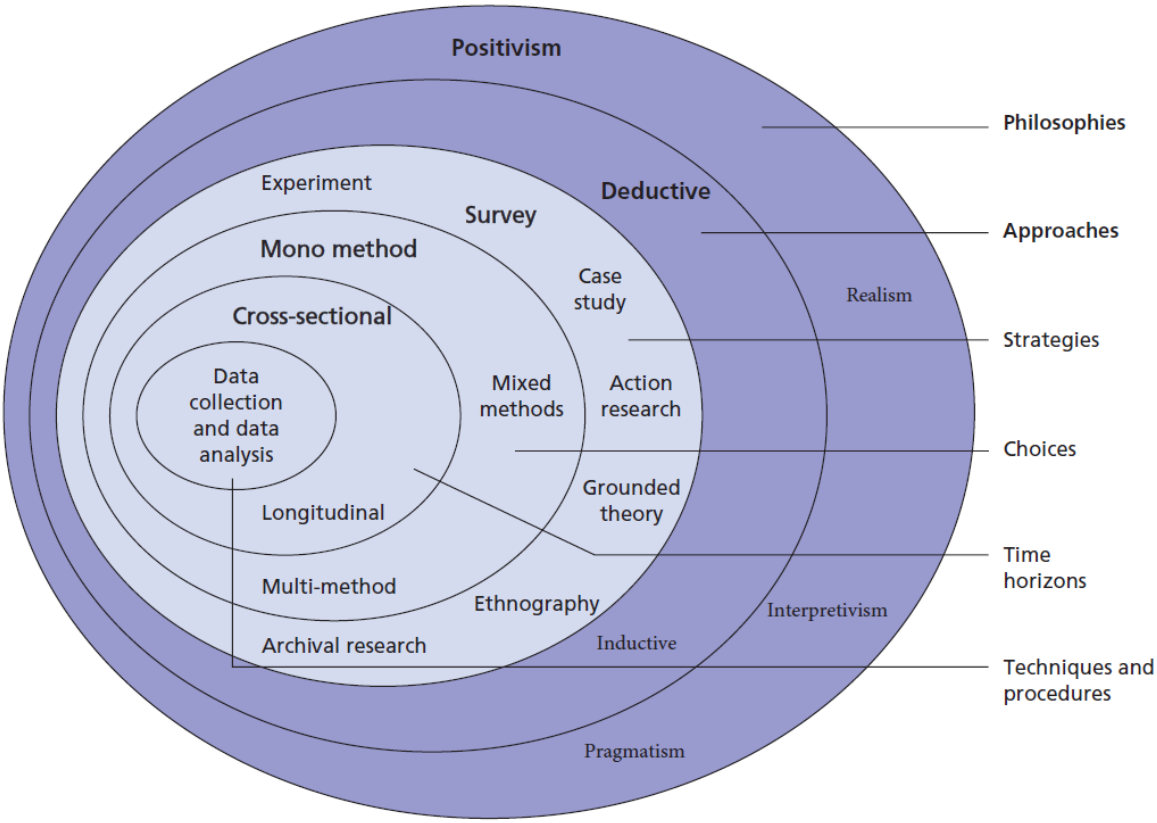

Figure 3.1 Research Onion (Saunders et al. 2009)

3.2. Research Philosophies

The selection of research philosophy/paradigms is crucial for corroborating the study strategy. The research philosophy, which we adopt, will have a significant effect on the problem that we are trying to investigate (Johnson & Clark, 2006). Accordingly, a string of assumptions should be used in order to develop or postulate what theoretical paradigms should be used (Filstead, 1979). Research paradigms are the methods, practices, guidelines and belief systems that are widely accepted and should be systematically followed by the researcher in order to conduct the study. Many authors have developed research paradigms, and there are different types of paradigms found in the literature (Cresswell, 2003). Saunders et al., (2009) research onion (Figure 3.1), and Easterby-Smith et al., (2012) have been credited with respectively explaining the three most widely used paradigms i.e. "*Positivism*", "*Interpretivism*" and "*Pragmatism*". Despite different views on paradigms, there are three underlying research philosophies explained by all authors, which are: "*Ontology*", "E*pistemology*" *and* "*Methodology*" (Meyer, 1990; Guba & Lincoln, 1994; Creswell,

2003). Ontology is related with the nature of reality (Saunders, Lewis, & Thornhill, 2009), epistemology is the researchers view on reality, and how it can be understood (Creswell, 2003; Cater-Steel, 2008) and methodology is the process and technique of gathering and validating empirical evidence concerning the current problem, i.e. how research validates the solution of the problem.

3.2.1. Positivism

John Stewart Mill was the first author to state the concept of positivism (Keeley, Shemberg, & Zaynor, 1988). Positivism is also the most dominated view presently in academic culture (Polkinghorne, 1983; Ponterotto, 2005). Positivism aims to explain and validate/prove the theory/question under observation through use of quantitative approaches. According to Creswell (2009) positivism proposes a quantifiable and empirical solution of the postulates of theory. Positivism also aims to explain the causal relationship of variables to develop a theory (e.g. TAM, UTAUT2, etc.). Positivism also says that the results of the problem being researched are independent of the researcher; in other words, both have no influence on either one.

3.2.2. Post-Positivism

Post-positivism is similar to positivism with some adjustments, and the inclusion of concepts from interpretivism (Guba & Lincoln, 1994). Post-positivist concepts advocate that the researcher cannot be “positive” about his/her claimed knowledge. According to Fox (2008), the concept of post-positivism has roots in the social sciences, i.e. to understand the realities of social phenomena. Accordingly, one needs to look at it the situation from the stand point of the respondent rather than the researcher/observer. In other words, researchers make up his/her own opinion and measure the problem based on the reality that commonly exists in the world. Post-positivism also effectively considers ethical consideration of the study.

3.2.3. Realism

Saunders et al. (2009) states that "realism is the epistemological position that objects exist independently of our knowledge of their existence". This concept proposes that objects exist independent of the human mind; also, what we apprehend through our senses is the reality/truth. There are two types of realism direct realism and critical realism, first says reality is as it is what we see and latter says what we see is not the things rather it is the image of reality or an actual object.

3.2.4. Constructivism / Interpretivism

This school of thought is based on the inductive approach and it uses of qualitative measures for theory development. According to Creswell (2009), the developed theory and concepts applied by the *"constructivism/interpretivism"* philosophy is mainly based on the understanding of the researcher. According *'constructivism/interpretivism'* studies aim to explain the actions on the basis of the subjective implications. In contrast to the concepts where the researcher concludes findings based on numbers, "*constructivism/interpretivism*" focuses on the underlying causes behind actions. The studies carried out using this research approach are commonly conducted through interviews and use of hermeneutics (Guba & Lincoln, 1994).

3.2.5. Pragmatism

This paradigm was defined/developed in early 20th century. Tashakkori and Teddlie (2010) state that "pragmatism debunks concepts such as 'truth' and 'reality' and focuses instead on 'what works' as the truth regarding the research question under investigation". This concept is different from positivism and interpretivism because it states that, in order to determine the correct, ontology, epistemology and methodology one should focus on the research question. Mixed method, i.e. both quantitative and qualitative are appropriate within this paradigm (Saunders, Lewis, & Thornhill, 2009). According to Tashakkori and Teddlie, in pragmatism, unlike other paradigms, researchers and the subject of the study must be interactive during the course of study. They also stated that researcher should "study what interests him/her and is of value to him/her, study in the different ways in which he/she deem appropriate, and use the results in ways that can bring about positive consequences within his/her value system".

3.2.6. Selection of Positivism Paradigm

Research paradigms differ on the basis of research goals. The question is which research paradigm is best for this study? The three research questions will be discussed one by one.

For research question 1, higher education quality indicators would be used to check if the student would be willing to switch to e-learning from a traditional format. The students would be approached to give them the option to select how they want to receive each of the Higher Education Services. They would have a choice to choose between a face-to-face format and/or use of different e-learning devices. The data needed to answer this research question would require capture of numeric values. Collection of numeric values will be done through structured questionnaires. Finally, student's preference would be compared statistically.

For research question 2, students would be grouped based upon their individual cultural orientation, and then their cultural orientation based preference would be checked against the overall preference measured in research question 1. Numeric data would be gathered from the students through structured questionnaires. This data would be used to create statistically significant cultural orientation based groups. The unique preferences of each of these groups would be checked against the overall preference.

For research question 3, the researcher would be exploring the factors leading to student's technology acceptance. This would be done by comparing the technology acceptance for each of the cultural orientation based groups formed in the previous research question. As before, this would require numeric data collection based upon questionnaires.

Based upon the research approach requirements, explained above, positivism paradigm will be applied in this research. Studies that use variables that can be numerically measured, and implicate results and relationships between variables by collecting data from population respondents (i.e. the sample), is known as the "*Positivist research*" (Orlikowski & Baroudi, 1991). In the area of Information Systems (IS), the use of the positivism approach is more dominant than any other paradigm; with Mingers (2003) claiming the use of positivism in more than 75 percent of the studies in the IS field. As the definition of positivism states that it aims to find solutions to the research problem using quantifiable measures. To answer the three-research questions, this study

will, therefore, employ survey instruments to gather data and quantifiable measures, i.e. to interpret the gathered data.

In positivism ontology "the role of the researcher is to discover the objective physical and social reality by crafting precise measures that will detect and gauge those dimensions of reality that interest the researcher" (Orlikowski & Baroudi, 1991). The three research experiments will check the overall device preference, the impact of culture at the individual level on the device preference, and the impact of culture at the individual level on the technology acceptance amongst the students. The researcher will be looking into certain dimensions/factors related to higher education services, cultural orientation and technology acceptance respectively. So, for all three research questions, positivism ontology would be applied.

This research would be testing the student's beliefs related to his/her perception of receiving HES through e-learning devices. Next, cultural orientation based groups would be used in order to explore the students' preference and technology acceptance. I would be checking the causal relationships for the selected model of technology acceptance. Positivism checks the casual relationship of the factors by the development of frameworks. Also, the epistemology of positivism is stated as beliefs that are tested (true or false) through empirical testing of the models and theories (Chua, 1986). Therefore, I will be applying epistemology of positivism.

Statistical software (i.e. SPSS and AMOS) would be used for data analysis. According to Mingers (2003), positivism uses survey and questionnaire methods to gather responses and statistical software is used to draw conclusions from gathered data. Therefore, the methodology of positivism will be used in this study.

3.3. Selecting the Deductive Approach

According to Saunders et al. (2009), there are two approaches that can be followed in a research project, namely the deductive approach and the inductive approach. In deductive approach, the aim is to confirm the hypothesis and check the relationship between two or more variables. It involves examining the specific outcome of the inquiry, modifying the theory in the light of the findings and causal relationship between variables. The data is generally numeric in nature and collected through

questionnaires. Whereas, the inductive approach relates to getting a hold of what is happening around and development of theory based on the observation. This approach is used in the formulation of theory and data is commonly collected using interviews based on the data collected.

Based on these two approaches, there are two methods to investigate the research problem, i.e. quantitative and qualitative methodologies respectively. As already explained above, quantitative methods will be used for each of the three experiments. Hence, the research approach is deductive. Quantitative methods are referred to as the solutions that seek to answer the research question through data and measurable relationship of variables (Bryman, 2008). Quantitative studies come under the banner of positivist paradigm and deductive appraoch (Alexander, 2014). The research problem in the quantitative method is explained by getting numerical data and then analysing it using statistical techniques to validate a hypothesis. In contrast to quantitative studies, qualitative studies use subjectivism and try to explore underlying causes behind the constructs (Creswell, 2003). In the three experiments, already established constructs of individual culture orientation would be used, and the relationships of different variables of the selected model of technology acceptance would also be explored.

Qualitative studies follow the Inductive approach. Qualitative studies are more useful while describing the phenomena in a subjective manner, also the qualitative method is used to explain the phenomena on which very little literature is available and the relationship of the constructs and definition are to be described (Gilbert & Stoneman, 2015). But after the development of constructs, their relationship cannot be proved with qualitative measures, the validation of those relationship requires quantitative methods and use of stats (Collis & Hussey, 2013). Creswell (2003) also stated that in order to generalise the theoretical prepositions, particularly in social sciences, it is required to use numerical data and perform statistical tests to interpret the findings.

3.4. Selecting Survey Strategy

After selecting the appropriate method of research i.e. quantitative method, the next step is to select a strategy for data gathering. According to Creswell (2003), there are number of ways to carry out quantitative research in social sciences and IT, such as: laboratory experiments, field study, ethnography, exploratory study, survey study, case study method etc. (Guba & Lincoln, 1994). As

already discussed, I will be using survey strategy to gather quantitative data for the three research questions. The survey research approach is most relevant for the current study as Saunders, Lewis, and Thornhill (2009) mentioned that survey method is fit for studies adopting the positivist philosophy. Survey method is best in three cases: first when the objective of the study is to find the relationship among the constructs through quantitative measures by gathering data from respondents; second, when the responses are gathered on predefined structured instrument/questions. Lastly, when the objective is to gather data from a fraction of the sample and generalise the findings to the whole population (Pinsonneault & Kraemer, 1993). The three research questions are relevant to the cases discussed above.

3.5. Selection of Mono-method Research Choice

Research choice consists of mono, mix and multi method. In mono-method, the researcher uses a single data collection technique and corresponding analysis of collected data (i.e. either quantitative or qualitative). Mixed methods approach employs quantitative and qualitative techniques either in parallel (at the same time) or in sequence (one after the other), but it does not combine them together. Whereas, when more than one way of collecting data is used then it is known as multiple method. Since I will be collecting numeric data using a structured questionnaire for the three research questions. Hence, I will be applying a mono-method of study, using quantitative methods (Saunders, Lewis, & Thornhill, 2009).

3.6. Selection of Cross-sectional Time Horizon

Time horizon is related to observational time for a study, either one observers a phenomenon in one round or multiple rounds (Saunders, Lewis, & Thornhill, 2009). The selection of a time horizon will depend on the nature of study (research questions). Gathering responses in one snap shot is referred as cross-sectional studies, whereas, longitudinal studies gather responses using the diary approach i.e. gathering observation over a period of time.

Cross-sectional studies are conducted to study a phenomenon at a given point in time. Cross-sectional studies often employ survey strategy (Easterby-Smith, Thorpe, & Jackson, 2012). However, short interviews case studies can also be applied in cross-sectional approach. The

longitudinal study aims to answer research question by observing people over a long period of time and studying their development overtime. Then drawing a conclusion based on the finding of past and post development.

For the current study, cross-sectional time horizon will be adopted and survey strategy will be used to gather observations.

3.7. Population and Sampling

Proper selection of a sample from a targeted population is very necessary to obtain unbiased data collection and helps generalisation of results in an adequate manner (Bryman & Bell, 2011). Sample is defined as "a selected segment of the population which is chosen carefully to draw a conclusion and the findings can be generalised to the overall targeted population". Literature suggests that four factors should be considered carefully during sampling "*Sampling choice*", "*Sample Frame*", "*Sample Size*" and "*Response Rate*" (Fowler, 2009).

3.7.1. Population

The identification and selection of population is very crucial for the success of the study. This will help the researcher in the generalisation of the results drawn from the sample. Before selecting the sample size, the identification of the population helps in explaining the researcher's problem and proposed theories in a better and effective way. A 'target' population is defined as the "universe of units from which the sample is to be selected" (Bryman & Bell, 2011). It is also referred to as a sum of the sample, which has some similar attributes, i.e. group of people (employees, students, patients, consumers), and/or institutions (medical, service, firms).

This study aims to check the device preference and acceptance of higher education students, so the target population is students enrolled in higher education universities in Pakistan. According to the Higher Education Commission of Pakistan (HEC), there are 163 public and private institutes, which provide higher education services to approximately 1.3 million students every year in different programmes (HEC, 2017). Using the whole population for the study is not possible so a sample size would be used and the findings will be generalised. For that, a sample size will be selected from the population of students enrolled in higher education in Pakistan.

3.7.2. Sampling Choice

Sampling choice is the recognition of respondents and importance of their response for the desired objective. Sampling choices can be categorised as “probability sampling” and “non-probability sampling” (Bryman & Bell, 2011). In probability sampling, every person in a population has a known and equal chance of being selected as the member of sample size, whereas in non-probability sampling chance of selection for every person within a population is unknown or unequal. Probability sample includes simple random sampling, systematic sampling, stratified random sampling and cluster sampling. Simple random sampling is the selection of respondents from the population on a random basis, and each respondent has an equal probability of being selected. In systematic sampling, the researcher selects respondents after an interval from a complete list of respondents. Stratified sampling is the division of the whole population in some groups, and then select respondents using either of the first two techniques. In cluster sampling, the population is divided into clusters on the basis of some characteristic, and then simple random sampling is used to choose from clusters. On the other hand, non-random sampling includes judgmental sampling, quota sampling, snowball sampling and convenience sampling (Blumberg, Cooper, & Schindler, 2005). In judgmental sampling, as the name indicates, the researcher uses his/her own judgment and experience to select the respondents. When the population is divided into control groups, then using convenience or judgmental sampling to select respondents is known as quota sampling. In snowball sampling, respondents are selected based on some special characteristics (i.e. who fits the needs of the study). Subsequently, from the initial respondents’ reference, other subjects are included. Convenience sampling is non-probabilistic sampling where respondents are selected based on ease and access.

Convenience sampling is fast, easy, and the cheapest of all sampling techniques. For the current study, convenience sampling will be used, as the selection of the respondents within the target population is easy to access.

3.7.3. Sample Frame and Size

The selection of a large sample does not ensure precision. According to Rice (1997) “the selected sample should be complete, i.e. every selected person should be part of the population, the frame should cover the whole population, sample size should be updated according to the changes in

population, sample size should be easy to access and lastly duplication should be carefully considered". The sample size is based on the HEC statistics of yearly statistics. Use of HEC statistics is preferred because in Pakistan HEC is the regulatory body controlling the majority of education aspects. The selection of HEC as the basis of sample frame covers all the aspects of Rice (1997).

It is clear that the use of the whole population for the study is not possible. Accordingly, selection of relevant sample size is quite a tricky process. A large sample size does not ensure precision, yet a small sample size would lead to greater chances of failure and wrong interpretations. There are number of methods to calculate the size of sample. The first measure that was used to calculate sample size was an online sample size calculator with the name of "Raosoft sample size calculator", which has been used by many well citied studies (Olawale & Garwe, 2010; Wainstein, Sterling-Levis, Taitz, & Brydon, 2006). Raosoft sample size calculator calculates the sample size based on four factors, i.e. margin of error, confidence level, population and the response distribution (Fatoki & Chindoga, 2011). Using a margin of error at 5%, confidence level 95%, and a total population of 1.3 million the recommended sample size was 385. Hair et al. (2010) mentions that while using SEM if the number of constructs are more than 6, size of the sample should be 400. So for the safer end, we targeted for a sample size of over and above 500 for each research question. For respondents above 500, the confidence level for my population is 97.7%.

3.8. Instrument Development

After the defining the proper sample size, the next step is to gather the responses from selected sample. According to Zikmund (2003) the instrument used in research should be able to address two things: first, the instrument should be capable of measuring the responses to answer research questions (Construct validity); secondly, the construct reliability should be deemed strong.

In the present study, for three research questions, three sets of questionnaires would be developed. The response of each individual would be given an ID to allow the researcher to link data to other questionnaire responses. Each questionnaire will have two sections, one for demographics questions and a second one for construct based questions.

First research question measures whether or not the student wants to switch to e-learning from traditional setting. For that reason, I would be identifying higher education services from the literature, and also the devices that are being commonly used in e-learning. My first questionnaire would check these devices against face-to-face format by asking students that what would be their preference when receiving the eight defined Higher Education Services (HES) (Kwan & Ng, 1999). They would be given the choice to choose between any of the devices or face-to-face setting. The responses would be gathered on a 5-point Likert scale (5 being strongly agree and 1 being strongly disagree).

The second questionnaire would be developed to address the second research questions, i.e. "Does e-learning student's individual culture impact his/her device preference across the higher education services?" Respondents would be the same to remain consistent – allowing cross comparison of results. The second questionnaire would be developed using the constructs of individual cultural orientation.

The third questionnaire would be developed to address the third and last research question, i.e. "Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?" Respondents would be the same again. This questionnaire would be developed based upon the constructs of the selected model of technology acceptance.

3.9. Data Analysis

The current research is considering three research questions. Analysis for each will be discussed accordingly. Two tools of data analysis, SPSS and AMOS would be used for the three experiments.

3.9.1. Research Question 1

The first research question would be to check the student preference of device for the higher education service quality indicator against the traditional/face to face learning. For that, data would be entered in SPSS and the responses from the first set of questionnaires would be entered (each row representing a respondent), and every respondent would be assigned a unique ID. The test used for this experiment would be simple means of frequencies of each HES for the selected e-learning devices and face to face learning. The means will be compared for answering research question 1.

3.9.2. Research Question 2

The second questionnaire will be used to measure the individual cultural orientation of the student (who would have already filled the first questionnaire). These responses would then be added to the responses of the first questionnaire, for each respondent. The following four tests will then be performed. Only the third test (i.e. structured equation modelling) would require us to use AMOS. SPSS would be used for the remaining three tests.

Reliability

Reliability will be checked using SPSS. The measure for reliability is Cronbach's Alpha. Cronbach's α is easier to calculate, it also checks the inter-item consistency and it is widely accepted and used in the field of academics (Nunnally & Bernstein, 1994). Next, Exploratory Factor Analysis (EFA) tests would be performed.

Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) will also be performed using SPSS. EFA helps to screen out the problematic items of the questionnaire. The measures to check the EFA are:

- First is the value of Kaiser Meyer Olkin Measrure (KMO) of sampling adequacy and Bartlett's Test of Sphericity.
- Second measure is communalities; these are initially at 1 for every factor in the consideration. If the extracted value of the communality for a certain variable is high (i.e. communality value is closer to 1), this implies that the extracted factors account for a large proportion of the variable's variance.
- Third measure is the cumulative variance explained, this means that the current extracted factors are explaining how much variance occurs in the data. Closer the value to 100%, the better is the variance explained.
- Fourth measure is the rotated component matrix/pattern matrix. This measure checks the loading and correlation of the items with each other.

Structural Equation Modelling

Structural Equation Modelling (SEM) is a very popular method in the information sciences, and it is used to confirm the theorised concepts. It involves covariance analysis and path analysis with latent variables (Gefen, Straub, & Boudreau, 2000). SEM is defined "as a multivariate technique, which combines features of multiple regression and factor analysis in order to estimate a multiple of networking relationships simultaneously" (Hair, Black, Babin, & Anderson, 2010). SEM also checks whether data fits according to the hypothesis model.

- SEM is very important to confirm the constructs of the model (Confirmatory Factor Analysis, i.e. CFA). This helps the researcher in determining the construct validity and readability at both variable and item level.
- Confirmatory Factor Analysis is performed on the constructs extracted through exploratory factor analysis, otherwise, it cannot be used in further analysis.
- The relation of the independent and dependent variable is more reliable in SEM than any other technique.

Hair et al. (2010) stated that there are six stages of SEM:

1. *Defining individual constructs:* This stage explains the constructs, with reference to the theoretical justification. Selection of item with respect to each construct is defined in this stage. This definition of the constructs can be done for the development of new scale or on the basis of the previous studies. Constructs defined then will be used in the measurement model.
2. *Developing the overall measurement model:* The defined constructs are then included as the latent variable in the model and each item (statement) is then assigned to the respective construct/latent variable. SEM consists of measurement, structural and correlational relationships. For the current stage, measurement relationship is defined between the items and the constructs. The linkage between the constructs and items measures the degree to which item is related to each construct. This step is also known as Confirmatory Factor Analysis.
3. *Designing a study to produce empirical results:* This stage helps the researcher to look for the issues, which can occur during the model estimation. Those issues include missing values, type of data to be analysed (covariance/correlation) and effect of sample size. Issues related to missing values can be resolved by either deleting the whole case (complete case approach) or

filling missing values using means (imputation approach). Sample size issues can be resolved to look at the number of observed constructs to the number of responses. According to Hair et al. (2009) for each item, there should be at least 10 responses; also for a model having construct less than 5 at least 100 responses are required.

4. *Assessing measurement model validity:* After the development of measurement model and collection of sufficient data, next step is to test model validity. This validity can be achieved by "establishing an acceptable level of goodness of fit for measurement mode" and "establishing evidence for construct validity". Table 3.1 shows the indices of model fit.

Table 3.1 Measures for Goodness of Fit (Hu & Bentler, 1999; Hair, et al., 2010)

Measures	**Threshold**
CMIN/DF	< 3 good
Comparative Fix Index (CFI)	> 0.90
Adjusted Goodness of Fit Index (AGFI)	> 0.80
Standardised Root Mean Square Residual (SRMR)	< 0.09
Root Mean Square Error of Approximation (RMSEA)	< 0.05 good, 0.05 – 0.10 moderate

5. *Specifying the structural model:* This stage involves the careful assignment of relationships between constructs based on the theoretical model. This is done by joining one construct with another construct using a single headed arrow (with the direction of the arrow representing the relationship based on theoretical model). The joining of two constructs should be based on a hypothesised relationship among the constructs. This step is also used to check the casual relationship between dependent and independent variable.
6. *Assessing structural model validity:* Lastly, goodness of fit for the structural model is also checked using the indices defined in stage four.

Grouping based on the Individual Culture Orientation

The constructs that would be confirmed and validated using confirmatory factor analysis, will be used for grouping the overall student data to find out the significant groups based on individual culture orientation. The students would now be classified based upon their individual culture

orientation based groups. Then, the means of preference for each of the individual culture orientation based groups will be used to check the difference in device and face-to-face preference across the higher education services among the groups. The individual culture orientation based preference means would also be compared with the over-all preference means found while answering research question 1. If a difference is found in the over-all preference and individual culture orientation based preference of the students, this would answer the second research question. This would also find out what are the preferred devices for the students belonging to each of individual culture orientation based groups.

3.9.3. Research Question 3

The last experiment will be based on the results of the first two experiments. First, similar to experiment 1, responses of technology acceptance questionnaire for each member of the individual culture orientation based groups will be separated. Now after the separation of data based on individual culture orientation based groups, the analysis will be performed using SPSS and AMOS for the preferred devices:

- Factor analysis to confirm and validate the constructs of selected technology acceptance model will be performed. Firstly, EFA will be performed.
- Then using SEM, CFA (for overall data relating to technology acceptance) will be performed.
- In the next step, data will be separated for the individual culture orientation based groups for the preferred devices.
- Then using stage 5 and 6 i.e. “Specifying the structural model” and “Assessing structural model validity” of SEM, the researcher will specify the relationships of constructs of technology acceptance through use of the structural model, and by assessing the structural model validity. Then, using the measures to check the strength of the relationship between Exogenous (influencing) variables and Endogenous (influenced) variable, the significant predictors of technology acceptance for each cultural group will be checked along with model fitness.

3.10. Ethical Consideration

Ethical compliance for the current study is ensured as per the guidelines of the Henley Business School (University of Reading). During the data collection participants were asked to sign the consent form, which explains the right of withdrawal anytime from participating in the study. The consent form also mentions that their responses will only be used for the research purposes and information they provided will be secured. The unique ID assigned to each respondent was only used to link, and keep track of data collection. This process helps us get the honest opinion from respondents. Ethical concerns after data collection were also checked during data analysis and reporting stages.

3.11. Research Design

Research design provides an overview of the study. Chapter 1 presents a high-level overview of the research questions, the research aim, and the research objective. In chapter 2 those research questions were justified. The appropriate philosophies, sampling type, data collection modes used in order to address those questions were explained in this chapter. The research design explains how three research questions will lead to three experiments and the conclusion will be drawn on the basis of all three experiments. Chapter 2 helped us to explain the research questions by undertaking a literature review, i.e. reviewing e-learning implementation barrier identified in the literature between 1990 to 2016, and formulating the TIPEC framework.

It was suggested that the individual (Student) and his/her perception towards e-learning technologies will play an important role in achieving the benefits of e-learning. Also, cultural orientation seemingly plays a significant role in the development of perception and behaviours. Therefore, in order to answer these research questions, a pathway is required to answer questions in a systematic and defined way. The discussion in the coming chapter 4 will be addressing research question 1, i.e. Is a student willing to switch to e-learning from a Traditional - Face to face - setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services? Section 3.9.1. is a detailed version of the systematics steps that will be considered to answer this research question. Chapter 5 will explore research question 2, i.e. Does e-learning student's individual culture impact his/her device preference across the higher education services?

Section 3.9.2. mentions the steps that will be followed to answer the second research question. Similarly, chapter 6 will address research question 3, i.e. Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)? Section 3.9.3. describes the steps that will be pursued to answer this research question.

The data analysis for the first research question will tell if the students are willing to switch over to e-learning for the 8 HES and do they prefer to receive all of them on a single device or a mix of devices. This will lead to the second research question, to investigate whether the cultural orientation at the individual (student) level plays a role in determining the preference of device(s) for HES quality indicators. The result of this chapter will help us narrow down that which device(s) are preferred by the students. For those selected devices, the researcher will check the technology acceptance considering the role of culture at the individual level. Finally, the discussion will be concluded by considering the three results, and importance of individual culture orientation in technology preference and acceptance will be identified.

3.12. Conclusion

This chapter explained and justified the research paradigms, approaches, strategies, choices, time horizons, target population, sample size and data analysis techniques concerning the three research questions for the study. All of the three research experiments will be performed using the quantitative method and statistical techniques. Questionnaire survey method was found to be best suited for the current study, which falls under the paradigm of positivism to collect responses for the three experiments. Detail of the targeted population and justification of the relevance of selected population and frame is also discussed in detail. Number of sample size and method of calculating the sample size for experiments is cited based on literature references. Later on, there is an explanation about the development of relevant survey instruments for each of the experiments. Lastly, a brief explanation of data analysis for three experiments is mentioned.

Chapter 4

Understanding e-learning Students' Device Preferences

As discussed in Chapter 2, the first research question asks whether students are willing to switch to e-learning/blended learning from a traditional, i.e. Face to face, setup at higher education institutes? If yes, then does (s)he prefer a single device for all Higher Education Services?

This chapter starts by considering literature, i.e. to define the role of education as a service. Higher education is discussed next by emphasising the role of students when assessing the quality of higher education that they receive. After a detailed review of the literature, eight service quality indicators for higher education are selected to serve as the basis of the planned experiment for this research question. These eight higher education service quality indicators are: Course content, Lecturer's Concern for Students, Facilities, Assessment, Social Activities, Communication with University, Counselling Services and People. The role of technology in education is discussed next, leading to introduction concerning the different types of e-learning technologies available to students. Six information assimilation devices i.e. TV, Radio, Desktop, Laptop, Mobile and Tablet, are selected to check the student's preference across the service quality indicators of Higher education.

4.1. Education as a Service

Education is fundamental in any society. The educational system transforms the youth with basic literacy skills into knowledge workers, and entry-level professionals (Maglio, Srinivasan, Kreulen, & Spohrer, 2006). All educational institutions (including universities, colleges, and schools) are justifying themselves by claiming that they are spending the public funds for the greater benefit of the public. Educational institutions are often considered as protectors and creators of knowledge which serves the wider benefit of humanity (Fuente, 2002). In a democratic social structure, educational institutions position themselves as supervisors for the free interchange of thoughts and ideas, and claim to provide protection for freedom of thought; including the freedom to dissent from existing orthodoxies. The significance of education, and how the education influences in the economic development of a social setting and a nation, has already been discussed in detail (see Chapter 2, Section 2.2).

The focus of discussion in this chapter is to elaborate upon the concept of education as a service. Services, in general, have been defined in many different ways: A service is an immaterial real-time process through which the user is delivered some intangible goods (Bitner, 1997); a service is deemed as an intention, process, and performance (Lovelock & Wirtz, 2001). Definitions of service show that in essence education is a service, since schools appeal to students based on intention, the study is in essence 'a process', and students evaluate quality based on the performance of academic and other staff. Accordingly, we can conclude that education offered to the students is a service that increases their knowledge and enhances their skill set.

Therefore, it is imperative that the service quality be formally assessed, beyond the teaching evaluations performed for each course. In this context, service quality is acknowledged as a key performance measure for excellence in education, and a major strategic variable for universities as service providers to increase market share (Blustain, 1998). Education is a pillar of the modern economy, which is the reason why scholars are seeking to ensure and obtain high service education quality (Buzzell & Gale, 1987; Grönroos, 1999; Changhong & Chi, 2002).

Application, adaptation and assessment of the service quality concepts and models in the higher education sector have been an area of concern for researchers in recent years; where many education institutions align themselves to achieve major goals (Temizer & Turkyilmaz, 2012). Furthermore, Astin stated that student's perception of quality service in higher education will determine student retention (Astin, 1993, p. 482); which is a major issue in e-learning. There is a need to assess what a student prefers during his e-learning experience. If an e-learning student can be provided e-learning that supports student preference, there is a good chance that we can increase retention rates; confirming that individual, i.e. student, is the central component in the education.
According to 2011 standards of educations (i.e. International Standard Classification of Education (ISCE), there are nine levels of education (Level 0 to Level 8) (UNESCO, 2012; Schneider, 2013).

- Level 0: There are two sub-levels of foundation education. The first is named 'early childhood educational development', which is for children up to the age of 3 years. The aim of this level is to prepare children for school. Second level is known as Pre-primary education, level 0 starts after the age of 3. The aim of the pre-primary level is to prepare the child for primary education.

- Level 1: Second level of foundation is Level 1, which starts at the age of 4 or 5 normally and this level builds the basic foundation of a child learning through reading, writing and basic mathematics.
- Level 2: Lower secondary is the name for Level 2. It is also one of the two stages of Secondary Education. This level is more subject oriented, which starts after primary education is completed.
- Level 3: Upper secondary is the second stage and fourth level of education system. After completing Level 3, secondary school is finished, as it is the final stage of secondary education. At this level, students are equipped with relevant basic employment skills and are offered different options and ranges of the subjects. Level 3 prepares students for tertiary education.
- Level 4: Post-secondary non-tertiary education builds on the knowledge of secondary education to prepare students for tertiary education as well as the labour market. From level 4 onwards higher education starts.
- Level 5: At this level, students can move to a selection of the occupation based on educational programmes. Level 5 is known as short-cycle tertiary education (Breen & Jonsson, 2000).
- Level 6: After completing this level, students can obtain a first level tertiary degree. This level provides the professional knowledge and skills for occupation. The name of Level 6 is Bachelor.
- Level 7: Level 7 is Master or second tertiary degree.
- Level 8: This level provides a degree for advanced research qualification it normally concludes after submitting and defence of a dissertation/thesis.

From the above mentioned different levels of education (primary, secondary, college and university etc.), Levels 5 to 8 are known as higher education, often termed ‘university education’. This study focuses specifically on the higher education.

4.2. Higher Education

Two services cannot be treated as identical if they are performed in different settings and/or by different individuals (Adler & Graham, 1989; Zeithaml & Bitner, 2000; Lovelock, Patterson & Walker, 2003). Given the student diversity, differences in learning styles, previous life experiences, and the variation in service facilities offered by universities, student perception of a generalised

service performance will be different, thus contributing a major challenge to universities in terms of sustaining a uniform standard of service performance (Dawson & Conti-Bekkers, 2002; Patterson & Anuwichanont, 2003). Perceptions formed by students, relating to service performance, are the result of the student attitudes, which can be expressed either as being positive or negative (Keaveney & Susan, 1995; Boshoff, 1997); based on how student expectations, concerning the delivery of the services, have been met by the university. If a negative attitude is formed, it will be difficult to achieve overall satisfaction and could result in complaints, decreasing loyalty and negative Word of Mouth (WOM) (Maxham & Netemeyer, 2002; Kau & Loh, 2006). It is critical therefore for universities to manage student perceptions of service performance, in order to improve their attitudes towards the institution (Bagozzi, 1992). Accordingly, universities need to recognise the fact that postgraduate students, all of whom have prior experience in a university service environment compared to undergraduate students evaluate educational service differently; resulting in the formation of different attitudes towards service performance.

What the university offers students is much more than just the education; including both social interaction and learning supporting services (Sevier, 1996). The attitude towards students has also changed, and the voice of the students is increasingly influencing higher education improvements (Williams, 2002). Hence, in university education, students are not only arguably the most important stakeholder, but also play a pivotal role in assessing the quality of the education provided by a higher education institute.

4.3. Service Quality Indicators of Higher Education

By considering service quality literature, it was noted that service quality is mostly defined in the context of consumers (Kessler, 1995). Service quality relates to how well the delivered service meets the customer expectations (Lewis & Booms, 1983). Defining service quality in the context of higher education is no less elusive. Reeves and Bednar (1994), argued that there is no such definition of service quality, which is universally appropriate for the higher education, thus quality in higher education should be defined under the general definition of service quality.

A number of studies consider higher educational quality Lee et al, (2009) describes seven critical factors of e-learning. Factors described by Lee et al. (2009) include:

1) Instructor characteristics: This is referred to as the characteristics like care and help that are provided by the instructor in order to accommodate students.
2) Teaching materials: This is related to the course material provided for learning. It signifies the relevance and suitability of learning material with e-learning.
3) Design of learning contents: Consistency of the content provided for learning, i.e. to ensure that the accurate delivery of the intended meaning is measured against some key criteria.
4) Playfulness: This factor explains the extent of student enjoyment while receiving e-learning.
5) Perceived usefulness: This factor was derived from the concept of technology acceptance, i.e. perceived usefulness. It measures that whether the student believes that the use of a particular e-learning technology increases his/her learning outcome or not, i.e. is it a useful activity.
6) Perceived ease of use: This factor measures the student's perception concerning the extent of ease felt by a particular when engaging with the technology for learning purposes, i.e. is the technology easy to use. This was also taken from the concept of technology acceptance.
7) Intention to use e-learning: Similar to the previous two factor this factor was also taken from the technology acceptance theory. This signifies the student's intention to use e-learning.

The Lee et al. (2009) study aimed to fill a gap in individual country-level e-learning research.
Levy (2008) investigated issues related to learners' perceived value by uncovering the critical value factors (CVFs) relating to online learning activities. The five critical value factors of learning defined by Levy (2008) are:

1) Collaborative, Social, and Passive Learning Activities (CSLA): This factor consolidates the collaborative, social and passive online learning activities. Activities like file sharing, live chat, email sharing files, with the peers are referred as the collaborative and social learning activities. Whereas activates that a student performs individually like listening to course audio/recordings, studying chapter notes (slides), and reading assignments of other classmates are called as the passive learning activities.
2) Formal Communication Activities (FCA): Formal activities include the formal communication with instructor e.g. e-mail, discussion forums, information related to

grades, and assignment guidelines. The formal activities also include the registration of the course and communication with the institution in order to gain information.

3) Formal Learning Activities (FLA): This factor refers to activities such as assignment submission, profile development (blog, website etc.), student's participation in discussion forums. Such formal learning activities have a direct impact on the grades of students.
4) Logistic Activities (LGA): This factor includes the online learning activities like uploading and downloading the assignment results and grades, downloading course material and outline and purchase of text book, software, and other items provided by the institutes.
5) Printing Activities (PA): Printing activities as the name suggests is about the printing of the course content, assignment guidelines, course documents, etc. (Levy, 2008).

Jung (2011) aimed to identify the quality dimensions as perceived by adult learners, i.e. those who had taken one or more e-learning courses offered by higher education institutions, to identify and confirm the structural features of these quality dimensions. The quality dimensions of learning defined by Jung (2011) are:

1) Institutional support: This factor referred to as the institutional planning, resources and leadership support for e-learning
2) Course development: This factor is referred to as effort by the e-learning institute to help in the development of course materials and learning activities.
3) Course structure: The course structure is related to the policies and procedures that relate to the learning process.
4) Teaching and learning: This factor relates to the pedagogical activities in e-learning to ensure the proper delivery of learning material.
5) Student support: This ensures the support services provided to students by the institute.
6) Faculty support: This factor takes into account the services required to ensure and facilitate the faculty/staff to perform their jobs.
7) Evaluation & assessment: This is related to how students are assessed and/or awarded the grades for their achievements by an e-learning institution (Jung, 2011).

Kwan & Ng (1999) proposed a set of higher education service quality indicators, which have been extensively used in a number of studies around the globe to check the quality of education service

offered by universities. Kwan and Ng (1999) proposed nine higher education service (HES) quality indicators to assess the service being delivered at universities. In 1970, a survey instrument was designed to measure service quality in education; keeping in mind the support services (Betz, Klingensmith, & Menne, 1970). Later in 1993, Hampton refined and reduced Betz, Klingensmith and Menne factors to find out the factors that contribute towards quality education. The main aim of Hampton's study was to develop "service indicators" by the students themselves (Hampton, 1993). Hampton (1993) mounted his questions in the form of a SERVQUAL survey which was carried out in the United States. In 1999 Kwan and Ng adopted the quality indicators developed by Hampton (1993). Kwan and Ng argued that students' perceptions and expectations are often influenced by their cultural orientation. Kwan and Ng (1999) considered cultural variables in service quality in their adaptation by conducting a survey in both Hong Kong and China.

Kwan and Ng (1999) used factor analysis to identify seven factors for each of the two universities in China and Hong Kong respectively (see Table 4.1).

Table 4.1 Studies of Kwan and Ng in Hong Kong and China

Quality of Education Factors (Hong Kong)	**Quality of Education Factors (China)**
Course Content	Course Content
Concern for Students	Lecturer's Concern for Students
Facilities	Facilities
Assessment	Assessment
Social Activities	Social Activities
Medium of Instruction	Counselling Services
People	Communication with University

The nine factors, defined by Kwan and Ng (1999), were identified by removing the duplicated factors:

1. **Course content:** Course content relates to:
    - Usefulness of course in terms of both personal growth and career development

- Material in course
- Module components offered

2. **Facilities:** Facilities relate to provision of:
    - Library
    - Computers
    - Recreational Facilities
    - Sports
3. **Lecturer Concern for Students:** Kwan and Ng defined this variable as "whether the students value the services of advisors from whom they can seek help as well, as the provision of upward communication channels to present their ideas to university management".
    - Personal attachment towards student
    - Talking with students after class
4. **Social activities:** It signifies the importance given to social activities in the university/college life.
    - Interactions with fellow students through events etc.
5. **Communication with University:** It is stated as the willingness of university management to take opinions from students.
    - Student communication with University management
    - Channels for students to reflect ideas to university management.
6. **Assessment:** This indicator means that "students are looking for a fair assessment scheme and are getting a righteous return for their effort spent on studying". Assessment scheme comprises of:
    - Exams
    - Quizzes
7. **Counselling Services:** Counselling services include personal advice that is offered by the institution, e.g.
    - Help provided by advisor
    - Interest taken by advisor in students' progress
8. **Instruction medium:** Instruction medium relates to the medium used to support the transfer of course material/information.

- Language used in instruction of education
- Language used in lectures and tutorials

9. **People:** The people factors considers:
    - Interaction with People
    - Aspiration to make new close friends

Kwan and Ng's (1999) higher education service (HES) quality indicators have extensively been used in numerus studies around the globe to check the quality of education service offered at the universities. A study was conducted at Universiti Tun Abdul Razak (UNITAR) to find out whether the current undergraduate students are satisfied with the quality of education delivered by the university. This study also attempts to discover which of the factors that constitute UNITAR's education service contribute the most to the students' satisfaction level; and uses the satisfaction model, which incorporates perceived value and perceived performance as the measure of satisfaction. Specifically, the research is modelled based on Kwan and Ng's (1999) constructs (Peng & Samah, 2006). A study conducted at the Central Queensland University (CQU), Rockhampton (Australia), to develop and empirically test an integrated model incorporating the antecedents and consequences of service quality in a higher education context. A model was developed by combining other models indications; including Kwan and Ng's (1999), and Sultan & Wong (2012). Studies by Garvin (1988), Watson, Saldaña, & Harvey (2002) and Peng & Samah (2006) have all applied the HES quality indicators (Kwan and Ng, 1999) to assess the quality of education. These HES quality indicators have been selected in the experiment to answer the first research question.

As mentioned in Chapter 2, education can be delivered in two ways, i.e. traditional (face to face) and/or e-learning (using technology). In this chapter, I will be comparing traditional (face to face) and e-learning methods of education delivery, considering relevant HES quality indicators. Since quality indicator number eight i.e. Instruction medium, is irrelevant to the technology preference, it will not be used in the experiment. Accordingly, the preference of students over face to face and e-learning against the eight remaining HES quality indicators will be checked. Before moving on to the experiment, there is a need to understand the role of technology in education and types of technologies available through which education can be delivered and received.

4.4. Education and Technology Advancement

Teaching is becoming one of the most challenging professions in our society, since knowledge is expanding rapidly, and changes in modern technologies require teachers to adjust and learn how to use these technologies in their teaching approaches (Jung, 2005). Today's generation of students has many opportunities and options when undertaking educational learning, with the involvement of technology making educational learning faster and easier.

In e-learning, technology can be defined as a tool that facilitates insight and understanding and/or disseminates what was learned (Fisher, Thompson, & Silverberg, 2005). Fundamentally, educational technology is the "use of information technology to facilitate students' learning" (Fleiszer & Posel, 2003).

There are two types of technologies that exist on the basis of structural distinction; i.e. broadcast technology and communication technology. Broadcast implies a one-way transfer of knowledge taking place, e.g. television and print media, where the bidirectional exchange of thoughts is not possible. Broadcast technology is considered to be standardised. Communication, on the other hand, is a two-way/bi-directional technology where interactions between the learner and the teacher are possible. Telephone and video conferencing are such examples. The main technologies, and their corresponding educational application, are presented in Table 4.2 (Bates, 2005).

Table 4.2 Technologies and their Application in Education

Technology	**Educational Application**
Class room, labs	Lectures, seminar
Print	Course unit, supplementary material
Radio, Telephone, TV	Programs, telephone tutoring, audio-conferencing, video-conferencing
Computers, world wide web	Power point, CAD, e-mail, online courses, data bases, Web Quest

4.5. E-Learning Technologies

Education is one of the fastest growing economic and social sectors in the world, and the use of new technologies is the driving and integral component of that growth (Chye, et al. 2014). Many e-learning technologies are currently available for educational use, by which students with a diverse cultural background and educational levels can obtain a benefit. These technologies can be classified as relating to either applications or devices.

4.5.1. Applications

The term "Application" has been referred in the literature as "a program running on a mobile or computing device" (Erb, 2014). Erb (2014) further mentions that programs like internet browsers, email, games, word processor programmes, spread sheet programmes, etc. are referred to as applications. Kelly et al. (2015) defined an application as a program that can be used in controlling, and/or operating, one or more of the following, a stationary mobile device, tablet, smart phone, and computer. Accordingly, it can be inferred that Applications are a software based program that can run on a device in order to control and operate processes for the right outcome."

Educational institutions can take advantage of cloud applications to provide students and teachers with free or low-cost alternatives to expensive, proprietary productivity tools. A cloud computing based solution for building a virtual and personal learning environment combines a wide range of technologies, and tools to create an interactive tool for science education. Such systems allow the exchange of educational content and integrate different pedagogical approaches to learning and teaching under the same environment (Al-Zoube, 2009).

Marjanovic (2005) showed that when designing and implementing a web-based handbook, in addition to content integration, it is necessary to integrate the existing tools and applications, for example, collaboration tools such as chat and bulletin board, as they could be used in individual tasks (Marjanovic, 2005). Internet-based classroom applications have been enthusiastically adopted in various educational settings. (Matusov, Hayes, & Pluta, 2005). The usage of web technologies in e-learning are further enhanced with by the Web 2.0, which is a set of economic, social, and technology trends that facilitate a more socially connected Web where everyone is able

to add to and edit the information space. These include blogs, wikis, multimedia sharing services, content syndication, podcasting and content tagging services (Andersen, 2007). Web services are Internet-based, modular applications, possibly offered by different providers, which use a standard interface to enable efficient integration of business applications across organisational boundaries. Recent reports by various leading industry analysts and practitioners claim that web-services will revolutionise existing IT applications as they enable easy integration of different platforms, tools and resources (Marjanovic, 2005). Hence, a wide range of applications used in e-learning have been mentioned in the literature (see Table 4.3).

Table 4.3 Applications in e-learning

Sr.	Application	Study
1.	Skype, Oovoo	Masalela, 2011
2.	WhatsApp	Maheswari, 2014
3.	Blogging	Ebner, 2007; Koller, et al. 2008
4.	SBS, Social Bookmarking System	Bateman, 2009
5.	Mobile Web 2.0	O'reilly, 2005; Cochrane & Bateman, 2010
6.	Cloud Computing	Sultan, 2010
7.	ILIAS (Integrated Learning, Information and System)	Hotrum, et al. 2005; Itmazi, et al., 2005
8.	Plone	Thiruvathukal & Laufer, 2004
9.	uPortal	Breslin, et al. 2006; Jianhong & Junsheng, 2010
10.	Clarolin	Babbie, 2010
11.	InterBook	Brusilovsky, Eklund, & Schwarz, 1998
12.	MetaDoc	Brusilovsky, 2004
13.	Instant Messaging	Nardi, et al. 2000; Vogiazou, 2002; Bronstein & Newman, 2006; Whipple, 2006; Pi, et al. 2008; Zinman, et al. 2009
14.	Web 2.0	Andersen, 2007
15.	Digital Textbooks	Embong, Noor, Hashim, Ali, & Shaari, 2012
16.	Virtual collaborative workspaces and Virtual Classrooms	Koller, et al. 2008; McBrien, et al. 2009
17.	Cloud Computing	Murah, 2012
18.	Podcasting	Scutter, Stupans, Sawyer, & King, 2010
19.	Moodle:	Nedeva, 2005
20.	Social Networking Sites:	Chatti, Jarke, & Frosch-Wilke, 2007
21.	Tutorials	Koller, Harvey, & Magnotta, 2008

Applications have many forms and the domain benefits from daily innovation. New versions are being launched on a regular basis for many applications. Accordingly, because of the constant/rapid change, specific research done at the application level will soon be out dated, as a better 'app' or a newer version with innovative features becomes available. Also, one app can be used easily on different devices. Whereas, the devices on which these applications run, are not practically changing as fast as the applications. The next section discusses the devices being used for e-learning.

4.5.2. Devices

The term "Device" has been interchangeably used as 'Gadget' by many different researchers. Gadget/Device are "novel products (e.g., mobile phones, computers, and GPS navigators) that have software applications loaded into hardware and software platforms" (Shoham & Pesämaa, 2013). Device/Gadget is a leading-edge, technology based good which provides the services complementing the technology, (Bruner & Kumar, 2007). Most of today's devices/gadgets use embedded software, which, in many cases, has taken over what mechanical and dedicated electronic systems used to do. Indeed, embedded software appears in everything (Lee, 2000). An E-gadget is defined as an everyday physical object enhanced with sensing, actuating, processing and electronic communication abilities (Markopoulos, Mavrommati, & Kameas, 2004). Handheld information devices, equipped with wireless LAN functionality include: PDAs, pocket game machines, smart phones etc. (Hoshi, Watanabe, & Osuka, 2011). The device is, therefore, a stand-alone component that encapsulates a specific behaviour (Kolbitsch, Holz, Kruegel, & Kirda, 2010). Accordingly, device is a technology based physical object which supports multiple applications. In the following text, various devices, used previously in e-learning, will be considered.

Television: Television refers to a unidirectional receiver that displays visual images of stationary or moving objects both live or pre-recorded and mostly accompanied by a sound which is electronically captured, processed and re-displayed. Learning programmes for kids and adults can be shown through different processes and activities that may not otherwise be available. Data displayed in the form of visual images of stationary and moving objects can be both pre-recorded and go live along with audio (Sife, Lwoga, & Sanga, 2007). Educational videos can be delivered

through television, and videos can be made in the variety of forms, e.g. like lectures, documentaries, case study and digital video clips (Park, 2009).

Radio: Radios have pre-recorded and/or live sound. Educational programmes or lectures can be recorded and broadcasted as scheduled. This would help those people who have time shortage and want to learn or be informed about some issues (Sife, Lwoga, & Sanga, 2007). Another author defines radio in learning as wireless transmission technology combined with awareness, learning, and adaptation capabilities (Hong, Kim, Kim, & Shin, 2008).

Computer/Desktop: A computer is PC or desktop terminal with a keyboard and monitor, capable of processing data such as a personal computer and personal digital assistant (Katz, 2000; Wong, Aggarwal, & Beebee, 2005). Computer-supported collaborative learning (CSCL) is a pedagogical approach wherein learning takes place via social interaction using a computer or through the Internet. This kind of learning is characterised by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common resource. The computer provides the network for the transfer of skills and knowledge (Ouamani, en Saoud, & Ben Ghézala, 2013).

Laptops: Laptops can provide similar functionality to that of computers/desktops, including CSCL; however laptops are small enough and portable enough to be common as classroom tools. Laptops have the bi-directional capability (e.g. built in camera, mic and speakers) and an increased level of mobility (Pilgrim, Bledsoe, & Reily, 2012).

Tablet: Tablet computers (or tablet PCs) are a form of mobile personal computer with large, touch-sensitive screens operated using a pen, stylus, or finger; and the ability to recognise a user's handwriting, a process known as "pen computing" (Atkinson, 2008). It has been maintained that devices like tablets and smartphones must be considered more as learning hubs than multiple devices. This is so because these devices dynamically integrate all the personal learning tools, resources and self-created artefacts in one place: Use of tablets is fast becoming ubiquitous, and students now use tablets everywhere to engage with their studies. Students can, therefore, access

library catalogues from home or on the road (Al-Fahad, 2009), and they download course materials from anywhere beyond the campus (Oliver, 2005). This is a technology that allows students to freely record lectures and play them at their own time and location (Bradley & Holley, 2010) as well as to gain fast access to a range of online sources (Hussein & Nassuora, 2011). Alleviated from the burden of carrying heavier tools like laptops, students now travel freely, carrying with them their files, working on them while on a train or bus, the lecture room or at the park (Oliver, 2005).

Mobiles/Smartphones: Advances in the smartphone and mobile application (app) technology provide new ways for outreach, especially for adolescents. Using smartphones not only can expand the extent to which information and resources can reach students but it also can provide students with direct interaction and opportunities for obtaining follow-up information from the services (Schneider, 2013). Smartphones and mobile internet connections are mainstream; these two factors open the door to an improvement in the quality and quantity of the information available to the user depending on his/her location and which he/she is also capable of sharing, instantly, with others (Neri, Lopez, Barón, & Crespo, 2013). Statistics show that more than 3 billion people around the world own a mobile phone. The penetration of mobile devices, especially in many European countries, exceeds 90% and the younger generations seem to be the most dependent on this device for communication (Traina, Doctor, Bean, & Wooldridge, 2005). The use of smartphones in education is also growing among the adolescent population, even those students from low-income households, with approximately one in three students using their phones for help on homework (Khadaroo, 2012). So, this is the device with maximum penetration among the students.

4.6. Why look at Device Level?

Research done at the application level would be outdated quickly, as compared to a research effectively considering student preference of device use. It will be interesting to see that how student's preference differs for various devices because the basic types of devices will remain the same as newer applications are developed for each of them. So, it would be more useful to do research at the device level. Also, in Pakistan, for last seven years, the provincial and federal government of Pakistan has been investing in a technological revolution, i.e. by distributing laptops

amongst the bright students. It would be interesting to reflect upon whether or not this is a positive strategy of investment.

At the end of 2011, the first phase of the technological reforms was executed by the Punjab provincial government, and 100,000 laptops were distributed amongst the brighter students. The 2nd phase was started a year later, and another 100,000 laptops were distributed for the newly enrolled students during the year. Two years later, the federal government started the prime minister youth development scheme across the country. Province wise distribution was held and the top students in classes were awarded laptops for use as university students. Within the same year, students of matriculation and intermediate were also awarded 100,000 laptops. Regardless of all these technological advances, the question still exists whether or not the laptop is fulfilling its purpose, and more importantly is laptop the right device to be distributed among HE students. Also, the initiative taken by the government to promote e-learning to achieve the educational goals are not giving results as expected. Two universities that tried to implement e-learning have failed badly in Pakistan (for detail see Chapter 2, Section 2.5).

There is no research to date that looks into the technology preference of the students of higher education institutes. Research is needed, for both the public and private sector to better inform educational specialists to understand student preferences in terms of devices preference in education. This research aims to give a better idea about the students' preference concerning device use, in context of specific educational services, and results will exhibit whether students are willing to switch to use of a device (over face to face). If yes, then which device is best?

A number of studies in literature explain the preference of the devices of the respondents. Most of these studies, however, have either checked preference on a single device (Thomas, Singh, & Gaffar, 2013; Yang, 2013) or were related to the consumer perspective instead of educational sector (Carlsson, Carlsson, Hyvonen, Puhakainen, & Walden, 2006; Vongjaturapat & Chaveesuk, 2013). A study in the context of the Guyana was carried out to check the adoption of mobile learning among the higher education students considering cultural aspects of Guyana (Thomas, Singh, & Gaffar, 2013). Results showed the variance in technology adoption amongst students, raising questions concerning cross cultural differences, however, this study only addresses mobile learning

instead of the wide range of technologies used in e-learning. Yang (2013) also used the concept of self-management to explain the technology adoption of the students, limitation of this study is consistent with the study in Guyana; and only explains the adoption of the single device/technology i.e. Mobile. Some other studies (Carlsson, Carlsson, Hyvonen, Puhakainen, & Walden, 2006; Vongjaturapat & Chaveesuk, 2013) carried out to measure technology adoption, yet these studies related only to the services with a consumer perspective. Carlsson, et al. (2006) used Unified Theory Acceptance and Use of Technology (UTAUT) to measure the mobile services in Europe. So, there is a need to measure the quality of education being provided by the institutes and to find out the expectation of the students about their needs from the institutes. Literature related to the quality indicators of education is available, but most literature focuses on explaining the quality of higher education for traditional/face to face learning methods (Levy, 2008; Lee, Yoon, & Lee, 2009; Jung, 2011). Kwan and Ng (1999) proposed higher education service quality indicators, the researcher plans to check the university student's preference across these indicators to find out that, for how many of these quality indicators students are willing to switch to use of e-learning devices, i.e. instead of face-to-face interaction; and if so – which services and what devices?

After looking at the results, it would be possible to see whether a sizeable percentage of the students out of the pool of data are willing to switch to use of a device in learning, or not. If they are willing to switch, it means students are willing to use e-learning format as opposed to the face to face format. Understanding student preference will help us understand which of these higher education services, on which specific device(s) are bringing more satisfaction to students. Moreover, for which higher education services students are not willing to switch and what are the reasons behind this and vice versa. The results will lead us to an understanding of whether keeping all the services in the traditional / face to face method is the only way to achieve student satisfaction, or we can offer these services as a split between face to face and devices solutions.

4.7. Method

Experimental respondents were used to gather responses concerning student higher education service quality indicator preference for six different devices. The respondents of this study were students from higher education institutes (universities both public and private) of Pakistan. These students were receiving education through both traditional and e-learning formats, which means

respondents were studying in a blended learning model (i.e. a mixture of e-learning and traditional learning). By capturing data from students with blended experience, it was aimed to avoid the possible problems that could be faced by gathering responses from students who received education only through either traditional or via e-learning only. The instrument used for gathering responses was a structured questionnaire. There were two sections of the questionnaire; first section comprised of gathering the information related to the demographics of the participants and in second section preference of device was asked in relation to the eight higher education service (HES) quality indicators (See Appendix A). Responses were gathered on a 5 point Likert scale. "1" representing "Strongly Disagree", and "5" representing "Strongly Agree". Students were given details explaining eight HES quality indicators prior to questionnaire filling, so that students could have a better understanding about the questionnaire. Students in this study were approached directly and the questionnaires were distributed and filled by the students at the end of their lecture. These students belonged to 2 business schools of Pakistan's private and public sector universities and they were enrolled in programmes of BBA Hons, BS Applied Management, MBA, MBA Engineering and MBA Executive. The survey was carried out in two steps. First data collection of 300 responses was done for a period of 5 months in 2015 and the second one was done for a period of 3 months in 2016 with 260 participants from universities in Lahore, Pakistan. Higher education quality indicators proposed by Kwan and Ng (1999) were adopted for use in the e-learning context of Higher Education Institutes (in Pakistan), for investigating preference of student on each device and face to face against each indicator.

4.8. Data Analysis

Statistical Package for Social Science (SPSS) was used to perform data analysis, using descriptive analysis. A total 560 responses were gathered by means of convenience sampling for data screening purpose; 42 responses were discarded due to issues of skewness, normality, and missing values. So, the remaining 518 data sets were used for further data analysis.

4.8.1. Students Demographics

This section will summarise the profile of the respondents. Table 4.4 indicates that number of male students were more than females i.e. 59.1% males and 40.9% females.

Table 4.4 Demographics of the Students

Demographics	Frequency	Percentage
• Gender		
• Male	306	59.1
• Female	212	40.9
• Age		
• 15-20	122	23.6
• 21-25	359	69.3
• 26-30	23	4.40
• 31-Above	14	2.70
• Education		
• BBA	349	67.4
• MBA	116	22.4
• EMBA	35	6.80
• MBA. Eng.	18	3.50

The largest group of students were aged 18-25 (69.3%). However, the age of most students in higher education is between 18-25. 69.3% of students were between age brackets of 21-25, and 23.6% was in between 15-20. Followed by age 26-30 (4.40%). The lowest category was aged 31 and over. In other words, 92.9% of the total data set was of age ranging from 15 to 25. Whereas looking at the demographics from the perspective of the educational status of the respondents, it is in accordance with the age, i.e. 67.4% of students were enrolled in the Bachelors (BBA) programme, and 22.4% were enrolled in the Master (MBA) programme. The rest (10.3%) of respondents were enrolled in the Professional degree programmes, i.e. Executive MBA and MBA Engineering.

4.8.2. Students Preference of Devices against HES Quality Indicators

This part of the chapter will discuss the respondent's device preference against the eight quality indicators of higher education. Students were asked to rate their preference for each device (TV, Radio, Desktop/Computer, Laptop, Mobile, Tablet) for each of Kwan and Ng (1999) higher education service quality indicators on a 5-point Likert scale (Course content, Facilities, Lecturer's Concern for Students, Social Activities, Communication with University, Assessment, Counselling Services & People). The average response regarding each indicator on each device was taken into consideration to compare preference of respondents on each device and the face to face option.

Table 4.5 Device Preference of Students

Higher Education Service (HES) Quality Indicators	Face to Face	TV	Radio	Desktop/ Computer	Laptop	Mobile	Tablet
1. Course Content	3.76	2.02	1.59	3.28	4.03	2.95	3.89
2. Facilities	3.74	1.98	1.66	3.36	4.05	3.06	3.20
3. Lecturer's Concern for Students	4.05	1.81	1.49	3.26	3.87	3.77	3.77
4. Social Activities	2.90	2.16	1.81	3.13	3.98	4.17	3.77
5. Communication With University	3.66	1.83	1.60	3.32	4.28	4.35	3.95
6. Assessment	3.53	1.59	1.43	3.22	4.12	3.93	3.83
7. Counselling Services	4.22	1.90	1.68	3.23	4.01	3.89	3.72
8. People	4.40	1.97	1.76	3.13	4.02	4.12	3.76

Table 4.5 exhibits the average responses for all respondent's (i.e. device preference) across the 8 higher education quality indicators. Majority of the students preferred the laptop for higher education quality indicators. The results will be discussed one by one in the following text.

Course Content: Course content is referred to as the material provided for a specific course. There is a clear shift noticed from Face to Face to device (see Table 4.5). For course content, the highest rated device is Laptop, as it gets the average of **4.03**. The value of Face to Face option is the third preference with an average value of **3.76**. After the Laptop, the second preferred device is Tablet, with the average of **3.89**, fourth preference is Desktop/Computer, having an average of **3.28.** After Desktop/Computer, Mobile is rated as the fifth preference, with a value of **2.95**. TV and radio are the least preferred devices. So, initial results imply that students want to have course material provided on the devices rather than Face to Face, as the top two preferences are Laptop and Tablet.

Facilities: Facilities is the second higher education services quality indicator which talks about the facilities like library or sports provided to the students by the institutes. Here, the shift from Face to Face is also noticeable (see Table 4.5). Laptop, the first preference has achieved the highest average of **4.05**. Face to Face is on second with an average of **3.74**. Desktop/Computer is third with an average of **3.36**, and Tablet came fourth with an average of **3.20**. Mobile is on the fifth

preference, with an average of **3.06**. TV with the average of **1.98**, and Radio with an average of **1.66**, came a distant sixth and seventh preference respectively. This result implies that students want some facilities, like library etc., provided by institutes on the devices instead of Face to Face or conventional facilities i.e. libraries. It is logical that it would appeal more to a student, that he can access the books inside the library, anywhere and anytime, on his preferred device, as compared to physically going to the library, finding the book and doing all these activities constrained by time and space.

Lecturer's Concern for Students: It is referred as the teacher's personal attachment towards student and talking with students after class to solve their issues in the lectures and problems related to course. Table 4.5 indicates that for this HES quality indicator respondents/students preferred face to face over device. Among devices, laptop is the first preference of respondents with an average of **3.87**. For second place, there was a tie between Mobile and Tablet, with an average value of **3.77** for each. Desktop/computer came fourth with an average of **3.26**, TV is sixth and Radio is the seventh with a distant average of 1.81, and 1.49 respectively. We can infer from the results that students are more comfortable with Face to Face interaction when it comes to talking to their teachers about problems with their courses.

Social Activities: Kwan and Ng (1999) define social activities as the interactions of students with their fellows. It can be through events, club or in case of technology it could be a social network. First preference of respondents/students for this HES quality indicator is Mobile, with an average of **4.17**. This can be explained since a mobile is a device that students can have with them all the time. Laptop came second with the average of **3.98**. After Mobile and Laptop students prefer to interact with their fellow students through Tablet as it is on third highest rated preference, with an average of **3.77**. Desktop/Computer came 4th, with the average of the **3.13**. Face to Face is fifth with the average of **2.90**. TV and radio have been rated again with the lowest values of **2.16** and **1.81** respectively. It can also be noted that students are inclined towards the use of devices for this HES quality indicator.

Communication with University: This HES quality indicator states that student's preferred way of communication with university management. For this HES quality indicator, mobile is the 1st

preference of the students with the average value of **4.35**. The explanation, as mentioned above, is that students carry mobile all the time, so they can check on, and keep in contact with the university anywhere/anytime. 2nd preference after mobile is Laptop, with the average of **4.28**. Tablet is third with an average of **3.95**, and Face to face came fourth with an average of **3.66**. Desktop/Computer came fifth, TV came sixth and radio came seventh with respective averages of **3.32**, **1.83** and **1.60** respectively. It is quite clear that for communication with university students prefer devices rather than going face to face to university administrators or in person.

Assessment: Assessment is the sixth HES quality indicator which is related to the assessment scheme (i.e. exam, quizzes, and assignments) and receiving a just return for their effort. Results exhibit that students first preference for this HES quality indicator is Laptop with an average of **4.12**. Mobile is the second preference with an average of **3.93**. The third preference is Tablet with an average of **3.83**. Fourth preference is face to face with an average of **3.53**. Desktop/computer is on fifth student preference with an average of **3.22**. TV is sixth with the average of **1.59**, and lastly, radio is seventh with an average of **1.43**. Results indicate that students want to use a device, instead of a traditional method, when undertaking the assessment.

Counselling Services: This HES quality indicator measures availability of advisers from whom students can seek help. For Counselling Services, students choose Face to Face as their first preference. The average value of Face to Face for this particular HES indicator is **4.22**. Whereas, for second preference Laptop is chosen by students, with an average of **4.01**. But if you take a closer look at the values of Face to Face and Laptop, there is a close competition for this HES indicator. We can state that by looking at the numbers, students really do not have a problem having counselling sessions remotely with teachers on a laptop if the need arises. The third preference was Mobile with an average of **3.89**. The fourth preference was Tablet with an average of **3.72**. Desktop/Computer was fifth, like the previous HES quality indicators, with an average of **3.23**. TV and radio were again the two least preferred devices. We can conclude from it that students feel more comfortable to talk to their advisor face to face but the close competition shows that students can shift to Laptop for this quality indicator.

People: The last HES quality indicator is people which state the opportunity for the students to meet and make friends. For this only HES quality indicator, students first preference with the average of **4.40** is Face to Face. Mobile, with the average of **4.12** came, was student second preference. Laptop, Tablet, Desktop/Computer, TV and Radio followed with averages of **4.02**, **3.76**, **3.13**, **1.97** and **1.76** respectively. People is the third HES quality indicator for which students choose Face to Face instead of device, which implies e-learning without face-to-face is not ideal. Since meeting new people is a personal experience, most of the students prefer Face to Face experience over a device being used for this quality indicator.

From the Table 4.5, based on the overall preference of 518 students, students largely dismiss the use of TV, Radio, Desktop and Tablet, as students do not prefer these devices for any higher education service (HES) quality indicator. Also, when we look at the overall results, it seems that two devices (i.e. Laptop and Mobile) and Face to Face/traditional learning prevail in the statistical averages representing the students' preferences. For three out of eight HES quality indicators, namely 'Course Content', 'Facilities' and 'Assessment', Laptop was defined as the top preference of students. For Mobile, students prefer to receive two services, i.e. 'Social Activities' and 'Communication with the University'. Whereas for the remaining three quality indicators (i.e. Lecturer's Concerns for Students, Counselling Services and People), Face to Face or traditional learning came on top as opposed to any other device. Looking at the average results it can be stated that for five out of eight HES quality indicators (i.e. Course Content, Facilities, Social Activities, Communication with the University, Assessment) students' first preference is a device. For three (i.e. Lecturer's Concerns for Students, Counselling Services and People) Face to Face came on top, which clearly exhibits that students are willing to move to technology devices for learning, socialising and counselling etc.

4.9. Results and Discussion

Service quality and user satisfaction are directly correlated with one another (Parasuraman, Zeithaml, & Berry, 1988; Roca, Chiub, & Martineza, 2006; Chu-Mei, 2005). In case of education, students are at the receiving end of the service or the end user of the education service. To measure the student satisfaction and quality of education being offered by universities, there are a number of parameters proposed in the literature. Higher education service quality indicators, proposed by

Kwan and Ng are used in this experiment to check the e-learning student preference. These indicators have been used extensively in literature to check the quality of educational service in a traditional setting, however, the researcher believes that he is the first to apply these in the context of e-learning. In this chapter, preference of students for HES quality indicators on six devices or face to face learning, is checked and results are compared to determine the preference.

When we look at Table 4.5 we can see that for three quality indicators, i.e. *Lecturer's Concern for Students, Counselling Service* and *People,* students preferred Face to Face. This can be explained by the fact that these three quality indicators have one common attribute, i.e. personal human to human interaction. So, students want to have a face to face interaction when it comes to counselling sessions, meeting new people and discussing the important matters with the instructors. For the other five quality indicators, a device has been selected over face to face interaction. For three quality indicators *Course Content, Facilities and Assessment,* Laptop came as the first preference of students, which explains that students may be willing to switch to dependence on the use of a Laptop for these learning services. Also, if we look at the quality indicators for which Laptop is preferred, all three of those have common attributes, i.e. these are services which are purely related to learning or interacting with the learning material or services which supports in learning (e-library, online forum, exams, pop-quizzes etc.).

As for the remaining two quality indicators, i.e. 'Social Activities' and 'Communication with the University', Mobile is the defined as the first average preference of students. Use of these two indicators relates to keeping in touch with the friends, and being in contact with the university. So, it can be explained by the fact since everyone carries mobiles with them all the time, making it convenient to reach out to friends and the university with a mobile. A student's university experience, for all the HES quality indicators, can be improved by involving two devices i.e. Laptop and Mobile. The clear willingness of students to use technology for education is apparent from this experiment, hence a shift towards e-learning over traditional format is visible.

Table 4.5 leads us to the conclusion that when it comes to e-learning, "one size fits all" is the wrong approach in order to increase student satisfaction. In order to improve student retention for e-learning courses, we will have to focus on the student's own preference, as to whether the student

feels more comfortable in receiving a certain higher education service face to face (traditional method) or whether the student feels more content if that service is provided on some device instead. Furthermore, we have also seen that for some higher education services, students have not opted for face to face as the most preferred choice. We can clearly see that across the eight higher education services, the options for Radio and TV have been rated out i.e. they were consistently given the lowest rankings. Interestingly both devices happen to be one directional in their interaction with the student. Hence, we can see that the students of e-learning want an interactive option for all the higher education services. Their preference depends upon the nature of the service being offered. When it comes to the three human-to-human interaction based services like, *Lecturer's Concern for Students, Counselling Service* and *People;* the top preference is face to face. For the remaining five services, the nature of the services leads the students to choose between laptop and mobile. Interestingly, the students have preferred mobile and laptop over tablet and desktop in all the services (except in course content, where 2nd preference is a tablet).

If we just look at the highlighted first two preferences across the eight Higher Education Services (Table 4.6). It shows that except course content, for each of the services, students have their top 2 preferences among face to face, laptop and mobile. So, we can say that in order to improve satisfaction and retention rate of the student of e-learning, we have to give the student options to use all these services according to his/her preferred mix of face to face and devices (Laptop and Mobile) based interaction.

Table 4.6 First Preference in Red Bold, Second Preference in Red

Higher Education Service (HES) Quality Indicators	Face to Face	TV	Radio	Desktop/ Computer	Laptop	Mobile	Tablet
1. Course Content	3.76	2.02	1.59	3.28	**4.03**	2.95	3.89
2. Facilities	3.74	1.98	1.66	3.36	**4.05**	3.06	3.20
3. Lecturer's Concern for Students	**4.05**	1.81	1.49	3.26	3.87	3.77	3.77
4. Social Activities	2.90	2.16	1.81	3.13	3.98	**4.17**	3.77
5. Communication with University	3.66	1.83	1.60	3.32	4.28	**4.35**	3.95
6. Assessment	3.53	1.59	1.43	3.22	**4.12**	3.93	3.83
7. Counselling Services	**4.22**	1.90	1.68	3.23	4.01	3.89	3.72
8. People	**4.40**	1.97	1.76	3.13	4.02	4.12	3.76

4.10. Conclusion

Results of this experiment show that students, for most services, are very willing to switch to e-learning; and when it comes to the e-learning device preference student do not want it on a single device rather they prefer a mix of devices across the services. The average findings, i.e. concerning average student device preference vs face to face/traditional learning, when applied to the eight higher education service (HES) quality, shows a clear willingness/preference of students to use devices over traditional/ face to face learning (5 out of 8 services). Interestingly, however, we see that students have the low quality perception concerning the use of TV, Radio, Desktop/Computer, and Tablet for all the Higher Education Services quality indicators.

Table 4.6 also exhibits that the students do not want a device that allows only unidirectional exchange of thought, i.e. broadcast technology (TV and Radio). Instead, students prefer devices that allow more interactive communication, with peers and instructors, i.e. communication technologies (e.g. Mobile, Laptop, and Tablet). So, we can conclude that broadcast technologies fail to meet student needs when it comes to any of the HES. Students have only agreed to replace face to face format with interactive and communication technology based devices. So, giving

students a broadcast technology for learning would result in the lower perception of quality, hence low satisfaction and increased dropout (as seen in the case of Virtual University and AIOU in Pakistan – Chapter 2). Also, we can say that in order to improve satisfaction and retention rate of the student of e-learning, we have to give the student options to use all these services according to his/her preferred mix of face to face and devices (Laptop and Mobile) based interaction.

Chapter 5

Investigating the Role of Individual Culture in e-learning Students' Device Preferences

Chapter 4 discussed the combined technology preference of students for different educational services offered by the higher education institutes. Findings showed a clear inclination towards the use of specific technological devices, i.e. Laptop and Mobile, whilst receiving education, assessing knowledge, interacting with university management and instructors, and socialising with peers. Literature suggests, however, the existence of individual cultural differences, behaviours and attitudes (Van de Vijver & Tanzer, 2004) that can influence the performance and ultimate success of information technology adoption.

The Higher Education Service (HES) quality indicators (Kwan and Ng, 1999), used in chapter 4, were originally tested in two countries, i.e. China & Hong Kong, and showed difference as a result of cultural differences; despite the fact that these cultures have a very similar national cultural profile (Hofstede country profile for HK/CH: PD-68/80; IN-25/20; MAS-57/66; UA-29/30; LTO-61/87). Because of the identified differences, it is crucial to further consider the cultural values of respondents when analysing their technology preference. Hence in this chapter, the discussion will be focused on the concept of culture and different theories and philosophies on the case in point. In this chapter, an experiment will be performed to analyse technology preference of students against the HES quality indicators proposed by Kwan and Ng, based on the cultural setting of the respondents at an individual level. This chapter, therefore, aims to answer the second research question, i.e. ***Does e-learning student's individual culture impact his/her device preference across the higher education services?***

5.1. Culture

The main challenge when doing research related to culture is to have a good understanding of how culture is defined. There are countless definitions, conceptualisations, and dimensions used to explain this concept, for example:

- Kluckholn defines that culture means sharing thinking patterns built on principles. The definition Kluckholn proposed "patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional ideas and especially their attached values" (Kluckholn, 1951).
- Hofstede proposed the definition of culture in the 80's as "Culture consists of the unwritten rules of the society. The collective programming of the mind which distinguishes the members of one human group from another" (Lonner, Berry, & Hofstede, 1980). Later on, another definition was proposed in 1991 as "a historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life" (Geert & Jan, 1991).
- Trompenaars believed that culture is a set of shared values. Trompenaars defines culture as "Members of a culture are likely to share common attitudes because they share a common history" (Trompenars & Hampden-Turner, 1993).
- Culture has sustained its roots by being bequeathed on towards the following generations with time as defined by Matsumoto as a set of approaches, ethics, opinions, views and actions mutually assembled by individuals, but dissimilar for each person, interconnected from one generation to the next (Matsumoto, 1996).
- Adler has also contributed vastly in the cultural aspects of human nature and defines it to be comprised of arrangements, obvious and hidden, of and for performance attained and spread by signs, establishing the unique accomplishments of social clusters, together with their personification of objects; the crucial primary culture comprises of old-fashioned attributes (i.e. traditionally imitative and nominated concepts specifically their close ethics); culture arrangements may, on the other hand, be well-thought-out as products of achievement (Adler, 1997).

- Culture has also been associated with both the biological needs of humans and their psychology. This is because the culture has an influence on the biological process. Also, most of our knowledge based conduct is achieved through learning and interrelating with other associates of our culture. Hence, culture can also influence our basic needs i.e. forms of eating, drinking, defecating etc. (Ferraro, 1998).
- More recently, culture encapsulates a broader terminology wherein culture is ambiguous but established simple expectations and principles, directions to natural life, views, strategies, actions and social agreements that are shared by a group of individuals, that effect but do not regulate every individual conduct or his/her descriptions of the sense of other working class actions (Spencer-Oatey, 2008).

A lot of work has been done in sociology and anthropology to understand the concept leading to the origination of varying definitions over the period of time. For a long time, anthropologists thought that culture is the way of life of people, a totality of their learned behaviour patterns, attitudes, and material things (Hall, 1959). However, the more anthropologists studied humans they realised that culture was a complex concept, and could only be studied through prolonged experience; and it is almost impossible to contextually explain to anyone who hasn't been through the same set of experiences. Refining the concept of culture revealed that culture is more than mere customs that can be changed with time. Culture has been outlined in various studies including ideologies, logic based beliefs, basic assumptions, shared core values, important understandings, and the collective will (Sackmann, 1992). Others suggested that 'culture includes more obvious, easy to observe cultural artefacts like norms and practices' (Hofstede, 1998; David & Fahey, 2000).

In the 1950's, Edward T. Hall published first book 'The Silent Language', which explained culture in depth, making it more comprehendible. According to Hall, culture is the learnt reaction to stimuli, and functions on three levels: formal, informal, and technical; i.e. with all three present in most given situations (Hall, 1959). Generally speaking, culture is learned and experienced by individuals in the family, at school, and in the workplace.

Parsons and Shils explained that culture is composed of a set of values, norms, and symbols that guide individual behaviour (Parsons, Shils, & Smelser, 1965). Herskovits (1955) argued that "there

is a general agreement that culture is learned; that it allows a man to adapt himself to his natural and social setting; that it is greatly variable; that it is manifested in institutions, thought patterns, and material objects".

According to Schein, Culture is based upon certain basic assumptions, and these basic assumptions represent the belief systems held by individuals. The belief of a human is related to his/her behaviour, relationships, reality, and truth (Schein, 1985a). People employ these basic assumptions to observe situations and to understand ongoing events, activities, and human relationships. These basic norms characterise interpretive schemes or cognitive structures. Observation and making sense forms the basis for collective action. (Schein, 1985b)

The definitions of the culture, and the debate concerning cultural definition, illustrates that most of the effort done to theorise culture is done on the basis of beliefs and value orientations that are shared by a reference group(Jackson, 1995); i.e. as a concept relating to the culture of a nation (Lonner, Berry, & Hofstede, 1980) or culture of specific organisations (Trompenars & Hampden-Turner, 1993). The major point of consideration in the literature concerning culture has been the beliefs and values, however, there is a direct correlation between the set values and beliefs with the subsequent actions and behaviours exhibit by groups (Posner & Munson, 1979). Therefore, the two common concepts of culture i.e. national and organisational are deemed as entirely different streams. Although both cultures share a commonality; i.e. values are used as the distinguishing factor to differentiate amongst a group of people. Like the concept of national culture, organisational culture aims to explain the difference in organisations based on the main values which transform the behaviour of people in an organisation. In the subsequent sections, I will discuss national culture and organisational culture separately.

5.2. Theories of National culture

Theories of national culture have gained prominence over the last few decades, which have primarily concentrated on the study of cultural values (Jackson, 1995). Studies focusing on national culture include Hall (1959; 1960) Lonner, Berry, and Hofstede (1980), and more recently Trompenars and Hampden-Turner (1993). The national culture models have been characterised

into three types of models, i.e. single dimension models, multiple dimension models and historical social models (Morden, 1999).

Single Dimension Models: Hall proposed that there are two kinds of cultures; High context and low context cultures. In high context cultures, people gather information and seek the opinion of friends and family members before making a final decision (Hall, 1959; 1960). In low context cultures, people do not seek the support of friends and family members for information but rely on other sources, e.g. comments on the internet (Lewis, 1992). Monochromic cultures like to do one task at a time. People belonging to Polychromic cultures like to do multiple tasks at the same time (Hall & Hall, 1990). Other studies concerning single dimension models include High and low trust societies (Fukuyama, 1995), and Idiocentric and allocentric cultures (Triandis et al., 1995).

Multiple Dimension Models: Hofstede is renowned for his work on a multiple dimensional models of culture. At first Hofstede proposed four dimensions, Power distance (ability to except and accept the power distribution by the members of society), Masculinity / Femininity (which measures the dominance of masculine or feminine traits in the society), Uncertainty avoidance (which measures the tendency of people in the society to avoid uncertainty) and individualism / Collectivism (which measures the preference towards adoption of individual benefits or group benefits) (Hofstede, 1980, 1988). Other studies proposing multiple dimensions include work of Trompenars and Hampden-Turner, in which they proposed the dimensions of culture including Universalism / Particularism, Integrating / Analysing, Individualism / Communitarisim, Inner / Outer directed, Time as Sequence / Synchronisation, Achieved/ascribed status and Equality / Hierarchy (Trompenars & Hampden-Turner, 1993). An alternative multiple dimensional model was proposed by Lessem & Neubauer (1994).

Historical-Social Models: Euromanagement Model explained the concept of culture based upon history was proposed by Bloom et al. (1994). Euromanagement model includes the following factors “International diversity”, “Orientation towards People”, “Social Responsibility”, “Internal Negotiation” and “Degree of Informality”. Another historical model, which includes the South East Asian Management model explains the phenomena in context of China. “Taosim” and “Confucianism” are the dimensions of this model (Chen, 1995; Cragg, 1995; and Seagrave, 1995).

The most commonly used classification of national culture is the original multiple dimensions proposed by Hofstede in 1980 i.e. “masculinity/femininity”, “power distance”, “individualism/collectivism”, and “uncertainty avoidance” (Lonner, Berry, & Hofstede, 1980), a fifth dimension long-term/short-term was added in the late 80’s (Hofstede & Bond, 1988). Trompenaars also defines national culture however through differing terminologies “universalism versus particularism”, “affective versus neutral relationships”, “internal versus external control”, “achievement versus ascription”, and “specificity versus diffuseness” (Trompenaars, 1996). National culture models include polychronic versus monochronic dimensions (Hall & Hall, 1990). The most cited work on national culture is by Hofstede, it will be discussed in detail in the next section before moving on to organisational culture.

5.2.1. Dimensions of Hofstede’s National Culture

Hofstede’s data collection was from a corporate organisation IBM (from over 50 countries). After data analysis, distinct dimensions of culture were identified. A dimension is an aspect of a culture that can be measured relative to other cultures. Dimensions can be used in comparative analysis of different cultures. The following dimensions were defined by Hofstede (1980).

***Power Distance*:** Power distance can be defined as the “degree to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.” (Hofstede, 1994). Societies with High Power Distance have inequality of wealth and power and the people with less power accepts the superiority of this power and wealth imbalance. There is more concentration of authority. In countries that have high power distance, employees are afraid to express their view to the boss, as a result, employees either completely obey or completely reject their bosses (Hofstede & Hofstede, 2005). The high power distance society focuses more on power and less on legality/equality. Elders are treated with respect and are feared. Kids ought to be obedient and parents teach them to give respect. Position and grading are to give power. Juniors should follow the orders of senior members of the culture. There is observably a huge difference in income of people in high power distance societies. (Hofstede, 2011). In contrast to high power societies, Low Power Distance societies discourage the power and wealth difference.

Opportunities and equality, for every member, is stressed in these societies. There is less concentration of power. In a culture where there is low power distance, there is less dependency of employees on their bosses and colleagues. (Hofstede, 1998). So, in low power distance settings, power, and its use is only appropriate for legitimate purposes. The hierarchy and positions are only for ease and lower staffs are always to be asked for their opinions. Governments are formed through majority voting, chances of corruption are very slim. Income is also equal in these societies (Hofstede, 2011).

***Individualism vs Collectivism*:** In a society with Individualism, people primarily watch out for themselves or only the direct family, otherwise individuals seek out their own interests. High Individualism signifies that only the rights of the individuals are the most important thing for the society. Individualist natured people make their choices on the basis of their own preference, and do not largely consider the suggestions or are affected by others (McCoy, Galletta, & King, 2007). Societies with High Individualism and low collectivism are self-orientated, "I" is the only thing that everyone cares for; with the exception of close family members. Other people are deemed as individuals and everyone expresses his/her opinions. Relationships do not count if work is involved, sometimes only work counts (Hofstede, 2011). Collectivism pertains to societies in where people from birth are integrated into strong, cohesive in-groups. These groups continue to protect group members throughout the person's lifetime in exchange for unquestioning loyalty (Hofstede, 1994). High Collectivism (Low Individualism) ranking typifies societies of a more collectivist nature with close ties among its members. People give more importance to a higher interest of groups or organisations over their own personal belief (McCoy, Galletta, & King, 2007). Loyalty towards the family/group is key in High collectivism or low individualism societies. The aim of collectivism cultures is achieving benefit for the group. If disagreeing with general opinion negatively impacts the harmony then this must be considered first before speaking. Relationship comes first, and fulfilment of tasks is usually ignored when it comes to before relations (Hofstede, 2011).

***Uncertainty Avoidance*:** It can be defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations and try to avoid such situations" (Hofstede & Hofstede, 2005). This dimension focuses on the level of tolerance for uncertainty and ambiguity

within the society. A High Uncertainty Avoidance ranking indicates that the country has a low tolerance for uncertainty and ambiguity. Individuals usually feel threatened by uncertain situations and have a high uncertainty avoidance (Srite & Karahanna, 2006). Therefore, individuals depend more on rules to reduce the level of uncertainty and like more stability in their lives and at work (Parboteeah, Bronson, & Cullen, 2005). This creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. Cultures with high uncertainty avoidance have a lot of written and unwritten rules. This culture will be risk averse. Different activities performed will be structured rigidly. A society with high uncertainty avoidance always struggles to fight the unexpected future. People are more stressed and have less control over themselves. Divergent ideas and people are not allowed. People in government and at jobs are not very competent, and job switch (even if one is dissatisfied) is not considered a sensible move in the society (Hofstede, 2011). A society with a Low Uncertainty Avoidance means that it has less concern about doubt and uncertainty and has more forbearance for the diversity of ideas. This is imitated in a civilisation that is less rule-oriented, more willingly accepts change, and takes more and greater risks. When uncertainty avoidance is low, there would be less structure and fewer rules. In this case, there will be more risk taking and less rigid structuring of performed activities. The nations with weak uncertainty avoidance accept the uncertainty and do not worry about the ambiguity of the future. People belonging to these cultural setting have low anxiety, less stress and have a hold of themselves. People easily accept the irregular ideas/people. Rules are not very much appreciated in these societies. People are more competent/trained/experienced within government and/or in job roles. Job switching is considered a regular task (Hofstede, 2011).

Masculinity vs Femininity**:** *Masculinity* refers to "the extent to which the dominant values of a society are "masculine" (e.g., assertive and competitive)". Here achievements are preferred over nurturing. Gender roles in the society are distinct and defined. Men are supposed to be confident, focused on success and tough emotionally and mentally, whereas women are supposed to be shy, loving, and worried about the excellence of life. Masculinity is defined by Hofstede as "it focuses on the degree to which 'masculine' values like competitiveness and the acquisition of wealth are valued over 'feminine' values like relationship building and quality of life". A society with High Masculinity encourages the more "assertive" and "aggressive" masculine qualities (Hofstede, 1998). In high Masculinity cultures, there is a high distinction of the social role between men and

women. Being assertive and full of ambitions is compulsory for men, women are not expected/encouraged to be assertive. Emotions are dealt by mothers whereas fathers only see facts. Boys are supposed to fight back and not cry, crying is for girls. Defining the number of children is decided by the father (Hofstede, 2011).

Femininity pertains to societies where nurturing is preferred over achievements. Importance is given to care, sympathy and emotional support. Here, roles and qualities of gender overlap for both men and women (like women traits in Masculinity). Feminine culture focuses on the degree to which feminine' values like relationship building and quality of life are valued over 'masculine' values like competitiveness and the acquisition of wealth. A High Femininity characterises civilisations in which development and thoughtful 'feminine' characteristics dominate. In a High Feminine culture, the differentiation between male and female gender roles is kept to a minimum. Women should be confident, like men, and men should be caring like women. Women deal with facts in the same way to men and are not expected to be purely emotionally driven. Boys can cry like girls, but they should not fight. Children number is decided by the female. Women are provided with the equal opportunities in politics and women politicians are common (Hofstede, 2011).

***Long Term orientation vs Short Term Orientation*:** Long-Term Orientation (LTO) (formerly called "Confucian dynamism") focuses on the degree the society embraces, or does not embrace long-term devotion to traditional values. "Long Term Orientation stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift. It's opposite pole, Short Term Orientation, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations." (Hofstede, 2001). In Cultures with high long term orientation, people feel free to take part in and respect other people's opinions in decision making until the achievement of desired results (Pavlou & Chai, 2002).

The fifth dimension which was discovered later was first identified in a survey among students in 23 countries around the world, using a questionnaire designed by Chinese scholars (Connection, 1987). As all countries with a history of Confucianism scored near one pole which could be associated with hard work, the study's first author, i.e. Michael Harris Bond, labelled the dimension as Confucian Work Dynamism. The dimension turned out to be strongly correlated with recent

economic growth. As none of the four IBM dimensions was linked to economic growth, Hofstede obtained Bond's permission to add his dimension as a fifth to four (Hofstede & Bond, 1988).

***Indulgence versus Restraint (IND)*:** This dimension was added later on. It is defined as "the extent to which people try to control their desires and impulses, based on the way they were raised". One challenge that confronts humanity, now and in the past, is the degree to which little children are socialised. Without socialisation, we do not become "human". Relatively weak control is referred to as "indulgence" and strong control is referred to as "restraint". Indulgent culture and restrained cultures then can be defined as two types of the culture (Hofstede, 2011). Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. In high indulgence cultures, people are driven by the desire to be happy, and have more direct control over their own life/behaviour. Everyone is encouraged to speak their mind. Freedom is considered as an essential. Indulgence civilisations have more educated masses, and upholding peace and order is given the highest precedence (Hofstede, 2011).

Restraint refers to as "a society that suppresses gratification of needs and regulates it by means of strict social norms". Civilisations with restraint settings have less number of people who are happy. Helplessness and vulnerability is a common perception. Expressing one's opinion is not appreciated. The sense of leisure is not considered necessary. Positive emotions are forgotten easily. (Hofstede, 2011).

Categorisation of culture does not aim to prove a certain type of culture as being better than another type, but to allow distinction and categorisation. It is to be noted that cultures cannot be rated as "good" or "bad", rather they can be compared using the dimensions of culture i.e. to facilitate an understanding of difference and drivers. Each cultural dimension gives a comparative advantage to the whole cultural profile, as described in Table 5.1.

Table 5.1 Each Culture Dimension and Characteristic adapted from Hofstede (Cultures and Organisations, p.240)

Cultural Dimension	**Comparative Advantage**
Power distance low	Accepts accountability, decision makers
Power distance high	Structured and disciplined approach
Individualism	Movement of management
Collectivism	Commitment of Workers
Masculinity	Labour Industry, High Yield
Femininity	Customised goods and personal service
Low Uncertainty avoidance	Risk takers, Innovators
High Uncertainty avoidance	Precision, Risk averse

After a detailed discussion on the six dimensions of culture as defined by Hofstede, I will now discuss the drawbacks of national level culture categorisations.

5.2.2. Critique on Hofstede's National Culture

The dimensions proposed by Hofstede were developed to represent nations, large populations or countries. The dimensions are correlated to work with nations and less with organisations or individuals. Furthermore, these dimensions are meaningless to explain the individual (Minkov & Hofstede, 2011). Hofstede advises that at organisational or individual levels his dimensions, using the construct questions used by Hofstede, do not make sense. Many authors have tried to use his dimensions (Taras, Kirkman, & Steel, 2010), yet Hofstede (2001) himself specified that data taken from IBM could not be applied at the individual level.

5.3. Theories of Organisational Culture

Van et al. (2004) stated that "the shared perceptions of organisational work practices, i.e. within the organisational unit, is the organisational culture". Halil (1991) mentioned that "organisational culture is the dominant values adopted by an organisation that creates a common understanding among members, i.e. about the nature of the organisation and the desired behaviours of the members". Barney (1986) explained that the role of organisational culture is to remain competitive, and Barney (1986) stated that "organisational culture is a complex set of values, beliefs,

assumptions and symbols that define the way in which an organisation conducts its business". There is significant work in this field, i.e. relating to organisational culture, but the most commonly cited model was developed by Trompenaars and Hampter-Turner.

5.3.1. Dimensions of Trompenaars Organisational Culture

Trompenaars and Hampden-Turner developed a cultural framework, based on the management market, to help improve business communication and collaboration; that illustrated that culture impacts the solutions selected when solving problems (Trompenaars & Hampden-Turner, 1993). The following dimensions are included in Trompenaars organisational cultural model.

***Universalism versus Particularism*:** Universalists are "prone to follow the rules even when friends are involved and look for "the one best way" of dealing equally and fairly with all cases. They assume that the standards they hold dear are the "right" ones and they attempt to change the attitudes of others to match". A particularist society exists where "particular" circumstances are more important than rules. Bonds of particular relationships (family, friends) are: stronger than any abstract rule and the response may change according to circumstances and the people involved" (Trompenaars, 1996). Universalism applies rules in the societies where there are no differences between people whereas particularism society evaluates each based on specific circumstances or personal background (Stouffer & Toby, 1951).

***Individualism versus Collectivism*:** Individualism is "a prime orientation to the self', and collectivism as "a prime orientation to common goals and objectives" (Parsons, 1955). This dimension relates to whether the society behaves based on an individual decision or community decision.

***Neutral versus Emotional*:** Neutral – A culture in which you screen emotions and people will work hard to control their state of mind. Emotional – A culture in which sentiments are expressed willingly and logically. And in this, people like to show every major type of sentiment, for example, smile, talk loudly, and greet each other with a passion (Trompenaars & Hampden-Turner, 1997).

***Specific versus Diffuse*:** Specific – A culture in which personages have a large public space that they voluntarily share with others, and a small reserved space where they safeguard strictly and share only with close associates. Individuals habitually are liberal and demonstrative, but individuals' way of living and behaving is different between their workplace and/or within domestic life (Trompenaars & Hampden-Turner, 1997). Diffuse – A culture in which both community and private space are very much alike in scope and people as individuals safeguard their unrestricted space. Diffuse strategies emphasise the importance of a holistic relationship with the organisation and its environment (Trompenaars, 1996).

***Achievement versus Ascription*:** All societies give certain members higher status than others, signalling that unusual attention should be focused upon such persons and their activities. While some societies accord status to people on the basis of their achievements, others ascribe it to them by virtue of age, class, gender, education, etc. The first kind of status is called achieved status and the second ascribed status. While achieved status refers to doing, ascribed status refers to being (Trompenaars, 1996; Trompenaars & Hampden-Turner, 1997).

***Sequential versus Synchronic relation to time*:** This dimension elaborates how different cultures manage time. Cultures that manage time as a series of distinct passing events are classified as sequential. Cultures that believe that past, present, and future events all are interrelated are classified as synchronic (Trompenaars, 1996); i.e. that the future is impacted by both memories and thoughts of the past, and actions undertaken in the present action. Synchronic culture does not see events as being distinct, but related over time.

***Inner versus External attitude*:** The "inner-directedness" towards nature is produced internally from inside the individual and is referred to as internal attitude. If someone has an internal-focused attitude then their view of nature may be machine-like, i.e. they believe that man can dominate nature, and that their view is important when determining the right action. This "inner-directedness" is also revealed by observing the customer-orientation and its current trend. Irrespective of the situation at hand, inner-directed people follow their deep-rooted principles of behaviour. (Trompenaars, 1996) In case of external-focused attitude, people consider that man is dependent on nature. Rather than focusing on their own capabilities, individuals survive by

focusing on the external environment. In these cultures, the organic view about nature is prominent i.e. man is subject to nature. People are needed to be "other-directed" for their survival, and they give more value to the environment rather than themselves (Trompenaars, 1996).

5.3.2. Critique on Trompenaars' Organisational Culture

The predominant view was that individuals living in a particular place and time belong to a single culture. This approach clarifies why cross-cultural researches are accused of "ecological fallacy" by not recognising the individual makeup of persons with respect to culture. It is important that each study establishes the salient "cultures", and each individual's background, and therefore includes different "cultures" factors as independent variables (Straub, Loch, Evaristo, Karahanna, & Strike, 2002). Similar to national culture, the dimensions of organisational culture, cannot be practically applied at the individual level.

5.4. Culture at Individual Level (CV Scale)

To study a large number of people, i.e. societies and nations, the theory of national culture is very useful, yet the individual has primary significance when it comes to business competitiveness (Farley & Lehmann, 1994). The individual level is therefore arguably more important when modelling managerial and business situations/behaviour (Kamakura & Mazzon, 1991; Kamakura & Novak, 1992); since individual culture will eventually impact business effectiveness. Accordingly, the application of national culture is not reliably able to explain an individual's behaviour (Straub et al., 2002), thus it is not right to use national culture values to predict an individual's behaviour (McCoy et al., 2005).

Aaker and Lee (2001) considered all Chinese as collectivists and all Americans as individualists, which is fundamentally and statistically inappropriate. Dawar and Parker (1994) similarly grouped the respondents based on their national identity and assigned Hofstede's dimensions to test the influence of culture on customer behaviours. This practice is adequate when the unit of study is a country, but it is not proper when a study examines the effect of an individual's cultural orientation.

Literature suggests that in order to measure the cultural differences among individuals or at a micro-level concept, use of national and/or organisational culture is just not reliable; because

national and organisational culture concepts are only suitable at the macro-level, whereas the adoption of technology is a concern at the individual level (Srite & Karahanna, 2006). Numerous studies have applied dimensions of national culture at the individual level, but results were found to be inconsistent with Hofstede's study (Hoppe, 1990; Straub, Loch, Evaristo, Karahanna, & Srite, 2002), literature shows that national culture cannot explain an individual's behaviour, thus it is wrong to use values of national culture to predict behaviour of individual level (Ford, Connelly, & Meister, 2003; McCoy, Galletta, & King, 2005).

The primary user of technology is an individual, which means we cannot use the dimensions of national or organisational culture to assess the behaviour and attitude of students towards e-learning technology. In 2011, Yoo, Donthu, and Lenartowicz conducted a research study explaining the culture variations at an individual level. The framework proposed by Yoo, Donthu, and Lenartowicz (2011) is called Cultural Value scale or CVSCALE. The CVSCALE was proposed to predict culture at an individual level in the consumer market. Hofstede's first five cultural dimensions are used to measure culture at the individual level, yet new constructs were developed and empirically tested and verified for use at the individual level. Yoo et al. (2011) started with 125 items constructs from different studies relating to culture dimensions. After the first test, they recategorised construct items based on results and were left with 86 themed items. Yoo et al. retested the 86 items, and retained 40 items that were then used for developing the scale. Those items included nine items for power distance, six items for masculinity, six items for uncertainty avoidance, eleven for long term orientation and eight for the collectivism. A questionnaire was developed to gather responses, and a total of 1530 responses where gathered from three different group of people. Using the techniques of factor analysis, they validated and confirmed the scale. The final CVSCALE comprised of 26 items for five dimensions (five for power distance, six for long term orientation, four for masculinity, six for collectivism and five for uncertainty avoidance); constructed from construct questions that effectively mapped and loaded at the individual level. The 26 items explained appropriately 45% of the variance in the total data set.

CVSCALE is a scale that assesses individual values of cultures, which consists of 26-items that align with Hofstede's (1980; 1991) five-dimensional typology of culture. Power distance defined as "the extent to which the less powerful members of institutions and organisations within a country

expect and accept that power is distributed unequally". Uncertainty avoidance is "the extent to which the members of a culture feel threatened by uncertain or unknown situations". Individualism "pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family"; opposite to it is collectivism. "Confucian dynamism refers to the long-term versus short-term orientation toward the future". Masculinity and femininity represent "the dominant sex role pattern in the vast majority of both traditional and modern societies". (Prasongsukarn, 2009).

Hence, this study defines the individual culture as the cultural orientation of a student across the above mentioned five dimensions of culture (i.e. Power Distance, Uncertainty Avoidance, Individualism/Collectivism, Masculinity/Femininity and Long/Short term orientation) at the individual level. Individual culture will help us understand/explore the student's technology preference and his/her technology acceptance behaviour, as individuals of a particular region behave/respond differently in various situations, this makes them different from one another. This makes the concept of individual culture a better predictor of student behaviours, as compared to the concepts of national and organisational culture.

5.5. Method

The respondents of this study were students were from higher education institutes (universities both public and private) in Pakistan. Students were enrolled in a number of different programmes (306 were males and 212 were female): 349 students were from BBA, 116 students were from MBA, 35 students were from Executive MBA and 16 students were from MBA Engineering programme (for detail see Table 4.4). All students had a prior exposure to e-learning in one or more of the courses offered to them, with most of their courses using some technology components. The survey was carried out in two stages. First, for a period of five months in 2015 (collecting 300 responses) and second for a period of three months in 2016 (collecting 260 participants). In total, data was collected from 518 participants from two universities in Lahore, Pakistan. The first questionnaire measured the student's preference concerning the 8 higher education service (HES) quality indicators (i.e. Course Content, Facilities, Lecturers' Concern for Students, Communication with University, Social Activities, Assessment, Counselling Services and People) against face to face learning and 6 devices (TV, Radio, Desktop/Computer, Laptop Mobile and Laptop). Data

gathered from this questionnaire has already been considered in chapter 4, in order to define user average device preference. Each response was given a unique identifier. Responses were gathered on 5 point Likert scale. “1” being “Strongly Disagree” to “5” being “Strongly Agree”. The second questionnaire, relating to CV scale construct questions (Yoo, Donthu, & Lenartowicz, 2011), allowed us to gather the cultural values of each individual student. The CV scale questionnaire includes 26 questions related to five dimensions of culture (see Appendix B). All questions were asked on a scale of 1 to 5 (five-point Likert scale) with 1 defined as ‘strongly disagree’ and 5 defined as ‘strongly agree’.

Combined data analysis allowed us to investigate preference of student on each device against each HES quality indicator based on the cultural differences at the individual level.

5.6. Data Analysis

Statistical Package for Social Science (SPSS) and Analysis of a Moment Structure (AMOS) was used to perform data analysis. The analysis was performed in two steps as mentioned. First, the constructs of the CV scale were confirmed and verified through use of Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Subsequently, cluster analysis was performed to identify unique clusters, i.e. clusters that exist based upon cultural dimensions at an individual level. Secondly, on the basis of the clustering, technology preference data, concerning Kwan and Ng higher education service (HES) quality indicators, was sorted and the preference of each individual cluster was analysed.

5.6.1. Reliability

The first step after checking the demographics of the respondents is to check the “psychometric properties” of the survey instrument, i.e. the reliability and the validity (Hair et al., 2010). Reliability is defined as the “the proportion of the estimated variance over the population of recording units in data and the estimated total variance for the universe of observers over the population of data” (Krippendorff, 1970). Three methods were considered, i.e. split-half method, test-retest and Cronbach Alpha. The split-half method signifies the consistency of the observed items with a single variable (Hair et al., 2010). Test-retest calculates the reliability on the basis of the correlation of data scores of respondents with the observed items at different points (Ticehurst

& Veal, 2000). Cronbach's alpha checks the reliability and is extensively applied and accepted in literature to check the internal consistency and reliability of constructs (Spiliotopoulou, 2009). Cronbach's α is easy to calculate, checks the inter-item consistency, and is widely accepted and used in the field of academics (Nunnally & Bernstein, 1994); accordingly, it was selected for use in this study. The minimum threshold value for Cronbach alpha is 0.70, some researchers also mentioned 0.60 as defining the accepted range (Sekaran, 2000). The reliability of the five dimensions of the CVSCALE was well above the recommended upper value of 0.70 (see Table 5.2); hence proving strong reliability of the data.

Table 5.2 Reliability of the CVSCALE Constructs

Factors	No. Items	Cronbach's Alpha
Power Distance (PD)	5	.969
Uncertainty Avoidance (UA)	5	.975
Individualism/Collectivism (IC)	6	.980
Masculinity/Femininity (MF)	4	.909
Long-term/Short-term Orientation (LS)	6	.969

5.6.2. Factor Analysis

CVSCALE items were used in the questionnaire, however, data from each construct needs to be confirmed before moving on to data analysis. After checking the reliability, factor analysis was performed. "Factor analysis is a data reduction technique that accepts correlations between data variables and each item/question for the individual variable (Chatfield & Collins, 1992)." Through this, items are grouped together based on the strong correlations amongst items and assign a separate factor for each of the group of items. Usually, there are two methods to perform factor analysis, i.e. to explore and confirm the variables that are different from one another. First is Exploratory Factor Analysis (EFA), this shows the number of potential factors that best denotes data (Hair et al., 2010). The second type of factor analysis is Confirmatory Factor Analysis (CFA). CFA validates and confirms that the extracted factors of variables are aligned to the theoretical model. Structural equation modeling (SEM) is applied to perform CFA.

Exploratory Factor Analysis (EFA)

EFA helps us screen out the problematic items within the survey. In this case, five variables of CVSCALE, and respective loading of 26 items, are checked. The most common measure of the

EFA is the Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy with Varimax rotation. The varimax method for the extraction was selected. The reason behind selecting varimax method was that varimax is most commonly used variance maximising procedure and has higher generalisability and replicability power compared to the oblique rotational method (Tabachnick & Fidell, 2007). Also, oblique rotations are suitable for secondary data, thus varimax is used for current survey research. KMO is a measure of sampling adequacy, and shows the adequacy of the sample. If the KMO value is above 0.5, the data is acceptable. Data from the study was analysed and the KMO was defined as being 0.935, which provides positive evidence concerning the adequacy of the sample. For the Bartlett's test sig < 0.05 is required, in my case, it was <0.001. Both tests showed that chosen items for each variable are correlated and questionnaire is adequate according to the respondent's response (shown in Table 5.3).

Table 5.3 KMO and Bartlett's Test CVSCALE

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.935
Bartlett's Test of Sphericity	Approx. Chi-Square	17980.036
	Df	325
	Sig.	.000

The extraction method can differ based on the analysis to be performed after EFA. The researcher will be using AMOS, for which "Maximum Likelihood" extraction is required. EFA was performed to check the factors of CVSCALE items.

The cumulative variance of the five factors was 84.95%, and eigenvalues of all extracted factors were above 1. Communalities are initially at 1, if the extracted value of the communality for a certain variable is high (i.e. communality value is closer to 1), which implies that the extracted factors account for a large proportion of the variable's variance. The communalities for all 26 items were closer to 1; most of them being higher than 0.8 (see Table 5.4).

Table 5.4 Communalities for 26 CVSCALE Items

Communalities					
Items	Initial	Extraction	**Items**	Initial	Extraction
PD1	.866	.892	**IC4**	.914	.920
PD2	.824	.842	**IC5**	.875	.881
PD3	.869	.889	**IC6**	.891	.898
PD4	.838	.850	**MF1**	.655	.687
PD5	.844	.859	**MF2**	.669	.718
UA1	.857	.872	**MF3**	.710	.770
UA2	.853	.869	**MF4**	.665	.706
UA3	.889	.901	**LS1**	.825	.841
UA4	.878	.897	**LS2**	.806	.819
UA5	.886	.903	**LS3**	.814	.829
IC1	.883	.891	**LS4**	.821	.841
IC2	.871	.873	**LS5**	.828	.845
IC3	.892	.903	**LS6**	.862	.888

Hence the variables are reflected well via the extracted factors, and consequently, this shows that factor analysis is reliable. Another measure for checking the factor analysis is the factor loading, which is mentioned in the 'Rotated Component Matrix' in factor analysis output. There are 26 items of CVSCALE and for 26-items five factors were extracted from rotated component matrix (Table 5.5).

According to Hair et al. (2010) researcher should carefully look in the factor matrix for cross loading items. Items which are loading to another factor or have loading values of less than 0.5 should be removed, and factor analysis should be repeated. However, items of the defined instrument have loading above 0.5 and all 26 items were loading in the five Cv-Scale factors defined in the original CV-Scale questionnaire. Table 5.5 shows that items for each extracted factor are represented according to original CVSCALE, and consequently, this shows that the exploratory factor analysis is done.

Table 5.5 Factor Loading, Maximum Likelihood Extraction

Items	Factor Loadings				
	1	2	3	4	5
PD1					.914
PD2					.891
PD3					.916
PD4					.885
PD5					.901
UA1				.916	
UA2				.915	
UA3				.933	
UA4				.933	
UA5				.936	
IC1			.897		
IC2			.877		
IC3			.894		
IC4			.904		
IC5			.886		
IC6			.903		
MF1		.822			
MF2		.839			
MF3		.861			
MF4		.829			
LS1	.849				
LS2	.840				
LS3	.842				
LS4	.856				
LS5	.850				
LS6	.877				

Confirmatory Factor Analysis

Confirmatory factor analysis is the second step in factor analysis, i.e. where factors explored in EFA are confirmed. CFA is performed through the use of Structure Equation Modeling (SEM), the objective of SEM is to confirm the theory using data. For SEM, there are two kinds of models, measurement model and structure model. The measurement model is used for confirmatory factor analysis (CFA), whereas the structure model is used for path analysis or for hypothesis testing or regression analysis of independent and dependent variables. For the current experiment, I will only be using measurement model.

In order to perform CFA, there is no need to define the independent or dependent variables. CFA is also known as construct validity (measured through convergent and discriminant validity) and reliability (measured through composite reliability). The CVSCALE has already been tested and

verified, however, it is mandatory to perform CFA validation and confirmation of the constructs (Hair, Black, Babin, & Anderson, 2010). CFA was performed using AMOS. Different measuring criteria concerning CFA and their respective acceptance threshold value are mentioned in Table 5.6.

Table 5.6 Measures of Construct Validity and Reliability in CFA (Hair, et al. 2010; Igbaria & Iivari, 1995)

Validity and Reliability	**Measures**	**Threshold**
Construct Reliability	Composite Reliability CR	>0.70
Convergent Validity	Average Variance Extracted	>0.50
Discriminant Validity (Construct)	Correlation of Constructs	explained below
Discriminant Validity (Item)	Maximum Shared Variance	MSV<AVE

- **Construct Reliability:** Construct reliability is measured using Composite Reliability (CR), which shows the internal consistency among all the factors used in CFA to measure a single construct (Fornell & Larcker, 1981). The threshold value of CR for every single factor should be greater than 0.7. Composite reliability for five extracted factors was above 0.9, thus confirming their reliability (see Table 5.7).
- **Construct Validity**: Construct validity measured uses two approaches: convergent and discriminant validity (Campbell & Fiske, 1959; Carmines & Zeller, 1979). Convergent validity is the type of construct validity which signifies the strength of correlation of measures of the same factors with a single factor. Convergent validity of construct is measured using average variance extracted (AVE), the threshold value of AVE is 0.5 (Igbaria & Iivari, 1995). AVE for all five factors is higher than 0.5, thus verifying the convergent validity (see Table 5.7). Discriminant Validity is of further two types, i.e. construct level and item level. Construct level discriminant validity means that "degree to which two conceptually similar concepts are distinct" (Hair, Black, Babin, & Andon, 2010). This validity makes sure that a unique factor should share more correlation with its own factor than with any other latent factors. This is measured by checking the correlation of the constructs with each other, the correlation of factors with itself (see the diagonal values of the constructs in Table 5.7), which should be

higher than the other factors. In my case, the correlation of categorised constructs is very high (see Table 5.7). Item level discriminant validity means the "degree to which two conceptually similar concepts are distinct from each other". The discriminant validity of construct is established if maximum shared variance (MSV) is less than average variance extracted (AVE) (Hair, Black, Babin, & Anderson, 2010). MSV of the five CV-Scale constructs is less than AVE (see Table 5.7).

Table 5.7 Construct Reliability and Validity (Convergent and Discriminant Validity)

Constructs	CR	AVE	MSV	MF	UA	LS	PD	IC
Masculinity/Femininity (MF)	0.910	0.716	0.057	**0.846**				
Uncertainty Avoidance (UA)	0.975	0.888	0.097	0.07	**0.942**			
Long-term/Short-term Orientation (LS)	0.970	0.843	0.354	-0.24	-0.183	**0.918**		
Power Distance (PD)	0.970	0.864	0.118	0.135	0.312	-0.344	**0.930**	
Individualism/Collectivism (IC)	0.980	0.893	0.354	-0.174	-0.190	0.595	-0.245	**0.945**

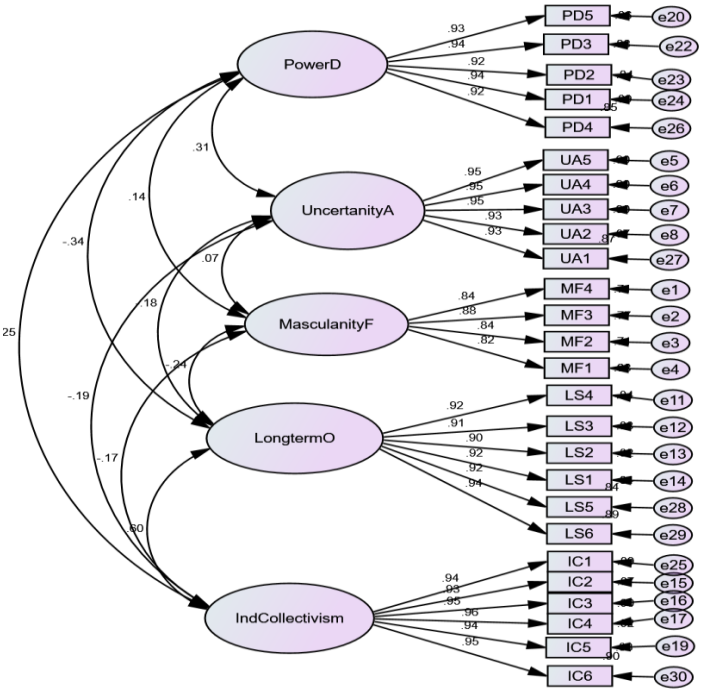

Figure 5.1 Measurement Model for CVSCALE Constructs

Goodness of Fit

Goodness of fit or model fit is used to check how well the factors in the structure correlate with the variables in the dataset. A maximum-likelihood estimation method was used. According to Hair, Black, Babin, & Anderson, (2010) there are some indices to check a good fit. These indices are CMIN/DF, Adjusted Goodness of Fit Index (AGFI), Comparative Fix Index (CFI), RMSEA (Root Mean Square Error of Approximation) and Standardised Root Mean Square Residual (SRMR). The values of all these factors should be within the executable range to achieve a good model fit. However, the Values of AGFI value is effected by the model fit, so if sample sizes vary, one can neglect this measure and can still have a good fit (Sharma, Mukherjee, Kumar, & Dillon, 2005). A good fit signifies that factors in the models are correct and are supported by the data set. Table 5.8 presents the model fit values obtained, and a threshold level for each measure (Hu & Bentler, 1999).

Table 5.8 Model Fit (Hu & Bentler, 1999; Hair, et al., 2010)

Measures	**Values**	**Threshold**
CMIN/DF	**1.998**	< 3 good
CFI	**0.984**	> 0.90
AGFI	**0.905**	> 0.80
SRMR	**0.041**	< 0.09
RMSEA	**0.044**	< 0.05 good, 0.05 – 0.10 moderate

Constructs of the CV scale are validated and confirmed according to original study of CV scale, by Yoo, Donthu, & Lenartowicz, (2011). 26-items were then computed into five respective factors, which were used for further analysis.

5.6.3. Clustering

Five-dimension variables, i.e. Power Distance (PD), Uncertainty Avoidance (UA), Individualism / Collectivism (IC), Masculinity / Femininity (MF) and Long-term / Short-term Orientation (LS), were used for cluster segmentation. A hierarchal clustering approach was used to find the optimal number of clusters in the data. The cubic clustering criterion was met when using a three cluster solution (Milligan & Cooper, 1985), thus three clusters were selected for use during further analysis. K-means clustering was applied, and final clusters and membership of each respondent were obtained (see Table 5.9). Three cluster segments were defined for the five data dimensions,

and results were found to be significant (i.e. <0.01). The F-value (see table 5.9) denotes how far the data is scattered from the mean. The lower the F value, the closer the data points are to the mean. The higher the F value the more scattered the data is from the mean. In this data, if we look at the mean of masculinity/femininity, the means of the three clusters are very close to one another; hence the low F value. If we look, however, at the values of the means of individualism/collectivism there is a distinct difference between the mean values of all three clusters, which explains why the F value is high for this dimension. Similarly, for the remaining three dimensions (i.e. Power Distance, Uncertainty Avoidance, and Long term / Short term Orientation) the F value is high, highlighting considerable variation between segments.

Table 5.9 Culture at the Individual Level Cluster wise Segmentation

	Cluster Segmentation			
Cultural Dimension	Segment 1	Segment 2	Segment 3	F-Value
Power Distance (PD)	3.83	1.50	2.35	178.152*
Uncertainty Avoidance (UA)	3.66	3.86	2.08	124.039*
Individualism/Collectivism (IC)	1.52	2.94	4.26	376.259*
Masculinity/Femininity (MF)	3.93	3.20	3.25	21.789*
Long-term/Short-term Orientation (LS)	2.36	4.12	4.27	278.869*
Total (N)	**146**	**175**	**197**	**518**
**Sign. <0.01*				

We identified that the three clusters can be differentiated firstly on the basis of Power Distance (PD). If PD is high, then the participant is most likely from cluster 1. If PD is low, we consider participant Individualism / Collectivism (IC) data. If IC is low, then the participant is from cluster 2. If IC is high, then the participant is from cluster 3. Looking at combined values for the three clusters, we can highlight them on the basis of these differences based on the 5 dimensions of culture at the individual level.

- Cluster 1 is highest in both Power Distance and Masculinity. This shows that cluster 1 students are assertive, result oriented and expect and accept the distance of power among different power levels. This cluster has short-term orientation and only focuses on individual benefits.
- Cluster 2 is highest in Uncertainty Avoidance and lowest in Power Distance, which shows that students in this group believe in the use of rules and structures to avoid any uncertainty.

However, they do not expect and accept any power distance. This segment is moderately more individualist than cluster 3 and less than cluster 1. They are also long term oriented (less than cluster 3).

- Cluster 3 is lowest in Uncertainty Avoidance and highest in both Collectivism and Long-term Orientation. These respondents believe in collective long-term goals; however, cluster 3 students are not always concerned about the rules and structures of the system.

5.6.4. Cluster Based Device Preference of Students

After the identification of three unique clusters, preference data was sorted according to the clusters and preference data of three clusters was separated. The data was separated so as to see if the preference of each cluster is the same as an overall preference. Then the means for 6 devices and face to face preference against the eight Higher Education Service (HES) quality indicators for each cluster was analysed. Now I will proceed with the device preference of each cluster.

Table 5.10 presents the preference of students for cluster 1. 146 respondents were in cluster 1, which prefer Face to Face rather than the use of technology devices, on six higher education service (HES) quality indicators. For two HES quality indicators, that is 'Communication with University' and 'Assessment', this group preferred Mobile and Laptop respectively.

Table 5.10 Device Preference Cluster 1 N = 146

Higher Education Service (HES) Quality Indicators	**Face to Face**	**TV**	**Radio**	**Desktop/ Computer**	**Laptop**	**Mobile**	**Tablet**
Course Content	4.41	2.10	1.64	3.18	3.48	2.26	3.88
Facilities	4.45	2.10	1.77	3.45	3.48	2.67	2.77
Lecturer's Concern for Students	4.18	1.91	1.49	3.19	3.22	2.93	3.62
Social Activities	4.39	2.21	1.82	3.11	3.70	3.54	3.75
Communication with University	3.56	1.92	1.68	3.32	4.32	4.35	3.86
Assessment	3.55	1.63	1.46	3.34	4.25	3.73	3.79
Counselling Services	4.49	1.98	1.71	3.18	3.78	3.57	3.66
People	4.58	2.18	1.87	3.20	3.96	4.10	3.74

175 students belonged to cluster 2, and the device preference for this segment is inclined towards the use of Mobile phones for six of the HES quality indicator (see Table 5.11). For quality

indicators ‘Counselling Services’ and ‘People’, this group of students preferred Face to Face. A closer look at the Table 5.11 shows that for ‘Counselling Services’ first preference of students is Face to Face, however, the values of Laptop and Mobile suggest that students would consider using either Laptop or Mobile (if required); as these values are not much lower as compared to Face to Face for these two quality indicators.

Table 5.11 Device Preference Cluster 2 N = 175

Higher Education Service (HES) Quality Indicators	**Face to Face**	**TV**	**Radio**	**Desktop/ Computer**	**Laptop**	**Mobile**	**Tablet**
Course Content	3.63	1.93	1.53	3.34	3.79	4.35	3.85
Facilities	3.38	1.91	1.57	3.29	3.95	4.37	2.98
Lecturer’s Concern for Students	3.85	1.66	1.45	3.22	3.99	4.46	3.79
Social Activities	2.41	2.11	1.81	3.07	4.04	4.75	3.75
Communication with University	3.59	1.77	1.53	3.33	4.23	4.34	3.95
Assessment	3.56	1.54	1.41	3.07	3.89	4.33	3.83
Counselling Services	4.13	1.83	1.67	3.29	4.05	4.01	3.78
People	4.27	1.81	1.73	3.11	4.06	4.10	3.71

Table 5.12 gives the preferences of the 197 students that belonged to cluster 3. This segment of students prefers Laptop for six of the HES quality indicators. When considering ‘Communication with University’, the students in this cluster prefer the use of Mobiles, however for direct communication with ‘People’ this segment prefers Face to Face.

Table 5.12 Device Preference Cluster 3 N = 197

Higher Education Service (HES) Quality Indicators	**Face to Face**	**TV**	**Radio**	**Desktop/ Computer**	**Laptop**	**Mobile**	**Tablet**
Course Content	3.39	2.03	1.60	3.29	4.67	2.22	3.93
Facilities	3.55	1.96	1.66	3.36	4.55	2.19	3.72
Lecturer’s Concern for Students	4.14	1.85	1.52	3.35	4.25	3.78	3.87
Social Activities	2.24	2.16	1.80	3.20	4.13	4.11	3.81
Communication with University	3.78	1.81	1.60	3.32	4.30	4.36	4.00
Assessment	3.49	1.61	1.43	3.26	4.23	3.73	3.85
Counselling Services	4.11	1.90	1.66	3.22	4.15	4.03	3.72
People	4.38	1.94	1.72	3.10	4.02	4.16	3.81

5.7. Results and Discussion

Perception about service quality is highly correlated with the user satisfaction (Parasuraman, Zeithaml, & Berry, 1988; Roca, Chiub, & Martineza, 2006). In case of e-learning, student satisfaction is very much dependent on the quality of educational services offered by the institutes, as the student plays the role of the user of these educational services offered across difference institutes (Wong & Huang, 2015).

Table 5.10 shows that Cluster 1 has a strong preference (6 out of 8 HES Quality Indicators) for Face to Face delivery of services. This can be attributed to their culture orientation of being highest in Power Distance and Masculinity. Such people would prefer upfront, Face to Face interaction with the services to experience overall satisfaction. Clusters 2 and 3 opt primarily for use of portable devices (i.e. Laptop and Mobile respectively). Cluster 2 is highest in Uncertainty Avoidance and lowest in Power Distance. So, we see them selecting a device which does not have any barriers of distance, or confinement as in a classroom space. Hence they selected Mobile. Cluster 3 is highest in Collectivism and Long-term Orientation, and lowest in Uncertainty Avoidance – which shows that they chose Laptop as it has a capability of performing multiple functions collectively. However, they do not believe in rules of having lectures delivered Face to Face etc., they prefer to have it on a portable device, commonly used for different functions, i.e. Laptop.

For the three clusters, for first four quality indicators, namely ‘Course Content’, ‘Facilities’, ‘Lecturer’s Concern for Students’ and ‘Social Activities’ – all clusters prefer service provision in a different form. Cluster 1 would like these to be delivered Face to Face, whereas cluster 2 and 3 prefer it on Laptop and Mobile respectively. By doing so, we can increase the student satisfaction by just providing them these services on their preferences. This also shows that these are the preferred information assimilation options for the three clusters.

For quality indicator ‘Assessment’, Laptop is preferred by cluster segments 1 and 3. Whereas, for students belonging to cluster 2, Mobile is preferred. Similar is the case for the quality indicator ‘Counselling Services’, cluster 1 and 2 prefer it face to face and cluster 3 prefers it on Laptop. However, if we look at the means of the Laptop and Face to Face for cluster 3 for ‘Counselling

Services' it can be said that this group does not have a huge preference difference for counselling sessions, whether the content is delivered on Laptop or Face to Face (see Table 5.12).

For HES quality indicator 'Communication with University', use of Mobile devices is preferred by students of all clusters. The reason for this can be explained as mobiles are devices that everyone carries most of the time, and it is easier to stay in touch with anyone including university administration via mobile. Another HES quality indicator 'People' has Face to Face as the top preference across the three clusters. This is because meeting new people is an experience which everyone prefers to have face to face.

This study can help in determining the technology preference of the students that have a different set of individual cultural values. Cluster segment 1 preferred traditional learning over e-learning perhaps due to their attribute of being assertive and their strong acceptance towards power distance. Being individualistic, these students want to have instructions laid out in person and want surety that they are getting the full benefits. Also, being individualistic and short term oriented, as they are bearing the cost of education, they would want the instructor to be present, i.e. in front of them, otherwise they may think the quality of education is low. Since they prefer face to face interaction instead of virtual interaction, introducing cluster 1 students to technology might lead to failure or dissatisfaction.

Cultural orientation of the segment 2 and 3 students shows that both have high long term orientation cultural scores. They have the characteristics of thinking about the benefits in the future, so they are willing to have an education that is dependent on a technological component i.e. Mobile or Laptop. So, people having long term orientation are inclined towards either laptop or mobile for education purposes. Introducing technology to these people will lead to positive results.

However, if one wants to introduce only Laptop or Mobile, one has to see whether a person looks for personal benefits or group benefits (individualism vs collectivism) and his/her tendency of avoiding uncertainty. Introducing Mobile to a person who is individualistic and wants to avoid uncertainty at all cost will be beneficial. As (s)he wants a device that is more suitable for personalised use. On the other hand, introducing a Laptop to a person who looks for collective

benefits of the group would be favourable. As laptop can cover many more aspects and has extra functions which can be utilised for almost every aspect of learning.

5.8. Conclusion

Results of the experiment in the previous chapter (see Chapter 4, Section 4.9) exhibits a clear willingness of students to use devices, i.e. Mobile and Laptop instead of traditional/face to face learning, for 5 of the 8 HES quality indicators. Since culture has been shown to impact the attitude of students toward HES (Kwan and Ng, 1999). The experiment in this chapter looked at the technology based preference of cultural cluster groups (see Table 5.10 -5.12). We conclude that amongst the first four of the higher education services (HES) quality indicators, there is a clear difference in the preference of students; aligning clearly to each of the three clusters. If we general/overall preference (see Chapter 4, Section 4.9.2), this significance of the role of a student culture, at the individual level, will be lost. Results in this chapter show that, to improve a student's satisfaction with his/her university experience, we have to consider cultural orientation at the individual level; as student preference varies across the multiple HES quality indicators and the devices available to receive them.

The students are willing to use technology for education, hence a shift, from traditional face to face student /teacher interaction, to virtual e-learning. However, it should be noted that overall device preference does not allow us to describe clustered device preference, i.e. based on cultural differences at the individual level. Our results show that, we do not check the student preference at the individual level, higher education service providers risk ignoring the individual preference. Hence, the analysis done at the individual level of culture not only better explains the technology preference, but also helps HEIs to the creation of higher student satisfaction rates; as the service is more likely to reflect student preference and perception of needs. Higher satisfaction rates would eventually lead towards lower drop-out rates for students in e-learning courses.

This study can help many important stakeholders, e.g. faculty members, policy makers and administrative staff, to work towards higher student satisfaction rates amongst students, i.e. by focusing on their device preference understanding student culture at the individual level (Van den Berg & Wilderom, 2004). Results also showed that Cluster 1 preferred Face to face, Cluster 2

preferred Mobile and Cluster 3 preferred Laptop respectively. From here onwards, these three clusters would be nominated as per their respective preferred device i.e. Face to face Cluster, Mobile Cluster and Laptop Cluster.

Chapter 6

Investigating the Role of Culture at the Individual Level in e-Learning: Students' Technology Acceptance towards Laptop and Mobile

The previous chapter discussed the technology preference of the students, based on their individual culture orientation. Results showed a huge difference in overall student preference, and the individual student preference, based upon individual cultural orientation. Three statistically significant clusters were identified in the previous chapter, with each of them having a different preference. Cluster 1 preferred to receive the majority of HES quality indicators via Face to Face interaction. Cluster 2 and 3 had preferences towards the use of Mobile and Laptop respectively. In this final chapter, the researcher will be investigating the factors that lead to Technology Acceptance of these two preferred devices (i.e. Laptop and Mobile) based on a cluster wise sorted data set. By finding out what factors specifically lead towards the acceptance of these devices by students, we are able to better manage and control the factors preventing e-learning implementation success. By analysing technology acceptance on the basis of individual culture orientation, the answer of the third research question will be considered; i.e. ***Does e-learning student's individual culture impact his/her technology acceptance towards a preferred device(s)?***

This chapter starts with some literature based discussion and a comparison of different technology acceptance models and the role of culture in technology acceptance. This leads to identifying UTAUT2 as the best suited model for my study. Next, I discuss the model and results derived from data analysis. Conclusions are written in detail to provide valuable suggestions for improving student satisfaction towards e-learning based on their behavioural intention towards the use of their preferred device.

6.1. Introduction

The definition of technology acceptance was proposed by Gattiker as "an individual's psychological state with regard to his or her voluntary or intended use of a particular technology" (Gattiker, 1984), Morris (1996) states that "acceptance is the degree to which individual users use a given system when usage is voluntary or discretionary (low or high acceptance)". It is evident from these definitions that behaviour of individual determines the technology acceptance, so in order to understand what factors play a role in determining this behaviour, several theories and models have been proposed to explain the acceptance and ultimate use of the technology (Venkatesh, Thong, & Xu, 2012).

6.2. Theories of Technology Acceptance

There are a number of models and theories (Abbasi, Chandio, Soomro, & Shah, 2011) to explain the concept of technology acceptance, yet most of the theories are built upon the Social Cognitive Theory (proposed by Bandura, 1986) and the Diffusion of Innovation theory (proposed by Rogers, 1983). Despite the fact that studies for the technology acceptance are believed to be a stand-out amongst the most developed zones inside modern information system literature (Hu, Chau, Liu Sheng, & Kar, 1999), despite all these models and theories there is a persistent issue faced by the researchers in the study of technology acceptance. That is "which model and constructs are best suited while considering the introduction of new technology?" (Venkatesh, Morris, Davis, & Davis, 2003). All the technology acceptance models have to be thoroughly understood before identifying the most suitable one for the research at hand.

6.2.1. Diffusion of Innovation theory (DOI)

DOI is one of the two founding theories on which all the models of technology acceptance have been built. The basic concept of DOI was derived from sociology, and is founded upon the work of two sociologists. Garbriel Trade and George Simmel worked on Sigmodal diffusion theory which was later on used by Rogers (1995), to define 'diffusion' i.e. adoption, 'innovation' i.e. formulation of a new technology and 'communication' i.e. process of sharing the innovation. Diffusion is stated as the method by which the message of innovation is delivered to the people in the system. Innovation is referred to as the new concept, technology or idea that is to be

communicated to the people. Briefly, Diffusion of Innovation (DOI) is the movement of technology or the idea of technology from one individual (the creator) to the other people (the users).

As the definitions state, Diffusion of Innovation is a complete process of sharing of information from one individual to another, during this process innovation might be accepted or rejected by the people. Five stages are defined that can lead to adoption or rejection. (Rogers, 1983: 1995). However, rejection can occur at any stage by an individual, whereas adoption can occur after the five stages (see Figure 6.1).

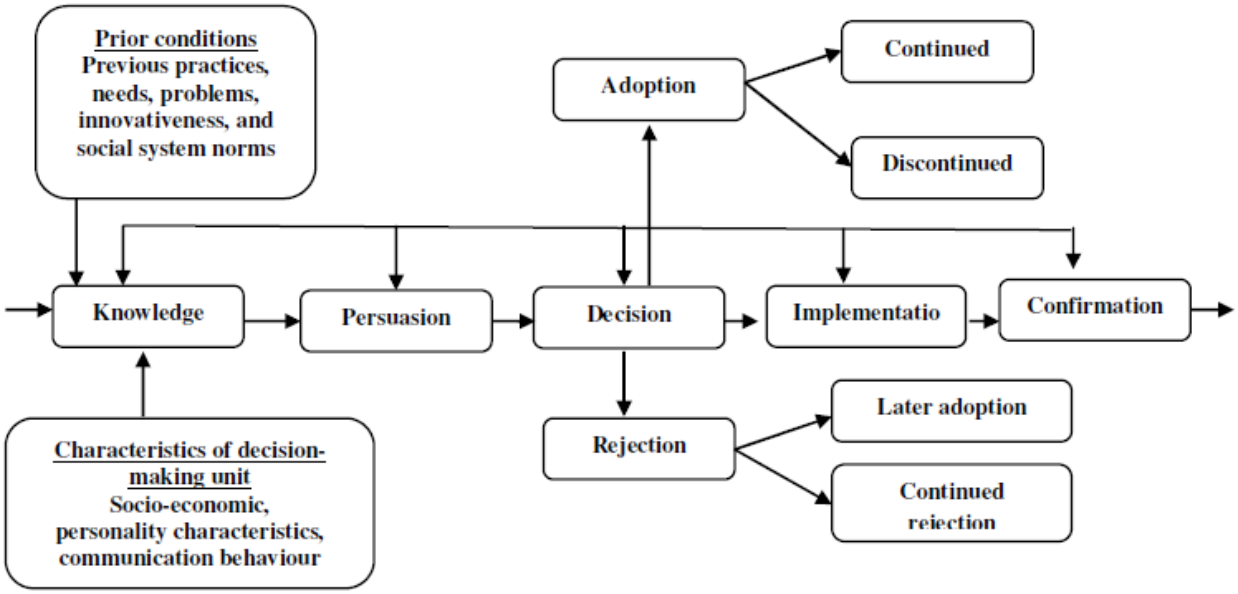

Figure 6.1 DOI Process (ROGERS, 1995)

- The first stage is entitled "Knowledge of innovation" and relates to making sure that information regarding the technology is available to the users. This can be achieved using multimedia / the mass media to transmit the 'existence of technology' and 'how to use the technology'.
- The second stage, i.e. "Forming attitude/persuasion towards innovation", involves the development of user curiosity as a result of information gained in stage 1. Ideally, users will now seek out knowledge about the technology, i.e. obtaining additional information in order to build a perception to accept or reject the technology.

- The third stage relates to the "Decision to adopt or reject". This stage involves the user forming a positive attitude towards the adoption of technology. The name does suggest adopt or reject but according to Rogers as mentioned earlier, rejection can happen at any stage. However, if one is to accept the technology, the positive attitude towards the technology is built from this stage onwards.
- The fourth stage is "Implementation of the new idea", since the adoption of a technology can never happen if a user does not facilitate access to the technology, i.e. gain hands-on experience with the technology. This stage involves the actual use of the technology by the users; in other words, prior to this stage, the adoption process is only at the level of preparing the mind of users to the use of technology. This stage takes into account the ease/complexity of using the technology, and the technical support provided to get a hang of innovation.
- The fifth and the last stage, entitled "Confirmation of the decision", encompasses the response of users concerning actual use of the technology. A positive response is highly influenced by the previous stage (actual use); with a positive response resulting in confirmation to adopt or vice versa. Rogers stated that it is not necessary for an individual to continue with the adoption of technology through the five stages, they can reject the decision of adoption for a better technology, if available; due to performance issues or/and other factors.

Along with the five stages, Rogers also proposed some characteristics of innovations. The first is **Relative advantages (RA),** which refers to "the degree to which an innovation is perceived as being better than its precursor" (Moore & Benbasat, 1991). RA checks the satisfaction or/and the efficiency of the technology as compared to the previous innovations (Rogers, 1995). The second factor is **Compatibility (COMP)**, which is "the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters" (Moore & Benbasat, 1991). COMP is very important to consider as the adoption of the technology might vary amongst individuals and/or groups based on the values and beliefs of the group.

Third factor is **Complexity (COLX):** which is defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Thompson, Higgins, & Howell, 1991). Ease and complexity in use of the technology is an important determinant of the rejection or acceptance of technology. The fourth factor, i.e. **Trial ability (TRI),** refers to as ease of use while testing the technology to help make the adoption or rejection decision (Rogers, 2003). The last

factor is **Observability (OBS),** which involves assessing adoption of the observed innovation/technology, OBS relates to whether something proficiently serves its desired purpose for individuals and/or organisations (Moore & Benbasat, 1991).

Regardless of all the benefits, the DOI theory has some limitation. The DOI theory does not account for attitudes, which can result in someone accepting or rejecting the innovation. The DOI theory also fails to create a link between the attitudes of the user, and the attributes of the technology. Furthermore, it is not clear how the defined five characteristics help in developing the attitude towards the technology (Karahanna, 1999; Chen, 2002). Accordingly, in order to consider the attitude factors, Social Cognitive Theory (SCT) was developed.

6.2.2. Social Cognitive Theory (SCT)

In contrast to issues of DOI, the Social Cognitive Theory (SCT) takes into account the role of human actions (approach of human agency) in innovation process (Bandura, 1986). SCT states that behaviour is learned from the environment through the process of observational learning. SCT was proposed to overcome the shortcomings of DOI (Bandura, 2006). There are three factors in SCT that are always affecting each other: "Behaviour", "Personal Factors" (Cognitive affective and biological events) and "Environmental Factors". This triple factor model states that behaviour of

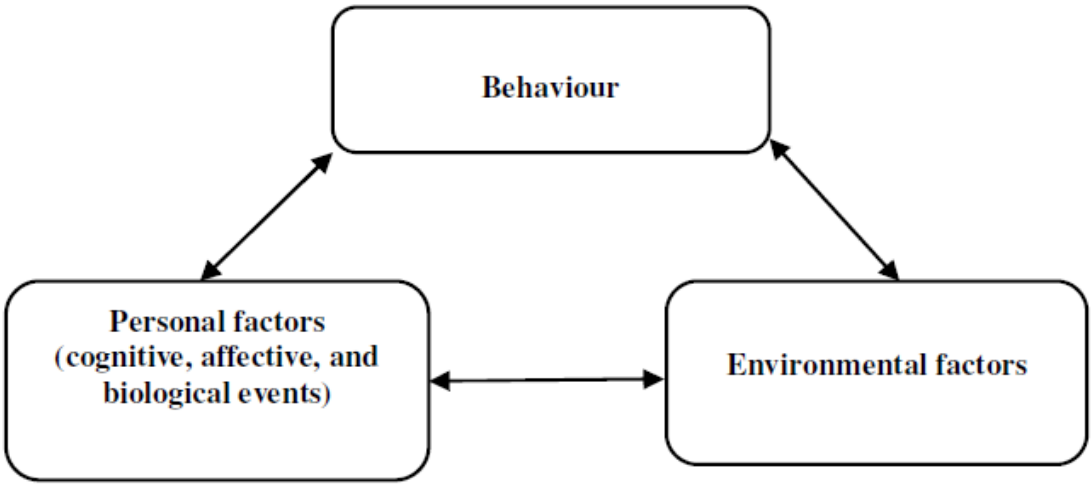

Figure 6.2 Social Cognitive Theory (SCT) (Bandura, 1986)

individual is influenced by his/her own beliefs, anticipations and perceptions, which are modified by their surroundings (i.e. environmental factors) - see Figure 6.2 - as a consequence, 'behaviour' is developed and shaped by the individual's own beliefs and environment (Bandura, 1986).

The behaviours and environmental factors are not the determinants of each other. Behaviour relates to the fact that "what people think, believe, and feel affects how they behave" (Bandura, 1986). It is not necessary for a person to exhibit a certain behaviour before making a decision towards technology. The other factors, however, do not directly affect the behaviour, yet effects the expectation, emotions and self-efficacy. Change in expectation, emotions and self-efficacy led to the introduction of self-efficacy, which is defined as "peoples' judgment of their capabilities to organise and execute courses of action required to attain a designated type of performance" (Compeau & Higgins, 1995a). Despite the contribution of SCT to improve the shortcomings of DOI, this theory is only used as a building block in order to develop models and theories (Compeau & Higgins, 1995a; Igbaria & Iivari, 1995; Agarwal, Sambamurthy, & Ralph, 2000). Regardless of the new concepts, SCT is widely used to propose new concepts, however, application of SCT itself in predicting behaviour towards technology is quite tough (Agarwal, Sambamurthy, & Ralph, 2000).

6.2.3. Theory of Reasoned Action (TRA)

The theory of reasoned action (TRA), proposed by Fishbein and Ajzen (1975; 1980), is also derived from the field of social psychology. TRA emphasises on behaviour and tries to give more insights to explain user behaviour. TRA states that an individual only considers his/her own action before

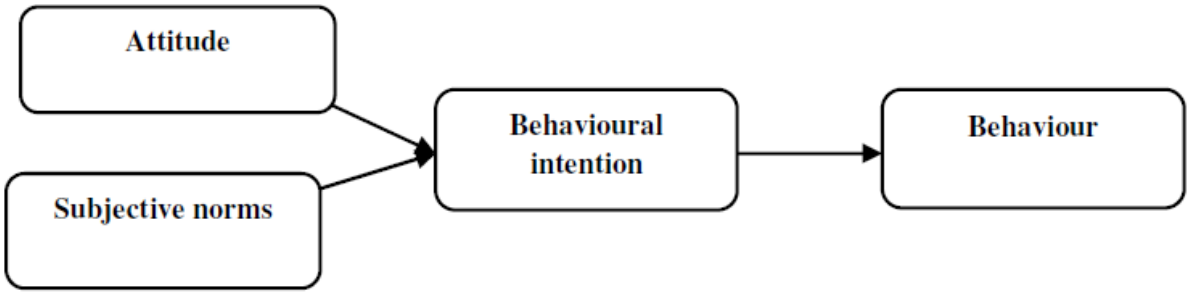

Figure 6.3 Theory of reasoned Action (Fishbein & Ajzen, 1975)

making any decision or exhibiting behaviour (Fishbein & Ajzen, 1975). And unlike DOI and SCT,

TRA proposed that intention is the contributing factor of behaviour, not the attitude. There are three factors of TRA "Attitude", "Subjective Norms" and "Behavioural Intention" (see Figure 6.3).

TRA postulates that attitude forms the intention, which in turn leads to the ultimate performance of behaviour. The first factor, i.e. Behavioural Intention (BI), is a direct determinant of behaviour. Behaviour and intention towards behaviour, are different, as behaviour is apparent actions, whereas intention is the mental readiness to perform the behaviour. BI is dependent on the attitude and subjective norms of individuals towards behaviour (Fishbein & Ajzen, 1975; 1980). The second variable, i.e. Attitude, relates to the positive or negative evaluation of the behaviour to be performed. Individual's past experience can be positive and it will impact attitude positively, which similarly impacts behavioural intention. The third variable, i.e. Subjective Norms (SN), which is a person's perception about what other people think regarding the behaviour in question (that whether he/she should preform that behaviour or not). The opinion of peers, therefore influences the formation of one's beliefs about the norms which are acceptable in a social setting.

Both attitude and subjective norms form the behavioural intention, which is the plan to do something, which later on may or may not become behaviour. If the attitude and subjective norms are added with perceived behavioural control (defined "as perceived ease or difficulty of adopting behaviour") then it becomes the theory of planed behaviour TPB, instead of theory of reasoned action TRA (Roberto, Shafer, & Marmo, 2014). The evolving trend of using technology has resulted in a world where people think about minimising resources using IT systems (Mishra, Akman, & Mishra, 2014); however, there is a need to predict where technology use will be accepted or rejected by the user. TRA has been used extensively in the literature, however, if the intention of the individual is not identified than the behaviour cannot be predicted correctly.

6.2.4. Theory of Planned Behaviour (TPB)

Ajzen (1991) states that Theory of Planned Behaviour (TPB) aims to overcome the failure of TRA i.e. to foresee the behaviour in case of incomplete "volitional controls". Volitional controls is defined as the extent to which a person can decide on his/her own whether to perform or not perform a certain behaviour.

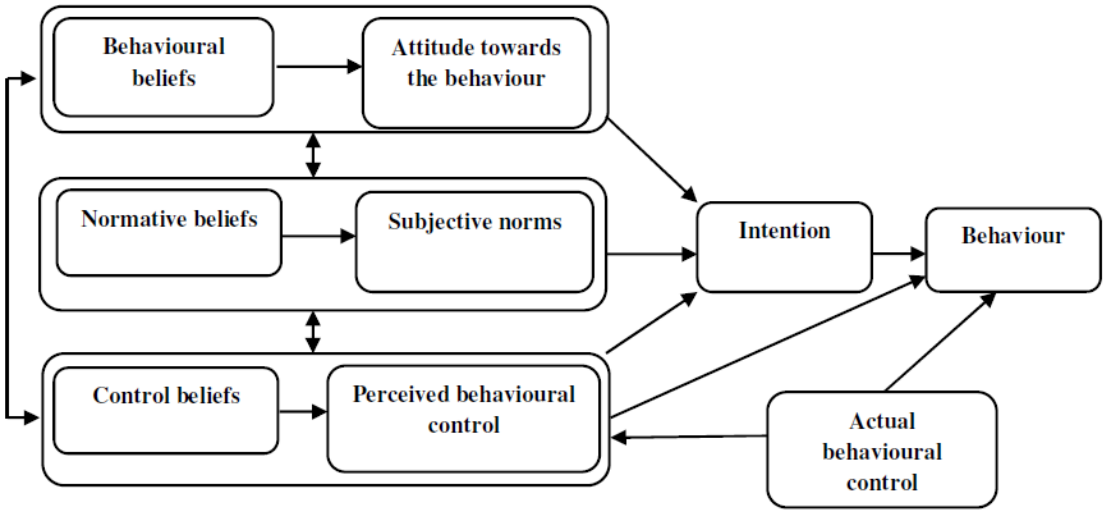

Figure 6.4 Theory of Planned Behaviour (Ajzen, 1991)

TPB states that an "individual's intention to perform a specified behaviour assists in the identification of the motivational factors that influence a behaviour; the factors indicate how hard people are willing to try performing a behaviour, and how much effort they are planning to put to performing the behaviour" (Ajzen, 1991). TRA added construct of "Perceived Behavioural Control (PBC)" to overcome the issue where a person exhibits behaviour without any hesitation (Rotter, 1966). Thus, the stronger the intention towards a behaviour, the better should be the performance. There are three conceptual postulates to determine intention in TPB, which are somewhat similar to TRA; "Attitude (A)", "Subjective Norms (SN)", and "Perceived Behavioural Control (PBC)" (see Figure 6.4).

Attitude Toward the behaviour: Attitude towards the behaviour can be stated as "the extent to which a person has a positive or negative evaluation or assessment of the behaviour "(Ajzen, 1991).

Subjective norms: Subjective norms refers to "the pressure from the society either to perform or not to perform a specific behaviour" (Ajzen, 1991).

Perceived behavioural control (PBC): In the theory of achievement motivation, proposed by Atkinson (1964), perceived control is stated as the perceived probability of succeeding at a given task. Perceived behaviour control is the perception of the difficulty or ease to perform a specific behaviour. So, we can say that it imitates the internal and external behavioural constraints of an

individual (Ajzen, 1991). Perceived behavioural control is important in the theory of planned behaviour.

In addition to these constructs, TPB also considers the normative beliefs, behavioural beliefs and control beliefs, combining the human beliefs. Behavioural beliefs are the beliefs about outcomes of behaviour that impact the attitude towards that behaviour. Whereas normative beliefs are related to the effects arising from other individuals' aspects on the behaviour. And finally, the control beliefs are related to any kind of factors that might influence behaviour. This influence can be either supportive or unsupportive (Ajzen, 1991). TPB is used by many researchers to study behaviour. In spite of the addition of PBC, the TPB model does not, however, take account of other factors that affect the behaviour, for example, morals, perception about technology, habit and support to use technology that might help to change the behaviour.

6.2.5. Technology Acceptance Model (TAM)

TRA was modified by Davis et al. (1989) to consider the need for a model designed specifically for use in the field of Information Technology. TAM is widely accepted and used in the domain of IT to study the technology acceptance of people. The constructs of TAM, i.e. "Attitude (A)" and "Behavioural Intention (BI)", are similar to those used in TRA. However, "Subjective Norms (SN)" has been dropped, and three new constructs "Perceived Usefulness (PU)", "Perceived Ease of Use (PEOU)", and "External Variables (EV)" are added. PU and PEOU are the determinants of attitude of a person towards technology. Primarily there are two main independent variables that determine the attitude towards a specific technology, i.e. "PEOU" and "PU" (King & He, 2006). PU can also have a direct influence on BI in addition to the indirect effect with 'A' on 'BI' (see Figure 6.5).

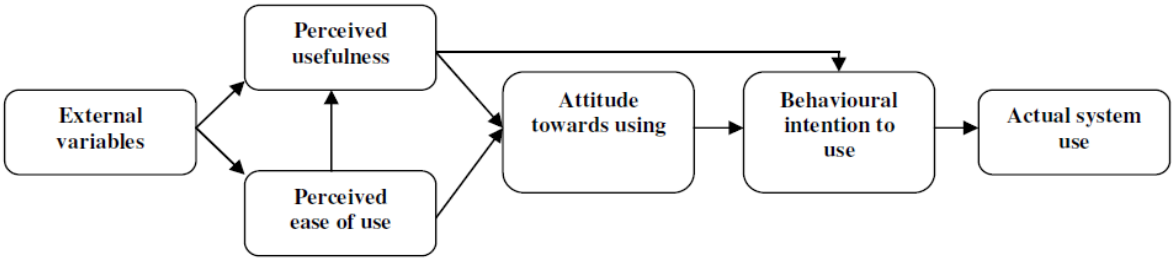

Figure 6.5 Technology Acceptance Model (Davis et al., 1989)

Now attitude is defined as the individual's feelings to do or refrain from doing a certain act. BI is the degree to which an individual is willing to exhibit a certain behaviour. PEOU is related to the personal belief that using a certain system would be free of effort (Venkatesh, Morris, Davis, & Davis, 2003). PU is related to the belief that a person's job performance would be improved as a result of using a particular system (Davis, Bagozzi, & Warshaw, 1989). Lastly, external variables (EV) is defined as "the explicitly included factors in the model that have an expected impact on BI and BU through the meditation of PU and PEOU" (Davis et al, 1989). EV are not specified and can be added if needed. EV may include "training", "enjoyment" "support for technology", etc. (Agarwal, Sambamurthy, & Ralph, 2000).

According to Davis (1989), TAM measures the acceptance of technology of a person by considering three specific aspects. The first two relate to the technology performance/functioning and ease of use, whereas the third relates to the perceived benefits which an individual expects to gain from the use of that technology. TAM signifies that considering all other factors constant, ease of using technology is directly correlated with 'reuse'. The purpose of TAM was to predict the intention of a specific person towards the acceptance or rejection of a specific technology. It has been applied to check the user intention towards e-mail, graphics (Karahanna & Straub, 1999), spreadsheets (Venkatesh & Davis, 1996), e-health (Lanseng & Andreassen, 2007), usage of personal computers (Igbaria & Iivari, 1995) and marketing (Gentry & Calantone, 2002), to name a few studies. The evolving ability of TAM to assess acceptance has led to its extensive use in different contexts.

Regardless of its vast popularity and use, TAM has a significant limitation reported by Davis (1993), i.e. "self-reported usage". Self-reported usage is related to the common method bias, which alters and overstates the causal relationship between dependent and independent variables. Additionally, TAM is unable to explain the causes behind some of the results. As TAM does not take into account the effect of contextual factors, (i.e. individual, social, and cultural influences) on the acceptance of technology; hence its ability to explain the variance of behaviour intention is not very reliable. TAM also ignores the design process leading to the defined acceptance behaviour (Venkatesh and Davis, 1996; Venkatesh and Davis, 2000).

6.2.6. TAM 2 or Revised TAM

Venkatesh and Davis proposed a model (2000) to overcome the limitations of the original TAM, and named the model TAM2, the "Revised Technology Acceptance Model". The objective of the study was to keep the original constructs of TAM, yet in order to overcome its short-comings, they added constructs to measure the acceptance when the user experiences change (Venkatesh & Davis, 2000). To do so, they included consideration of "Subjective Norms (SN)" from TRA, which was omitted in TAM in order to address the impact of social influence on the behaviour. TAM2 also used constructs of DOI.

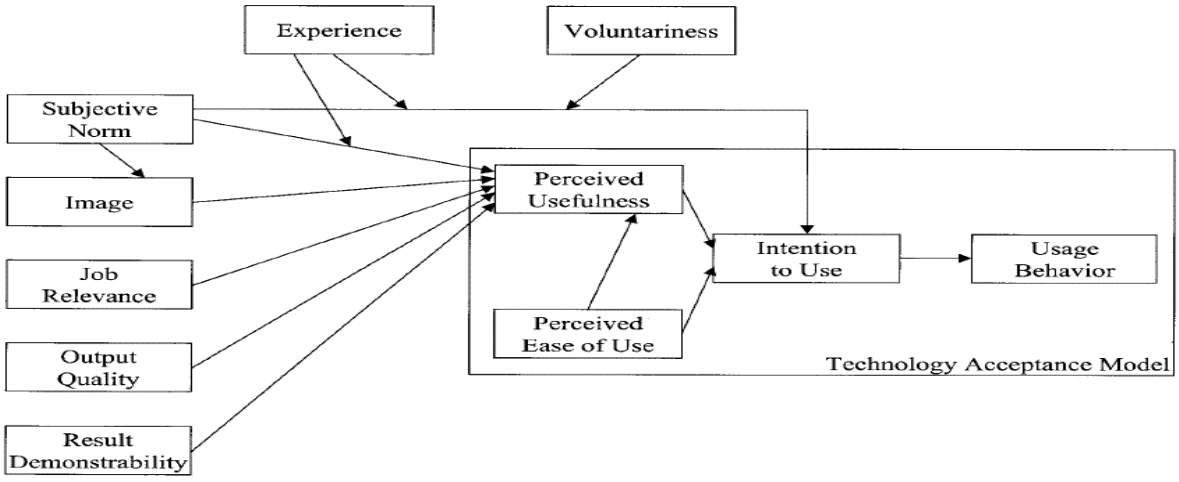

Figure 6.6 TAM2 (Venkatesh & Davis 2000)

The add-on in TAM was described as "social influence processing factors" and "cognitive instrumental processing factors" (see Figure 6.6). "Social influence process" comprises of

“Subjective Norms (SN)”, “Image (IMG)”, “Experience (EXP)” and “Voluntariness (VOL)”. Venkatesh and Davis stated that social influence has a direct influence on the acceptance and rejection decision of the individual. Furthermore, they defined SN as the influence of other people on the acceptance or rejection decision (Fishbein & Ajzen, 1975). VOL is stated as the extent to which potential adopters believe that the decision to adopt is not a mandatory decision (Venkatesh & Davis, 2000). IMG is taken from DOI factors and relates to the degree to which use of an innovation is believed to improve a person’s status in his/her social system (Moore & Benbasat, 1991). SN has an influence on IMG because exhibiting a certain behaviour in a group will improve the status among the group members. EXP is related to the familiarity towards a specific system. EXP decreases the relation of Subjective Norms on Perceived Usefulness and Behavioural Intention (Venkatesh & Davis, 2000). The second addition in TAM was the inclusion of cognitive instrumental processes that take into account the usefulness and relevance of technology in order to perform a specific job. This factor comprises of Job Relevance (JR), Output Quality (OQ), Result Demonstrability (RD), and Perceived Ease of Use (PEOU) (Venkatesh & Davis, 2000). Job Relevance (JR) is similar to the complexity variable in DOI, and is defined as an individual’s belief regarding how much the target system is relevant to his/her job (Venkatesh & Davis, 2000). Output Quality (OQ), as the name implies, is related to whether a system can achieve its designed objectives or not. OQ has a direct relation with Perceived Usefulness (PU)” (Venkatesh & Davis, 2000). Result Demonstrability (RD) is the tangibility of the results of using innovations. The results of the validation showed that TAM2 was able to explicate more variance than TAM i.e. TAM explained 40% whereas TAM2 explained 53% variance (Venkatesh & Davis, 2000). TAM2 was able to explain more variance than TAM, but it still has the short-comings of the original model, i.e. self-reported usage and common method bias. Also, there is an assumption in TAM2 that voluntariness is the key decision maker to perform an action, as a result, it overlooks the impact of other factors, e.g. unconscious habits, limitation of time, experience, skills and environmental factors. Perceived Usefulness (PU) is another TAM2 limitation, because it assumes that PU is only impacted by external factors.

6.2.7. Augmented Technology Acceptance Model (A-TAM)

Another attempt to overcome the short-comings of the TAM was made by Taylor and Todd (1995a), who proposed Augmented TAM (A-TAM). A-TAM is a mixture of TPB and TAM. The constructs of A-TAM include: Perceived Usefulness (PU), Attitude (A), Perceived Ease of Use (PEOU), Subjective Norms (SN), Perceived Behavioural Control (PBC), Behavioural Intention (BI) and Use Behaviour (UB). A definition of all A-TAM constructs is mentioned in the discussion of TAM and TPB. The relationship of the constructs is shown in Figure 6.7.

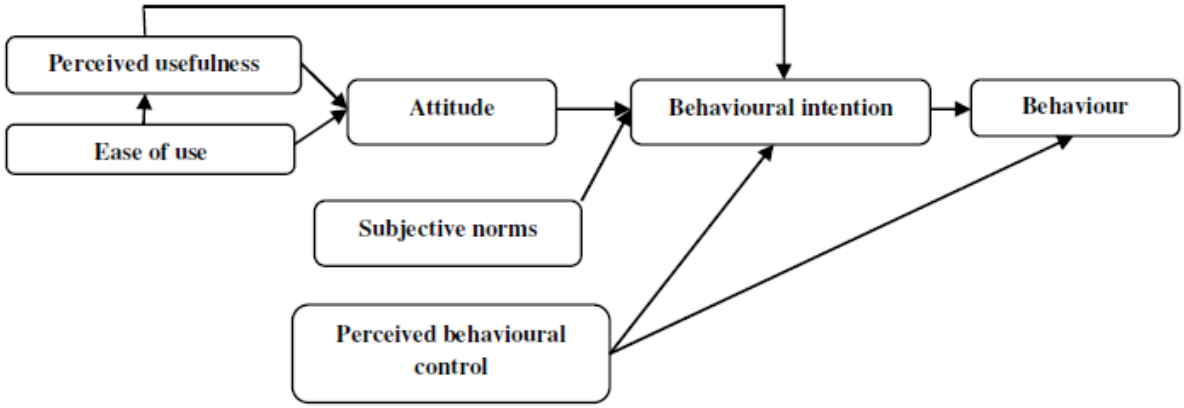

Figure 6.7 Augmented TAM A-TAM (Taylor and Todd 1995a)

The objective of Taylor and Todd to combine both models was to overcome the major issues related to constructs of Perceived Behavioural Control (PBC) in Theory of Planned Behaviour (TPB) and Subjective Norms (SN) in TAM, which hinders the true prediction of IT behaviour. Authors reported that by combining two models, results helped them differentiate the behaviour according to the experience level of users which helped them predict the behaviour of a user before experiencing the technology. The shortcomings of A-TAM are that this study was tested on students, and the results differ if applied in organisations and/or the wider society. Also, the demographic variables were neglected in the model, which can have a significant impact on the experience.

Furthermore, the scale of study i.e. to measure experience, was dichotomous, i.e. lacks in generalisation of study, when users advance from being a learner, to being an expert, of a certain technology.

6.2.8. Unified Theory of Acceptance and Use of Technology (UTAUT)

In an effort to overcome the variance that remained unexplained by TAM, TAM2, Venkatesh, Morris, Davis and Davis (2003) combined the eight base models of technology acceptance and proposed a new model; Unified Theory of Acceptance and Use of Technology (UTAUT). After the detailed review of the previous models of the technology acceptance, Venkatesh, et al., (2003) added four new major constructs in the model. The first two constructs are similar to TAM's PU and PEOU, i.e. Performance Expectancy (PE) and Effort Expectancy (EE) respectively. The third is taken from SN of TRA, i.e. Social Influence (SI). The last is taken from the TPB construct in PBC, i.e. Facilitating Conditions (FC). The factors are influencing the BI and/or Use behaviour (UB) of technology (see Figure 8). Age, experience, gender and voluntariness of use (VOL) were also added as variables moderating the relationship between independent variables (PE, EE, SI and FC) and dependent variables (BI and UB) (see Figure 6.8).

Performance Expectancy (PE) is defined as the degree to which the individuals perceive that the usage of technologies will lead to performance gains" (Venkatesh, Morris, Davis, & Davis, 2003). PE was identified as the strongest determinant amongst UTAUT constructs. PE is moderated by age and gender, and it was found that younger people have a strong impact on PE.

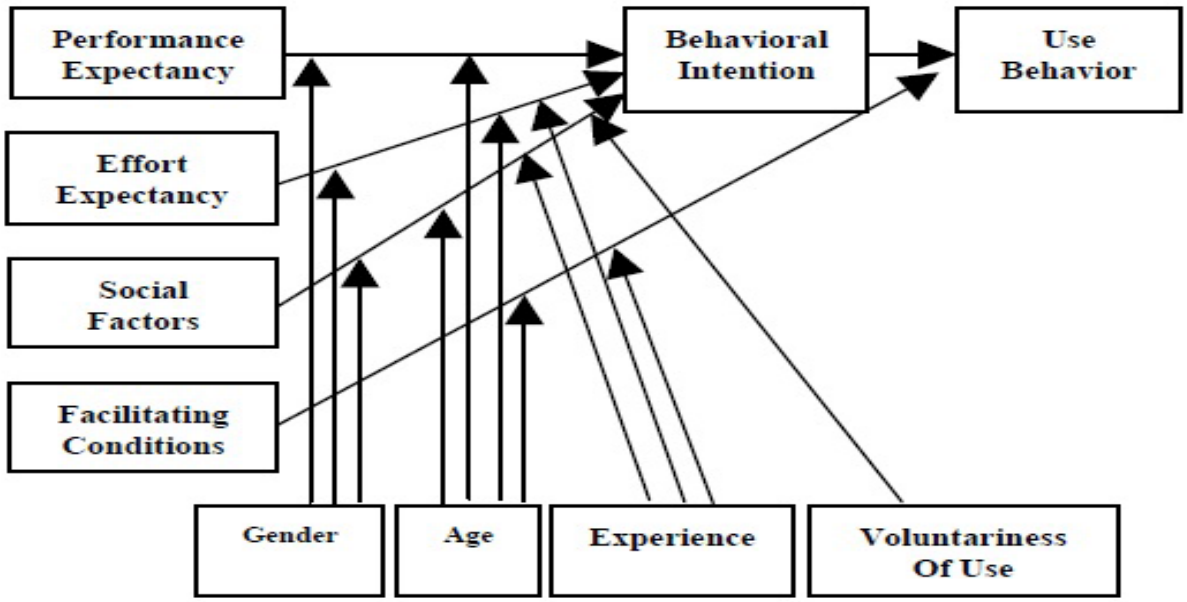

Figure 6.8 Unified Theory of Acceptance and Use of Technology (Venkatesh, et al. 2003)

Effort Expectancy (EE) is the extent to which an individual believes that a system will be easy to use. Age, gender, and experience were found to have a moderating impact on EE. EE has a stronger impact on BI among young females with early experience.

Social Influence (SI) is the degree to which an individual perceives that others believe that they should use the technologies. Age, gender, experience and voluntariness moderate the relationship between SI and BI.

Facilitating Conditions (FC) is the extent to which an individual perceives that organisational and technical resources are available to facilitate the usage of the system. It was found that FC did not have a direct relation with BI, but with the moderation of experience and age, FC directly influences the use behaviour (UB).

UTAUT has been applied in many longitudinal studies to measure technology acceptance. The model is capable of predicting higher variance than previous models. According to Venkatesh et al. (2003), UTAUT was able to explain 56% variance in BI and 40% variance in UB. However, it has been argued that variance in behaviour explained by UTAUT is very much dependant on the moderating variable, without the moderator, the model is less parsimonious than TAM and TAM2 (Van Raaij & Schepers, 2008). Also, Venkatesh, Thong and Xu (2012) mentioned that despite the application of the UTAUT model in different contextual settings, there is still a need to investigate the factors influencing technological use in the context of consumers.

6.2.9. Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)

In 2012 Venkatesh, Thong and Xu proposed an extension to UTAUT, in order to account for the silent factors that play a role in determining IT acceptance. They made three changes: firstly they identified the factor of consumer acceptance and use of technology; secondly, they changed some relations in UTAUT; and lastly, they created new relations. The first change was made by introducing three new constructs: i) Hedonic Motivation (HM), an important factor in consumer behaviour studies; ii) Cost, the most important factor in consumer context accounted for by introducing Price Value (PV); and iii) Habit (HT), which is also an important predictor of consumer

behaviour. In the modifications of relationship, HT has a direct effect on UB and/or increases or decreases the strength of relation of BI and UB of technology. VOL was dropped as a moderator in the UTAUT2, and the moderated effect of age, gender and experience is proposed for the three new introduced constructs (see Figure 6.9).

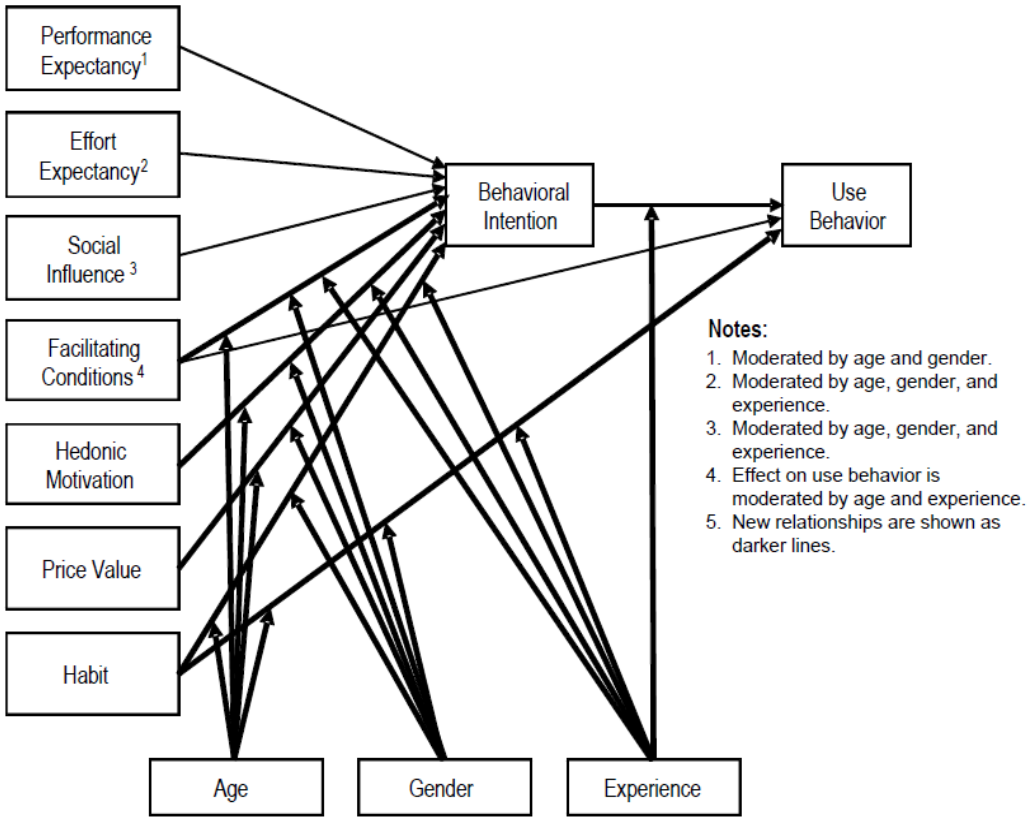

Figure 6.9 UTAUT2 (Venkatesh, Thong, & Xu, 2012)

Venkatesh, Thong and Xu (2012) defined the constructs of UTAUT2 as: Performance Expectancy (PE), which refers to the extent to which using a technology will be beneficial to consumers while performing certain activities; Effort Expectancy (EE), which is the extent of ease associated with consumer's technology usage; Social Influence (SI), which is the degree to which consumers believe that important others (e.g., family and friends) believe they should use a specific technology; Facilitating Conditions (FC), which are related to the perceptions of consumers about the support and resources available to perform a behaviour; Hedonic Motivation (HM), which is defined as the pleasure or fun derived from usage of a technology. HM plays a significant role in

determining technology acceptance and use (Brown & Venkatesh, 2005); Price Value (PV), which is consumers' cognitive trade-off between the financial cost of using technology and the perceived benefits of that technology (Dodds, Monroe, & Grewal, 1991). The PV is positive if the perceived benefits are greater than the cost/price of technology, as a result BI will be positively affected by PV (Venkatesh, Thong, & Xu, 2012); Habit (HT), which is referred to as the degree to which people have a tendency to perform certain behaviours automatically due to learning (Limayem, Hirt, & Cheung, 2007), while (Kim & Malhotra, 2005) equate habit with automaticity.

By adding the three new constructs (considering the consumer perspective), the new model explained 74% variance in BI and 52% variance in UB. It is mentioned, in the literature, that models with fewer variables, and more explanatory powers, are better when applied. In contrast to that Venkatesh (2003) said that if the underlying concept of the theory is explained, the parsimony can be ignored. The balance of consideration of both (i.e. parsimony and the understanding of the concept) during the investigation, is deemed important (Taylor & Todd, 1995a). In our discussion, the shortcomings of all models have been described in detail. The extended model of UTAUT2 is based on UTAUT, which was formulated by combining the eight previous models of technology acceptance. The explanatory power among the eight models varies from 17%-53% (Venkatesh, Morris, Davis, & Davis, 2003), whereas UTAUT alone was able to explain 56% of the variance in BI and 40% variance in UB. The UTAUT2 model surpasses predecessors, by explaining 74% variance in BI and 52% in UB. Considering all the models of technology acceptance described, UTAUT2 not only covers the majority of the basic concepts in the other models, but also is the closest when it comes to generalising the technology acceptance models to date. The role of the e-learning student, i.e. as the user of e-learning devices, is the same as that of a consumer of a certain device/technology. UTAUT2 is specifically customised to study the consumer's acceptance and use of technology. UTAUT2 has not yet been applied for students of higher education institutes, when using e-learning devices in Pakistan. Hence, I will be using the constructs of UTAUT2 within this study.

6.3. Culture and Technology Acceptance

Literature suggests that a technological solution is not enough when the acceptance of e-learning devices is under consideration; but that other important factors must be taken into account such as behavioural and cultural factors (Masoumi, 2010), e.g. individual factors (Liaw, 2008) and social factors (Schepers and Wetzels, 2007). Chapter 5 highlighted that culture plays a significant role in determining the attitudes, behaviour and exhibiting behaviour. Researchers have also been working to find out the causes of failure of technology acceptance due to cultural differences (Straub, Keil, & Brenner, 1997; Alsajjan & Dennis, 2010). There are a number of studies that applied different concepts of culture to check the technology acceptance:

- Venkatesh, Morris, Sykes, and Ackerman (2004) used TPB under the consideration of masculinity-femininity to study the individual differences when explaining the impact of culture on technology acceptance, however, all the dimensions of Hofstede culture were not considered.
- Hasan (1999) looked at three different cultural settings, i.e. Africa, Middle East and Australia across ten organisations, to check the variance in acceptance of technology due to different cultural orientations.
- Straub et al. (1997) applied Hofstede national culture dimensions to check the acceptance variance in context of the US, Switzerland, and Japan.

Studies measuring the technology acceptance on the basis of the cultural differences have been conducted on a national level. However, traditionally the dimension of Hofstede cannot be applied at the individual level (see Chapter 5, Sections 5.3.2 & 5.5). The current study aims to explain culture at the individual level, using CVSCALE model. Also, demographic variables are affected by culture and it was also mentioned in the studies measuring technology acceptance based on cultural differences that culture is a broader umbrella which influences age (Nelson, 2004), gender (Sen, 2004) and experience (Baptista & Oliveira, 2015). Tarhini et al. (2017) and Baptista and Oliveira (2015) have ignored the demographic moderators while applying cultural dimensions to explain the role of culture in determining technology acceptance. Similarly, technology acceptance will be checked based on cultural orientation at the individual level, so the demographic moderators will not be considered in this study.

As for Use Behaviour, the main objective of use behaviour is to check the pre and post usage behaviour of respondents (Venkatesh, Thong, & Xu, 2012). Also, Baptista and Oliveira (2015) mentioned in their findings that the relation of BI and UB was not found to be significant, and in order to check UB, new constructs should be added to the model (i.e. risk, trust). This study is not measuring the pre and post usage acceptance of the respondents, as the respondents were approached one time for data collection. Accordingly, UB was dropped from this study.

The main aim of the study is to critically analyse the factors leading to e-learning student's behavioural intention towards the two preferred devices; i.e. Laptop and Mobile; based upon their individual culture orientation based clusters. As a result, the model used for the study is shown in Figure 6.10.

The model will be used to check the difference in technology acceptance, i.e. e-learning device data for 518 students. Participants data was separated on the basis of the individual cultural segmentation (see Chapter 5, Section 5.7.3). The difference in technology acceptance of each cluster can be determined by the number/name of significant predictors of the BI. If the result shows that the technology acceptance differs across clusters for both devices, i.e. different predictors become significant across different clusters for the two devices (i.e. Laptop and Mobile), this will prove that e-learning student's individual culture does have an impact on his/her

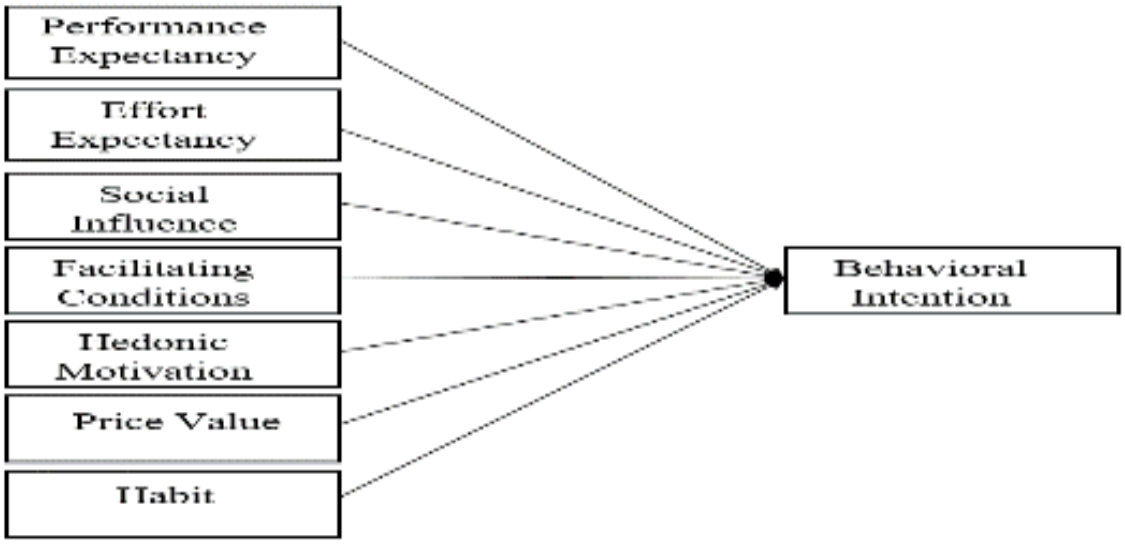

Figure 6.10 UTAUT2 Framework for Study (Source: Venkatesh, Thong, & Xu, 2012)

technology acceptance towards the preferred device(s). If the results of technology acceptance across the three clusters do not show any difference in prediction of BI, then there is no role of culture at the individual level in student e-learning device technology acceptance.

6.4. Method

The method used for this experiment was similar to the previous two experiments performed in Chapter 4 and Chapter 5. A total of 560 responses were gathered from the students (for details see Sections 4.8 and 5.5). Responses were gathered on a 5 point Likert scale. "1" being "Strongly Disagree" to "5" being "Strongly Agree". Data was collected concerning UTAUT2 constructs, i.e. 26 questions were asked for both Mobile and Laptop (See Appendix C). The data was then sorted into three groups based on the individual culture based segmentation performed in the previous experiment (See Section 5.6 and 5.7). After removing outliers and missing values, 518 responses were used for data analysis.

6.5. Data Analysis

The data was analysed using SPSS 20 and AMOS 22. SPSS was used for preliminary data analysis i.e. EFA and Reliability. After that, SEM was performed using AMOS. In SEM, CFA was performed to validate the constructs of the adopted UTATU2 model, and regression was performed to find the significant relations between independent and dependent variables. The results of Chapter 5 have already shown that two devices are preferred within the three clusters of e-learning students; based on their individual culture orientation (see Chapter 5, Section 5.7.4). Accordingly, in the technology acceptance model, data for the two preferred devices, i.e. Laptop and Mobile will be analysed in more detail (Appendix C). A full description of respondents' profile is provided in Chapter 4 (see Section 4.9.1).

6.5.1. Reliability

Cronbach Alpha is the measure to check the reliability of the data. The minimum threshold value of Cronbach Alpha is 0.70. Cronbach's Alpha of all eight factors of adopted UTAUT2 for both

laptop and mobile was greater than 0.70 (Nunnally & Bernstein, 1994). Thus, proving the reliability of the data for both devices (see Table 6.1).

Table 6.1 Reliability Laptop and Mobile

		Cronbach's Alpha	
Factors	**No. Items**	**Laptop**	**Mobile**
Performance Expectancy (PE)	3	.965	.963
Effort Expectancy (EE)	4	.970	.957
Social Influence (SI)	3	.966	.926
Facilitating Conditions (FC)	4	.973	.963
Hedonic Motivation (HM)	3	.959	.965
Price Value (PV)	3	.929	.957
Habit (HT)	3	.910	.968
Behavioural Intention (BI)	3	.935	.945

6.5.2. Factor Analysis

Technology acceptance for two devices is under observation. Hence data on two devices i.e. Laptop and Mobile, was collected using constructs of adopted UTAUT2. After checking the reliability of both devices, factor analysis was performed. Factor analysis must be conducted before performing further steps of analysis, to explore and then confirm the items for each of the UTAUT2 model constructs. Firstly, exploratory factor analysis (EFA) is performed. This shows the number of possible factors that best represent the data (Hair et al., 2010). Secondly, confirmatory factory analysis (CFA) was performed, which confirms if the extracted factors of the variables match the theoretical model. Structural equation modeling (SEM) is used for CFA.

Exploratory Factor Analysis

Exploratory factor analysis helps screen out the problematic items within the questionnaire, in this study, items belong to seven independent and one dependent variable of the adopted UTAUT2 model. The most common measure of the EFA is the Kaiser-Meyer-Olkin Measure of Sampling Adequacy with Varimax rotation (for details see, Chapter 5, Section 5.7.2).

The cumulative variance of the eight factors for Laptop was ***86.8%*** and for mobile was ***87.3%***, and eigenvalues of all extracted factors for both devices were above 1. Communalities are initially at 1, if the communality for a certain variable is high (i.e. communality value is closer to 1), this implies that the extracted factors account for a large proportion of the variable's variance. The communalities for all 26 items, for both devices, were higher than 0.7, most being higher than 0.8.

Kaiser Meyer Olkin (KMO); a measure of sampling adequacy shows the acceptability of sample value above 0.5 is acceptable, in the case of the laptop it was ***0.846*** and for the mobile, it was ***0.838***. Thus, proving the adequacy of the sample for both devices. Bartlett's test sig < 0.05 is required for both laptop and mobile as results were less than 0.001. Both of the tests showed that chosen items for each variable are correlated, and the questionnaire is adequate according to the respondent's responses (see in Table 6.2).

Table 6.2 KMO and Bartlett's Test (Laptop and Mobile)

Measures		**Laptop**	**Mobile**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.846	.838
Bartlett's Test of Sphericity	Approx. Chi-Square	15539.127	15470.048
	Df	325	325
	Sig.	.000	.000

Another measure for checking the factor analysis is the factor loading mentioned in the Rotated Component Matrix in factor analysis output. According to Hair et al. (2010), researchers should carefully look at the factor matrix for cross loading items. Items that are loading to another factor, with the loading of less than 0.5 should be removed, and the researcher should start the factor analysis. However, factor loading for both devices was above 0.5 and all 26 items were loading in the eight respective factors according to the original questionnaire of UTAUT2 (see Table 6.3). Hence the items for each extracted factor is represented according to the original UTAUT2 model, and consequently, this shows that the factor analysis is reliable. There are 26 items of UTAUT2 and for 26-items eight factors were extracted for both devices in the rotated component matrix (Table 6.3).

Table 6.3 Factor Loading, Maximum Likelihood Extraction (Laptop, Mobile)

Items	Laptop Factors								Mobile Factors							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
PE Q1				.945								.957				
PE Q2				.945								.922				
PE Q3				.939								.928				
EE Q1		.940								.962						
EE Q2		.912								.933						
EE Q3		.924								.932						
EE Q4		.915								.842						
SI Q1			.946													.877
SI Q2			.935													.866
SI Q3			.916													.883
FC Q1	.933								.932							
FC Q2	.912								.914							
FC Q3	.928								.921							
FC Q4	.897								.922							
HM					.920								.910			
HM					.950								.923			
HM					.934								.894			
PV Q1						.813								.925		
PV Q2						.843								.918		
PV Q3						.915								.933		
HT Q1								.825			.923					
HT Q2								.862			.916					
HT Q3								.826			.939					
BI Q1							.852								.835	
BI Q2							.808								.833	
BI Q3							.857								.892	

Confirmatory Factor Analysis

Confirmatory factor analysis is the second factor analysis step, i.e. where factors explored in EFA are confirmed. It is also known as construct validity and reliability. Confirmatory Factor Analysis (CFA) was performed using AMOS. Here the values of CFA for UTAUT2 are mentioned. For further details of the CFA, and the related concepts see Factor Analysis in Chapter 5. Reliability in CFA is measured through composite reliability (CR), which shows internal consistency amongst all the constructs used in CFA to measure a single construct (Fornell & Larcker, 1981). The threshold value of CR for each factor should be greater than 0.7. Composite reliability for the eight

constructs for laptop and mobile were above 0.9, thus confirming construct reliability (see Tables 6.4 and 6.5).

Construct validity is measured using two approaches convergent and discriminant validity (Campbell & Fiske, 1959). The suggested Average Variance Extracted (AVE) threshold value is 0.5 (Igbaria & Iivari, 1995). AVE for all eight constructs for both devices is greater than 0.5 (see Tables 6.4 and 6.5); thus, verifying the convergent validity. Another measure of construct validity is discriminant validity, which signifies the distinction amongst the different constructs used to measure different traits (Carmines & Zeller, 1979). The discriminant validity item level is established if Maximum Shared Variance (MSV) is less than Average Variance Extracted (AVE) (Hair, Black, Babin, & Anderson, 2010). MSV of eight constructs for both laptop and mobile is less than AVE (see Tables 6.4 and 6.5), proving discriminant validity. The statistical threshold of discriminant validity at construct level for both devices is met (see Tables 6.4 and 6.5). For details of discriminant validity (see Chapter 5, Section 5.7.2 CFA).

Table 6.4 Convergent and Discriminant Validity (Laptop)

Constructs	**CR**	**AVE**	**MSV**	**HT**	**EE**	**FC**	**PV**	**BI**	**PE**	**SI**	**HM**
HT	0.911	0.774	0.277	**0.880**							
EE	0.970	0.890	0.093	0.144	**0.943**						
FC	0.973	0.899	0.145	0.243	0.305	**0.948**					
PV	0.930	0.816	0.127	0.312	0.275	0.260	**0.903**				
BI	0.936	0.829	0.277	0.526	0.245	0.381	0.356	**0.911**			
PE	0.965	0.903	0.021	-0.084	-0.049	-0.128	-0.144	-0.123	**0.950**		
SI	0.967	0.906	0.089	-0.159	-0.169	-0.066	-0.299	-0.155	0.117	**0.952**	
HM	0.959	0.887	0.021	-0.091	-0.036	-0.146	-0.031	-0.083	0.108	-0.134	**0.942**

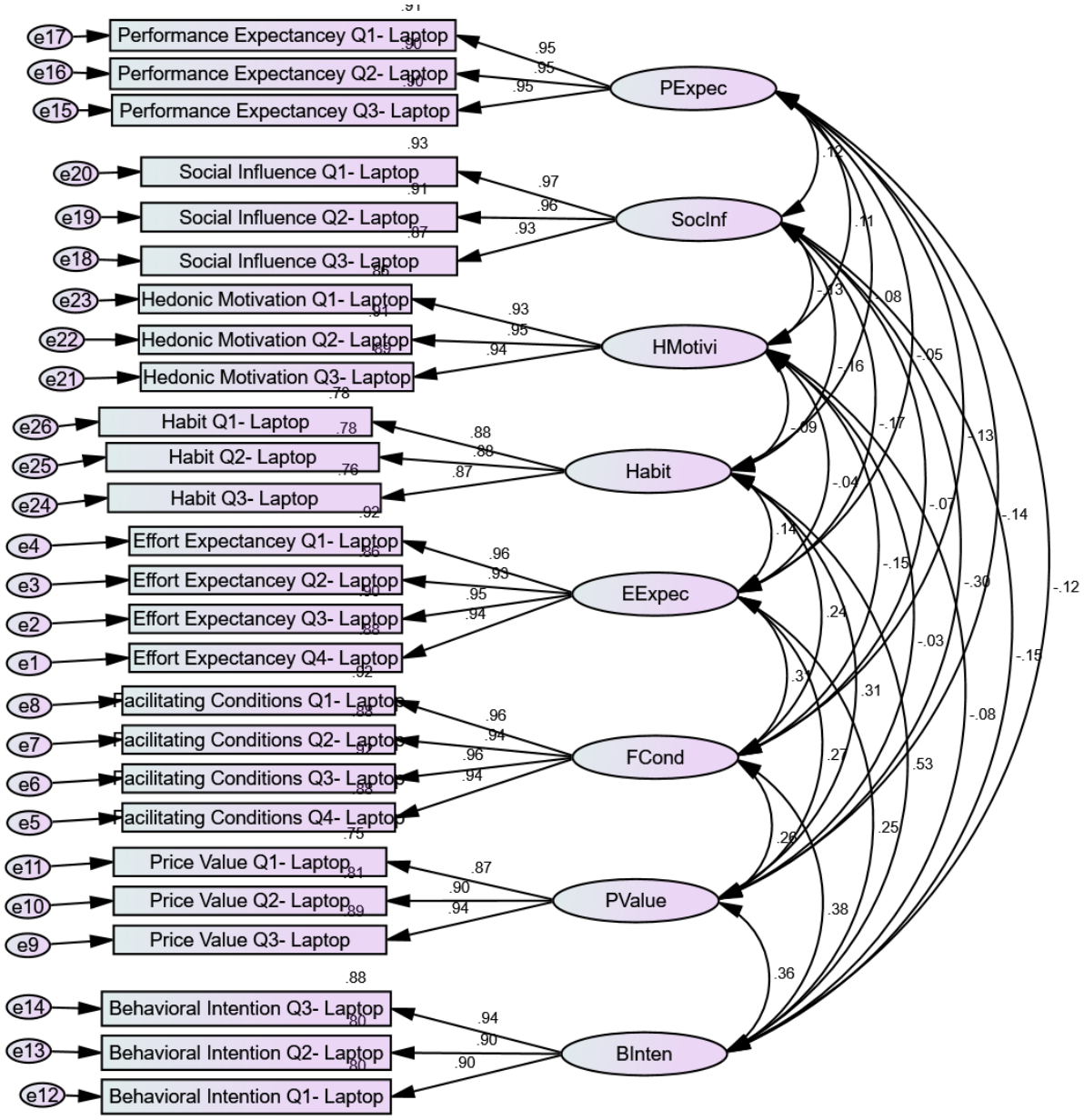

Figure 6.11: Measurement Model for Laptop

Table 6.5 Convergent and Discriminant Validity (Mobile)

Constructs	CR	AVE	MSV	HM	EE	FC	PV	BI	PE	SI	HT
HM	0.965	0.902	0.162	**0.950**							
EE	0.958	0.852	0.017	0.131	**0.923**						
FC	0.964	0.869	0.049	0.176	0.131	**0.932**					
PV	0.957	0.882	0.092	0.156	-0.038	0.126	**0.939**				
BI	0.947	0.856	0.215	0.403	0.120	0.115	0.304	**0.925**			
PE	0.964	0.899	0.060	0.244	0.082	0.070	0.072	0.209	**0.948**		
SI	0.926	0.807	0.092	0.304	0.063	0.221	0.122	0.251	0.155	**0.898**	
HT	0.969	0.912	0.215	0.209	0.031	0.070	0.146	0.464	0.124	0.169	**0.955**

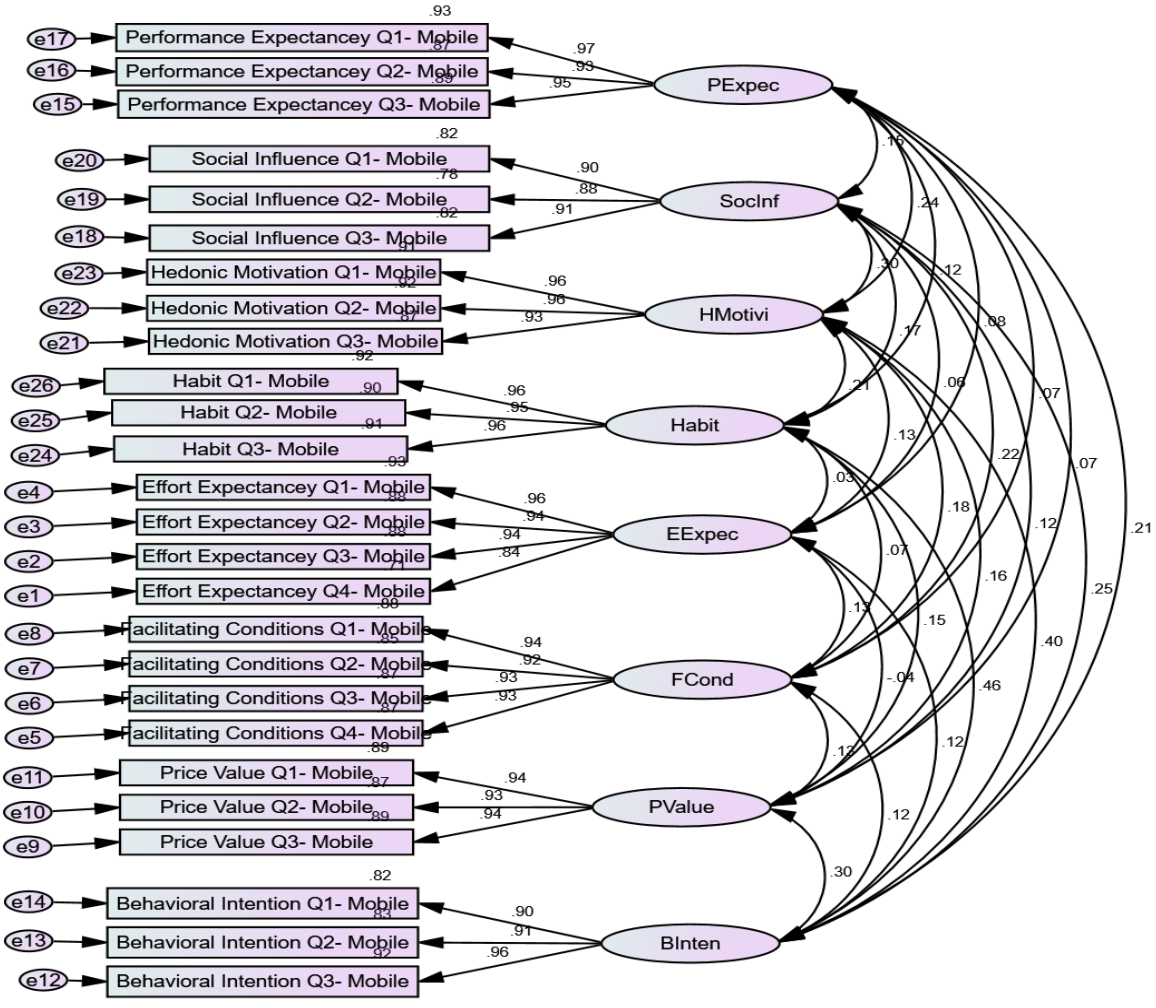

Figure 6.12: Measurement Model for Mobile

Goodness of fit is the last measure required to complete CFA. Goodness of fit checks how well the data correlates with the model. The threshold details are explained in Chapter 5 (see section 5.7.2). The values of both devices (i.e. laptop and mobile) are mentioned in Table 6.6. Looking at the threshold value, it is evident that we have achieved a good fit thus confirming the CFA.

Table 6.6 Model Fit Values (Laptop and Mobile)

Measures	**Laptop Values**	**Mobile Values**	**Threshold**
CMIN/DF	1.799	1.250	< 3 good
CFI (Comparative Fix Index)	0.986	0.996	> 0.90
AGFI (Adjusted Goodness of Fit Index)	0.911	0.940	> 0.80
SRMR (Standardised Root Mean Square Residual)	0.02	0.018	< 0.09
RMSEA (Root Mean Square Error of Approximation)	0.039	0.022	< 0.05 good, 0.05 – 0.10 moderate

6.5.3. Cluster Wise Technology Acceptance

After confirming the construct reliability and validity, the next step is to check the relationship between dependent and independent variables. As mentioned in Chapter 5, the data was categorised on the basis of three significant individual culture based clusters, identified in chapter 5. UTAUT2 data was also sorted on the basis of cluster membership of the respondents and the results for each cluster was analysed separately. Based on the measures mentioned above in CFA, the model fit, for each cluster and both devices, was checked using regression testing.

For analysing cluster based technology acceptance, first goodness of each cluster is checked and then regression performed. The measure of model fit is used as earlier in the CFA, however, Standardised Root Mean Square Residual (SRMR) cannot be applied as it is based on the members of each cluster, because it is positively biased by the number of responses, as usually a small sample would increase the SRMR (Hu & Bentler, 1999; Hooper, Coughlan, & Mullen, 2008). Similarly, the Adjusted Goodness of Fit Index (AGFI) measure can also be neglected here since it varies due

to the sample size. Thus, it can be neglected to achieve a good fit (Sharma, Mukherjee, Kumar, & Dillon, 2005). In this case, Face to face cluster comprised of 146 respondents, Mobile cluster comprised of 175 respondents, and Laptop cluster comprised of 197 respondents. AGFI for overall data (i.e. 518) was 0.911 and 0.94 for laptop and mobile respectively. The value of AGFI for each cluster was less than 0.9, which is above the threshold of 0.7; so, we can still report a good fit for the overall data set neglecting the AGFI values for each of the clusters. All other measures are within defined thresholds.

Face to Face Cluster

Goodness of fit

As mentioned above goodness of fit is necessary to move further in SEM. Face to face cluster consists of participants who are high in Power Distance and high in Masculinity (for detail see section 5.7.3). Respondents who belong to this segment are likely to be assertive, results oriented and expect and accept the distance of power amongst different power levels. For the Face to face cluster, goodness of fit values are as follows: ***Laptop:*** CMIN/DF is 2.001, CFI is 0.926, AGFI is 0.731 and RMSEA is 0.08; ***Mobile:*** CMIN/DF is 1.015, CFI is 0.999, AGFI is 0.803 and RMSEA is 0.01. Figures were in acceptable range, thus proving a good fit for both devices.

Regression – Laptop

Structural model used for determining regression for Face to Face Cluster is available in Appendix D – Figure D1. Table 6.7 shows the regression results of Face to face cluster for laptop. The estimates and the level of significance of independent variables (IV), i.e. predictors on the dependent variable (DV) is mentioned. For the relations of IV, i.e. PE, EE, SI, FC, HT, HM, PV on DV, it is required that the level of significance, or P-Value, should be less than 0.05. The highlighted relationships have a P value less than 0.05, which signifies that their relation with BI has a confidence level of above 95%. For Social influence (SI), Habit (HT) and Facilitating Conditions (FC). "***" means that P value is <0.0001. Estimates mean that "1" unit change in IV will lead to the "x" unit change in the DV. For the Face to face cluster's laptop acceptance, Social influence has an estimate of 0.327, HT has an estimate of 0.170, and FC has an estimate of 0.404. All other relationships were not found to be significant, i.e. impacting behavioural intention. This means that for Laptop acceptance of the Face to face cluster, SI, HT and FC are statistically

significant and therefore determine the Behavioural intention towards the Face to face cluster use of Laptops.

Table 6.7 Regression Face to face cluster – Laptop

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	0.015	0.843
Behavioural Intention (BI) ← Social Influence (SI)	0.327	***
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.036	0.625
Behavioural Intention (BI) ← Habit (HT)	0.170	0.038
Behavioural Intention (BI) ← Effort Expectancy (EE)	-0.034	0.645
Behavioural Intention (BI) ← Facilitating Conditions (FC)	0.404	***
Behavioural Intention (BI) ← Price Value (PV)	0.021	0.782

Regression – Mobile

For Face to face cluster, Mobile acceptance is determined through HT only, which has a P-value of 0.003 (<0.05), and an estimate value of 0.246 (see Table 6.8). All other relationships were not found to be significant, i.e. has a significant impact on student behavioural intention. This means that for Mobile acceptance of the Face to face cluster HT is impacting the BI towards the use of Laptops. Structural model used for determining regression for Face to Face Cluster for Mobile device is available in Appendix D – Figure D2.

Table 6.8 Regression Face to face cluster – Mobile

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	0.104	0.217
Behavioural Intention (BI) ← Social Influence (SI)	0.103	0.229
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.022	0.789
Behavioural Intention (BI) ← Habit (HT)	0.246	0.003
Behavioural Intention (BI) ← Effort Expectancy (EE)	0.079	0.347
Behavioural Intention (BI) ← Facilitating Conditions (FC)	-0.069	0.412
Behavioural Intention (BI) ← Price Value (PV)	-0.014	0.867

Mobile Cluster

Goodness of Fit

Mobile cluster students have a high level of Uncertainty Avoidance and low level of Power Distance (for details see Chapter 5 section 5.7.3). This shows that Mobile cluster participants believe in a lot of rules and structure to avoid uncertainty. However, they do not expect and accept any power distance. For the Mobile cluster, goodness of fit values are as follows, for ***Laptop:*** CMIN/DF is 1.387, CFI is 0.975, AGFI 0.826 and RMSEA is 0.047; for ***Mobile:*** CMIN/DF is 1.616, CFI is 0.951, AGFI is 0.848 and RMSEA is 0.059. Results are within the expected range confirming the goodness of fit for both devices.

Regression – Laptop

Table 6.9 shows the regression results of Mobile cluster for laptop. HM, HT, FC and PV were found to significantly impact the BI. Whereas structural model used for determining regression for Mobile Cluster for Laptop device is available in Appendix D – Figure D3. All other relationships were found not to have a significant impact on the BI. This means that, for Laptop acceptance of the Mobile cluster, only the highlighted variables will determine the BI towards the Laptop.

Table 6.9 Regression Mobile cluster – Laptop

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	0.002	0.972
Behavioural Intention (BI) ← Social Influence (SI)	0.028	0.687
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.156	0.038
Behavioural Intention (BI) ← Habit (HT)	0.268	0.002
Behavioural Intention (BI) ← Effort Expectancy (EE)	0.031	0.657
Behavioural Intention (BI) ← Facilitating Conditions (FC)	0.153	0.031
Behavioural Intention (BI) ← Price Value (PV)	0.291	***

Regression – Mobile

For Mobile cluster Mobile five out of the seven independent variables were found to be significant on mobile acceptance (see Table 6.10). PE has an estimate of 0.142 with a P-value of 0.035. SI has an estimate of 0.213, with P-value 0.017. HM has an estimate of 0.559 with a "***" P-value =< 0.001. HT has an estimate of 0.16, with a P-value 0.015. PV has an estimate of 0.163 with a P-value of 0.013. EE and FC were found not to have a significant impact on the BI. This means that for Mobile acceptance of Mobile cluster PE, SI, HM, HT and PV will determine the BI towards the Mobile. Structural model used for determining regression for Mobile Cluster for Mobile device is available in Appendix D – Figure D4.

Table 6.10 Regression Mobile cluster – Mobile

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	0.142	0.035
Behavioural Intention (BI) ← Social Influence (SI)	0.213	0.017
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.559	***
Behavioural Intention (BI) ← Habit (HT)	0.16	0.015
Behavioural Intention (BI) ← Effort Expectancy (EE)	0.019	0.773
Behavioural Intention (BI) ← Facilitating Conditions (FC)	-0.025	0.708
Behavioural Intention (BI) ← Price Value (PV)	0.163	0.013

Laptop Cluster

Goodness of Fit

The laptop cluster contains those with a low Uncertainty Avoidance, yet a high Collectivism and Long-term Orientation. These respondents have a belief in collective goals achieved in the long term. However, they are not convinced about the rules and structures of a system. For the Laptop cluster, goodness of fit values are as follows: ***Laptop*** CMIN/DF is 1.416, CFI is 0.974, AGFI is 0.837, and RMSEA is 0.046; ***Mobile:*** CMIN/DF is 1.152, CFI is 0.992, AGFI is 0.868 and RMSEA is 0.028. Results for both devices are within acceptable range, thus confirming model fit.

Regression – Laptop

For the Laptop cluster, Laptop there are three variables found to significantly impact BI. The first variable is PE, which has an estimate of 0.203, and a P-value of 0.007. Second variable is HM with an estimate of 0.194, and a P-value of 0.008 (see Table 6.11). The third and last significant variable for the Laptop cluster (Laptop), is HT with an estimate of 0.24 and significance of 0.001. For this cluster, laptop acceptance is determined by PE, HT and HM. Structural model used for determining regression for Laptop Cluster for Laptop device is available in Appendix D Figure – D5.

Table 6.11 Regression Laptop cluster – Laptop

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	0.203	0.007
Behavioural Intention (BI) ← Social Influence (SI)	0.029	0.702
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.194	0.008
Behavioural Intention (BI) ← Habit (HT)	0.24	0.001
Behavioural Intention (BI) ← Effort Expectancy (EE)	0.004	0.952
Behavioural Intention (BI) ← Facilitating Conditions (FC)	0.04	0.576
Behavioural Intention (BI) ← Price Value (PV)	-0.041	0.567

Regression – Mobile

Table 6.12 shows the relation of the Laptop cluster (Mobile). Three out of the seven independent variables were found to be significant. HM with an estimate of 0.295 estimate was resulted in a "***" P-value, HT had an estimate of 0.365, with a P value "***" =<0.001, and PV with an estimate of 0.362, with a P-value "***" = <0.001. All other variables were not found to be significant. The structural model used for determining regression for Laptop Cluster for Mobile device is available in Appendix D Figure – D6.

Table 6.12 Regression Laptop cluster – Mobile

Relationship	**Estimates**	**Sig (P)**
Behavioural Intention (BI) ← Performance Expectancy (PE)	-0.051	0.395
Behavioural Intention (BI) ← Social Influence (SI)	0.029	0.636
Behavioural Intention (BI) ← Hedonic Motivation (HM)	0.295	***
Behavioural Intention (BI) ← Habit (HT)	0.365	***
Behavioural Intention (BI) ← Effort Expectancy (EE)	0.05	0.41
Behavioural Intention (BI) ← Facilitating Conditions (FC)	-0.045	0.453
Behavioural Intention (BI) ← Price Value (PV)	0.362	***

6.6. Results and Discussion

If the significant predictors for the three clusters are summarised across laptop and mobile (see Table 6.13), the results clearly illustrate that technology acceptance of Laptop and Mobile varies according to the individual culture orientation clusters.

For all clusters, Habit (HT) is found to be positively impacting the Behavioural Intention (BI). This can be explained by the fact that we live in the technological era, and most students now have a laptop and/or mobile for communication, learning or entertainment purposes. This implies that, at the basic level, in order to improve technology acceptance, habit has to be inculcated in the students during their educational activities.

Table 6.13 Summary of Acceptance Results

Technology Acceptance across three clusters for Laptop and Mobile		
	Laptop	**Mobile**
Face to face cluster **Individual Culture orientation** PD High Masculine Short-Term Oriented **Device Preference** Face to Face	**Significant Predictors**	**Significant Predictors**
	Habit	Habit
	Social Influence	
	Facilitating Conditions	
Mobile cluster **Individual Culture orientation** UA High PD low Long-Term Oriented **Device Preference** Mobile	Hedonic Motivation	Social Influence
	Habit	Hedonic Motivation
	Facilitating Conditions	Price Value
	Price Value	Habit
		Performance Expectancy
Laptop cluster **Ind. Culture orientation** UA Lowest Collectivist Long-Term Oriented **Device Preference** Laptop	Performance Expectancy	Hedonic Motivation
	Hedonic Motivation	Habit
	Habit	Price Value

For Laptop acceptance of the Face to face cluster, Social Influence (SI) plays an important role in determining the Behavioural Intention (BI). This can also be explained by the fact that respondents of this cluster have a high power distance individual culture, so they are affected by the opinions of others, and aim to meet the expectations of both peers and university stakeholders. One more significant predictor for BI (Laptop) for the Face to face cluster is the Facilitating Conditions (FC), which means, if the technological infrastructure is not provided to this cluster, then their technology acceptance towards the laptop will decrease and could lead to dissatisfaction. This cluster preferred Face to Face learning over the use of a Mobile, Laptop and/or any other device (see Chapter 5, Table 5.10). So, this means that Face to face cluster participants do not prefer technology when it comes to choice; however, peer influence and use of infrastructure provided could be used to result in a positive behaviour concerning the use of specific device(s).

If we look at the Laptop acceptance of the Mobile cluster, it is interesting to see that for this cluster results show that Price Value (PV) is a strong predictor of cluster two participant acceptance. So, students in the cluster are conscious about the price of the laptop. We have to keep in mind that Mobile cluster students preferred the use of Mobile for HES indicators (see Chapter 5, Table 5.11). The Mobile cluster has high uncertainty avoidance, so students in this cluster try to avoid the uncertainty by all means. When it comes to buying a device, students in this cluster first look at the price of the product they are buying. Facilitating conditions (FC) and Hedonic Motivation (HM) are also significant for the Mobile cluster. Students belonging to the Mobile cluster believe in rules and structure (i.e. high UA) and are not commonly influenced by their peers (low PD), which directly explains why Social Influence was not significant here. However, since they prefer a device, i.e. Mobile, as opposed to students in the Face to face cluster who prefer face to face, their hedonic motivation towards laptop is significant. Mobile cluster students enjoy using devices preferring to use a mobile over and above use of a laptop.

Lastly, laptop acceptance of the Laptop cluster, clearly shows that they not only enjoy (HM significant) using a laptop, but they also expect that by using laptop their performance will improve (PE significant). This explains why Laptop is their preferred device for HES indicators. These students would look for a device that can do powerful/flexible multi-tasking. Laptop cluster participants prefer a device which gives them the freedom to run what they want, where they want. Being collectivists, they would use a device that can collectively respond to maximum education related activities (all HES quality indicators). Laptop is the best fit for them. We can also deduce that their reason to not prefer mobile, is that it cannot be used for most of the quality indicators collectively.

For the Face to face cluster, only Habit significant impacts mobile acceptance (already explained above). For the Mobile cluster, Mobile acceptance exhibits interesting results. Mobile is the preferred device for them, and we can see that students in this cluster enjoy the intrinsic motivation while using mobiles (HM significant). Students are, however, conscious of the price value, and are influenced by their peers when it comes to mobile (SI significant). For their preferred device, i.e. Mobile, their performance expectancy is significant. This means that they expect their performance for most of the HES quality indicators to be better if they are using their mobile. If we look at their

cultural orientation, the Mobile cluster students avoid uncertainty, hence they would automatically prefer a device which is low cost, and that is always available irrespective of the restrictions of time and space.

Mobile acceptance of the Laptop cluster students is significantly impacted by HM. We can see that the Laptop cluster participants enjoy using a Mobile, however, they are conscious of the price value of Mobiles. This is because they prefer a laptop and expect it to be the device that most increases their performance; and therefore automatically price conscious towards the not ideal device, i.e. Mobile.

Overall, we can see a trend that, in spite of different individual culture orientations, when it comes to the preferred device, Performance Expectancy, Habit and Hedonic Motivation are the three primary drivers. We can conclude that, in order to increase student satisfaction from a specific e-learning device, these three variables must be considered as being of pivotal importance. It should also to be noted, that whenever Performance Expectancy is significant for a device, the device is the preferred device for the respective cluster (PE significant in the Mobile cluster for Mobile, and the Laptop cluster for Laptop).

One proposed solution to increase student satisfaction towards e-learning by lowering their dropout rates, is to provide them the HES quality indicators according to their device preference based upon the individual cultural orientation. However, if we plan to switch the device preference of students belonging to a certain cluster, we must devise focused strategies to improve their perceptions of those variables which are significant in case of that cluster's preferred device.

Mobile cluster students prefer Mobile because of Social Influence (SI), Hedonic Motivation (HM), Habit (HT), Price Value (PV) and Performance Expectancy (PE) (which are the significant variables). Students with cultural orientation of Mobile cluster prefer to use mobiles because of these five variables. If we want the participants of Mobile cluster to switch towards Laptop, then we will have to develop transfer strategies to influence Social Influence (SI) and Performance Expectancy (PE) for Laptop perception (as the remaining three variables are already significant in

case of Laptop for the Mobile cluster). If we want them to switch to any other device, we will have to strategically manage the five significant variables mentioned.

Participants of the Laptop cluster have preferred Laptop due to Performance Expectancy (PE), Hedonic Motivation (HM) and Habit (HT) (i.e. the three significant variables having an impact on Behavioural Intention (BI) to use Laptop). Students with cultural orientation of cluster 3 are preferring a device due to PE, HM and HT. If we want the participants of the Laptop cluster to switch towards Mobile, then we will have to implement those strategies which can improve their perception of Performance Expectancy (PE) for Mobile (as the remaining two variables are already significant in case of Mobile for the Laptop cluster). Similarly, if we want them to switch to any other device, we will have to strategically manage the Laptop cluster PE, HM and HT variables.

Participants of the Face to face cluster have not preferred a device for most of the HES. If we want to make an effort in order to switch them from face to face towards a device, we can recommend improving their perceptions of Performance Expectancy (PE), Habit (HT) and Hedonic Motivation (HM) towards the target device. These three variables are common significant variables for the two different culturally oriented clusters for their respective preferred device (see Table 6.13). This might improve the chances of making students within the Face to face cluster switch towards the use of a device, as they will already exhibit a Habit (HT), which is seen as a significant variable for both Mobile and Laptop.

6.7. Conclusion

To conclude the results of this chapter, Table 6.13 clearly shows that the variation in the technology acceptance behaviour of the students is based on their individual culture orientation. Performance Expectancy, Habit and Hedonic Motivation are the three key drivers of the technology acceptance behaviour of the preferred devices. Specially, Performance Expectancy becomes a significant predictor of each cluster's preferred device.

However, if we plan to switch the device preference of students belonging to a certain cluster, i.e. from their preferred device to a different one, we must develop different ways to positively influence their perceptions of variables that are significant to that cluster's preferred device. These

significant predictors represent those variables, which makes the students of a certain individual culture orientation prefer a specific device.

Chapter 7

Conclusion and Future Research Avenues

7.1. Chapter Overview

This chapter provides a conclusion to the research findings of the study. It presents an overview of the conducted research and the reported results while performing the three research experiments across chapter 4, chapter 5 and chapter 6 respectively. A summarised evaluation of the Ph.D. research in a holistic manner is presented below.

This chapter summarises how the researcher investigated the factors impacting technology acceptance, based on behavioural intention of a student towards e-learning device(s). This was done in order to explore and improve his/her experience with e-learning device(s), so that a better experience leads to higher retention rates for students in e-learning setups. The research aim and the related research questions were established in chapter 1. In chapter 2, based on the research aim, the research scope was identified, discussed in detail and justified, in context of a review of relevant literature, leading to the formulation of the three research questions. This chapter also led to the formulation of the TIPEC framework concerning the implementation barriers of e-learning. Next, chapter 3 discussed the research methodology justification, according to the research questions identified in the literate chapter (i.e. Chapter 2). In chapter 4, the researcher explored the first research question i.e. *Is a student willing to switch to e-learning from a Traditional i.e. face to face setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services?* The researcher found out that students may be willing to switch from face-to-face format to an e-learning one for certain services, but students do not consistently prefer the same devices. Laptop and Mobile were the most preferred devices based upon statistical averages. In chapter 5, the second research question was explored i.e. *Does e-learning student's individual culture impact his/her device preference across the higher education services?* the role of student's culture at an individual level was focused upon in an e-learning student's device preference when receiving the higher education services. This led to the creation of three individual culture based clusters which preferred to receive higher education services via respectively face to

face format (the Face to face cluster), Mobile (the Mobile cluster) and Laptop (the Laptop cluster). This proved that if we ignore the individual culture orientation of the students, we risk providing students with higher education services on devices that they do not prefer. As a result, students will not be satisfied and the retention would deteriorate. Chapter 6 explored the third research question, i.e. *Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?* quantitative investigation was done on the role of e-learning student's individual culture orientation in the factors leading to his/her technology acceptance of the two most preferred devices, i.e. Laptop and Mobile. Finally, in this chapter, we summarise the research outcomes and discuss the contributions of this study. Lastly, future recommendations based on the findings are also mentioned.

7.2. Research Overview

This section will provide an overview of each of the seven chapters of this thesis and the steps that were taken to fulfil the research aims and objectives.

Chapter 1 discusses the research motivation and the scope of the research problem. The research background and motivation of this research was explained. The research aim and objectives are set out, which are implemented in all chapters of this Ph.D. thesis.

Chapter 2 explores the published literature in the context of the research aim. This includes the literature regarding education and its role in the society, e-learning and its applications, implementation barriers of e-learning, different technologies being used in e-learning, selected case studies about e-learning implementation in different countries and the role of culture related to technology acceptance. After the discussion about the societal role of education, a comparison was drawn between traditional education and e-learning. Benefits of e-learning are then discussed and different case studies of e-learning implementation are reviewed in order to find out if the implementation of e-learning leads to the same benefits as claimed in the literature. The researcher found many implementation barriers being faced in e-learning implementation. A detail literature review of 26 years (1990-2016) of published literature about e-learning implementation barriers was undertaken to formulate the TIPEC framework, which categorises 68 unique barriers into four main dimensions (Technology, Individual, Pedagogy and Enabling Conditions). Out of these four

dimensions, I focused on the individual (student) related barriers. Specifically, those individual barriers were discussed which are related to the technologies in e-learning. Lastly, the role of student's culture at the individual level and its role in student's technology preference and acceptance is discussed in order to identify the research gaps. Based on the research gaps, this chapter clearly mentions the following three research questions.

RQ 1: *Is a student willing to switch to e-learning from a Traditional i.e. face to face setup at higher education institutes? If yes, then does (s)he prefer a single device for all higher education services?*

RQ 2: *Does e-learning student's individual culture impact his/her device preference across the higher education services?*

RQ 3: *Does e-learning student's individual culture impact his/her technology acceptance towards the preferred device(s)?*

Chapter 3 considers the research methodology and design in detail. Different research philosophies were discussed, leading to the justification of the appropriate philosophy for the study. After that, research strategy, research design, survey strategy, population selection, sampling, a method of data collection and data analysis is explained and selected for the current study. Chapter 3 provides the theoretical justification on the methodology and techniques adopted for three experiments undertaken, discussed later in chapters 4, 5 and 6; addressing each of the research questions respectively.

Chapter 4 discussed the eight service quality indicators for higher education which were selected to serve as the basis of our planned experiment for the first research question. These indicators are Course content, Lecturer's Concern for Students, Facilities, Assessment, Social Activities, Communication with University, Counselling Services and People. Technologies in e-learning are argued at application and device level. TV, Radio, Desktop, Laptop, Mobile and Tablet were selected as the six devices to be checked in order to find out the student's preference across the Higher Education Services.

Results showed that students dismissed the use of unidirectional interaction devices, i.e. TV and Radio across all e-learning Higher Education Services. It was found that for the three human-to-human interaction based HES, i.e., People, Lecturer's Concern for Students and Counselling Services; the students preferred to receive them through face to face and do not prefer to use a technology device. For the remaining five, students were willing to switch face to face for e-learning devices, but their device preference was based upon the nature of the HES being offered. However, their top two device preferences for these remaining five HES were consistently Laptop and Mobile. Finally, the top two student preferences, throughout the eight Higher Education Services except course content were among face-to-face, laptop and mobile interaction. Accordingly, chapter four answered the first research question by showing that individual students are mostly willing to switch to e-learning/blended learning modes, rather than sticking to purely traditional face to face teaching formats. Secondly, it was also found out that students (on average) do not seemingly have a single favourite device for all the HES, rather they prefer a mix of face to face, mobile and laptop.

Chapter 5 discussed different concepts of culture and literature related to the culture at national, organisational and individual level respectively. It also considers the role of cultural difference in determining the behaviour and attitude of individuals towards the usage of technology. Results showed that when students were clustered according to their individual culture orientation, each cluster's device preference was found to be unique. Among the eight HES, the Face to face cluster, the Mobile cluster and the Laptop cluster were found to (i.e. 6 out of 8 HES) prefer "Face to Face", "Mobile" and "Laptop" respectively. If we just relied on the results of overall i.e. average preference (as in chapter 4), student's individual culture orientation is ignored, and this would totally disregard the true preference of all cultural segments identified within the overall student body. So, chapter five answered the second research question by proving the significant role of individual culture orientation on the student's device preference for the HES. The analysis based on individual culture orientation not only better clarifies the device preference but also it is expected to lead to higher satisfaction rates among students.

Chapter 6 discussed different theories and models of technology acceptance and a comparison was undertaken, which identified UTUAT2 as the best suited technology acceptance model to

answer my third research question. UTAUT2 was used to investigate the factors that lead to Technology Acceptance of two preferred devices i.e. Laptop and Mobile for the data of each of the three individual culture based clusters.

Table 7.1 Summary of Results of Study

Technology Acceptance across three clusters for Laptop and Mobile		
	Laptop	**Mobile**
Face to face cluster **Individual Culture orientation** PD High Masculine Short-Term Oriented **Device Preference** Face to Face	**Significant Predictors**	**Significant Predictors**
	Habit	Habit
	Social Influence	
	Facilitating Conditions	
Mobile cluster **Individual Culture orientation** UA High PD low Long-Term Oriented **Device Preference** Mobile	Hedonic Motivation	Social Influence
	Habit	Hedonic Motivation
	Facilitating Conditions	Price Value
	Price Value	Habit
		Performance Expectancy
Laptop cluster **Ind. Culture orientation** UA Lowest Collectivist Long-Term Oriented **Device Preference** Laptop	Performance Expectancy	Hedonic Motivation
	Hedonic Motivation	Habit
	Habit	Price Value

Results (Table 7.1) showed that technology acceptance of Laptop and Mobile differs according to the individual culture orientation of student clusters. Table 7.1, not only summarises the individual culture orientation and the preferred device for each cluster, it also discusses the significant predictors of behavioural intention for the students belonging to three clusters across the two devices. It was found that different predictors become significant for the clusters as we move across the two devices.

Results showed that whenever it comes to the cluster's preferred device, three predictors (independent variables) become statistically significant, i.e. Performance Expectancy (PE), Hedonic Motivation (HM) and Habit (HT). Specially, Performance expectancy has become significant on a specific device for a cluster, if and only if, that device was preferred by the specific cluster. As the Face to face cluster had no preference towards laptop and mobile, so Performance Expectance (PE) and Hedonic Motivation (HM) were not significant for either of the devices. On the other hand, it is significant for the Mobile cluster in case of mobile (preferred device). Similarly, it is significant for the Laptop cluster in case of Laptop (preferred device).

7.3. Research Summary and Conclusion

Summarising the findings of the three experiments performed for the three research questions, I can state that higher education students are willing to switch from face to face format to e-learning/blended learning options for many of the higher education services being offered to them. However, it would be unjust to provide all these e-learning preferred HES on a single device. As the results showed, students overall preferred certain HES on primarily two devices, i.e. Laptop and Mobile. Further, student individual culture orientation also plays a major role in device preference, as each cluster had a unique preference concerning HES delivery. If we ignore their individual culture based preference, we will end up compounding reduction in the satisfaction of the e-learning students. The role of student's individual culture orientation also influences the different factors leading towards the technology acceptance of the preferred devices.

Cluster segmentation based on individual culture clearly shows that students' preference towards technology varies according to their cultural values. Cluster segment 1 is assertive, high in power distance, short-term orientated and individualist. Due to these cultural attributes, students in Cluster 1 feel that the teacher should always be present in front of them while delivering education. Cluster 1 participants are individualistic in nature, so if they are spending money on education, they want surety that the instructor will be present, or they may perceive the education quality to be low. This cluster segment does use mobiles and laptops for daily purposes, as their behavioural intention to use mobile was positivity determined by habit. When it comes to the use of technology (laptop or mobile), for educational purposes, use of devices is not their preference. Due to short-term orientation and high power distance, they are focused to receive educational services face-to-face

and nothing less. Hence, they are named the “Face to face Cluster”. Their behavioural intention, to use a laptop, is also impacted by facilitating conditions and social influence (i.e. peer pressure). Social influence acts as a catalyst towards behavioural intention, i.e. to use laptop with the Face to face cluster. The Face to face cluster does not have “Performance Expectancy (PE)” and “Hedonic Motivation (HM)” as significant predictors of behavioural intention, which are factors that are observed for the preferred devices in other clusters. So, it would be suitable to ensure satisfaction of students belonging to the Face to face cluster by providing them their preferred HES, i.e. using traditional face to face methods.

For the cluster segments, which preferred the use of technical devices (i.e. Cluster 2 and 3 named the Mobile Cluster and the Laptop Cluster respectively), it is interesting to see that these students have low power distance and are long term oriented, which indicates that students are focused on the long-term benefits of education. They do not worry about the short-term approach of receiving education if and only if they have a physical presence at the university. Rather they have a long-term focus to welcome those device options, which not only help them to receive educational services but also gives them the benefit of time and space flexibility. These characteristics, i.e. low power distance, and a focus on thinking about the future, are a determinant of their shift towards e-learning devices. Therefore, the Mobile cluster and the Laptop cluster students use mobile and/or laptop on a daily basis (as habit is found to significantly influence behavioural intention for both laptop and/or mobile use). These students understand the inevitable role of devices in the future, and because of their long-term approach, they are positive towards the usage of these devices in education. Usage of device, i.e. laptop and/or mobile, is also explained by the fact, that people having attributes of the Mobile cluster and the Laptop cluster enjoy using devices; as hedonic motivation positively impacts their behavioural intention to use e-learning devices.

The individual culture orientation based differentiating factor between the Mobile cluster and the Laptop cluster, who have a preference concerning a specific device, is student tendency towards uncertainty avoidance, and their level of individualism/collectivism. Mobile cluster students have high uncertainty avoidance, and an individualistic approach; and their preferred device (for 6 out of 8 HES) is Mobile. Whereas, Laptop cluster students have low uncertainty avoidance and a collectivist approach; and their preferred device (for 6 out of 8 HES) is Laptop.

Students from the Mobile cluster exhibit high uncertainty avoidance and an individualistic approach, so they would prefer a device, which is portable and available in all circumstances, hence reducing the uncertainty of its use in all situations. This automatically explains why these students would prefer a Mobile as compared to a Laptop when it comes to using a device for support planning, and/or social interaction. For Mobile, "Social Influence" and "Performance Expectancy" were significant for the Mobile cluster students. This group believes that using mobile will increase their performance and will also improve their social standing. Individual culture based values of these people implicate that they want a technology, which is for their personalised usage (individualistic approach). Participants from the Mobile cluster are sensitive towards the cost of both Mobile and Laptop, as Price Value has a significant impact on Behavioural Intention for both devices. This is because they are high on uncertainty avoidance, and hence they follow certain rules and restriction regarding the price that they have to pay for selecting a device. Being individualistic, they would prefer a device, which follows their own personal budget constraints. If we want to make laptop their preferred device, the cost of the laptop will have a significant impact on determining their behaviour to use laptop. The price of a laptop is relatively high compared to that of a mobile, so we can say that there is a chance for them to switch to a laptop, if they find its "Price Value (PV)" to be justified.

Students belonging to the Laptop cluster preferred Laptop, and their cultural orientation shows that they are collectivists and have a low uncertainty avoidance. This group does not believe in structures and rules, yet instead, try to find solutions collectively. For Laptop cluster students, the mutual collective benefit is more important than the rules and regulations. Laptop cluster students prefer a device that can perform almost every function for every aspect of learning simultaneously (i.e. Laptop), and hence create benefit collectively. This cluster also prefers a laptop because they believe that using a laptop will have a positive impact on their performance. Students with such individual cultural orientation are looking for devices and technologies, that can be widely used for multi-tasking by every student (collectivist approach). It is to be noted that they appear to be price conscious when it comes to their not-preferred device i.e. Mobile. Although laptop prices are higher than the prices of Mobiles, once these students find a device that they believe increases their performance, students in this cluster are not price conscious. For the other device, i.e. Mobile, which is less costly, yet does not ensure that it will guarantee functional efficiencies, the Laptop

cluster students are price conscious. This is because of their low uncertainty avoidance, they do not believe in any structural restrictions of price, rather they are willing to buy a costly device, i.e. laptop, once they find that it would significantly help in solving most of their HES related problems. So, in order to lower the dropout rate, by improving student satisfaction towards e-learning, the research results showed that the student should be provided HES according to their device preference based upon the individual cultural orientation.

However, in order to make students, who belong to a specific individual culture, switch to and/or use another device, the research results propose that strategies should be devised to manage student perception of variables, which were found to be significant in device preference. For example, to change the device preference of the Mobile cluster, to Laptop, management of Performance Expectancy (PE), Hedonic Motivation (HM), Social Influence (SI), Price Value (PV) and Habit (HT) is required to positively improve Mobile cluster member perception towards use of Laptop when receiving higher education services. On the other hand, to improve or build a positive perception of Laptop cluster members concerning mobile, Performance Expectancy (PE), Habit (HT) and Hedonic Motivation (HM) have to be positively managed to help Laptop cluster students make the switch, i.e. using a mobile for learning. Most importantly, to develop a positive perception about a certain device for individuals in the Face to face cluster, we need to measure and manage Performance Expectancy (PE), Hedonic Motivation (HM) and Habit (HT), since these three variables were common in the preferred device of culturally distinct clusters, (i.e. clusters 2 and 3). By managing these variables, we believe that perception of the Face to face cluster individuals about the use of devices for higher education services can be improved.

On the basis of individual culture, this research has explored the student's behaviour towards his/her preference and acceptance of the e-learning technology devices available to him/her. These significant predictors of the preferred devices' technology acceptance help us better understand the reasons behind technology related implementation barriers in the Individual category of the TIPEC framework (Section 2.9). In order to retain and improve e-learning students' perception concerning higher education services, the role of culture at student (individual) level must not be ignored. If we accommodate the students' individual culture based differences in their device preference, we may not only be able to reduce the dropout rates, but also, may find the e-learning students more

satisfied with service delivery. This will eventually lead Higher Education Institutes towards reaping the promised benefits of e-learning, including the availability of high access, high quality and low-cost education, irrespective of time and location of the student.

7.4. Research Contributions

Current study contributes to the literature by developing the TIPEC framework of e-learning barriers (see Chapter 2, Section 2.7). The TIPEC framework highlights the implementation barriers, from both academic and commercial e-learning studies. It consolidates research of 26 years, which will help researchers and practitioners to appreciate the interplay of implementation barriers, which are related to e-learning. The TIPEC framework can prove to be very useful while implementing technology in educational institutes or corporate organisations. Using this framework, one can easily understand the barriers that are commonly faced in e-learning and then resources can be committed to resolving urgent/priority based barriers. The TIPEC framework can be personalised for a specific learning domain, and the identified changes will help focused stakeholder, understand variation in the importance of implementation barriers as a result of changes in education technology/infrastructure/government policy etc.

Another contribution of the current study is that it signifies the role of culture at the individual level, and considers the impact of individual culture on student e-learning device preference. An individual culture based device preference helps researchers and practitioners to focus on more customised technology implementation, i.e. based on the difference amongst the students due to diverse individual cultural orientation. This study can also help to select devices according to student's overall individual culture orientation; across Hofstede's original five dimensions (i.e. power distance, uncertainty avoidance, individualism/collectivism, masculine/feminine, and long/short term orientation). The research of Baptista and Oliveira (2015), which states that individual cultural values help better predict the technology acceptance behaviour, supports the findings of this research. Baptista and Oliveira mentioned that technology behaviours, predicted by using the individual culture concept, would be more accurate than the other concepts; i.e. National and Organisational Culture. Same arguments were reported by Tarhini, et al. (2017), i.e. that acceptance of technology is a micro level phenomenon and using national or organisational culture concepts (i.e. macro level phenomenon) will reduce the accuracy of the findings. Using this

study, and applying the methods used in experiments, researchers can check and validate the findings for different contexts. Findings also contribute that individual cultural orientation is neglected in UTAUT2 model, as this study helps in better prediction of human behaviour through UTAUT2 model considering the cultural values at the individual level. Performance expectancy was found to be the significant predictor of behavioural intention in UTAUT2 model in clusters where students have preferred the device. This finding was found to be consistent with the results reported by the El-Masri and Tarhini, (2017) in their study of two different countries.

7.5. Future Research

This is the first study that explores the device preference and acceptance based upon individual culture orientation of a Higher Education Student in context of e-learning. The proposed TIPEC framework, in Chapter 2, opens many avenues for future research regarding e-learning implementation barriers. I would like to recommend future researchers to quantitatively validate the issues within each of the four TIPEC categories. The TIPEC can be used to show which barriers are prominent in case of e-learning, allowing comparison between different countries belonging to developing and developed worlds. Similarly, this can point out towards those barriers whose priority changes throughout the life of an e-learning implementation project. For example, Technical barriers might be very important in the basic infrastructure phase, but pedagogical and individual factors might surface as implementation moves to launch phase. Further research on TIPEC can help identifying prominent barriers within specific countries or at different phases of implementation. This can practically help in prioritising fund utilisation for e-learning ventures and will contribute towards the learning curve of professionals (System Designers, Faculty, Support Staff etc.) involved in e-learning implementation.

To further understand the preference of e-learning devices and their acceptance, future research can be geared towards consideration of specific device characteristics, i.e. whether device properties were actually becoming the main reason for the selection of that specific device, e.g. screen size, processing capability and battery time etc. This layer of research can help in better assessing the basic reasons behind device selection and preference to receive different HES on the preferred device. Last but not least, it would be interesting to see some personality tests (MBTI, Big 5 and/or Belbin team roles) incorporated with individual culture based segmentation to figure

out whether there is a specific relationship between the personality type of the student and his/her specific device preference. In the long run, if an individual based assessment questionnaire can be prepared, which can help predict his preference and acceptance of e-learning devices, we can not only improve the satisfaction rates of e-learning students, but also help suggest the students, as a result of their culture orientation and/or personality type, to use the best device for all of the higher education services. We have a long way to go, but this research has taken a small step towards understanding the impact of individual culture based differences on students' e-learning device preference.

References

Aaker, J. L., & Lee, A. Y. (2001). "I" seek pleasures and "we" avoid pains: The role of self-regulatory goals in information processing and persuasion. *Journal of Consumer Research, 28(1),* 33-49.

Abbasi, M. S., Chandio, F. H., Soomro, A. F., & Shah, F. (2011). Social influence, voluntariness, experience and the internet acceptance: An extension of technology acceptance model within a south-Asian country context. *Journal of Enterprise Information Management, 24(1),* 30-52.

Abbott, W. F., & Monsen, R. J. (1979). On the measurement of corporate social responsibility: Self-reported disclosures as a method of measuring corporate social involvement. *Academy of management journal*, *22*(3), 501-515.

Abdulaziz, M., Shah, S. K., Mahmood, R., & e Haq, H. M. (2012). Change from a general English teacher to an ESP practitioner: issues and challenges in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business, 4(1),* 434.

Adeoye, B. F. (2012). Culturally different learning styles in online learning environments: A case of Nigerian university students. *Learning Tools and Teaching Approaches through ICT Advancements,* , 226.

Adler, N. (1997). *International Dimensions of Organizational Behavior. 3rd ed.* Ohio: South-Western College Publishing.

Adler, N. J., & Graham, J. L. (1989). Cross-Cultural interaction: The International Comparison Fallacy? *Journal of International Business Studies, 20*.

Agarwal, R., Sambamurthy, V., & Ralph, M. (2000). Research Report: The Evolving Relationship Between General and Specific Computer Self-Efficacy - An Empirical Assessment. *Information Systems Research*, 418-430.

Aguti, B., Walters, R., & Wills, G. (2014). Effective use of e-learning technologies to promote student-centered learning paradigms within higher education institutions. *International Journal for e-learning Security (IJeLS),* 1-8.

Aïmeur, E., Hage, H., & Onana, F. S. (2007). A Framework for Privacy-preserving E-learning. *Trust Management IFIP International Federation for Information*, 223-238.

AIOU, A. I. (2007). *Brief History, AIOU Allama Iqbal Open University*. Retrieved from Allama Iqbal Open University: http://www.aiou.edu.pk/BriefHistory.asp

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, 50(2),* 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. NJ: Prentice-Hall, Englewood Cliffs.

Alajmi, M. A. (2014). Predicting The Use of A Digital Library System: Public Authority for Applied Education and Training (paaet). *International Information & Library Review, 46(1-2),* 63-73.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly,* 107-136.

Alenezi, A. R., Karim, A. M., & Veloo, A. (2010). An Empirical investigation into the role of enjoyment, computer anxiety, computer self-efficacy and internet experience in influencing the students' intention to use e-learning: A case study from Saudi Arabian

Governmental Universities. *TOJET: The Turkish Online Journal of Educational Technology, 9(4)*.

Alenezi, A. R., Karim, A. M., & Veloo, A. (2011). Institutional support and e-learning acceptance: An extension of the technology acceptance model. *International Journal of Instructional Technology and Distance Learning, 8(2)*, 3-16.

Alexander, J. C. (2014). *Positivism, Presupposition and Current Controversies (Theoretical Logic in Sociology).* Routledge.

Alexander, S. (2001). E-learning Developments and Experiences. *Education and Training, 43(4/5).*

Al-Fahad, F. N. (2009). Students' Attitudes and Perceptions towards the Effectiveness of Mobile Learning in King Saud University, Saudi Arabia. *Online Submission, 8(2)*.

Alhasan, N. U., & Tyabo, A. (2013). Revitalizing technical and vocational education (TVET) for youth empowerment and sustainable development. *Journal of Educational and Social Research, 3(4)*, 149.

Ali, A. (2004). Issues & Challenges in Implementing E-Learning in Malaysia. *Open University Malaysia*, n.d.

Al-Jarf, R. (2004). Intercultural communication: Saudi, Ukrainian and Russian students online. *In 37th National Educational Computing Conference (NECC).* New Orleans, Louisiana, USA.

Al-Jarf, R. (2007). Cultural issues in online collaborative learning in EFL. *In 3rd International Online Conference on Second and Foreign Language Teaching and Research.* NA: NA.

Alkhateeb, F., AlMaghayreh, E., Aljawarneh, S., Muhsin, Z., & Nsour, A. (2010). e-learning Tools and Technologies in Education: A Perspective. *E-learning*.

Alsabawy, A., Cater, S., & Soar, J. (2013). IT Infrastructure Services as A Requirement for E-Learning System Success. *Computers & Education, 69*, 431-451.

Alsajjan, B., & Dennis, C. (2010). Internet banking acceptance model: Cross-market examination. *Journal of Business Research, 63(9)*, 957-963.

Alshwaier, A., Youssef, A., & Emam, A. (2012). A new Trend for E-learning in KSA using educational clouds. *Advanced Computing: An International Journal (ACIJ), 3(1)*, 81-97.

Alvan, A. B., Ranjdoust, S., & Talebi, B. (2013). The Study of E - Learning Challenges in Primary Schools from the Viewpoint of Teachers in Julfa Region. *MAGNT Research Report*, 416-419.

Al-Zoube, M. (2009). E-Learning on the Cloud. *Int. Arab J. e-Technol., 1(2)*, 58-64.

Anagnostopoulou, E., Mavroidis, I., Giossos, Y., & Koutsouba, M. (2015). Student Satisfaction in the Context of a Postgraduate Programme of the Hellenic Open University. *Turkish Online Journal of Distance Education, 16(2)*, 40-55.

Andersen, P., (2007). *What is Web 2.0? Ideas, technologies and implications for education. (Vol. 1, No. 1).* Bristol, UK: JISC.

Andersson, A. (2008). Seven major challenges for e-learning in developing countries: Case study eBIT, Sri Lanka. *International Journal of Education and Development using Information and Communication Technology*, 45-62.

Andersson, A. S., & Grönlund, Å. (2009). A conceptual framework for e-learning in developing countries: A critical review of research challenges. *The Electronic Journal of Information Systems in Developing Countries*, 1-16.

Anohina-Naumeca, A., & Grundspenkis, J. (2012). Concept Maps as a Tool for Extended Support of Intelligent Knowledge Assessment. *In Proceedings of the 5th International Conference on Concept Mapping.* Malta.

Anuwar, A. (2008). Issues and challenges in implementing e-learning in Malaysia. *Open University Malaysia*

Anwar, M. M., Greer, J., & Brooks, C. A. (2006). Privacy enhanced personalization in e-learning. *In Proceedings of the 2006 International Conference on Privacy, Security and Trust: Bridge the Gap Between PST Technologies and Business Services* (p. 42). ACM.

Anwar, M., & Niwaz, A. (2011). Experience of E-Learning in Pakistan: Perceptions and Suggestions of Graduates Students. *International Journal of Academic Research*, 373.

Arabasz, P., Pirani, J. A., & Fawcett, D. (2003). Supporting e-learning in higher education, Impact and challenges of e-learning. *EDUCAUSE Center for Applied Research*, 39-47.

Arbaugh, J. B. (2000). How classroom environment and student engagement affect learning in Internet-based MBA courses. *Business Communication Quarterly, 63(4)*, 9–26.

Arbaugh, J. B. (2002). Managing the on-line classroom. *The Journal of High Technology Management Research, 13(2)*, 203-223.

Arbaugh, J. B., & Duray, R. (2002). Technological and structural characteristics, student learning and satisfaction with web-based courses an exploratory study of two on-line MBA programs. *Management learning, 33(3)*, 331-347.

Arnold, S. D. (2014). Assessing Student Learning Online. *Digital Systems for Open Access to Formal and Informal Learning*, 83-100.

Ashby, A. (2004). Monitoring Student Retention in the Open University: Definition, Measurement, Interpretation and Action. *The Journal of Open, Distance and e-Learning*, 65-77.

Astin, A. W. (1993). *What matters in college? Four critical years revisited.* San Francisco: Jossey-Bass.

Atkinson, J. W. (1964). *An introduction to motivation.* NJ: Van Nostrand: Princeton.

Atkinson, P. (2008). A Bitter Pill to Swallow: The Rise and Fall of the Tablet Computer. *Design issues, 24(4)*, 3-25.

Attwell, G. (2004). *E-Learning and Sustainability.* 1-69: The University Of Bremen As A Contribution To The Lefo Learning Folders Project.

Azer, M., & El-Sherbini, A. (2011). Cultural challenges in developing e-learning content. *International Journal of Emerging Technologies in Learning (iJET), 6(1).*

Aziz, B., Khan, T., & Aziz, S. (2008). Impact of higher education on economic growth of pakistan. *MPRA*, 2-8.

Babbie, E. R. (2010). Introduction to social research. *Wadsworth Cengage learning*.

Bagozzi, R. P. (1992). The Self-Regulation of Attitudes, Intentions, and Behavior . *Social Psychology Quarterly, Vol. 55, No. 2 Special Issue: Theoretical Advances in Social Psychology*, 178-204.

Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *The Internet and Higher Education, 12(3)*, 152-155.

Bakari, J. K., Tarimo, C. N., Yngström, L., & Magnusson, C. (2005). State of ICT security management in the institutions of higher learning in developing countries: Tanzania case study. *In Advanced Learning Technologies, 2005. ICALT 2005. Fifth IEEE International Conference on* (pp. 1007-1011). IEEE.

Baloian, N. A., Pino, J. A., & Hoppe, H. U. (2000). A teaching/learning approach to CSCL. *System Sciences, 2000. Proceedings of the 33rd Annual Hawaii International Conference* (pp. 10-pp). Hawaii: IEEE.

Banathy, B. (1994). Designing educational systems: Creating our future in a changing world. *Systemic change in education*, 27-34.

Banciu, V., Gordan, M., & Stanciu, S. (2012). The Social Benefits of e-learning in the Study of Foreign Languages in. *International Conference on Management and Education Innovation, 37.*

Bandura, A. (1986). *Social Foundations of Thought and Action.* Prentice-Hall, Englewood.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control.* Worth Publishers, New York.

Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents, 5*, 307-337.

Baptista, G., & Oliveira, T. (2015). Understanding mobile banking: The unified theory of acceptance and use of technology combined with cultural moderators. *Computers in Human Behavior, 50*, 418-430.

Barney, J. B. (1986). Organizational culture: can it be a source of sustained competitive advantage? *Academy of management review*, *11(3)*, 656-665.

Bartley, S. J., & Golek, J. H. (2004). Evaluating the Cost Effectiveness of Online and Face-to-Face Instruction. *Educational technology and society 7(4)*, 167-175.

Baruchson-Arbib, S., & Yaari, E. (2004). Printed versus Internet plagiarism: A study of students' perception. *International Journal of Information Ethics*, *1(6)*, 29-35.

Bashar, M. I., & Khan, H. (2007). e-learning in Singapore: A brief assessment. *U21Global Working Paper Series, No. 003/2007*. Retrieved from http://poseidon01.ssrn.com/delivery.php?ID=994020123000096105095070016070105010116045067060095028110096081103022122108020016101018063099111026042034107115025091095007023029066004033083002077121097011018071123077022050020029008104084029094124017020119005 00

Bateman, S. M. (2009). Personalized retrieval in social bookmarking. *Social Bookmarking Tools as Facilitators of Learning and Research Collaborative Processes: The Diigo Case*, 91-94.

Bates, A. T. (2005). *Technology, e-learning and distance education.* Routledge.

Bates, A. W. (1990). Third Generation Distance Education: The Challenge of New Technology. *Educational Resources Information Centre (ERIC).*

Becking, D., Betermieux, S., Bomsdorf, B., Birgit, F., Heuel, E., Langer, P., & Schlageter, G. (2004). (2004). Didactic profiling: supporting the mobile learner. *In World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, 2004(1)* (pp. 1760-1767). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Belanger, F., & Jordan, D. H. (2000). *Evaluation and Implementation of Distance Learning: Technologies, Tools and Techniques.* Hershey, PA: Idea Publishing Group

Berryman, J. (2004). E-government: Issues and Implications for Public Libraries. *The Australian Library Journal, 53(4)*, 349-359.

Betz, E., Klingensmith, J., & Menne, J. (1970). The measurement and analysis of college student satisfaction. *ERIC*.

Bhat, A. P., & Shetty, S. (2015). Higher Education-Ethical Issues and Challenges. *Nitte University, Higher Education: Special Emphasis on Management Education*.

Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education, 5(3)*, 235-245.

Bitner, M. (1997). Services marketing. Perspectives on Service Excellence. *Journal of Retailing, 73(1)*, 3-6.

Björk, E., Ottosson, S., & Thorsteinsdottir, S. (2008). e-learning for all. *In: e-learning: 21st Century Issues and Challenges*, 50.

Black, E. J. (1992). Faculty Support for University Distance Education. *International Journal of E-Learning & Distance Education, 7(2)*, 5-29.

Bleyer, A. J., Chen, R., D'Agostino, R. B., & Appel, R. G. (1998). Clinical correlates of hypertensive end-stage renal disease. *American journal of kidney diseases, 31(1)*, 28-34.

Blignaut, A. S., & Els, C. J. (2010). Comperacy Assessment of Postgraduate Students' Readiness for Higher Education. *The Internet and Higher Education, 13(3),*, 101-107.

Bloom, H., Calori, R., & De Woot, P. (1994). *Euromanagement: A new style for the global market*. Kogan Page Publishers.

Blumberg, B. F., Cooper, D. R., & Schindler, P. S. (2005). Survey Research. (B. Blumberg, D. Cooper, & P. S. Schindler, Eds.) *Business Research Methods*, 243-276.

Blustain, H. G. (1998). Assessing the New Competitive Landscape. *Cause/Effect, 21(3)*, 19-27.

Boezerooij, P., Wende, M. V., & Huisman, J. (2007). The Need for E-Learning Strategies: Higher Education Institutions and Their Responses to a Changing Environment. *Tertiary Education and Management, 13(4)*, 313-330.

Boshoff, C. (1997). An Experimental Study of Service Recovery Options. *International Journal of Service Industry Management, 8(2)*, 110-130.

Bozkaya, M. A., & Kumtepe, E. G. (2012). Research Trends and Issues in Educational Technology: A Content Analysis of TOJET (2008-2011). *Turkish Online Journal of Educational Technology-TOJET, 11(2)*, 264-277.

Bradley, C., & Holley, D. (2010). How students in Higher Education use their mobile phones for learning. *In Proceedings of the 9th World Conference on Mobile and Contextual Learning (m-Learn2010),* (pp. 232-239). Valetta, Malta: n.d.

Breen, R., & Jonsson, J. O. (2000). Analyzing educational careers: A multinomial transition model. *American sociological review*, 754-772.

Breslin, J. G., Decker, S., Harth, A., & Bojars, U. (2006). SIOC: an approach to connect web-based communities. *International Journal of Web Based Communities, 2(2)*, 133-142.

Bronstein, J., & Newman, A. (2006). IM 4 Learning. *T AND D, 60(2)*, 47-50.

Brown, I., & Snow, C. R. (1999). A proxy approach to email security. *Software:Practice and experience*, 1049-1060.

Brown, S. A., & Venkatesh, V. (2005). Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life Cycle. *MIS Quarterly (29:4)*, 399-426.

Bruner II, G. C., & Kumar, A. (2007). Gadget lovers. *Journal of the Academy of Marketing Science, 35(3)*, 329-339.

Brusilovsky, P. (2003). Adaptive navigation support in educational hypermedia: The role of student knowledge level and the case for meta-adaptation. *British Journal of Educational Technology*, 487-497.

Brusilovsky, P. (2004.). KnowledgeTree: a Distributed Architecture for Adaptive E-Learning. *In Proceedings of the 13th international World Wide Web conference on Alternate track papers & posters,* (pp. 104–113). ACM.

Brusilovsky, P., Eklund, J., & Schwarz, E. (1998). Web-based education for all: a tool for development adaptive courseware. *Computer Networks and ISDN Systems, 30(1),* , 291-300.

Bryer, T., & Chen, B. (2012). Investigating instructional strategies for using social media in formal and informal learning. The International Review of Research in Open and Distributed Learning, 13(1), 87-104. *The International Review of Research in Open and Distributed Learning, 13(1),* 87-104.

Bryman, A. (2008). *Social Research Methods.* Oxford University Press.

Bryman, A., & Bell, E. (2011). *Business research methods.* New York, NY: Cambridge Oxford University Press.

Burge, E., & Lenksyj, H. (1990). Women studying in distance education: Issues and principles. *International Journal of E-Learning & Distance Education, 5(1),* 20-37.

Buzzell, R. D., & Gale, B. T. (1987). *The PIMS principles: Linking strategy to performance.* New York: Simon and Schuster.

Bytheway, A. J., Bladergroen, M., & Bangui, L. (2015). Managing information and communications technologies in South African education: final project report.

Cai, L., Yang, Y., & Yang, Y. (2004), September). A new idea of e-learning: establishing video library in University Network League. In E-Commerce Technology for Dynamic E-Business, 2004. IEEE International Conference on (pp. 126-129). IEEE. *In E-Commerce Technology for Dynamic E-Business, 2004. IEEE International Conference on* (pp. 126-129). IEEE.

Callinan, C. J. (2014). *Constructing scientific knowledge in the classroom: a multimodal analysis of conceptual change and the significance of gesture* (Doctoral dissertation, School of Education).

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological bulletin, 56(2),* 81.

Campbell, M., Gibson, W., Hall, A., Richards, D., & Callery, P. (2000). Online vs. face-to-face discussion in a web-based research methods course for postgraduate nursing students: A quasi-experimental study. *International Journal of Nursing Studies,* 750-759.

Cantoni, V., Cellario, M., & Porta, M. (2004). Perspectives and challenges in e-learning: towards natural interaction paradigms. *Journal of Visual Languages & Computing,* 333-345.

Cantoni, V., Cellario, M., & Porta, M. (2004). Perspectives and challenges in e-learning: towards natural interaction paradigms. *Journal of Visual Languages and Computing,* 333-345.

Cárdenas, R. G., & Sánchez, E. M. (2005). Security challenges of distributed e-learning systems. *Advanced Distributed systems,* 328-344.

Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., & Walden, P. (2006). Adoption of mobile devices/services-searching for answers with the UTAUT. *In System Sciences, 2006. HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on, 6* (pp. 132a-132a). Hawaii: IEEE.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment (Vol. 17).* Sage publications.

Carr, J. (1999). The Role of Higher Education in the Effective Delivery of Multimedia Management Training to Small and Medium-Sized Enterprises. *Educational Technology & Society*, n.d.

Carswell, L. (1997). Teaching via the Internet: The impact of the Internet as a communication medium on distance learning introductory computing students. *ACM SIGCSE Bulletin, 29(3)*, 1-5.

Cater-Steel, A. (2008). *Information systems research methods, epistemology, and applications.* IGI Global.

Changhong, B., & Chi, L. (2002). Customer Loyalty and Its Determinants for Service Firms. *Nankai Business Review, 6*, , 64-69.

Chatfield, C., & Collins, A. J. (1992). *Introduction to Multivariate Analysis.* London: Chapman & Hall.

Chatti, M. A., Jarke, M., & Frosch-Wilke, D. (2007). The future of e-learning: a shift to knowledge networking and social software. *International journal of knowledge and learning*, 404-420.

Chatzara, K., Karagiannidis, C., & Stamatis, D. (2012). Emotional Interaction in e-Learning. *Research on e-Learning and ICT in Education*, 253-265.

Chen, L. G. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & Management, vol. 39, no. 8*, pp. 705-719.

Chen, M. (1995). *Asian Management Systems*. London: Routledge.

Chen, M. P. (2009). An evaluation of the ELNP e-learning quality assurance program: Perspectives of gap analysis and innovation diffusion. *Journal of Educational Technology & Society, 12(1)*, 18-33.

Chigona, A. (2015). Pedagogical shift in the twenty-first century: Preparing teachers to teach with new technologies. *Africa Education Review, 12(3)*, 478-492.

Christou, E. S. (1999). Hospitality management education in Greece An exploratory study. *Tourism Management, 20(6)*, 683-691.

Chroust, G. (2007). Software like a courteous butler–Issues of Localization under Cultural Diversity. *In Proceedings of the 51st Annual Meeting of the ISSS-2007, (Vol. 51, No. 2).* Tokyo, Japan: ISSS.

Chua, A. Y. (2009). The dark side of successful knowledge management initiatives. *Journal of Knowledge Management, 13(4)*, 32-40.

Chua, W. F. (1986). Radical developments in accounting thought. *Accounting review*, 601-632.

Chu-Mei, L. (2005). The multidimensional and hierarchical structure of perceived quality and customer satisfaction. *International Journal of Management, 22*(3), 426.

Chye, Y. F., Ong, J. C., Tan, J. X., & Thum, S. J. (2014). *The fundamental factors that influencing mobile learning acceptance in higher education institution* (Doctoral dissertation, UTAR).

Cochrane, T., & Bateman, R. (2010). Smartphones give you wings: Pedagogical affordances of mobile Web 2.0.. *Australasian Journal of Educational Technology, 26(1)*, 1-14.

Collis, J., & Hussey, R. (2013). *Business research: A practical guide for undergraduate and postgraduate students.* New York: Palgrave macmillan.

Collopy, R., & Arnold, J. M. (2009). To Blend or Not to Blend: Online and Blended Learning Environments in Undergraduate Teacher Education. *Issues in Teacher Education, 18(2)*, 85-101.

Compeau, D., & Higgins, C. A. (1995a). Application of Social Cognitive Theory to Training for Computer Skills. *Information Systems Research, 6(2)*, 118-143.

Connection, C. C. (1987). Chinese values and the search for culture-free dimensions of culture. *Journal of cross-cultural psychology, 18*(2), 143-164.

Cook, J., Holley, D., & Andrew, D. (2007). A stakeholder approach to implementing e-learning in a university. *British Journal of Educational Technology, 38(5)*, 784-794.

Cragg, C. (1995). *The New Taipans*. London: Century Business.

Crawford, R. J. (1987). Dairy Foods Education in Member Countries of the International Dairy Federation. *Journal of Dairy Science, 70(8)*, 1725-1738.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches, 2nd edn.* Thousand Oaks, CA: Sage.

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches, 3rd edition, .* London: Sage Publications.

Croxall, K., & Cummings, M. N. (2000). Computer usage in family and consumer sciences classrooms. *Journal of Family and Consumer Sciences Education, 18(1)*, 9-18.

Czerniewicz, L., & Brown, C. (2009). A study of the relationship between institutional policy, organisational culture and e-learning use in four South African universities. *Computers & Education, 53(1)*, 121-131.

Dabbagh, N. (2005). Pedagogical models for e-learning: A theory-based design framework. *International Journal of Technology in Teaching and Learning*, 25-44.

Dantas, R. A., Aguillar, O. M., & dos Santos Barbeira, C. B. (2002). Implementation of a nurse-monitored protocol in a Brazilian hospital: a pilot study with cardiac surgery patients. . *Patient education and counseling, 46(4)*, 261-266.

Darabi, A. A., Sikorski, E. G., & Harvey, R. B. (2006). Validated competencies for distance teaching. *Distance Education, 27(1)*, 105-122.

Datuk, T. S., & Ali, A. (2013). Issues and challenges in implementing e-learning in Malaysia. *Available at asiapacific-odl2. oum. edu. my C*, 33.

Daugherty, M., & Funke, B. L. (1998). University faculty and student perceptions of Web-based instruction. *Journal of Distance Education, 13 (1)*, 21-39.

David, W., & Fahey, L. (2000). Diagnosing Cultural Barriers to knowledege management. *The Academy of management executive, 14(4),, 14*(4), 113-127.

Davie, L. E., & Wells, R. (1991). Empowering the learner through computer-mediated communication. *American Journal of Distance Education, 5(1)*, 15-23.

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies, 38*(3), 475-487.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science (35:8)*, 982-1002.

Dawar, N., & Parker, P. (1994). Marketing universals: consumers' use of brand name, price, physical appearance, and retailer reputation as signals of product quality. *The Journal of Marketing*, 81-95.

Dawson, J., & Conti-Bekkers, G. (2002). Supporting International Students' Transitional Coping Strategies. Focusing on Students. *Proceedings of the Annual Teaching Learning Forum, 5-6 February. Perth, Edith Cowan University*.

De Freitas, S., & Oliver, M. (2005). Does E-learning Policy Drive Change in Higher Education? : A case study relating models of organisational change to e-learning implementation. *Journal of Higher Education Policy and Management, 27(1),* 81-96.

DeBoer, J., Ho, A., Stump, G. S., Pritchard, D. E., Seaton, D., & Breslow, L. (2013). Bringing student backgrounds online: MOOC user demographics, site usage, and online learning. *engineer. 2*, 0-81.

Digión, L. B., & Sosa, M. (2012). Communicability and Usability for the Interface in e-Learning. *Advances in New Technologies, Interactive Interfaces and Communicability*, 165-175.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of Price, Brand, and Store Information on Buyers. *Journal of Marketing Research (28:3),* 307-319.

Dogan, T. G. (2015). Integrating Field of Communication to the Distance Education (DE): A New Perspective for DE Leadership. *Identification, Evaluation, and Perceptions of Distance Education Experts, 17*.

Drago, W., Peltier, J., & Sorensen, D. (2002). Course content or the instructor: Which is more important in on-line teaching? *Management Research News, 25(6/7),* 69-83.

Dudeney, G., Hockly, N., & Pegrum, M. (2013). *Digital literacies.* Harlow: Pearson.

Duveskog, M., Sutinen, E., & Cronje, J. (2014). Design milieux for learning environments in African contexts. *British Journal of Educational Technology, 45(4),* 5.

Easterby-Smith, M., Thorpe, R., & Jackson, P. R. (2012). *Management research.* Sage.

Ebner, M. (2007). E-Learning 2.0 = e-Learning 1.0 + Web 2.0?

Economides, A. A. (2008). Culture-aware collaborative learning. *Multicultural Education & Technology Journal, 2(4),* 243-267.

Egi, H., Ozawa, S., & Mori, Y. (2014). Analyses of comparative gaze with eye-tracking technique for peer-reviewing classrooms. *In Advanced Learning Technologies (ICALT), 2014 IEEE 14th International Conference on* (pp. 622-623). IEEE.

Eisenberg, M. B., & Johnson, D. (1996). Computer skills for information problem-solving: Learning and teaching technology in contex. *ERIC Clearinghouse on Information and Technology*.

Elango, R., Gudep, V. K., & Selvam, M. (2008). Quality of e-learning: An analysis based on elearners' perception of e-learning. *The Electronic Journal of e-Learning, 6(1),* 31-44.

Elias, S. M., Smith, W. L., & Barney, C. E. (2012). Age as a moderator of attitude towards technology in the workplace: Work motivation and overall job satisfaction. *Behaviour & Information Technology, 31(5),* 453-467.

Eliason, S. K., & Holmes, C. L. (2010). Reflective practice and inquiry in professional development for online teaching. *Journal of Online Learning and Teaching, 6(2).*

Elloumi, F. (2004). Value chain analysis: A strategic approach to online learning. *Theory and practice of online learning*, 61.

El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational Technology Research and Development*, 1-21.

Embong, A. M., Noor, A. M., Hashim, H. M., Ali, R. M., & Shaari, Z. H. (2012, February 10). E-Books as Textbooks in the Classroom. *Procedia-Social and Behavioral Sciences, 47*, 1802-1809.

Erb, P. A. (2014). *U.S. Patent No. 8,738,772*. Washington, DC: U.S. Patent and Trademark Office.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational technology research and development, 53(4)*, 25-39.
Esposito, A. (2012). Research Ethics in Emerging Forms of Online Learning: Issues Arising from a Hypothetical Study on a MOOC. *Electronic Journal of e-Learning, 10(3)*, 315-325.
Farid, S., Ahmad, R., Niaz, I., Itmazi, J., & Asghar, K. (2014). Identifying perceived challenges of e-learning implementation. *In First International Conference on Modern Communication & Computing Technologies.*
Farley, J. U., & Lehmann, D. R. (1994). Cross-national "laws" and differences in market response. *Management Science, 40(1)*, 111-122.
Fatoki, O., & Chindoga, L. (2011). An investigation into the obstacles to youth entrepreneurship in South Africa. *International Business Research, 4(2)*, 161.
Ferraro, G. (1998). The Cultural Dimension of International Business. 3rd Edition. *New Jersey: Prentice Hall.*
Filstead, W. J. (1979). Qualitative methods: A needed perspective in evaluation research. *Qualitative and quantitative methods in evaluation research*, 33-48.
Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research.
Fisher, M., Thompson, G. S., & Silverberg, D. A. (2005). Effective group dynamics in e-learning: Case study. *Journal of educational technology systems, 33(3),*, 205-222.
Fleiszer, D. M., & Posel, N. H. (2003). Development of an undergraduate medical curriculum: the McGill experience. *Academic Medicine, 78(3),* , 265-269.
Flores, R., Ari, F., Inan, F. A., & Arslan-Ari, I. (2012). The Impact of Adapting Content for Students with Individual Differences. *Educational Technology & Society*, 251-261.
Ford, D. P., Connelly, C. E., & Meister, D. B. (2003). Information systems research and Hofstede's culture's consequences: an uneasy and incomplete partnership. *Engineering Management, IEEE Transactions on, 50(1)*, 8-25.
Forman, D., & Nyatanga, L. R. (2002). E-learning and educational diversity. *Nurse Education Today, 22(1)*, 76-82.
Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of marketing research*, 382-388.
Foulger, T. S., Ewbank, A. D., Kay, A., Popp, S. O., & Carter, H. L. (2009). Moral spaces in MySpace: Preservice teachers' perspectives about ethical issues in social networking. *Journal of Research on Technology in Education, 42(1)*, 1-28.
Fowler, F. J. (2009). *Survey Research Methods.* Sage Publications.
Fox, N. J. (2008). Post-positivism. *The SAGE encyclopedia of qualitative research methods, 2*, 659-664.
Frank, M., Kurtz, G., & Levin, N. (2002). Implications of presenting pre-university courses using the blended e-learning approach. *Journal of Educational Technology & Society, 5(4)*, 137-147.
Freedman, M., Kaner, O., & Kaplan, I. (2014). Voting for extreme right parties in Israel: Evidence from the 2009 elections. *Electoral Studies, 34*, 68-77.
Fuente, D. L., & J.R. (2002). Academic Freedom and Social Responsibility. *Higher Education Policy, 15*, 337-339.
Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity.* (No. D10 301 c. 1/c. 2) Free Press Paperbacks.

Fuller, R. M., Vician, C., & Brown, S. A. (2006). E-learning and individual characteristics: The role of computer anxiety and communication apprehension. *Journal of Computer Information Systems, 46(4),* 103-115.

Fyfe, S. (2000). Collaborative learning at a distance: The Human Biology experience. *In Flexible futures in tertiary teaching. Proceedings of the 9th annual teaching learning forum,* (pp. 2-4). Perth, Australia.

Galusha, J. M. (1998). Barriers to learning in distance education. *ERIC,* 1-23.

Garrison, D. R. (2011). *e-learning in the 21st century: A framework for research and practice.* Taylor & Francis.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The internet and higher education, 7(2),* 95-105.

Garvin, D. (1988). Managing quality: The Strategic and Competitive Edge. . *New York: Free Press*.

Gattiker, U. E. (1984). Managing computer-based office information technology: A process model for management. *Human Factors in Organizational Design, North-Holland, Amsterdam, The Netherlands, 1,* 395-403.

Geert, H., & Jan, H. G. (1991). *Cultures and organizations: Software of the mind.* New York: Mc-Graw Hills.

Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural Equation Modeling and Regression: Guidelines For Research Practice. *Communications of the Association for Information Systems, 4,* 7.

Gentry, L., & Calantone, R. (2002). A comparison of three models to explain shop-bot use on the web. *Psychology & Marketing, 19(11),* 945-956.

Gibson, C. C., & Graff, A. O. (1992). Impact of adults' preferred learning styles and perception of barriers on completion of external baccalaureate degree programmes. *Journal of Distance Education,* 39-51.

Gilbert, N., & Stoneman, P. (2015). *Researching social life.* Sage.

Gisondi, M. A., Lu, D. W., Yen, M., Norris, R., Courtney, D. M., Tanabe, P., ... & Quest, T. E. (2010). Adaptation of EPEC-EM™ curriculum in a residency with asynchronous learning. *Western Journal of Emergency Medicine*, *11*(5), 491.

Govender, D. W., & Chitanana, L. (2016). Perception of Information and Communications Technology (ICT) for Instructional Delivery at a University: From Technophobic to Technologically Savvy. *African Journal of Information Systems, 8(2).*

Goyal, E., Purohit, S., & Bhagat, M. A. (2010). Factors that affect information and communication technology usage: A case study in Management Education. *Journal of information technology management, 21(4),* 38.

Graham, C. R., Woodfield, W., & Harrison, J. (2013). A framework for institutional adoption and implementation of blended learning in higher education. *The internet and higher education, 18,* 4-14.

Grönroos, C. (1999). Internationalization strategies for services. *Journal of Services Marketing, 13(4/5),* 290-297.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research, 2(105),* 163-194.

Gudanescu, N. (2010). Using modern technology for improving learning process at different educational levels. *Procedia-Social and Behavioral Sciences, 2(2),* 5641-5645.

Gulati, S. (2008). Technology-Enhanced Learning in Developing Nations: A review. *International Review of Research in Open and Distance Learning*, 1-16.

Güllü, F., Kuusik, R., Shogenov, K., Laanpere, M., Oysal, Y., Sözcü, Ö. F., & Parlak, Z. (2016). An Analysis and Comparison of Adoption of E-learning Systems in Higher Education by Lecturers at Largest Universities in Estonia and Turkey. *Baltic Journal of Modern Computing, 4(3)*, 428-440.

Gutiérrez-Santiuste, E., & Gallego-Arrufat, M. J. (2016). Barriers in computer-mediated communication: typology and evolution over time. *Journal of e-Learning and Knowledge Society, 12(1)*, 107-119.

Guy, R. (2012). The use of social media for academic practice: A review of literature. *Kentucky Journal of Higher Education Policy and Practice, 1(2)*, 7.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective.* Upper Saddle River, NJ: Pearson.

Halil, C. A. (1991). *Organizasyon ve Yönetim.* Ankara: Adım Yayıncılık.

Hall, E. T. (1959). *The silet language.* New York.

Hall, E. T. (1960). The silent language in overseas business. . *Harvard Business Review, 38(3)*, 87-96.

Hall, E. T., & Hall, M. R. (1990). *Understanding Cultural Differences: German French and American.* Yarmouth: Intercultural Press.

Hampton, G. M. (1993). Gap analysis of college student satisfaction as a measure of professional service quality. *Journal of Professional Services Marketing, 9(1)*, 369–80.

Hannum, W. H., & Briggs, L. J. (1982). How Does Instructional Systems Design Differ from Traditional Instruction? *Educational Technology, 22(1)*, 9-14.

Hanushek, E., & Kimko, D. (2000). Schooling, labor-force quality, and the growth of nations. *The American Economic Review*, 1184-1188.

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *The Internet and higher education, 3(1)*, 41-61.

Hasan, H. D. (1999). The impact of culture on the adoption of IT: An interpretive study. *Journal of Global Information Management (JGIM), 7(1)*, 5-15.

HEC, P. (2017). *University wise enrollment of year 2014-15*. Retrieved from Higher Education Commission Pakistan: http://www.hec.gov.pk/english/universities/Pages/University-wise-enrollment-of-yearwise.aspx

Heckman, J. J. (2008). Earnings functions and rates of return (No. w13780). *National Bureau of Economic Research*.

Hepworth, M., & Duvigneau, S. (2013). An Investigation into the Development of an Institutional Strategy to Build Research Capacity and Information Literate, Critical Thinking, Independent Learners in Three African Universities. *In Worldwide Commonalities and Challenges in Information Literacy Research and Practice* (pp. 86-92). Chicago: Springer International Publishing.

Herskovits, M. J. (1955). *Cultural Anthropology.* New York: Knopf.

Hiemstra, R. (1994). Computerized Distance education: the role of facilitators. *Educational Technology*, 179.

Higgs, J. (1997). Barriers to the Effective Use of Technology in Education. *Journal of Educational Computing, 17(4)*, 385-395.

Hiltz, S. R., & Wellman, B. (1997). Asynchronous learning networks as a virtual classroom. *Communications of the ACM, 40(9),*, 44-49.

Hofstede, G. (1980). *Culture's Consequence: International Differences in Work-Related Values.* Beverly Hills, CA: : Sage.
Hofstede, G. (1994). The business of international business is culture. *International business review, 3(1),*, 1-14.
Hofstede, G. (1998). Identifying Organzational Subcultures:An Empirical approach. *Journal of Management Studies, 35*(1), 1-12.
Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online readings in psychology and culture, 2(1)*, 8.
Hofstede, G. H. (2001). Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. *Sag*.
Hofstede, G., & Bond, M. H. (1988). The Confucius connection: From cultural roots to economic growth. *Organizational Dynamics, 16(4),, 16*(4), 4-21.
Hofstede, G., & Hofstede, J. (2005). Cultures and Organizations: Software of the Mind, 2nd Edition. *McGraw-Hill*.
Hölscher, C., & Strube, G. (2000). Web search behavior of Internet experts and newbies. *Computer networks*, 337-346.
Holt, D., & Challis, D. (2007). From policy to practice: One university's experience of implementing strategic change through wholly online teaching and learning. *Australasian Journal of Educational Technology, 23(1)*, 110-131.
Homan, G., & Macpherson, A. (2005). E-learning in the corporate university. *Journal of European Industrial Training, 29(1)*, 75-90.
Hong, M., Kim, J., Kim, H., & Shin, Y. (2008). An adaptive transmission scheme for cognitive radio systems based on interference temperature model. *Consumer Communications and Networking Conference, 2008. CCNC 2008. 5th IEEE* (pp. 69-73). IEEE.
Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. Articles, 2. *Electronic Journal of Business Research Methods, 6(1)*, 53-60.
Hoppe, M. H. (1990). A comprehensive study of country elites: International differences in work-related values and learning and their implications for management. *Unpublished PhD diss., University of North Carolina at Chapel Hill*.
Hoshi, T. O., Watanabe, K., & Osuka, R. (2011). A gadget-based information management system for environmental measurement and control in greenhouses. *In SICE Annual Conference (SICE), 2011 Proceedings of IEEE* (pp. 2801-2805). Tokyo: IEEE.
Hotrum, M., Ludwig, B., & Baggaley, J. (2005). Open Source Software: Fully featured vs." the devil you know"?. *The International Review of Research in Open and Distance Learning*, 6(1).
Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause quarterly, 31(4)*, 51-55.
Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative health research, 15(9)*, 1277-1288.
Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal, 6(1)*, 1-55.
Hu, P., Chau, P. Y., Liu Sheng, O. R., & Kar, Y. T. (1999). Examining the Technology Acceptance Model Using Physician Acceptance of Telemedicine Technology. *Journal of Management Information Systems, 16(2)*, 91-112.

Hussain, I. (2007). A Study of Students' Attitude Towards Virtual Education in Pakistan. *Turkish Online Journal of Distance Education*, 69-79.

Hussein, A. R., & Nassuora, A. B. (2011). Academic attitudes towards the use of mobile phone technologies for knowledge sharing in higher education institutions: An exploratory survey. . *Am. Acad. Sch. Res. J, 1*, 6-9.

Hylén, J. (2006). Open educational resources: Opportunities and challenges. *Proceedings of Open Education*, 49-63.

Igbaria, M., & Iivari, J. (1995). Effects of self-efficacy on computer usage. *Omega-International Journal of Management Science, 23, 6*, 587-605.

Inglis, A. (2007). Approaches taken by Australian universities to documenting institutional e-learning strategies. *ICT: Providing choices for learners and learning, Proceedings ACILITE*, 419-427.

Iqbal, A., Rauf, M., Rashid, A., Rehman, S. U., & Salam, M. (2013). *Analysis Of The Problems Of Primary Education System In Pakistan: Critical Review Of Literature.* Retrieved from Academic Research International: www.savap.org.pk/journals/ARInt./Vol.4(2)/2013(4.2-34).pdf

Iqbal, M. J., & Ahmad, M. (2010). Enhancing quality of education through e-learning: the case study of Allama Iqbal Open University. *Turkish Online Journal of Distance Education, 11(1).*

Itmazi, J. A., Megías, M. G., Paderewski, P., & Vela, F. L. (2005). A comparison and evaluation of open source learning managment systems. *In IADIS AC*, pp. 80-86.

Ivergård, T., & Hunt, B. (2005). Towards a learning networked organisation: human capital, compatibility and usability in e-learning systems. *Applied ergonomics, 36(2)*, 157-164.

Jackson, T. (1995). Cross Cultural Management. *Butterworth-Heinemann*.

Jager, A. K., & Lokman, A. H. (1999). Impacts of ICT in education. The role of the teacher and teacher training. *The European Conference on Educational Research*, (pp. 22-25). Lahti, Finland.

Janowski, A. J., Sobieraj, A., Szulwic, J., Wróblewska, D., & Wieczorek, B. (2014). Improving the quality of education through the implementation of the diplomas and group projects during engineering studies in cooperation with employers. *EDULEARN14 Proceedings*, 1837-1843.

Jara, M., & Mellar, H. (2009). Factors affecting quality enhancement procedures for e-learning courses. *Quality Assurance in Education, 17(3)*, 220-232.

Jarvis, H., & Szymczyk, M. (2010). Student views on learning grammar with web-and book-based materials. *ELT journal, 64(1)*, 32-44.

Javed, Z. H., Khilji, B. A., & Mujahid, M. (2008). Impact of education on socio-economic status of villagers life: A case study of shrien wala village of faisalabad district. *Pakistan Economic and Social Review*, 133-146.

Jensen, M. L., Mondrup, F., Lippert, F., & Ringsted, C. (2009). Using e-learning for maintenance of ALS competence. *Official journal of european resuscitation council*, 903-908.

Jianhong, S., & Junsheng, L. (2010). University portal, The door of digital campus. In Education Technology and Computer Science (ETCS),. *2010 Second International Workshop on (Vol. 3)* (pp. 773-775). IEEE.

Johns, J., & Woolf, B. (2006). A dynamic mixture model to detect student motivation and proficiency. *In Proceedings of the National Conference on Artificial Intelligence* (p. 163). Cambridge, London: Menlo Park, CA;.

Johnson, P., & Clark, M. (2006). *Mapping the terrain: an overview of business and management research methodologies, in P. Johnson and M. Clark, (eds), Business and Management research Methodologies.* London: Sage.

Johnston, G. (2004). Healthy, wealthy and wise?: a review of the wider benefits of education (No. 04/04). *New Zealand Treasury*.

Jones, P., Jones, A., & Packham, G. (2009). E-learning induction design for an undergraduate entrepreneurship degree. . *International Journal of Management Education, 8(1)*, 35-51.

Joo, Y. J., Bong, M., & Choi, H. J. (2000). Self-efficacy for self-regulated learning, academic self-efficacy, and internet self-efficacy in web-based instruction. *Educational Technology Research and Development*, 5-17.

Joy, S., & Kolb, D. A. (2009). Are there cultural differences in learning style? *International Journal of Intercultural Relations, 33(1)*, 69-85.

Jung, I. (2005). ICT-Pedagogy Integration in Teacher Training: Application Cases. *Educational Technology & Society, 8(2)*, 94-101.

Jung, I. (2011). The dimensions of e-learning quality: from the learner's perspective. *Educational Technology Research and Development, 59(4)*, 445-464.

Juutinen, S., Huovinen, T., & Yalaho, A. (2011). Emotional Obstacle in E-learning-The fear of technology. *International Journal for e-Learning Security (IJeLS), 1(3/4).*

Kakar, Z. K., Khilji, B. A., & Jawad, M. (2011). Relationship between Education and Economic Growth in Pakistan: A time series analysis. *Journal of International Academic Research, 11(1).*

Kaleta, R., Skibba, K., & Joosten, T. (2007). Discovering, designing, and delivering hybrid courses. *Blended learning: Research perspectives*, 111-143.

Kamakura, W. A., & Mazzon, J. A. (1991). Value segmentation: A model for the measurement of values and value systems. *Journal of consumer research*, 208-218.

Kamakura, W. A., & Novak, T. P. (1992). Value-system segmentation: exploring the meaning of LOV. *Journal of consumer research*, 119-132.

Karahanna, E., & Straub, D. (1999). The psychological origins of perceived usefulness and ease-of- use. *Information & Management, vol. 35, no. 4*, pp. 237-250.

Karahanna, E., Evaristo, J. R., & Srite, M. (2006). Levels of culture and individual behavior: An integrative perspective. *Advanced Topics in Global Information Management, 5(1)*, 30-50.

Karaman, S., Kucuk, S., & Aydemir, M. (2014). Evaluation of an online continuing education program from the perspective of new graduate nurses. *Nurse education today, 34(5)*, 836-841.

Kashif, A. (2005). e-learning Evolution in a Developing Country–An In-Depth Study. . *In 4th European Conference on e-learning Amsterdam, The Netherlands 10(11).* Amsterdam.

Katz, L. F. (2000). *Technological change, computerization, and the wage structure (pp. 217-244).* . Cambridge MA: MIT Press.

Kau, A. K., & Loh, E. W. (2006). The Effects of Service Recovery on Consumer Satisfaction: a Comparison Between Complainants and Non-complainants. *Journal of Services Marketing, 20(2)*, 101-111.

Kaur, M. (2013). 3rd World Conference on Learning, Teaching and Educational Leadership (WCLTA-2012). *Procedia - Social and Behavioral Sciences*, 613-617.

Kay, R. H. (2006). Evaluating strategies used to incorporate technology into preservice education: A review of the literature. *Journal of research on technology in education, 38(4)*, 383-408.

Keaveney, & Susan, M. (1995). Customer Switching Behavior in Service Industries: An Exploratory Study. *Journal of Marketing, 59(2)*, 71-82.

Keeley, S. M., Shemberg, K. M., & Zaynor, L. (1988). Dissertation research in clinical psychology: beyond positivism? *Professional Psychology: Research and Practice, 19(2)*, 216.

Kelly, J., Lalama, M. A., Kelly, C., & Bruton, M. (2015). *U.S. Patent Application No. 14/750,896*.

Kelly, M. (1990). Course creation issues in distance education. . *Education at a distance: From issues to practice*, 77-99.

Keramidas, C., Ludlow, B., Collins, B., & Baird, C. (2007). Saving your sanity when teaching in an online environment: Lessons learned. *Rural Special Education Quarterly, 26(1)*, 28.

Kessler, S. (1995). *Total quality service: A simplified approach to using the baldrige award criteria.* Milwaukee: ASQC Quality Press.

Khadaroo, S. (2012). *Not just 4 texting: 1 in 3 middle-schoolers uses smart phones for homework.* Retrieved from The Christian Science Monitor: http://www.csmonitor.com/USA/Education/2012/1129/Not-just-4-texting-1-in-3-middle-schoolers-uses-smart-phones-for-homework

Kiani, A. K. (2010). The Role of Education On Economic Growth in Pakistan. *The Fifth Conference of Learning International Networks Consortium (LINC)*. May 23rd - 26th, 2010. MIT, Cambridge, Massachusetts, USA

Kim, K. J., Liu, S., & Bonk, C. J. (2005). Online MBA students' perceptions of online learning: Benefits,challenges, and suggestions. *The internet and Higher Education, 8(4)*, 339-344.

Kim, S. S., & Malhotra, N. K. (2005). A Longitudinal Model of Continued IS Use: An Integrative View of Four Mechanisms Underlying Post-Adoption Phenomena. *Management Science (51:5)*, 741-755.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management 43.6*, 740-755.

Kipsoi, E. J., Chang'ach, J. K., & Sang, H. C. (2012). Challenges facing adoption of information communication technology (ICT) in educational management in schools in Kenya. *Journal of sociological Research, 3(1)*, 18.

Kluckholn, C. (1951). *The study of cultures.* Stanford university press.

Kolb, D. A. (2005). *The Kolb learning style inventory version 3.1: Self-scoring and interpretation booklet.* Boston, MA: Hay Group Transforming Learning.

Kolbitsch, C., Holz, T., Kruegel, C., & Kirda, E. (2010). Inspector Gadget: Automated Extraction of Proprietary Gadgets from Malware Binaries. *In Security and Privacy (SP), 2010 IEEE Symposium on* (pp. 29-44). Oakland, CA, USA: IEEE.

Koller, V., Harvey, S., & Magnotta, M. (2008). Technology-based learning strategies. *Social Policy Research Associates Inc.*, 10-11.

Kosak, L., Manning, D., Dobson, E., Rogerson, L., Cotnam, S., Colaric, S., & McFadden, C. (2004). Prepared to teach online? Perspectives of faculty in the University of North Carolina system. *Online Journal of Distance Learning Administration, 7(3)*.

Krippendorff, K. (1970). Estimating the reliability, systematic error and random error of interval data. *Educational and Psychological Measurement, 30(1),* 61-70.

Kruse, K. (2002). *The Benefits and Drawbacks of e-learning.* Retrieved from e-learning Guru: http://www.e-learningguru.com.

Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL, 21(02),* 157-165.

Kwan, P. Y., & Ng, P. W. (1999). Quality indicators in higher education-comparing Hong Kong and China's students. *Managerial Auditing Journal, 14(1/2),* 20-27.

Kwofie, B., & Henten, A. (2011). The advantages and challenges of e-learning implementation: The story of a developing nation. *WCES-2011 3rd World Conference on Education Sciences, Bahcesehir University,* (pp. 13-14). Istabul, Turkey: WCES.

Lange, F. &. (2006). The social value of education and human capital. *Handbook of the Economics of Education, 1,*, 459-509.

Lanseng, E. J., & Andreassen, T. W. (2007). Electronic healthcare: a study of people's readiness and attitude toward performing self-diagnosis. *International Journal of Service Industry Management, 18(4),* 394-417.

Lanzilotti, R., Montinaro, F., & Ardito, C. (2009). Influence of Students' Motivation on Their Experience with E-Learning Systems: An Experimental Study. *Universal Access in Human-Computer Interaction. Applications and Services*, 63-72.

Lareki, A., de Morentin, J. I., & Amenabar, N. (2010). Towards an efficient training of university faculty on ICTs. *Computers & Education, 54(2),* 491-497.

Latif, A. (2011). Alarming situation of education in Pakistan. *UNESCO - Education for All - Knowledge sharing - Testimonials - Pakistan*, 1-3.

Lee, B. C., Yoon, J. O., & Lee, I. (2009). Learners' acceptance of e-learning in South Korea: Theories and results. *Computers & Education, 53(4),* 1320-1329.

Lee, E. A. (2000). What's Ahead for Embedded software? *Computer, 33(9),* 18-26.

Lessem, R., & Neubauer, F. F. (1994). *European management systems: towards unity out of cultural diversity.* London: McGraw-Hill.

Lester, J., & Perini, M. (2010). Potential of social networking sites for distance education student engagement. *New Directions for Community Colleges, 2010(150),* 67-77.

Levy, S. (2003). Six factors to consider when planning online distance learning programs in higher education. *Online Journal of Distance Learning Administration, 6(1).*

Levy, Y. (2008). An empirical development of critical value factors (CVF) of online learning activities: An application of activity theory and cognitive value theory. *Computers & Education, 51(4),* 1664-1675.

Levy, Y., Ramim, M. M., & Hackney, R. A. (2013). Assessing ethical severity of e-learning systems security attacks. *The Journal of Computer Information Systems, 53(3),* 75.

Lewis, A. (1992). Helping Young Urban Parents Educate Themselves and Their Children. ERIC/CUE Digest, Number 85.

Lewis, D., & Chen, E. (2009). *Factors leading to a quality e-learning experience. Online Education and Adult Learning.* New Frontiers for Teaching Practices: New Frontiers for Teaching Practices, 101.

Lewis, R. C., & Booms, B. H. (1983). The marketing aspects of service quality. *Emerging perspectives on services marketing, 65(4),* 99-107.
Liao, H. L., Liu, S. H., Pi, S. M., & Chou, Y. J. (2011). Factors Affecting Lifelong Learners' Intention to Continue Using E-Learning Website: An Empirical Study. *New Horizons in Web-Based Learning - ICWL 2010 Workshops*, 112-119.
Liaw, S. S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. *Computers & Education, 51(2),* 864-873.
Liaw, S. S., Huang, H. M., & Chen, G. D. (2007). An activity-theoretical approach to investigate learners' factors toward e-learning systems. *Computers in Human Behavior, 23(4),* 1906-1920.
Lim, C. P., Chai, C. S., & Churchill, D. (2011). A framework for developing pre-service teachers' competencies in using technologies to enhance teaching and learning. *Educational Media International, 48(2),* 69-83.
Limayem, M., Hirt, S. G., & Cheung, C. M. (2007). How Habit Limits the Predictive Power of Intentions: The Case of IS Coninuance. *MIS Quarterly (31:4),* 705-737.
Lin, C. C. (2010). Analysis of the e-learning innovation process in higher education. *Nottingham eTheses*, n.d.
Little, B. (2003). Achieving high performance through e-learning. *Industrial and Commercial Training,* 203-207.
Liu, S. H., Liao, H. L., & Pratt, J. A. (2009). Impact of media richness and flow on e-learning technology acceptance. *Computers & Education, 52(3),* 599-607.
Liu, Y., Han, S., & Li, H. (2010). Understanding the factors driving m-learning adoption: a literature review. *Campus-Wide Information Systems, 27(4),* 210-226.
Lochner, L. (2011). Non-production benefits of education: Crime, health, and good citizenship (No. w16722). *National Bureau of Economic Research*.
Loh, J., & Smyth, R. (2010). Understanding students' online learning experiences in virtual teams. *Journal of Online Learning and Teaching, 6(2),*, 335-342.
Lonner, W. J., Berry, J. W., & Hofstede, G. H. (1980). Culture's Consequences: International Differences in Work-Related Values. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, 5.* Illinois.
Lopes, C. T. (2007). Evaluating e-learning readiness in a health sciences higher education institution. *In IADIS International Conference ELearning.* Citeseer.
Lovelock, C. L., Patterson, P. G., & W. R. (2003). Services Marketing: An Asia-Pacific Perspective. *Sydney: Prentice- Hall/Pearson Education Australia*.
Lovelock, C., & Wirtz, J. (2001). *Services marketing: people. Technology, Strategy, 4th. ed.* Upper Saddle River.
Lu, T., & Chen, X. S. (2007). Usability Assessment of an E-Learning Courseware for Basic Cataloging. *Human-Computer Interaction. HCI Applications and Services*, 198-207.
Lushnikova, N., Chintakayala, P. K., & Rodante, A. (2012). Massive Open Online Courses from Ivy League Universities: Benefits and Challenges for Students and Educators. *XI International Conference "Providing continuity of content in the system of stepwise graduate and postgraduate education", National University of Water Management and Nature Resources Use.* Rivne, Ukraine.

Lykourentzou, I., Giannoukos, I., Nikolopoulos, V., Mpardis, G., & Loumos, V. (2009). Dropout prediction in e-learning courses through the combination of machine learning techniques. *Computers & Education, 53(3)*, 950-965.

Machado, C., & Lussana, E. (2008). Paths of participation in a knowledge-based era: Disseminating e-learning opportunities in Central Asia. *European Journal of Open, Distance and e-learning, I*.

Mackintosh, W. (2005). Chapter Thirteen: Can you Lead from Behind?: Critical Reflections on the Rhetoric of E-Learning, Open Distance Learning, and ICTs for Development in Sub-Saharan Africa (SSA). In A. A. Carr-Chellman, *Global prespective on e-learning:Rhetoric and reality* (pp. 179-197). n.d.: SAGE Publications, Inc.

Maglio, P., P., Srinivasan, S., Kreulen, J. T., & Spohrer, J. (2006). Service systems, service scientists, SSME, and innovation. *Communications of the ACM, 49(7)*, 81-85.

Maheswari, P. U. (2014). Frequency of using WhatsApp Messenger among College Students in Salem District. *TamilNadu*.

Mahmoodi-Shahrebabaki, M. (2014). E-learning in Iran as a developing Country: Challenges ahead and possible solutions. *International Journal of Research in Education Methodology*, 788-795.

Maki, C., & Charalambous, K. (2014). Cyprus public secondary general education school administrators' self-perceived competence and challenges in using ICT for administrative and managerial purposes. *In World Conference on Educational Multimedia, Hypermedia and Telecommunications, 14(1)*, (pp. 3366-3376).

Malik, B. A., Amin, N., Irfan, Y., Bilal, M., Paracha, Z. F., & Zia, A. M. (2015). *Pakistan Education Statistics.* Islamabad: National Education Management Information System Academy of Educational Planning and Management, Ministry of Federal Education and Professional Training Government of Pakistan.

Manochehr, N. N. (2006). The Influence of Learning styles on learners in e-learning Environment: An Empirical study. *Computers in Higher Education Economics Review, 18(1)*, 10-14.

Marjanovic, O. (2005). Towards A Web-Based Handbook of Generic, Process-Oriented Learning. *Educational Technology & Society, 8(2)*, 66-82.

Markopoulos, P., Mavrommati, I., & Kameas, A. (2004). End User Configuration of ambient Intelligence Envoirments; Feasbility form of perspective. *Spring Berlin Heidelberg*, 243-254.

Marold, K. A., Larsen, G., & Moreno, A. (2000). Web-based learning: is it working? A comparison of student performance and achievement in web-based courses and their in-classroom counterparts. . *In IRMA Conference*, (pp. 350-353).

Marshall, S. (2010). Change, technology and higher education: are universities capable of organisational change? *Australasian Journal of Educational Technology, 26(8)*.

Martinez, M. (2003). High attrition rates in e-learning: Challenges, predictors, and solutions. *The E-Learning Developers' Journal, 14(1)*.

Martín-García, T., & Baizán, P. (2006). The impact of the type of education and of educational enrolment on first births. *European Sociological Review, 22(3)*, 259-275.

Marzilli, C., Delello, J., Marmion, S., McWhorter, R., Roberts, P., & Marzilli, T. S. (2014). Faculty attitudes towards integrating technology and innovation. *arXiv preprint arXiv*, n.d.

Masalela, R. K. (2011). Implementing e-Learning at the University of Botswana: the Practitioner's Perspective. *Online Journal of Distance Learning Administration, 14(2)*.

Mason, R., & Weller, M. (2000). Factors affecting students' satisfaction on a web course. *Australasian Journal of Educational Technology, 16(2).*

Masoumi, D. (2010). Critical factors for effective eLearning. *Goteburg University*.

Matsumoto, D. (1996). *Culture and Psychology.* Pacific Grove, CA: Brooks/Cole.

Matusov, E., Hayes, R., & Pluta, M. J. (2005). Using discussion webs to Develop an Academic Community of Learners. *Educational Technology & Society, 8(2),*, 16-39.

Maxham III, J. G., & Netemeyer, R. G. (2002). A Longitudinal Study of Complaining Customers' Evaluations of Multiple Service Failures and Recovery Efforts. *Journal of Marketing Research, 66(4)*, 57-71.

Mayo, N. B., Kajs, L. T., & Tanguma, J. (2005). Longitudinal Study of Technology Training to Prepare Future Teachers. *Educational Research Quarterly, 29(1)*, 3-15.

McAllister, N. C., & McAllister, D. F. (1996). Providing education electronically to nontraditional sites: new delivery to a new audience. *n Proceedings of the 14th annual international conference on systems documentation: Marshaling new technological forces: building a corporate, academic, and user-oriented triangle* (pp. 187-193). ACM.

McBrien, J. L., Cheng, R., & Jones, P. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. The International Review of Research in Open and Distance Learning. *The International Review of research in open and distance learning, 10(3).*

McCausland, S. R. (2005). *The Conditions Which Facilitate and Challenge Online Support Staff's Services for Web-Based College Courses: A Case Study.* Calgary: Doctoral dissertation, University of Calgary.

McCloskey, D. W., Antonucci, Y. L., & Schug, J. (1998). Web-based vs. traditional course development: Identifying differences in user characteristics and performance outcomes. *In Proceedings of the international business schools computing association annual conference.*

McCoy, S., Galletta, D. F., & King, W. R. (2007). Applying TAM across cultures: the need for caution. *European Journal of Information Systems, 16(1),*, 81-90.

McInnerney, J. M., & Roberts, T. S. (2004). Online learning: Social interaction and the creation of a sense of community. *Journal of Educational Technology & Society, 7(3)*, 73-81.

Medárová, V., Bures, V., & Otcenásková, T. (2012). A review of obstacles to successful e-learning deployment in SMEs. *Journal of Innovation Management in Small & Medium Enterprises*, *2012*, 1.

Meyer, J. D., & Barefield, A. C. (2010). Infrastructure and administrative support for online programs. *Online Journal of Distance Learning Administration, 13(3).*

Meyer, K. (2006). The Road Map to Cost Efficiencies in Online learning" in Cost-Efficiencies in Online learning. *ASHE Higher Education Report*, 17-25.

Meyer, R. (1990). *Classical and Modern Regression with Applications.* Boston, MA: Duxbury Press.

Miliszewska, A. R. (2011). Reflections on a Trial Implementation of an E-Learning Solution in a Libyan University. *Issues in Informing Science and Information Technology*, 61-76.

Miller, I., & Schlosberg, J. (1997). *Guide to distance learning: Graduate education that comes to your home.* New York: Kaplan Books.

Milligan, G. W., & Cooper, M. C. (1985). An examination of procedures for determining the number of clusters in a data set. *Psychometrika, 50(2)*, 159-179.

Mingers, J. (2003). The paucity of multimethod research: a review of the information systems literature. *Information Systems Journal, 13(3),* 233-249.
Minkov, M., & Hofstede, G. (2011). The evolution of Hofstede's doctrine. Cross Cultural Management. *An International Journal, 18(1),* 10-20.
Mircea, M., & Andreescu, A. I. (2011). Using cloud computing in higher education: A strategy to improve agility in the current financial crisis. *Communications of the IBIMA, 2011,* 1-15.
Mishra, D., Akman, I., & Mishra, A. (2014). Theory of Reasoned Action application for Green Information Technology acceptance. *Computers in Human Behavior, 36,* 29-40.
Moenaert, R. K., Caeldries, F., Lievens, A., & Wauters, E. (2000). Communication flows in international product innovation teams. *Journal of product innovation management, 17(5),* 360-377.
Mohammadi, N., Ghorbani, V., & Hamidi, F. (2011). Effects of e-learning on Language-learning. *Procedia Computer Science, 3,*, 464-468.
Mokhtar, I. A. (2005). Education in the information age–a preliminary study of the changing roles of school teachers in Singapore. *Educational Research for Policy and Practice, 4(1),* 27-45.
Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2,* 192–222.
Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-learning, online learning, and distance learning environments: Are they the same? *The Internet and Higher Education, 14(2),* 129-135.
Morden, T. (1999). Models of national culture–a management review. Cross Cultural Management: *An International Journal, 6(1),* , 19-44.
Morris, M. G. (1996). A longitudinal examination of information technology acceptance. *School of Business. Indiana,*.
Motaghian, H., Hassanzadeh, A., & Moghadam, D. K. (2013). Factors affecting university instructors' adoption of web-based learning systems: Case study of Iran. *Computers & Education, 61,* 158-167.
Mtebe, J. S., & Raisamo, R. (2014). A model for assessing learning management system success in higher education in sub-saharan Countries. *The Electronic Journal of Information Systems in Developing Countries, 61*.
Muhammad, A., Ahamd, F., & Shah, A. (2015). Resolving Ethical Dilemma in Technology Enhanced Education through smart mobile devices. *International Arab Journal of e-Technology, 4(1),* , 25-31.
Muir-Herzig, R. G. (2004). Technology and its impact in the classroom. *Computers & Education,42(2),* 111-131.
Munyangeyo, T. (2009). Enhancing learner engagement in e-learning provision. *Assessment, Teaching and Learning Journal, 7,* 10-13.
Murah, M. Z. (2012, August 17). Teaching and learning cloud computing. *Procedia-Social and Behavioral Sciences, 59,* 157-163.
Mysirlaki, S., & Paraskeva, F. (2010). Designing Motivating Online Games for the Next Generation of Workers. *In International Conference on E-Learning in the Workplace,* New York, NY.

Nagunwa, T., & Lwoga, E. (2012). Developing eLearning technologies to implement competency based medical education: Experiences from Muhimbili University of Health and Allied Sciences. *International Journal of Education and Development using Information and Communication Technology*, 7-12.

Naidu, S. (2006). *e-learning: A Guidebook of Principles. Procedures and Practices, 2nd Revised Edition.* CEMCA.

Naismith, L. (2007). Using text messaging to support administrative communication in higher education. *Active Learning in Higher Education, 8(2),* 155-171.

Nardi, B. A., Whittaker, S., & Bradner, E. (2000). Interaction and Outeraction: Instant Messaging in Action. *Proceedings of the 2000 ACM conference on Computer supported cooperative work* (pp. 79-88). ACM.

Nawaz, A., & Khan, M. Z. (2012). Issues of technical support for e-Learning systems in higher education institutions. *International Journal of Modern Education and Computer Science (IJMECS), 4(2),* 38.

Nawaz, M., Hussain, F., & Zaka, B. (2013). Quality Assurance in e-learning: Study of e-learning Practices in Pakistan. *World Applied Sciences Journal, 28(2),* 236-249.

Nedeva, V. (2005). The possibilities of e-learning, based on Moodle software platform. *Trakia Journal of Sciences, 3(7),* 12-19.

Nelson, T. D. (2004). *Ageism: Stereotyping and prejudice against older persons.* MIT press.

Neri, R. B., Lopez, G. M., Barón, H. B., & Crespo, R. G. (2013). Annotation and Visualization in Android: An Application for Education and Real Time Information. *IJIMAI, 2(2),* 7-12.

Ng, I. C., & Forbes, J. (2009). Education as service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education, 19(1),* 38-64.

Ngimwa, P., & Wilson, T. (2012). An empirical investigation of the emergent issues around OER adoption in Sub-Saharan Africa. *Learning, Media and Technology, 37(4),* 398-413.

Nikoi, S., & Edirisingha, P. (2008). What can we learn from a WoLF? Mobile learning lessons from an HE in FE project. *Association for Learning Technology Annual Conference*. Leeds.

Nim Park, C., & Son, J. B. (2009). Implementing computer-assisted language learning in the EFL classroom: Teachers' perceptions and perspectives. *International Journal of Pedagogies and Learning, 5(2),* 80-101.

Nor, M. Z., & Mohamad, A. M. (2013). Challenges in Accepting the E-Learning System: The Case of E-Learners from Different Backgrounds of Study. *3rd International Conference For e-learning & Distance Education*, 1-14.

Ntinda, M., Thinyane, H., & Sieborger, I. (2014). m-Learning system enhancing mathematical concepts (m-LSEMC): A case study of University of Namibia and Rhodes. *In IST-Africa Conference Proceedings* (pp. 1-13). IEEE.

Nunnally, J., & Bernstein, I. (1994). *Psychometric theory (3rd ed.).* New York: McGraw-Hill.

Nwabufo, B., Umoru, T., & Olukotun, J. (2013). The Challenges of E-Learning in Tertiary Institutions in Nigeria. *International conference the future of education*.

O'reilly, T. (2005). *Web 2.0: compact definition.* Retrieved from Radar: http://radar. oreilly. com/archives/2005/10/web_20_compact_definition. html.

Ocak, M. A. (2011). Why are faculty members not teaching blended courses? Insights from faculty members. *Computers & Education, 56(3),* 689-699.

Oh, E., & Park, S. (2009). How are universities involved in blended instruction? *Journal of Educational Technology & Society, 12(3),* 327-342.
Okine, R. K., Agbemenu, A. S., & Marfo, J. S. (2012). Access to Internet Connectivity: the Major Bottleneck to the Adoption of Technology-Enabled Education. *n.d.*, n.d.
Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African journal of Business management, 4(5),* 729.
Oliver, B. (2005). Australian university students' use of and attitudes towards mobile learning technologies. *IADIS international conference: Mobile learning.* IADIS.
Oliver, R. (2001). Assuring the quality of online learning in Australian higher education. *Proceedings of 2000 Moving Online Conference* (pp. 222-231). Gold Coast, QLD: Norsearch Reprographics.
Olt, M. R. (2002). Ethics and distance education: Strategies for minimizing academic dishonesty in online assessment. *Online journal of distance learning administration, 5(3)*.
Omwenga, E. I. (2006). Pedagogical issues and e-learning cases: Integrating ICTs into the teaching and learning process. *School of Computing and Informatics*, 1-11.
Ong, C. S., Lai, J. Y., & Wang, Y. S. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information & management, 41(6),* 795-804.
Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information systems research, 2(1),* 1-28.
Ostwald, M. J. (1992). The Application of Problem Based Learning to Distance Education. *World Conference of the International Council for Distance Education.* Bangkok, Thailand: ERIC.
Ouamani, F., en Saoud, N. B., & Ben Ghézala, H. H. (2013). Management of socio-cultural knowledge using an ontology-based socio-cultural user profile in a computer-supported collaborative learning environment. *Journal of Decision Systems, 23(1),* 40-54.
Outreach, N. (2005). *The Role of Higher Education in Economic Development: Higher Education Alliance for the Rock River Region.*
Ozudogru, F., & Hismanoglu, M. (2016). Views of Freshmen Students on Foreign Language Courses Delivered via E-Learning. *Turkish Online Journal of Distance Education, 17(1),* 31-47.
Pachler, N., Bachmair, B., & Cook, J. (2009). *Mobile learning: structures, agency, practices.* New York: Springer Science & Business Media.
Pagram, P., & Pagram, J. (2006). Issues in e-learning: A THAI Study. *EJISDC*, 1-8.
Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: a multiple-item scale for measuring customer perceptions of service quality. *Journal of Retailing, 64(1),* 12-40.
Parboteeah, K. P., Bronson, J. W., & Cullen, J. B. (2005). Does national culture affect willingness to justify ethically suspect behaviors? A focus on the GLOBE national culture scheme. *International Journal of Cross Cultural Management, 5(2), ,* 123-138.
Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 150-162.
Parrish, M. S., Klem, J. L., & Brown, D. R. (2012). Diversity in Learning: A Comparison of Traditional Learning Theories With Learning Styles and Cultural Values of Native American Students. *Ideas and Research You Can Use*, 1-9.

Parsons, T. (1955). The Social System, . *The Free Press New York*.

Parsons, T., Shils, E. A., & Smelser, N. J. (1965). *Towards a general theory of action:theoretical foundation for the social sciences.* New York: Transaction Publishers.

Patterson, P. G., & Anuwichanont, J. (2003). The Impact of Key Personality Constructs on the Satisfaction, Trust, Loyalty Relationship in a Services Context. *In Annual Conference of the Australian and New Zealand Marketing Academy*, (pp. 3-5). Adelaide.

Paul, R. J., & Chen, S. Y. (2003). Individual differences in web-based instruction-an overview. *British Journal of Educational Technology*, 385-392.

Pavlou, P. A., & Chai, L. (2002). What Drives Electronic Commerce across Cultures? Across-Cultural Empirical Investigation of the Theory of Planned Behavior. *J. Electron. Commerce Res., 3(4)*, 240-253.

Pedrelli, M. (2001). *Developing countries and the ICT revolution.* Luxembourg: European Parliament.

Pegrum, M. (2009). From blogs to bombs: The future of digital technologies in education. *UWA publishing*.

Pegrum, M., Oakley, G., & Faulkner, R. (2013). Schools going mobile: A study of the adoption of mobile handheld technologies in Western Australian independent schools. *Australasian Journal of Educational Technology, 29(1)*.

Peng, P. J., & Samah, A. J. (2006). Measuring Students' Satisfaction for Quality Education in a e-learning university. *Unitar E-Journal, 2(1),* , 11-21.

Pi, S. M., Liu, Y. C., Chen, T. Y., & Li, S. H. (2008). The influence of instant messaging usage behaviour on organizational communication satisfaction. *Proceedings of the 41st Hawaii International Conference on System Sciences* (p. 449). Hawaii: IEEE.

Picciano, A. G., & Seaman, J. (2007). *K–12 Online learning: A survey of U.S. school districts administrators.* USA: Sloan-C.

Pilgrim, J., Bledsoe, C., & Reily, S. (2012). New Technologies in tlie Ciassroom. *The Delta Kappa Gamma Bulletin*.

Pinsonneault, A., & Kraemer, K. (1993). Survey research methodology in management information systems: an assessment. *Journal of management information systems, 10(2)*, 75-105.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic. *Journal of Educational Psychology*, 33-40.

Pituch, K. A., & Lee, Y. K. (2006). The influence of system characteristics on e-learning use. *Computers & Education, 47(2)*, 222-244.

Polkinghorne, D. (1983). *Methodology for the Human Sciences: Systems of Inquiry.* Albany, NY: State University of New York Press.

Pollack, T. A. (2003). Using a course management system to improve instruction. *In annual conference of the Association of Small Computer Users in Education, held at.* Myrtle Beach, South Carolina.

Ponterotto, J. G. (2005). Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of counseling psychology, 52(2)*, 126.

Poon, W. C., & Koo, A. C. (2010). Mobile learning: the economics perspective. *International Journal of Innovation and Learning, 7(4)*, 412-429.

Posner, B. Z., & Munson, J. M. (1979). The importance of values in understanding organizational behavior. *Human Resource Management, 18*(3), 9-14.

Prakasam, A. R. (2013). Enhancing cloud based E-learning using knowledge sharing system. *E-learning, 84(9).*

Prasongsukarn, K. (2009). Validating the cultural value scale (CVSCLAE): A case study of Thailand. *ABAC journal, 29(2),* , 1-13.

Pratas, E., & Marques, V. (2012). Adaptive e-Learning Systems Foundational Issues of the ADAPT Project. *Computational Intelligence and Decision Making Intelligent Systems, Control and Automation: Science and Engineering*, 429-438.

Pratas, E., & Marques, V. M. (2012). Adaptive e-Learning Systems Foundational Issues of the ADAPT Project. *Computational Intelligence and Decision Making Intelligent Systems, Control and Automation: Science and Engineering*, 429-438.

Pratt, D. D. (1991). Conceptions of self within China and the United States: Contrasting foundations for adult education. *International Journal of Intercultural Relations, 15(3),* 285-310.

Qureshi, I. A., Ilyas, K., Yasmin, R., & Whitty, M. (2012). Challenges of implementing e-learning in a Pakistani university. *Knowledge Management & e-learning: An International Journal,* 310-324.

Qureshi, Q. A., Nawaz, A., & Khan, N. (2011). Prediction of the problems, user-satisfaction and prospects of e-learning in HEIs of KPK, Pakistan. *International Journal of Science and Technology Education Research, 2(2),* 13-21

Radijeng, K. (2010). Open access in institutions of higher learning in Botswana. *World library and information congress: 76th IFLA General conference and assembly* , 10-15.

Radović-Marković, M. (2010). Advantages and disadvantages of e-learning in comparison to traditional forms of learning. *Annals of the University of Petroşani, Economics*.

Ray, J. (2009). Faculty perspective: Training and course development for the online classroom. *Journal of Online Learning and Teaching, 5(2),* 263-276.

Reddi, U. V., & Mishra, S. (2005). *Perspectives on Distance Education: Educational Media in Asia.* Vancouver: Commonwealth of Learning.

Reeves, C. A., & Bednar, D. A. (1994). Defining quality: alternatives and implications. *Academy of management Review, 19(3),* , 419-445.

Reeves, T., & Li, Z. (2012). Teachers' technological readiness for online professional development: evidence from the US e-Learning for Educators initiative. *Journal of Education for Teaching, 38(4),* 389-406.

Reilly, J. R., Vandenhouten, C., Gallagher-Lepak, S., & Ralston-Berg, P. (2012). Faculty Development for E-Learning: A Multi-Campus Community of Practice (COP) Approach. *Journal of Asynchronous Learning Networks, 16(2),* 99-110.

Reynolds, K., Becker, K., & Fleming, J. (2013). Contemporary Challenges in E-learning. *Workforce Development*, 269-282.

Rhoades, G., & Smart, D. (1996). The political economy of entrepreneurial culture in higher education: Policies towards foreign students in Australia and the United States. *The social role of higher education: Comparative perspectives. New York: Garland*.

Rice, C. (1997). *Understanding Customers.* Oxford: Butter worth-Heinemann.

Roberto, A. J., Shafer, M. S., & Marmo, J. (2014). Predicting substance-abuse treatment providers' communication with clients about medication assisted treatment: A test of the theories of reasoned action and planned behavior. *Journal of substance abuse treatment, 47(5),* , 307-313.

Roca, J. C., Chiub, C.-M., & Martineza, F. J. (2006). Understanding e-learning continuance intention: An extension of the technology acceptance model. *International Journal of Human-Computer Studies, 64*, 68-696.

Rogers, E. (1983). *Diffusion of Innovations, Third Edition edn.* New York: The Free Press.

Rogers, E. (1995). *Diffusion of Innovations Fourth Edition edn.* New York: The Free Press.

Rogers, E. (2003). *Diffusion of innovations, 5th edn.* New York: Free Press.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. . *Psychological monographs: General and applied, 80(1),*.

Roy, A., & Raymond, L. (2005). e-Learning in support of SME. *In Proceedings of 5th European Conference on E-Learning*, 383-388.

Roy, A., & Raymond, L. (2005). e-Learning in support of SME: pipedream or reality. *In Proceedings of 5th European Conference on E-Learning* (pp. 383-388). n.d.: n.d.

Rutkowski, A. F., Vogel, D. R., Van Genuchten, M., Bemelmans, T., & Favier, M. (2002). E-collaboration: The reality of virtuality. *Professional Communication, IEEE Transactions on, 45(4)*, 219-230.

Ryu, H., & Parsons, D. (2012). Risky business or sharing the load?–Social flow in collaborative mobile learning. *Computers & Education, 58(2), ,* 707-720.

Saadé, R. (2003). Web-based educational information system for enhanced learning, EISEL: Student assessment. *Journal of Information Technology Education: Research, 2(1)*, 267-277.

Sackmann, S. A. (1992). Culture and Sub-Cultures:An analysis of organizational knowledge. *Administrative Science Quaterly*, 140-161.

Salaway, G., Caruso, J. B., & Nelson, M. R. (2008). The ECAR study of undergraduate students and information technology 2008. *EDUCAUSE Center for Applied Research.* Colorado: Boulder.

Salem, S. F., & Salem, S. O. (2015). Factors Influencing the-learning Management System (LMS) Success Among Undergraduate Students in Limkokwing University of Creative Technology, Malaysia. *International Journal of Multicultural and Multireligious Understanding, 2(3)*, 17-26.

Sambrook, S. (2003). E-learning in small organisation. *Technical Education and Industrial Training*, 506-516.

Sana, A., & Mariam, H. (2013). Use of Information and Communication technologies in e-learning System of Pakistan-a comparison study. *International Journal of Computer Science and Electronics Engineering*, 528-533.

Sandkull, O. (2005). Strengthening inclusive education by applying a rights-based approach to education programming. *In ISEC Conference*, (pp. 1-9). Glasgow.

Sangi, N. A. (2008). Electronic assessment issues and practices in Pakistan: a case study. *Learning, Media and Technology, 33(3)*, 191-206.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students (5th ed.).* Harlow, England: Prentice Hall.

Saxena, A., & Yadav, R. (2013). Impact Of Mobile Technology On Libraries: A Descriptive Study. *International Journal of Digital Library Services*, 1-13.

Scanlon, P. M. (2003). Student online plagiarism: how do we respond? *College Teaching, 51(4),* 161-165.

Schein, E. H. (1985a). How Culture forms,develops, and changes. In R. H. Kilman, M. J. Saxton, & R. Serpa, *Gaining Control of the corporate Culture* (pp. 17-43). San Francisco: Jossey-Bass.

Schein, E. H. (1985b). *Organizational culture and Leadership.* Jossy-Bass.

Schepers, J., & Wetzels, M. (2007). A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & management*, *44*(1), 90-103.

Schneider, B. B. (2013). Pathways to college and STEM careers: Enhancing the high school experience. *New directions for youth development (140)*, 9-29.

Schneider, S. L. (2013). The international standard classification of education 2011. *In Class and stratification analysis. Emerald Group Publishing Limited.*, 365-379.

Schoefer, K., & Ennew, C. (2005). The Impact of Perceived Justice on Consumers' Emotional Responses to Service Complaint Experiences. *Journal of Service Marketing, 19(5)*, 261-270.

Schott, M., Chernish, W., Dooley, K. E., & Lindner, J. R. (2003). Innovations in Distance Learning Program Development and Delivery. *Online Journal of Distance Learning*, n.d.

Schrum, L., & Hong, S. (2002). From the Field: Characteristics of Successful Tertiary Online Students and Strategies of Experienced Online Educators. *Education and Information Technologies*, 5-16.

Scutter, S., Stupans, I., Sawyer, T., & King, S. (2010). How do students use podcasts to support learning? *Australasian Journal of Educational Technolog, 26(2),*, 180-191.

Seagrave, S. (1995). *Lords of the Rim: The Invisible Empire of the Overseas Chinese*. London: Bantam Press.

Sekaran, U. (2000). *Research Methods For Business: A Skill-Building Approach* (3rd ed.). New York, NY: John Wiley & Sons.

Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computer & Education*, 396-413.

Selwyn, N. (2007). The use of computer technology in university teaching and learning: a critical perspective. *Journal of computer assisted learning, 23(2)*, 83-94.

Sen, A. (2004). How does culture matter. *Culture and public action, 38*.

Sevier, R. A. (1996). Those Important Things: What Every College President Needs To Know About Marketing and Student Recruiting. *College & University, (Spring)*, 9-16.

Shah, R. (2015). Protecting children in a situation of ongoing conflict: Is resilience sufficient as the end product? *International Journal of Disaster Risk Reduction*.

Shaikh, Z. A. (2009). Usage, acceptance, adoption, and diffusion of information and communication technologies in higher education: a measurement of critical factors. *Journal of Information Technology Impact, 9(2)*, 63-80.

Sharma, R. C. (2003). Barriers in using technology for education in developing countries. *World Conference on Education for All* (pp. 512-516). Jomtien: Browse Conference Publications.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. R. (2005). A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research, 58(7)*, 935-943.

Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a theory of mobile learning. *Proceedings of mLearn 2005, 1(1)*, 1-9.

Shelton, K. (2011). A review of paradigms for evaluating the quality of online education programs. *Online Journal of Distance Learning Administration, 14(1)*.

Shoham, A., & Pesämaa, O. (2013). Gadget loving: a test of an integrative model. *Psychology & Marketing, 30(3)*, 247-262.

Shonola, S. A., & Joy, M. S. (2014). Learners' Perception on Security Issues in M-learning (Nigerian Universities Case Study). *Exchanges: the Warwick Research Journal, 2(1)*, 102-122.

Sife, A., Lwoga, E., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development using Information and Communication Technology*, 57-67.

Song, S. H., & Keller, J. M. (2001). Effectiveness of Motivationally Adaptive Computer-Assisted Instruction on the Dynamic Aspects of Motivation. *ETR&D*, 5-22.

Soong, M. B., Chan, H. C., Chua, B. C., & Loh, K. F. (2001). Critical success factors for on-line course resources. *Computer & Education*, 101-120.

Sorey, K., & Duggan, M. H. (2008). Homeschoolers Entering Community Colleges: Perceptions of Admission Officers. *Journal of College Admission, 200*, 22-28.

Spector, J. M., Merrill, M. D., Merrienboer, J. V., & Driscoll, M. P. (2008). *Handbook of research on educational communications and technology* (3rd ed. ed.). New York: Lawrence Erlbaum Associates.

Spencer-Oatey, H. (2008). *Culturally Speaking. Culture, Communication and Politeness Theory.* Continuum International Publishing Group.

Spiliotopoulou, G. (2009). Reliability reconsidered: Cronbach's alpha and paediatric assessment in occupational therapy. *Australian Occupational Therapy Journal, 56(3)*, 150-155.

Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS quarterly*, 679-704.

Srite, M., Straub, D., Loch, K., Evaristo, R., & Karahanna, E. (2003). Inquiry into definitions of culture in IT studies. *Advanced topics in global information management, 2*, 30.

Staats, S., Hupp, J. M., Wallace, H., & Gresley, J. (2009). Heroes don't cheat: An examination of academic dishonesty and students' views on why professors don't report cheating. *Ethics & Behavior, 19(3)*, 171-183.

Stahl, G., Koschmann, T., & Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. *Cambridge handbook of the learning sciences*, 409-426.

Stansfield, M., Connolly, T., Cartelli, A., Jimoyiannis, A., Magalhães, H., & Maillet, K. (2009). The Identification of Key Issues in the Development of Sustainable e-Learning and Virtual Campus Initiatives. *Electronic Journal of e-Learning, 7(2)*, 155-164.

Stansfield, M., Connolly, T., Cartelli, A., Jimoyiannis, A., Magalhães, H., & Maillet, K. (2009). The Identification of Key Issues in the Development of Sustainable e-Learning and Virtual Campus Initiatives. *Electronic Journal of e-Learning, 7(2)*, 155-164.

Stevens, P., & Weale, M. (2004). 4 Education and economic growth. *International handbook on the economics of education, 164*.

Stouffer, S. A., & Toby, J. (1951). Role conflict and personality. *American Journal of Sociology*, 395-406.

Straub, D., Keil, M., & Brenner, W. (1997). Testing the technology acceptance model across cultures: A three country study. *Information & management, 33(1)*, 1-11.

Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Strike, M. (2002). Toward a theory Based Measurement of Culture. *Journal of gloabal information management, 10*, 13-23.
Sultan, N. (2010). Cloud computing for education: A new dawn?. *International Journal of Information Management, 30(2),* , 109-116.
Sultan, P., & Wong, H. Y. (2012). Service quality in a higher education context: an integrated model. *Asia Pacific Journal of Marketing and Logistics, 24(5),* , 755-784.
Sun, P. C., & Cheng, H. K. (2007). The design of instructional multimedia in e-Learning: A Media Richness Theory-based approach. *Computers & education, 49(3),* 662-676.
Surry, D. W., Ensminger, D. C., & Jones, M. (2005). A model for integrating instructional technology into higher education. *British journal of education technology*, 327-329.
Swan, K. (2004). Learning online: A review of current research on issues of interface, teaching presence and learner characteristics. *Elements of quality online education: Into the mainstream, 5*, 63-79.
Sweeney, J., O'donoghue, T., & Whitehead, C. (2004). Traditional face-to-face and web- based tutorials: a study of university students' perspectives on the roles of tutorial participants. *Teaching in Higher Education, 9(3),* 311–323.
Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston: Allyn and Bacon.
Tan, K. C., & Kek, S. W. (2004). Service quality in higher education using an enhanced SERVQUAL approach. *Quality in Higher Education, 10(1),* 17-24.
Tao, Y. H., Cheng, C. J., & Sun, S. Y. (2012). Alignment of Teacher and Student Perceptions on the Continued use of Business Simulation Games. *Educational Technology & Society, 15(3),* 177-189.
Taras, V., Kirkman, B. L., & Steel, P. (2010). Examining the impact of Culture's consequences: A three-decade, multilevel, meta-analytic review of Hofstede's cultural value dimensions. *Journal of Applied Psychology, 95(3),* 405.
Tarhini, A., Hone, K., Liu, X., & Tarhini, T. (2017). Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: a structural equation modeling of an extended technology acceptance model. *Interactive Learning Environments, 25(3),* 306-328.
Tashakkori, A., & Teddlie, C. (2010). *Handbook of mixed methods in social & behavioral research.* Sage.
Tayar, M. (2013). Challenges and opportunities for growth of e-Learning enrolments: an international business perspective. *30th ascilite Conference 2013 Proceedings.* Sydney: Macquaire University .
Taylor, S., & Todd, P. A. (1995a). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research, vol. 6, no. 2 (June),* pp. 144-176.
Tedre, M., Ngumbuke, F., & Kemppainen, J. (2010). Infrastructure, human capacity, and high hopes: A decade of development of e-Learning in a Tanzanian HEI. *RUSC. Revista de Universidad y Sociedad del Conocimiento, 7(1).*
Temizer, L., & Turkyilmaz, A. (2012). Implementation of student satisfaction index model in higher education institutions. *Procedia-Social and Behavioral Sciences, 46,*, 3802-3806.
Temple, J. (2001). *Growth effects of education and social capital in the OECD countries.* Centre for Economic Policy Research.
Teo, T. (2011). Modeling the determinants of pre-service teachers' perceived usefulness of e-learning. *Campus-Wide Information Systems, 28(2),* 124-140.

Teo, T., & Wong, S. L. (2013). Modeling key drivers of e-learning satisfaction among student teachers. *Journal of Educational Computing Research, 48(1)*, 71-95.
Tham, C. M., & Werner, J. M. (2005). Designing and evaluating e-learning in higher education: A review and recommendations. *Journal of leadership & organizational studies, 11(2)*, 15-25.
Thiruvathukal, G. K., & Laufer, K. (2004). Plone and content management. *Computing in Science & Engineering, 6(4)*, 88-95.
Thomas, P. L. (2010, September 22). Death to the Digital Dropbox: Rethinking Student Privacy and Public Performance.
Thomas, T., Singh, L., & Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *International Journal of Education and Development using ICT, 9(3)*.
Thompson, R., Higgins, C., & Howell, J. (1991). Personal Computing: Toward a Conceptual Model of Utilization. *MIS Quarterly, 15(1)*, 125-142.
Thurmond, V., Wambach, K., Connors, H., & Frey, B. (2002). Evaluation of student satisfaction: Determining the impact of a web-based environment by controlling for student characteristics. *The American journal of distance education, 16(3)*,169-190.
Ticehurst, G., & Veal, A. J. (2000). *Business research methods: a managerial approach.* French Forest, NSW: Longman, .
Timmerman, C. E., & Kruepke, K. A. (2006). Computer-assisted instruction, media richness, and college student performance. *Communication Education, 55(1)*, 73–104.
Tomusk, V. (2002). The rise of the transnational capitalist class and World Bank'aid'for higher education. *International Studies in Sociology of Education, 12(3)*, 335-352.
Traina, M., Doctor, D., Bean, E., & Wooldridge, V. (2005). Student code of conduct in the online classroom: A consideration of zero tolerance policies. *In World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, 2005(1)* (pp. 1855-1863). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
Traxler, J. (2010). Will Student Devices Deliver Innovation, Inclusion, and Transformation? *Journal of the Research Center for Educational Technology, 6(1)*, 3-15.
Triandis, H. C. (2000). Culture and conflict. *International Journal of Psychology, 35(2)*, 145-152.
Triandis, H. C., Bhawuk, D. P., Iwao, S., & Sinha, J. B. (1995). Multimethod probes of allocentrism and idiocentrism. *International journal of psychology, 30(4)*, 461-480.
Tricker, T., Rangecroft, M., Long, P., & Gilroy, P. (2001). Evaluating distance education courses: the student perception. *Assessment & Evaluation in Higher Education, 26(2)*, 165-177.
Trippe, A. P. (2002). Training for distance learning faculty. *Distance Education Online Symposium, 12*.
Trompenaars, F. (1996). Resolving International Conflict: Culture and Business Strategy. *Business Strategy Review, 7(3), 7*(3), 51-68.
Trompenaars, F., & Hampden-Turner, C. (1997). *Riding The Waves of Culture.* London: Nicholas Brealey.
Trompenars, F. O., & Hampden-Turner, C. (1993). *Riding the Waves of Culture.* New York: Mc-Graw Hills.

Tusubira, F., & Mulira, N. (2004). Integration of ICT in organisations: Challenges and best practice recommendations based on the experience of Makerere University and other organizations. *Universities – Taking a Leading Role in ICT Enabled Human Development*, 1-9.

Tylor, E. B. (1871). *Primitive culture: researches into the development of mythology, philosophy, religion, art, and custom (Vol. 2).* Murray.

Ünal, Y., Alır, G., & Soydal, İ. (2013). Students Readiness for E-Learning: An Assessment on Hacettepe University Department of Information Management. *Beyond the Cloud: Information…Innovation…Collaboration…*, 35-40.

UNESCO, I. f. (2012). *International Standard Classification of Education: ISCED 2011*. . Montreal, Quebec: UIS.

Ungku, A. A. (1997). Human resource development: The education and training aspect. *In Malaysia's Vision 2020: Understanding the concept and implications and Challenges, (Ed) Ahmad Sarji.* Selangor, Malaysia: Pelanduk Publications.

Valcke, M. (2004). ICT in higher education: An uncomfortable zone for institutes and their policies. *In Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (pp. 20-35). Perth: ASCILITE.

Van de Vijver, F., & Tanzer, N. K. (2004). Bias and equivalence in cross-cultural assessment: An overview. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, *54(2)*, 119-135.

Van den Berg, P. T., & Wilderom, C. P. (2004). Defining, measuring, and comparing organisational cultures. *Applied Psychology, 53(4)*, 570-582.

van Leusen, P., & Millard, M. (2013). Interpersonal Consulting Skills: Developing Effective Relationships with Online Faculty-A Multiple Case Study. *In World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, 2013(1)* (pp. 2150-2158). n.d: n.d.

Van Raaij, E. M., & Schepers, J. J. (2008). The acceptance and use of a virtual learning environment in China. *Computers & Education, 50(3)*, 838-852.

van't Hooft, M. (2008). Mobile, wireless, connected: Information clouds and learning. *Emerging technologies for learning, 3*, 30-46.

van't Hooft, M. (2008). Mobile, wireless, connected: Information clouds and learning. *Emerging technologies for learning, 3*, 30-46.

Veeramani, M. (2010). E-Learning: A conceptual framework. *International journal of educational research and technology, 1(2)*, 20-24.

Vencatachellum, I., & Munusam, V. (2006). Barriers to effective Corporate E-Learning in Mauri Tius. http://www.ufhrd.co.uk/wordpress/wp-content/uploads/2008/06/1-1_vencatachellum_munusami.pdf

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, 342-365.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision sciences*, *27*(3), 451-481.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management science, 46(2)*, 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly (27:3)*, pp. 425-478.

Venkatesh, V., Morris, M. G., Sykes, T. A., & Ackerman, P. L. (2004). Individual reactions to new technologies in the workplace: The role of gender as a psychological construct. *Journal of Applied Social Psychology, 34(3),* 445-467.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly, 36(1),* 157-178.

Vogiazou, Y. (2002). Wireless Presence and Instant Messaging. *Knowledge Media Institute, The Open University, United Kingdom, 21*.

Vonderwell, S. (2003). An examination of asynchronous communication experiences and perspectives of students in an online course: a case study. *The Internet and Higher Education, 6(1),* 77-90.

Vongjaturapat, S., & Chaveesuk, S. (2013). Mobile technology acceptance for library information service: A theoretical model. *In Information Society (i-Society), 2013 International Conference on* (pp. 290-292). IEEE.

Voogt, K. A. (2009). E-learning course design in teacher design teams: Experiences in the Open University of Tanzania. *13th Biannual Conference for Research on Learning and Instruction in Amsterdam* (pp. 1-16). Amsterdam: n.d.

Voyler, T., & Lord, D. (2000). Critical Success Factor in Online Education. *The International Journal of Educational Management, 40(6),* 1282-1309.

Vrasidas, C. (2004). Issues of pedagogy and design in e-learning systems. *In Proceedings of the 2004 ACM symposium on Applied computing*, 911-915.

Wainstein, B. K., Sterling-Levis, K. B., Taitz, J., & Brydon, M. (2006). Use of the Internet by parents of paediatric patients. *Journal of paediatrics and child health, 42(9),* 528-532.

Wan, Z., Fang, Y., & Neufeld, D. J. (2007). The role of information technology in technology-mediated learning: A review of the past for the future. *Journal of Information Systems Education*, *18*(2), 183.

Wang, A., An, N., Chen, G., Li, L., & Alterovitz, G. (2015). Predicting hypertension without measurement: A non-invasive, questionnaire-based approach. *Expert Systems with Applications, 42(21),* 7601-7609.

Wang, Q., Zhu, Z., Chen, L., & Yan, H. (2009). E-learning in China. *Campus-Wide Information Systems*, 77-81.

Watson, S., Saldaña, A., & Harvey, L. (2002). *The 2002 Report on the Student Experience at UCE*. Birmingham: University of Central England in Birmingham, Centre for Research into Quality.

Waycott, J., Bennett, S., Kennedy, G., Dalgarno, B., & Gray, K. (2010). Digital divides? Student and staff perceptions of information and communication technologies. *Computers & education, 54(4),* 1202-1211.

Weaver, D., Robbie, D., & Borland, R. (2008). The practitioner's model: Designing a professional development program for online teaching. *International Journal on E-learning, 7(4),* 759-774.

Weaver, D., Spratt, C., & Nair, C. S. (2008). Academic and student use of a learning management system: Implications for quality. *Australasian Journal of Educational Technology, 24(1),* 30-41.

Webster, J., & Martocchio, J. J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quarterly, 16,* 201–226.

Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British journal of educational technology, 39(6),*, 987-995.

Whipple, R. (2006). E-Body Language:. *T AND D, 60 (2)*, 20- 22

Wiksten, D. L., Patterson, P., Antonio, K., De La Cruz, D., & Buxton, B. P. (1998). The effectiveness of an interactive computer program versus traditional lecture in athletic training education. *Journal of athletic training, 33(3)*, 238.

Wild, R., Griggs, K., & Downing, T. (2002). A framework for e-learning as a tool for knowledge management. *Industrial Management & Data Systems, 102(7)*, 371-380.

Williams, J. (2002). Student Satisfaction; a British model of effective use of student feedback in quality assurance and enhancement. *In 14th International Conference on Assessment and Quality in Higher Education.*

Williamson, G. R., Maramba, I., Jones, R. B., & Morris, J. (2009). Undergraduate nurses' and midwives' participation and satisfaction with live interactive webcasts. *The Open Nursing Journal, 3(1).*

Willis, B. (1994). Enhancing faculty effectiveness in distance education. *Distance education: Strategies and tools*, 277-290.

Winschiers-Theophilus, H. (2009). Cultural appropriation of software design and evaluation. . *In Handbook of Research on Socio-technical Design and Social Networking Systems. IGI Global.*, 699-710.

Wong, L. C., Aggarwal, S. M., & Beebee, P. L. (2005). Methods and systems for controlling access to presence information according to a variety of different access permission types.

Wong, S. K., Nguyen, T. T., Chang, E., & Jayaratna, N. (2003). Usability Metrics for E-learning. *On The Move to Meaningful Internet Systems 2003: OTM 2003 Workshops*, 235-252.

Wong, W. T., & Huang, N. T. (2015). The effects of e-learning system service quality and users' acceptance on organizational learning. *International Journal of Business and Information, 6(2).*

Wu, D., & Hiltz, S. R. (2004). Predicting learning from asynchronous online discussions. *Journal of Asynchronous Learning Networks, 8(2)*, 139-152.

Yaakop, A. Y. (2015). Understanding Students' Acceptance and Adoption of Web 2.0 Interactive EduTools. *In Taylor's 7th Teaching and Learning Conference 2014 Proceedings* (pp. 127-136). Singapore: Springer.

Yaghoubi, J., Malek Mohammadi, I., Iravani, H., & Attaran, M. (2008). Desired Characteristics of Faculty Members and Students in E-Learning in Higher Education of Iran: Virtual Students' Viewpoint. *Quarterly journal of Research and Planning in Higher Education, 14(1)*, 160173-0.

Yang, F., Fang, Y., & Wang, S. (2013). E-learning privacy: perceptions of east asian students. *Hybrid learning learning and continuing education*, 256-268.

Yang, S. (2013). Understanding Undergraduate Students' Adoption of Mobile Learning Model: A Perspective of the Extended UTAUT2. *Journal of Convergence Information Technology, 8(10).*

Yoo, B., Donthu, N., & Lenartowicz, T. (2011). Measuring Hofstede's five dimensions of cultural values at the individual level: Development and validation of CVSCALE. *Journal of International Consumer Marketing, 23(3-4),*, 193-210.

Yoo, S. J., Han, S. H., & Huang, W. (2012). The roles of intrinsic motivators and extrinsic motivators in promoting e-learning in the workplace: A case from South Korea. *Computers in Human Behavior, 28(3),* 942-950.

Zamzuri, Z. F., Manaf, M., Ahmad, A., & Yunus, Y. (2011). Computer security threats towards the e-learning system assets. *Software engineering and computer system,* 335-345.

Zeithaml, V. A., & Bitner, M. J. (2000). Service Marketing: Integrating Customer Focus Across the Firm (Second Edition ed.). *USA: McGraw-Hill Companies Inc.*

Zengin, B., Arikan, A., & Dogan, D. (2011). Opinions of English Major Students about Their Departments' Websites. *Online Submission, 2(4),* 294-307.

Zhang, D., & Nunamaker, J. F. (2003). Powering e-learning in the new millennium: an overview of e-learning and enabling technology. *Information Systems Frontiers, 5(2),* 207-218.

Zigurs, I., & Buckland, B. K. (1998). A theory of task/technology fit and group support systems effectiveness. *MIS quarterly,* 313-334.

Zikmund, W. G. (2003). *Business Research Methods, 7th edn.* Ohio: South-Western.

Zinman, A., & Donath, J. (2009). Signs: Increasing Expression and Clarity in Instant Messaging. *In System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on IEEE* (pp. 1-10). Hawaii: IEEE.

Appendices

Appendix A

Your participation is highly appreciated in this research effort. Your participation is voluntary and your responses to these questions will be kept confidential. The data collected from this questionnaire will only be used for research purpose. Thank you for your co-operation!

Demographics

Gender

- ☐ Male
- ☐ Female

Age (Years)

- ☐ 15-20
- ☐ 21-25
- ☐ 26-30
- ☐ 31-Above

Education

- ☐ PhD
- ☐ Masters
- ☐ Bachelors
- ☐ Other

Total Monthly <u>Household</u> Income (Rupees)

- ☐ Less than 50,000
- ☐ 50,000-100,000
- ☐ 101,000-200,000
- ☐ Above 200,000

Based upon the following indicators of quality for Higher Education Services, kindly rate your preference on the options mentioned with reference to the given scale:

1. Strongly Disagree **2**. Disagree **3.** Neutral **4.** Agree **5.** Strongly Agree

Indicators	**Face to Face**	**TV**	**Radio**	**Desktop/ Computer**	**Laptop**	**Mobile**	**Tablet**
1.Course content							
2.Facilities							
3.Lecturer's Concern for Students							
4.Social activities							
5.Communication with University							
6.Assessment							
7.Counselling Services							
8.People							

Please select one of the following devices on which you would prefer to receive ALL the above mentioned indicators of quality for Higher Education Service:

- □ TV
- □ Radio
- □ Desktop/Computer
- □ Laptop
- □ Mobile
- □ Table

Appendix B

Please take a few minutes to complete this survey. The purpose of this survey is to determine cultural values of an individual that how individuals from different cultures perceive different situations. This survey is anonymous and the information will be used only for research purposes. Thank you in advance for the participating in the survey.

Demographics

Gender

- ☐ Male
- ☐ Female

Age (Years)

- ☐ 15-20
- ☐ 21-25
- ☐ 26-30
- ☐ 31-Above

Education

- ☐ PhD
- ☐ Masters
- ☐ Bachelors
- ☐ Other

Total Monthly <u>Household</u> Income (Rupees)

- ☐ Less than 50,000
- ☐ 50,000-100,000
- ☐ 101,000-200,000
- ☐ Above 200,000

Cultural Value Scale	SD	DA	N	A	SA
Power Distance					
1. People in higher positions should make most decisions without consulting people in lower positions.					
2. People in higher positions should not ask the opinions of people in lower positions too frequently.					
3. People in higher positions should avoid social interaction with people in lower positions.					
4. People in lower positions should not disagree with decisions by people in higher positions.					
5. People in higher positions should not delegate important tasks to people in lower positions.					
Uncertainty Avoidance					

1. It is important to have instructions spelled out in detail so that I always know what I'm expected to do.					
2. It is important to closely follow instructions and procedures.					
3. Rules and regulations are important because they inform me of what is expected of me.					
4. Standardized work procedures are helpful.					
5. Instructions for operations are important.					
Individualism/Collectivism					
1. Individuals should sacrifice self-interest for the group (either at school or the work place).					
2. Individuals should stick with the group even through difficulties.					
3. Group welfare is more important than individual rewards.					
4. Group success is more important than individual success.					
5. Individuals should only pursue their goals after considering the welfare of the group.					
6. Group loyalty should be encouraged even if individual goals suffer.					
Masculinity/Femininity					
1. It is more important for men to have a professional career than it is for women.					
2. Men usually solve problems with logical analysis; women usually solve problems with intuition.					

3. Solving difficult problems usually requires an active, forcible approach, which is typical of men.					
4. There are some jobs that a man can always do better than a woman.					
Long-term Orientation/Short-term Orientation					
1. Careful management of money (Thrift).					
2. Going on resolutely in spite of opposition (Persistence).					
3. Personal steadiness and stability.					
4. Long-term planning.					
5. Giving up today's fun for success in the future.					
6. Working hard for success in the future.					

Appendix C

Your participation is highly appreciated in this research effort. Your participation is voluntary and your responses to these questions will be kept confidential. The data collected from this questionnaire will only be used for research related to technology acceptance. Thank you for your co-operation!

Demographics

Gender

- ☐ Male
- ☐ Female

Age (Years)

- ☐ 15-20
- ☐ 21-25
- ☐ 26-30
- ☐ 31-Above

Education

- ☐ PhD
- ☐ Masters
- ☐ Bachelors
- ☐ Other

Total Monthly <u>Household</u> Income (Rupees)

- ☐ Less than 50,000
- ☐ 50,000-100,000
- ☐ 101,000-200,000
- ☐ Above 200,000

Answer the following questions considering each of the devices mentioned with reference to given scale:

1. Strongly Disagree **2**. Disagree **3.** Neutral **4.** Agree **5.** Strongly Agree

Questions	**TV**	**Radio**	**Desktop/ Computer**	**Laptop**	**Mobile**	**Tablet**
Performance Expectancy						
1. I find the device useful in my daily life.						
2. Using the device helps me accomplish things more quickly.						
3. Using the device increases my productivity.						
Effort Expectancy						
1.Learning how to use the device is easy for me.						
2.My interaction with the device is clear and understandable.						
3.I find the device easy to use.						
4.It is easy for me to become skilful at using the device.						

Social Influence						
1.People who are important to me think that I should use the device						
2.People who influence my behaviour think that I should use the device						
3. People whose opinions that I value prefer that I use the device.						
Facilitating Conditions						
1. I have the resources necessary to use the device.						
2. I have the knowledge necessary to use the device.						
3. The device is compatible with other technologies I use.						
4. I can get help from others when I have difficulties using the device.						
Hedonic Motivation						
1. Using the device is fun.						
2. Using the device is enjoyable.						
3. Using the device is very entertaining						
Price Value						
1. The device is reasonably priced.						
2. The device is a good value for the money.						
3. At the current price, the device provides a good value.						
Habit						
1. The use of the device has become a habit for me.						
2. I am addicted to using the device.						
3. I must use the device.						

Behavioural Intention						
1. I intend to continue using the device in the future.						
2. I will always try to use the device in my daily life.						
3. I plan to continue to use the device frequently.						

Appendix D

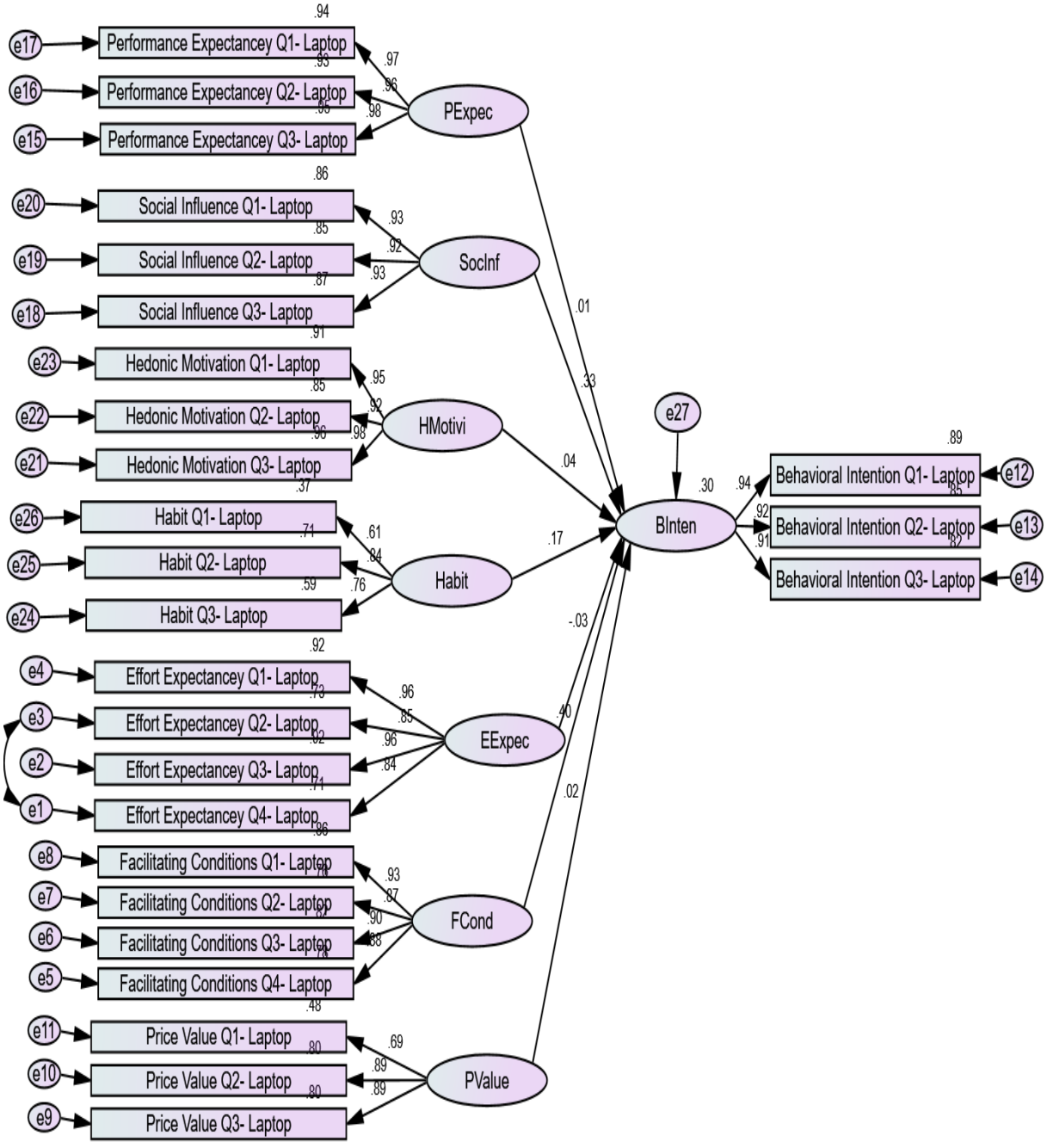

Figure D1: Laptop Technology Acceptance: Structured Model for Face to Face Cluster

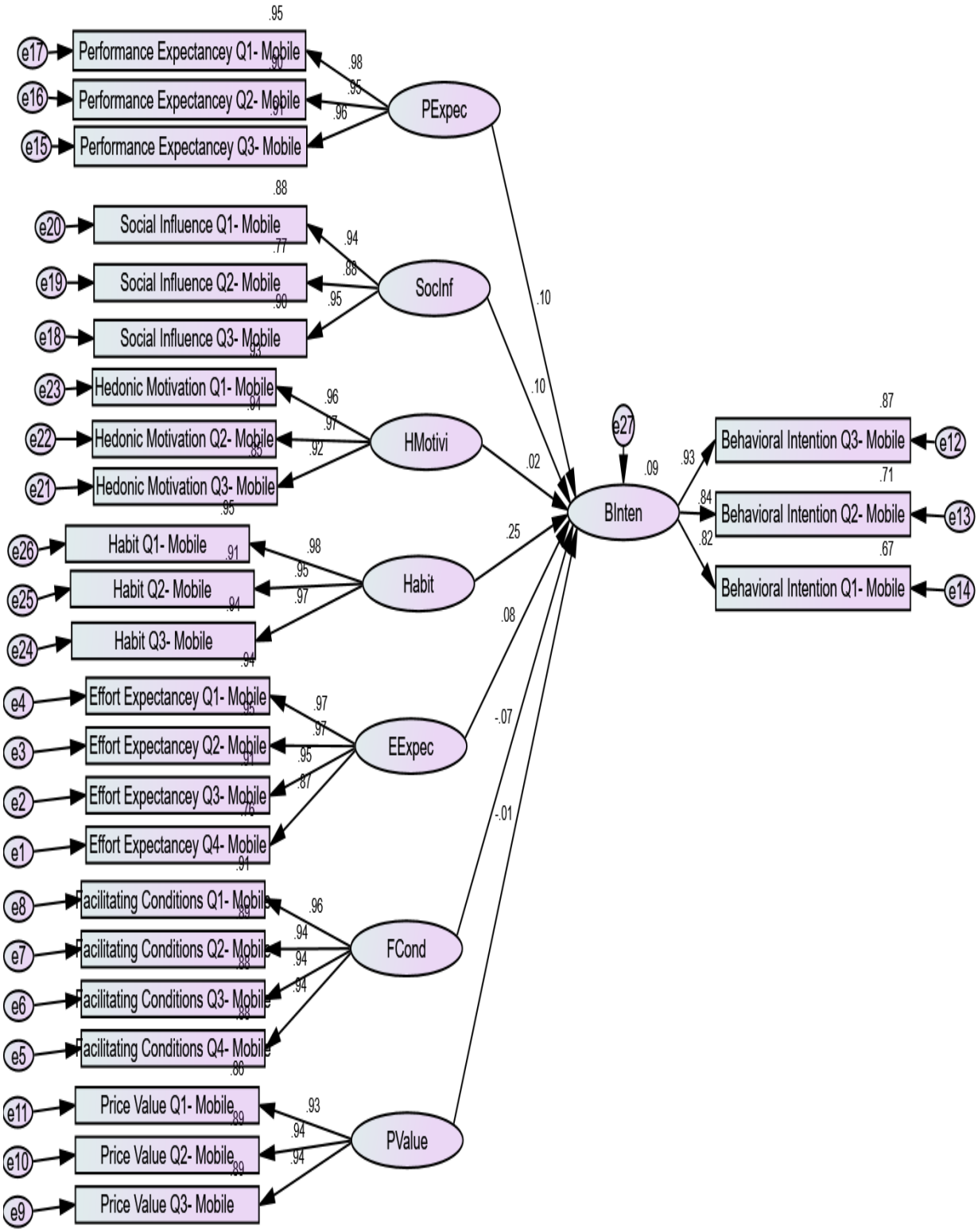

Figure D2: Mobile Technology Acceptance: Structured Model for Face to Face Cluster

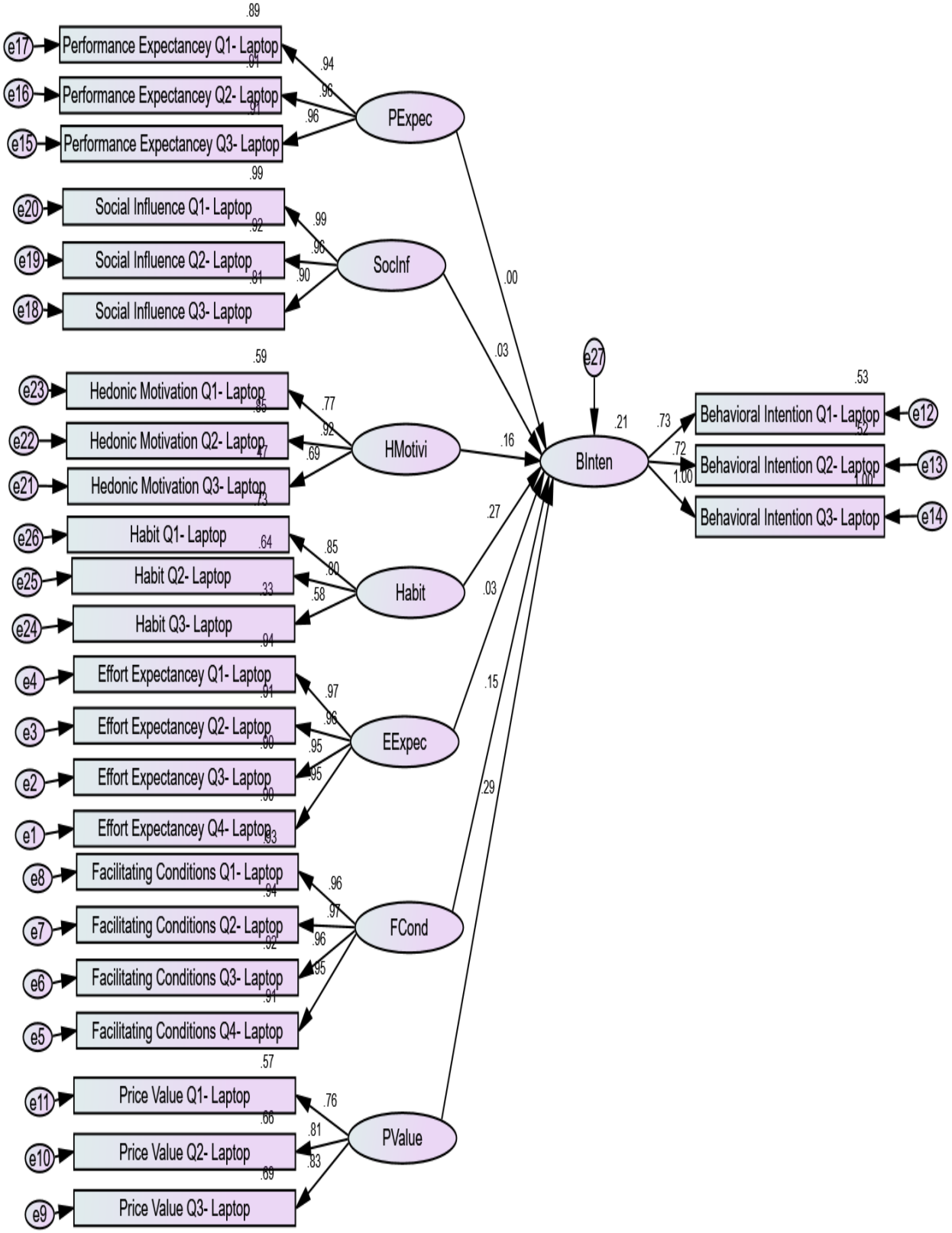

Figure D3: Laptop Technology Acceptance: Structured Model for Mobile Cluster

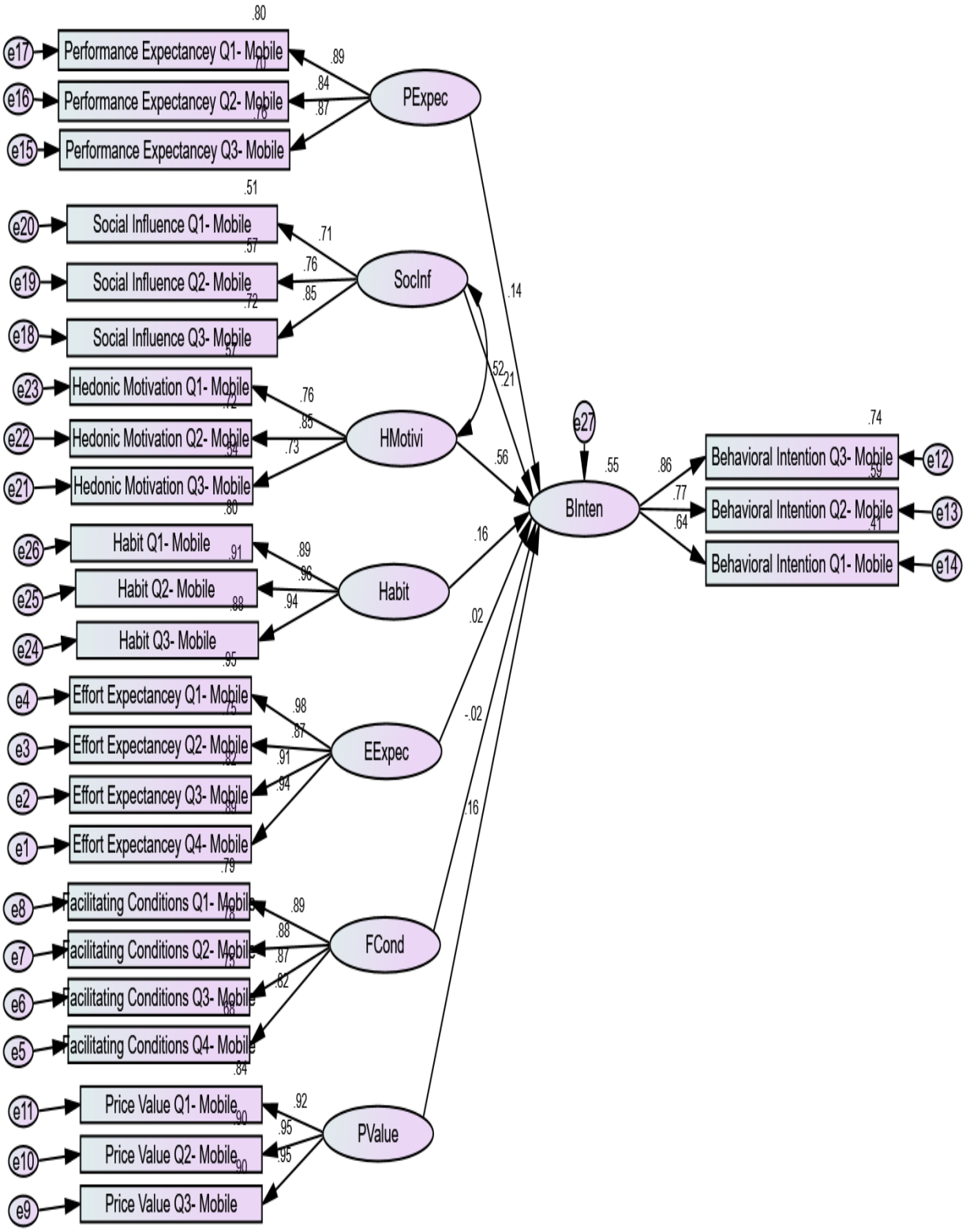

Figure D4: Mobile Technology Acceptance: Structured Model for Mobile Cluster

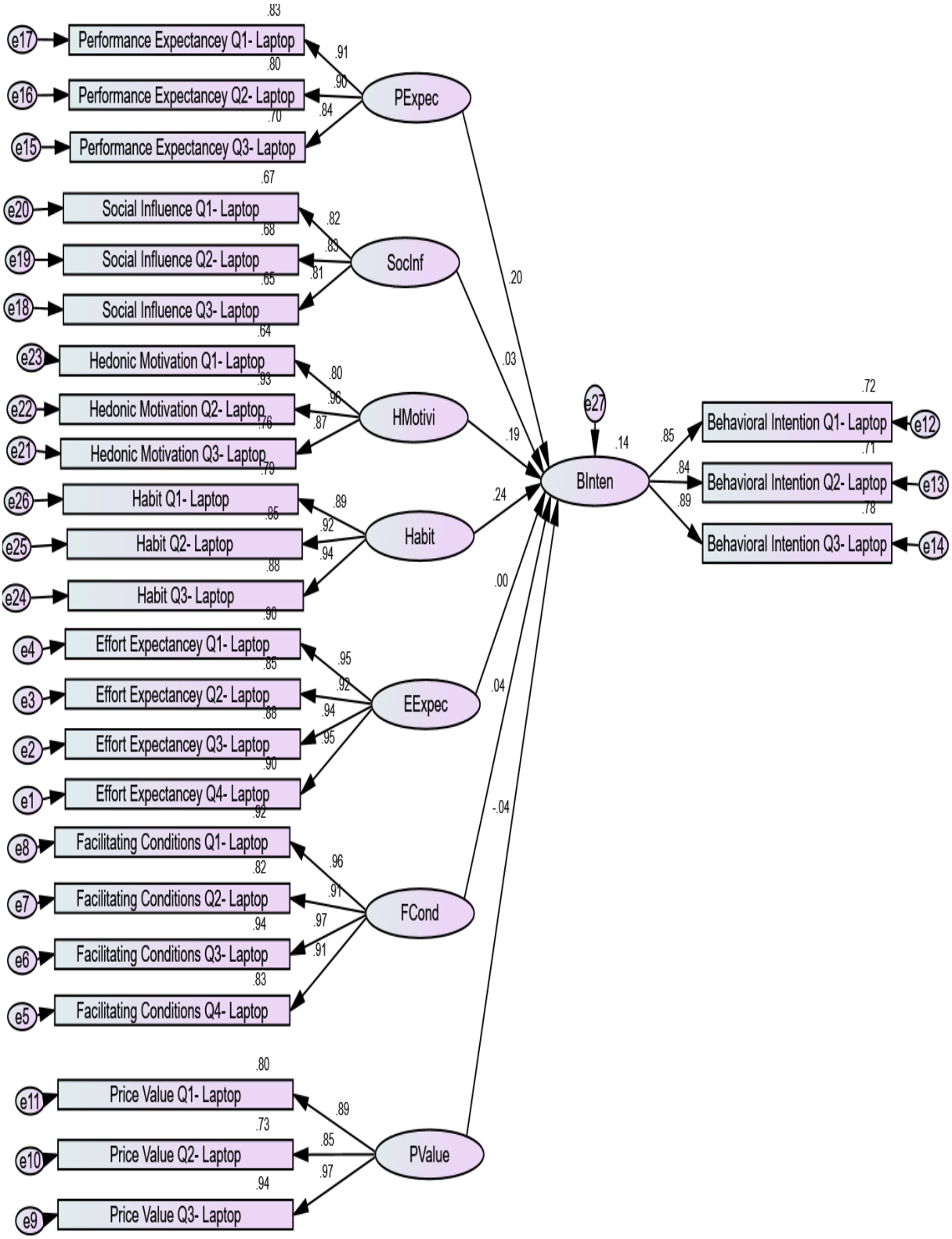

Figure D5: Laptop Technology Acceptance: Structured Model for Laptop Cluster

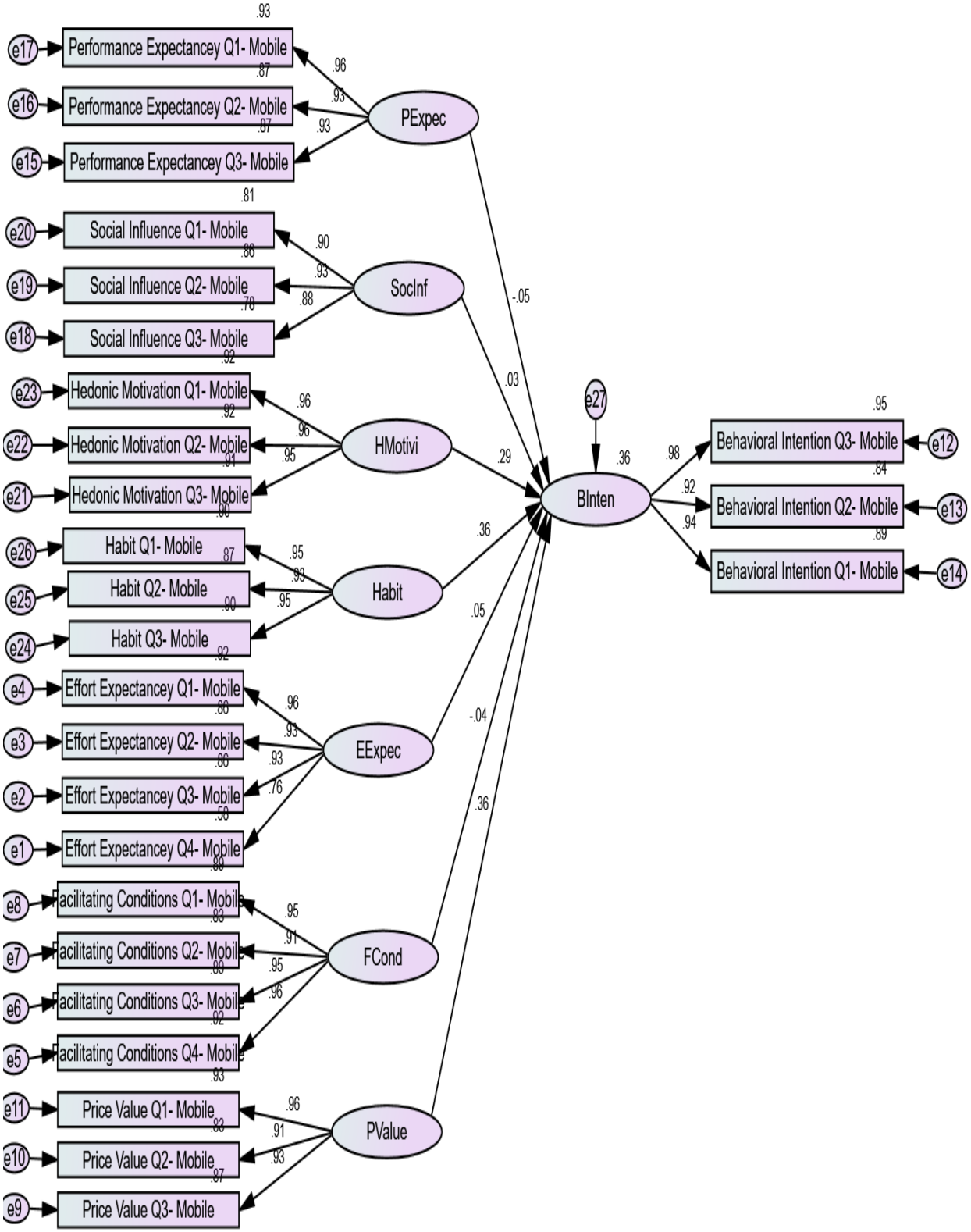

Figure D6: Mobile Technology Acceptance: Structured Model for Laptop Cluster