EMERGING PARADIGM OF INFORMATION AND COMMUNICATION TECHNOLOGIES USE IN TEACHER TRAINING INSTITUTIONS OF PAKISTAN

By

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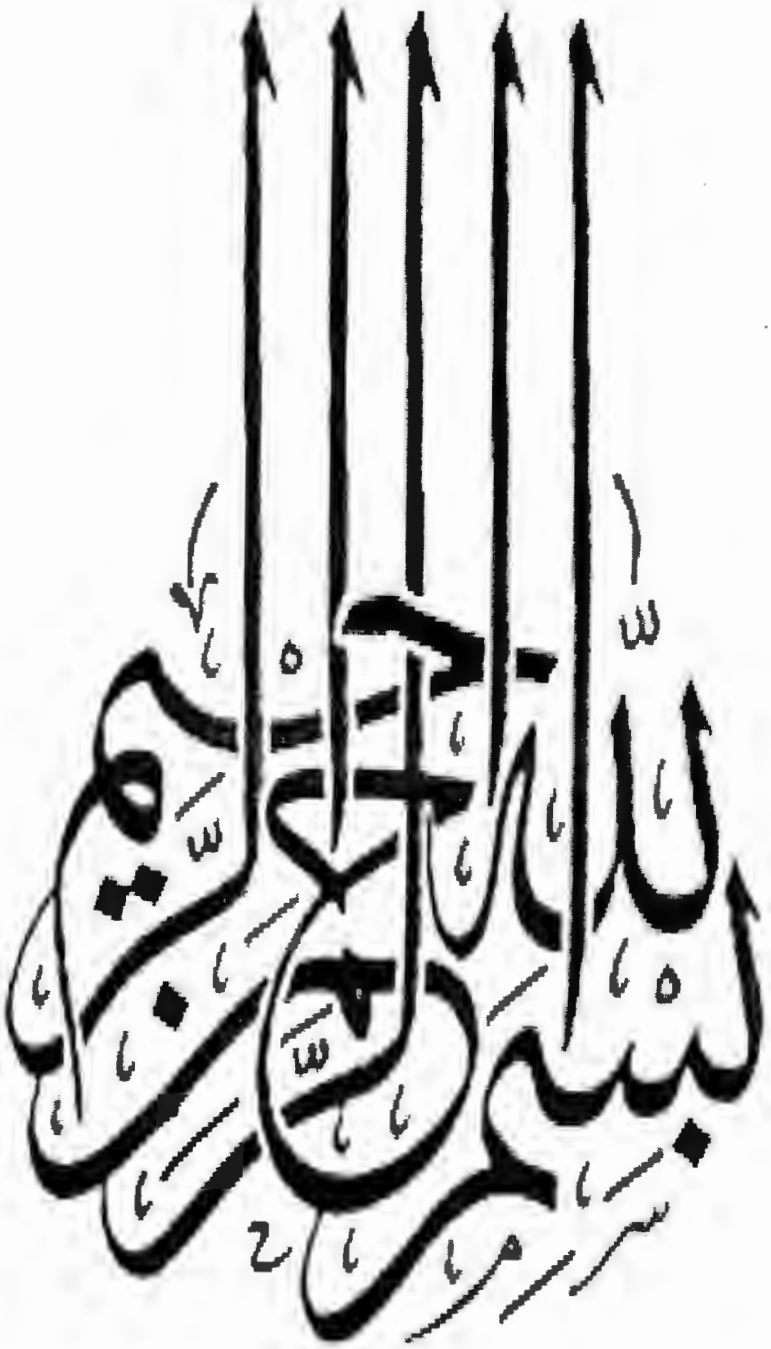
بسم الله الرحمن الرحيم

Dedicated

To

MY VERY KIND, AFFECTIONATE, EVER LOVING,

COURAGEOUS AND BELOVED

PARENTS

THEIR PRAYERS AND LOVE

TAKE ME TO THE APEX OF GLORY AND

TRANSFORM MY DREAMS INTO REALITY

MAY ALLAH ALMIGHTY LIVE THEM LONG AND

BLISSFUL

FORWARADING SHEET

This thesis entitled, "Emerging Paradigm of Information and Communication Technologies Use in Teacher Training Institutions of Pakistan" accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Education.

Prof. Dr. Muhammad Zafar Iqbal
Supervisor

APPROVAL SHEET

EMERGING PARADIGM OF INFORMATION AND COMMUNICATION TECHNOLOGIES USE IN TEACHER TRAINING INSTITUTIONS OF PAKISTAN

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ABSTRACT

The study "Emerging Paradigm of Information and Communication Technologies Use in Teacher Training Institutions of Pakistan" was conducted through survey approach. Main objectives of the study were to; (1) Assess the teachers' and students' attitude towards the use of ICTs, (2) Evaluate the existing situation of ICTs utilization, (3) Investigate the teachers' and students' skills to use these technologies and (4) Examine the barriers in the utilization of ICTs.

Population of the study consisted of 3609 students of B.Ed, M.Ed and MA Education and their 442 teachers. A sample of 1805 students out of 3609 and all of 442 teachers were taken through random and universal sampling techniques respectively. A questionnaire was developed on five point Likert scale to elicit the opinions of students and teachers.

The major findings of the study were; (1) Majority of the teachers and students are frequent user of e-mailing, word-processing and Internet browsing. (2) A considerable number of teachers was infrequent user of spreadsheets. (3) Majority of the teachers opined that that they have good skills of e-mailing, word-processing, presentations and Internet browsing while they have insufficient skills to use spreadsheets. (4) Majority of the respondents both teachers and students opined that lack of training, power failure, lack of hardware and lack of confidence were major barriers in up taking these technologies.

On the basis of the findings it was concluded that (1) Both teachers and students have positive attitude towards ICTs. (2) Both teachers and students are frequent user of e-mailing, word-processing and Internet browsing. (3) Both teachers

and students have sufficient skills to use e-mailing, word-processing and Internet browsing while teachers have insufficient skills to use spreadsheets. Similarly students have insufficient skill to use spreadsheets and presentation technologies. (4) Major barrier to the uptake of ICTs were lack of training, power failure, lack of hardware and lack of confidence.

Therefore, on the basis of these conclusions the following recommendations were made (1) Maximum deployment of these technologies may be ensured to address the barrier of lack of hardware. (2) A judicious policy may be developed and implemented for continuous training of technological usage so that teachers may become familiar with advancement in these technologies. (3) Use of spreadsheets and presentations may be enhanced (4) Especial emphasis may be given to address the problems of lack of training, power failure, lack of hardware and lack of confidence.

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ABBREVIATIONS

ADB	Asian Development Bank
BCS	Bachelor in Computer Science
B.Ed	Bachelor in Education
CD	Compact Disk
COL	Commonwealth of Learning
ET	Educational Technology
GB	Gigabyte
HEC	Higher Education Commission of Pakistan
ICTs	Information and Communication Technologies
IIUI	International Islamic University Islamabad
KB	Kilobyte
MB	Megabyte
M.Ed	Master of Education
MoE	Ministry of Education
NDL	National Digital Library
NICT	National Information and Communication Technology
PERN	Pakistan Educational Research Network
PhD	Doctor of Philosophy
PRR	Pakistan Research Repository
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WWW	World Wide Web

CHAPTER 1

INTRODUCTION

Education has got paramount importance in the 21st century due to emergence of globalization. In the process of advancement and competition information and communication technologies (ICTs) has been the sole potent driving factor of globalization. In this fast, changing and competitive world, education and technology are the master keys for respectable survival, growth and development; especially information technology offers some extraordinary opportunities in education (Government of Pakistan, 2007).

ICT has played vital role in the advancement of teachers' professional development throughout the world and these are helpful for continuing professional development of teachers. The current and emerging communication and information technologies provide unique opportunities to continue the professional development of teachers and other educators. National Education Policy 1998-2010 (1998, p.88) has given special emphasis for the integration of ICT in education in these words, "The investment in information technology infrastructure and its network will bring our institutions of higher education on the world map". (Government of Pakistan, 1998)

ICT plays a significant role in the professional development of teachers and administrators, consequently in enhancing the quality of education. To improve education in Pakistan, the needs of our teachers, head teachers, and administrators must be addressed holistically. ICT can enhance teaching quality by supporting and reinforcing the use of innovative teaching practices. It can allow educators to access a wide array of materials, reducing isolation and permitting peer-exchanges (Ministry of Education, 2003).

The success of technology use in the educational settings largely depends on teachers' attitudes toward technology use (Albirini, 2006, Baylor & Ritchie, 2002) and there is significant positive correlation between teachers' level of ICT use and their attitudes levels. Teachers' attitudes levels towards the use of ICT had a direct relation with the use of ICT for educational purposes. In other words, the correlation findings revealed that there was significant positive correlation between teachers' level of ICT use and their attitudes levels. Similarly, teachers were less likely to contribute effectively to the utilization of ICT for educational purposes those hold negative attitudes towards the use of ICTs. (Al-Zaidiyeen, Mei, & Fook, (2010), Albirini (2006).

Teachers have not to attain only basic skills of ICTs for professional development but they should also acquire these skills for daily life requirements of students. It is not only necessary to know the basic principles of ICTs and the use of ICTs for personal development but also to cope with the daily life contexts of students and teachers. Following skills are necessary for teachers in this era:

- All teachers must be able to use ICTs and to help students in using these technologies.
- Frequent use of Word-processing (MS Word) i.e. letters, tests and assignments etc.
- Fluent use of spreadsheets (MS Excel) for teaching and personal uses: preparing class lists and mark sheets etc.
- Most information systems in use today (e.g. school administration) are based on the principles of databases, and so an understanding of databases is useful for teachers.
- Efficient user of Internet for searching information and using emails.
- Teachers need to be role models regarding ICTs issues.
- Teachers must know about changes regarding ICTs in teaching profession. (UNESCO, 2005)

Similarly, in the revised syllabus of the Higher Education Commission (HEC) of Pakistan for B.Ed teachers in Pakistan, emphasis was given on the use of following six technologies:

- E-mailing
- Word-processing
- Spreadsheets
- Presentations and
- Internet browsing (HEC, 2006)

At the advent of 2009, Policy and Planning Wing, Ministry of Education, Government of Pakistan, set 10 professional standards for initial preparation of teachers in Pakistan. One prominent strand among those was effective communication and proficient use of information and communication technologies. (Ministry of Education, 2009)

According to Global Information Technology Report 2012, Pakistan is ranked at 102 (score 3.39) ahead of Iran (104, score 3.36) and Bangladesh (113, score 3.20) while behind India (69, score 3.89) and China (51, score 4.11). (World Economic Forum, 2012) Many key initiatives especially articulations of IT Policy and Action Plan and National Information and Communication Technology (NICT) Strategy for Education in Pakistan, have been taken for the promotion of ICTs in Pakistan.

The Higher Education Commission of Pakistan is determined to meet the challenges offered by the information age. In order to enhance the technological capacities of institutions, the continued implementation of the University Computerization and Networking Programmes, the HEC has provided universities with funds to establish computerized infrastructures to provide modern and effective working environment. By installing Local and Wide Area Networking system (LAN/ WAN) the project furnishes universities with modern communications systems, supporting local intranet, internet, and Pakistan Educational Research Network (PERN) accessibility (HEC Annual Report, 2004-05 & HEC MTDF, 2005-2010). In order to strengthen and restructure this network, HEC launched PERN-II in 2006, which is controlled and managed by the Commission. (HEC Activities, 2006)

The National Digital Library (NDL) programme of HEC is the vital initiative of its information and communication technology (ICT) strategy. Main purpose of NDL was to cope with requirements of scholars and research sector in Pakistan by providing easy access to electronic ocean of knowledge. Through this programme access to 45,000 e-books and about 25,000 journals is being provided for research purpose.

HEC is making exceptional efforts for the maximum provision and utilization of ICTs to all universities and degree awarding institutions for the expansion of knowledge and quality education, as early as possible so that Pakistan can meet the global requirements. HEC has mentioned 100% of the faculty should have undergone 1-3 months training courses emphasizing pedagogical skills, communications skills and information technology usage skills. (HEC Annual Report, 2005-06)

1.1 STATEMENT OF THE PROBLEM

Technological advancement is the sole potent driving factor behind knowledge driven economies of this globalize world. Technologically advanced countries are dominant and are enjoying respectable status in this competitive world. Developing countries are also giving prime importance to the provision and utilization of ICTs in every walk of life especially in education and training.

In Pakistan, for the promotion of ICTs, IT Policy and Action Plan was articulated in 2000. While for the integration of ICT in education, a comprehensive

National Information and Communication Technology Strategy for Education in Pakistan was formulated in 2003. In this policy, prime importance was given to the provision and utilization of ICTs throughout the country especially in higher education and teacher training sectors so that Pakistan can meet global requirements. Technology was used as catalyst of progress in every segment of education especially in higher education teacher training sectors. Besides other facilities, minimum of one gigabyte (GB) last mile connectivity of internet, Pakistan Education Research Network (PERN) and National Digital Library (NDL) are the foundation stone initiatives in Pakistan's history. However, the use of information and communication technologies in Teacher Training Institutions of Pakistan has not been formally investigated at national level. Therefore, this study was designed to assess the paradigm of ICTs use in teacher training institutions of Pakistan.

1.2 OBJECTIVES OF THE STUDY

The study sought to achieve the following main objectives:

1. To investigate the teachers' and students' attitude towards the use of information and communication technologies in teacher training institutions of Pakistan.
2. To explore the current utilization of these technologies in teacher training institutions of Pakistan.
3. To assess the teachers' and students' skills to use these technologies in teacher training institutions of Pakistan.

4. To examine the problems in the utilization of information and communication technologies in these institutions.

1.3 RESEARCH QUESTIONS

The present study sought answers to the following research questions:

1. What attitude do the teachers have towards the use of information and communication technologies?

2. What attitude do the students have towards the use of information and communication technologies?

3. What is the existing status of use of these technologies by students in teacher training institutions?

4. What is the current use of these technologies by teachers in teacher training institutions?

5. What is the level of skills to use these technologies among teachers in these institutions?

6. What is the level of skills to use these technologies among students in these institutions?

7. What are the main issues and problems in the utilization of these technologies in teacher training institutions?

1.4 SIGNIFICANCE OF THE STUDY

The study was conducted to assess the usability of ICTs in teacher training institutions therefore, its results would be significant to all stakeholders related to teacher training programmes e.g. students, teachers, managers and planners etc.

1.4.1 Planners and Managers

- The study would be useful for technology planners, policy makers and managers because goal of this study is to provide Ministry of Education and HEC personnel data that may be utilized when planning for more effective utilization of ICTs in teacher training institutions of Pakistan. Additionally, it would be gauged that to what extent the desired goals regarding use of ICTs in these institutions have been achieved.
- It might also provide guidelines for the solution of problems that arise during the utilization of ICTs in higher education.
- Moreover the study would be helpful in minimizing the wastage of resources and maximizing the usability of ICTs for enhancing teachers' performance and increase in quality of teacher education in Pakistan.
- This study might add to the existing limited research regarding teachers' utilization of ICTs in Pakistan.
- This study may also provide a description of the ways ICTs are used in universities and colleges of education. Therefore, other institutions like GECTs, Colleges, Higher Secondary Schools, Secondary Schools, Elementary Schools

and Primary Schools can look at the way ICTs are used in the universities and colleges of education as a model that can be followed.

1.4.2 Teachers

- This study would help teachers for the improvement of performance and competency both in the utilization of these technologies and knowledge to meet global competition.
- Appropriate utilization of these devices may make teaching learning process easier, interesting, qualitative, and fruitful.
- Proper management of these technologies would make teachers' activities more effective, efficient and productive by enhancing teacher's confidence, authenticity and research skill.
- The study might also reveal the problems and their solutions, which are faced by the teachers during the utilization of ICTs.

1.4.3 Students

- The study would be beneficial for students by revealing the effectiveness of ICTs and persuading maximum use of ICTs for increasing their performance.
- Maximum utilization of ICTs may make their learning process more active, constructive, intentional, self-directed, cooperative and authentic. Highest utilization of ICTs will cause increase in student's achievement and quality of teaching learning process by expanding research facilities, approach to ocean of knowledge and learning at their own pace.

- Technological skills would make them more competent, valuable and beneficial for the society and the nation in this information era.
- The study might also indicate the problems and provide suggestions related to usability of ICTs in teacher training institutions of Pakistan especially regarding skills to use these ICTs and training for their utilization so that maximum benefits may be attained during teacher training programmes.
- Technological empowerment would enable our teachers to compete in this globalize environment in the 21st century.
- Moreover the study may provide direction to those who are and will undertake research in this field.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 INFORMATION AND COMMUNICATION TECHNOLOGIES

Information and communication technologies (ICTs) are defined as computer based resources, networked and stand alone including both hardware and necessary software (Wikipedia, 2010). The phrase ICTs is an acronym that stands for:

Information &

Communication

Technologies

It was first coined by Stevenson in his report to the UK government in 1997. Information are stored, processed and communicated through networked computers. Information and Communication Technologies (ICTs) have revolutionized every aspect of human life especially the field of education and training (Field, & Fegan, 2005). World has been shrunk into a global village and these technologies have not only created the competitive environment but also enhanced the level of competition in this world. Technological and scientific knowledge is expanding at an unprecedented rate and changes of centuries are taking place in decades. World knowledge base doubles in every two to three years (Dawson, 2003) while internet traffic is doubling every 100 days (Abernathy, 1999) and there is no way to escape from the impact of information and communication technologies.

2.2 INFORMATION AND COMMUNICATION TECHNOLOGIES AND 21ST CENTURY

This century, the 21st century is referred to information technology and in recent years, technology has changed every walk of human life. These technologies have changed the style of conducting business, learning and even observing the world. Live information from thousands miles away can be envisioned in a few seconds and the array of methods for acquiring and collecting data seems endless (Henry, 2007). These technologies have created knowledge based economy arena and for developing countries to experience economic development, they must be included in the information society.

According to UNESCAP, "information and communication technologies are the main defining elements of the new economy" (UNESCAP, 2001 quoted by Monstad, 2004). Information and communication technologies (ICTs) have got paramount importance in the 21st century due to emergence of globalization and doubtless to say that ICT is the sole potent factor behind globalization. It has revolutionized every sphere of life and increased intensity of global competition.

Nations worldwide have recognized developmental opportunities and challenges of the emerging information age characterized by information and communication technologies. These technologies are driving national development efforts worldwide and a number of countries in both developing and the developed world are exploring ways of facilitating their development process through

development, deployment and the exploitation of ICT within their economies and societies. (Government of Pakistan, 2006)

Maximum deployment of these technologies in every sphere of life will cause optimal productivity because ICTs have a significant impact on all areas of human activity. These technologies can prove a niche tool for eliminating poverty and bringing prosperity every where in the world especially in developing countries and poverty stricken societies. It has been stated by Secretary-General of the United Nations Kofi Annan that, "The new information and communications technologies are among the driving forces of globalization. At the same time, however, the gap between information 'haves' and 'have-nots' is widening, and there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy" (Monstad , 2004).

Resultantly technologically advanced countries are heading fast while developing countries are lagging behind in this race on this planet. Therefore, to address the enormous problems of poor developing countries by improving their social and economic conditions eight millennium development goals (MDGs) were established in September 2000. Amazingly, ICTs play pivotal role in the achievement of every goal hence, especial emphasis may be given to the maximum deployment of these technologies so that respectable survival may be ensured in this ever increasing competitive world.

2.3 MILLINEUM DEVELOPMENT GOALS AND ICTs

Realizing the prevailing and increasing situation of hunger and poverty among unfortunate, miserable inhabitants of this global village, eight goals were established to bring happiness and bliss in their unpleasant and clumsy lives. In Millennium Declaration eight Millennium Development Goals (MDGs) were established by a group leaded by Jeffrey Sachs in September 2000 (Magambo, 2007 & Wikipedia, 2010). These goals were; (1) Eradicate poverty and hunger, (2) Achieve universal primary education, (3) Promote gender equality and empower women, (4) Reduce child mortality, (5) Improve maternal health, (6) Combat HIV/AIDS, malaria and other diseases, (7) Ensure environmental sustainability and (8) Develop a global partnership for development for the betterment of humanity especially in developing countries.

These goals set targets to be met by the year 2015 which in summary refer to the eradication of extreme poverty and hunger, achievement of universal primary education, strengthening of gender equity, improvement of sanitary conditions, promotion of environmental sustainability and, in general terms, the promotion of development in poorer countries. One of the issues included in goal eight precisely refers to ensuring that the benefits provided by new technologies, particularly ICTs, are made available to all people.

For the achievement of eighth Millennium Development Goals (MDGs), to "develop a global partnership for development" one of the targets, it is

recommended to; "In cooperation with the private sector, make available the benefits of new technologies, especially information and communication technologies" (World Bank 2003). To indicate or measure the targets given in the MDG, a set of indicators has been determined. For the 18th target to the 8th goal presented above, the indicators address the ICT situation. This includes telephone lines, cellular subscribers, personal computers and Internet users per 100 capita.

In action plans for poverty alleviation, information and communication technology has become an increasing element. This is in line with the recommendations in the MDG. The Economic and Social Commission for Asia and the Pacific has defined an overall strategy to: "Foster the application of information and communication technologies for poverty alleviation, and the development of appropriate pro-poor contents, through pilot projects demonstrating best practices". The inclusion of ICT in the Millennium Development Goals shows that the UN sees the importance of using ICT to fight poverty. For this to have any effect, attention must be given to the factors for success, strategies for ICTs development, target groups, and employment of ICT (Monstad, 2004).

ICTs have been acknowledged very beneficial in the achievement of MDGs. Virtually and verily, these technologies have potential to address the panic of poverty and hunger through helping in swift achievement of all prescribed MDGs in many ways.

2.4 UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO) AND ICTs

Education is considered as a catalyst of development in humanity and the need to encourage and facilitate the use of ICTs in education system is urgent and imperative (UNESCO, 2003). In his foreword to the UNESCO "Information and Communication Technologies in Teacher Training: A Planning Guide" (2002), the assistant Director-General for Education, John Daniel states that "Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education to reap the full benefits of ICTs in learning, it is essential that pre- and in-service teachers are able to effectively use these new tools for learning. Teacher education institutions and programmes must provide the leadership for pre- and in-service teachers and model the new pedagogies and tools for learning." (UNESCO, 2002)

In this knowledge base economy arena the value of these technologies is ever increasing because ICTs are driving forces for modern economies and an important tool for higher education to enhance teaching, research and administration (UNESCO, 2003). For effectively harnessing the power of the new information and communication technologies and to improve learning, the following essential conditions must be met:

- Students and teachers must have sufficient access to digital technologies and the Internet in their classrooms, schools, and teacher education institutions.

- High quality, meaningful, and culturally responsive digital content must be available for teachers and learners.
- Teachers must have the knowledge and skills to use the new digital tools and resources to help all students in achieving high academic standards.

Keeping in view the paramount importance of teachers in educational system and the potential of ICTs in the promotion of education in the 21st century, UNESCO documents have laid special emphasis on the integration of ICTs in education.

2.5 COMMONWEALTH OF LEARNING (COL) AND ICTs

The rapid expansion and growth of ICTs have now brought unprecedented opportunities for achieving greater educational access and reach. Tools are also now available on the Internet to assist both teachers and students to manage writing assignments to detect and avoid the pitfalls of plagiarism and copyright violations. One of the great benefits of ICTs in teaching is that they can improve the quality and the quantity of educational provision. For this to happen however, they must be used appropriately. (Commonwealth of Learning, 2009)

While using ICTs in teaching has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. (Daniel and Uvalic, 2012)

The Commonwealth Certificate for Teacher ICT Integration (CCTI) is an innovative open and distance learning programme that uses teachers to mentor

other teachers on how to integrate ICT into school management, teaching and learning. Typically a two-year part-time course, CCTI helps to build local capacity in ICT by training mentors – teachers who each go on to train 25 more teachers. (Commonwealth of Learning, 2012)

Commonwealth of Learning is building its Commonwealth Certificate for Teacher ICT Integration around UNESCO's ICT Competency Framework for Teachers. This certificate programme, like the competency framework itself, is not just about giving teachers basic ICT literacy, vital though that is, but going beyond that to show how ICT can improve and enliven the teaching of the whole curriculum. We call it deepening teachers' ICT skills. The Commonwealth Certificate for Teacher ICT Integration is an open educational resource that you can adapt to your needs. Hundreds of teachers across the Caribbean are rapidly developing their skills and knowledge of information and communication technology (ICT) with the support of Commonwealth of Learning.

COL's work will continue to raise levels of digital literacy and the ICT competencies of teachers by facilitating the creation of high-quality learning materials made available as open educational resources (OER). COL will continue its partnership with UNESCO for the global advocacy of OER and the open licensing of educational materials produced with public funds.

During this Three-Year Plan 2012-2015, COL will:

- develop e-learning capacity in governments, institutions and communities;

- maximize economies of scale in both the delivery and management of eLearning;
- promote ICT competency among teachers;
- promote the development and use of open educational resources (OER); and
- provide technical advice on emerging technologies and their implications for learning outcomes.

The Commonwealth Secretariat, Microsoft and the World Bank are collaborating with COL in its activities related to teachers' ICT policy development and implementation in the Caribbean. Nine Caribbean countries participated in an ICT in Education survey for the Caribbean. (Commonwealth of Learning, 2012)

2.6 INFORMATION AND COMMUNICATION TECHNOLOGIES IN PAKISTAN

Undoubtedly, since the revolution of the chip, the computers have rapidly permeated all societies and the blend of computers and Internet technology has made unimaginable progress in every walk of life. Surely, ICTs are driving factor behind globalization which has altered this world into a global village. In National Education Policy 1992 it was vowed that computer literacy, and computer education will be emphasized and made a part of educational curricula at all levels. Computer education would be compulsory part of all training programs for teachers and educational administrators. For launching computer hardware and software in schools, provision of special funds would be ensured. Some important strategic features of National Education Policy are as under:

- Launching of computer education at Primary, middle and secondary levels.
- Activities based on educationally meaningful computer games and compatible with the cognitive ability of children at primary level.
- Activities which may enrich students' experiences in general science and mathematics at middle level.
- Activities which may enable students to understand the computer logic in solving problems also at middle level.
- A further exposure to operating system, programming and software preparation at high school level.
- Computer education as a regular part of curricula in all technical and vocational schools and colleges.
- Computer science as an optional subject at higher secondary and degree level.
- A crash program for the teachers training of computer literacy with the collaboration of computer science departments in the universities.
- Computer education as a compulsory part of all teachers training programs.
- Provision of funds to the universities for the development of software relevant to school education.
- Introduction of subjects like computer aided designs (CAD), artificial intelligence, computer aided machines, robotics and parallel processing at post-graduate level.

- Provision of matching grants to the private sector for the establishment of high quality research and training institutes in computers.

Prime importance of ICTs was realized in the introduction of National Education Policy 1998-2010 in these words, "Technological and scientific knowledge is expanding at unprecedented rate. The 21st century is referred to as the century of information technology. The policy takes care of this need by introducing computer education as a subject at secondary level. Proper laboratories and trained teachers will be provided for this purpose". Further, for the massive penetration of these technologies at all levels among sixteen chapters, one chapter was dedicated to information technology in education and similarly one objective out of seventeen was about the integration of ICTs. Salient features of this policy are:

- Computer literacy shall be spread at all level managerial training programs.
- Computer Education shall be introduced at secondary, higher secondary and degree levels in phased manner.
- School curricula shall be revised according to the recent advancement and developments in information technology.
- A crash program for teachers' computer literacy shall be launched in all universities.
- Computer education shall be made a compulsory component for all training programs in the education sector.
- Satellite (PakSat-2) shall be used for teacher training.
- Application of multi-media at various levels of education.

- National level software competition will be launched.
- Provision of incentives to the private sector for the opening of high quality training and research institutions in the field of computers.
- Establishment of Amateur Computer Clubs with collaboration of private sector.
- Establishment of Cyber-Institute in Islamabad for launching e-learning in Pakistan.
- Provision of Internet connectivity to all institutes of higher education in Pakistan.
- Establishment of advanced computer and information technology centers in all Pakistani Universities. (Government of Pakistan, 1998)

Similarly, in National Education Policy (2009), some salient features regarding importance of ICTs in education were quoted as:

- In-service training shall cover a wide range of areas: pedagogy and pedagogical content knowledge; subject content knowledge; testing and assessment practices; multi-grade teaching, monitoring and evaluation; and programmes to cater to emerging needs like trainings in languages and ICTs.
- Faculty training in pedagogical, communication and ICTs skills is required at all levels to enhance the efficiency of teaching in higher education.
- Modern information and communications technologies are key to enhancing efficiency, efficacy and impact of programmes of development in the higher education sector.

- ICT must be effectively leveraged to deliver high quality teaching and research support in higher education both on-campus and using distance education, providing access to technical and scholarly information resources, and facilitating scholarly communication between researchers and teachers. (Government of Pakistan, 2009)

2.7 PROMOTION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN PAKISTAN

The revolution in communications over the last about half a century has changed the way of life on this planet. The advantages, if any, of isolation, disconnect separation of identities and economies have become irrelevant in a highly interactive and inseparably interdependent world. The term globalization cannot be over emphasized. The future now does not belong to being isolation but to pro-active interaction (Government of Pakistan, 2007). Realizing the prime importance of ICTs, National Education Policy 1998-2010 (1998, p.88) has given special emphasis for the integration of ICTs in education in these words:

> Our universities need to concentrate on information technology and should use its vast scope for developing teaching learning resources and improving the quality of education as well as linking themselves with scientists in other countries. The investment in information technology infrastructure and its network will bring our institutions of higher education on the world map. (Government of Pakistan, 1998)

Therefore, to meet the requirements of information age an IT Policy and Action Plan was articulated in August 2000. This document also confirmed the prime importance of ICTs in these words, "Information Technology (IT) has unprecedented importance in the global economic arena. In Pakistan, the then Government accorded a very high priority to this sector".

Elaborating the value of ICTs in education it was further expressed, "Fortunately, the information revolution offers some extraordinary opportunities in education". Through this plan it was targeted that for the provision of low-priced computers and Internet connectivity to universities, colleges and schools a scheme will be launched through public-private sector initiative. To ensure the economical and equitable access to world information electronic libraries will be set up. Further, for the adoption of computer assisted learning and other IT tools to aid in the teaching process educational facilities will be encouraged. (Government of Pakistan, 2000)

Hence, to achieve these targets a comprehensive National Information and Communication Technology (NICT) strategy for education in Pakistan was formulated in 2003. This policy expressed that ICT integration in education should be focused to improve education in Pakistan. By supporting and reinforcing the use of innovative teaching practices these technologies can enhance teaching quality. These technologies can allow teachers to access immense materials, reducing isolation and permitting peer-exchanges (Ministry of Education, 2003).

For the improvement of capacity building and pedagogy in teacher education it was planned that 208 teacher training institutions and a majority of the 350 Teacher Resource Centers across the country will be equipped with IT labs and networked for effective and efficient standardized professional development (Government of Pakistan, 2004). ICTs provide wide opportunities of knowledge sharing throughout the world and help teachers and students having up-to-date information and knowledge. Accurate and right information is a key for effective teaching learning process and professional development. Teachers learn ICTs skills as well as how to teach ICTs as a subject or integrate it within the curriculum. It is more important for teachers to know how to teach with ICTs than how to use ICTs, and such instruction should be integrated within the basic courses at teacher training institutions.

Maximum output is possible by identifying and rewarding innovative uses of technology in the classroom. Incentives can be both internal (enhanced self-esteem and pride) and external (tangible rewards), including: stipends, recognition, a chance to win ICT equipment, and/or salary increases or promotions. (Ministry of Education, 2003) The NICT Strategy consists of following six elements:

- Use ICTs to extend the reach of educational opportunity.
- Apply ICTs to strengthen the quality of teaching and educational management.
- Employ ICTs to enhance student learning.
- Develop complementary approaches to using ICTs in education.

- Built on the current experiences of existing and successful ICTs programmes.
- Develop capacity at the federal and provincial department of education levels.

The capacity and the possibilities offered by ICTs in improving socio-economic life are almost limitless. Hence, there is need to fully integrate ICTs in education to exploit its potential to overcome any challenges to expansion of quality education. Over the last decade, we have witnessed the flourishing "knowledge societies" who's well-educated and ICTs savvy population has helped them increasingly graduate from developing economies to developed economies. (Government of Pakistan, 2007)

2.7.1 Role of Higher Education Commission (HEC) in the Promotion of ICTs in Pakistan

To develop, improve and uplift the higher education in Pakistan according to the global requirement of 21st century HEC was established in 2002. Since its inception HEC is determined to meet the challenges offered by the information age (HEC Annual Report 2003-2004) and it has given prime importance to the provision and utilization of ICTs in higher education sector throughout the country. HEC took some gigantic measures for the integration of ICTs in education. Besides other facilities, minimum of 1 GB last mile connectivity of internet, Pakistan Education Research Network (PERN) and National Digital Library (NDL) are the foundation stone initiatives in Pakistan's history.

The Higher Education Commission in September 2002 has initiated many programmes to develop the IT infrastructure of universities in order to enable institutions in Pakistan to reap the benefits of the ICT revolution. The University Computerization and Networking programme has provided public-sector universities with funds to establish a computerized infrastructure to provide a modern and effective working environment.

By installing Local and Wide Area Networking systems (LAN/WAN), the project is equipping universities with modern communications systems, supporting local intranet, Internet, and PERN accessibility. The revolutionary Pakistan Education and Research Network (PERN) programme, has established the vital telecommunications infrastructure, which is currently connecting 56 universities; participating institutions are provided with Internet bandwidth of up to four megabits. This educational network is allowing the real-time transfer of audio and video, multimedia-enabled lectures, remote research partnerships, and many other applications hitherto unknown.

This solid foundation for the dissemination of information will allow the benefits of the ICT revolution in building indigenous scientific capacity to be exploited. A bird eye view of these initiatives is given below:

2.7.1.1 **Pakistan Education Research Network (PERN)**

Research is the key to advancement in knowledge, and to develop and improve research environment in Pakistan's educational system especially in higher

education sector establishment of PERN was a revolutionary step taken by HEC in 2004 (HEC Annual Report, 2006-07). Its main purpose was to interlink all universities and degree awarding institutions, registered with HEC (HEC Annual Report, 2004-05).

Initially 11,000 scientific journals were provided for access to the researchers which were increased to 23000 electronic journals, covering approximately 75% of the world's peer reviewed scientific journals and 45000 e-books. The total bandwidth was increased from 155 Mbps to 310 Mbps (which is now leading in South Asia being three times bigger than the linkage capacity of India's Education and Research Network, The News 2008) at 50% cost reduction (HEC Annual Report, 2004-05). This project provides opportunity of access to International Ocean of electronic knowledge.

PERN 2 was launched in 2007 to strengthen PERN and it aimed to provide gigabyte connectivity to all higher education institutions in Pakistan. Through this mega project more than 100 times enhanced bandwidth will be provided to all universities as compared to present bandwidth (HEC Annual Report, 2006-07).

2.7.1.2 **National Digital Library (NDL)**

The digital library programme of HEC is the corner stone of its information and communication technology strategy which was launched in January 2004. It is a part of PERN. The vision of the digital library programme is to meet the information requirements of the higher education and research sector in Pakistan by providing

access to high quality scholarly information based on electronic delivery. It is playing fundamental role to address the knowledge gap or "digital divide" between Pakistan and developed countries. More than 23,000 journals and 45,000 e-books from 220 international publishers are being provided for research purpose.

Hundreds of scholars are going abroad for presenting their research papers in different educational conferences. Article downloading and publication rate is increased dramatically after the establishment of digital library. In 2004 approximately 10000 full text articles were downloaded while downloading count exceeded 1 million in 2005 and this figure increased sharply and reached over 2 million at the end of 2006. (Amina, 2006 and HEC Annual Report 2006-07, pp.I-II)

2.7.1.3 **Pakistan Research Repository (PRR)**

Another key initiative to promote open access to scientific literature, to facilitate national and International knowledge sharing to promote the international visibility of research conducted in Pakistani universities, HEC has launched the Pakistan Research Repository. More than 3000 PhD and M.Phil theses are available online in high-quality digitized format. Further 200 theses have been digitized and are in process of being uploaded onto repository and made available through the web. (HEC Annual Report 2006-07 and HEC Report 2002-2008).

2.7.1.4 **ICT Ranking of Universities**

For best possible utilization of ICT in higher education, HEC has launched ICT ranking process in Pakistani universities. The objectives of this programme are:

- To develop and bring the higher education institutions at par with international standards.
- To define the levels of development of standards-complaint, websites, network architecture.
- To provide and implement standards to access the information worldwide. (HEC Annual Report, 2005-06)

The ICT strategy of HEC is a blend of vision and wisdom. Establishment of PERN, PERN 2, NDL and PRR etc are gigantic initiatives in the history of Pakistan taken by HEC in the recent years. Provision of Mbps connectivity and access to thousands of electronic journals and e-books at fifty percent reduced cost caused revolution in the institutions of higher education and virtually, for the first time in Pakistan's history three Pakistani universities grabbed the position in top six hundred universities of the world.

2.8 ICTs IN TEACER EDUCATION

Information and communication technologies help teachers in professional development in many ways i.e. enhancing knowledge competency and teaching methodology etc. These technologies can provide more flexible and effective ways for professional development for teachers, improve pre- and in-service teacher training, and connect teachers to the global teacher community. (Jung, 2005)

ICTs can help in creating better learning and teaching environments. These technologies have the potential to contribute to the improving of students' critical thinking, decision making, problem-solving skills and generating ideas with its integration into classroom activities (Altun, 2007). According to Magambo (2007, p.90), projects such as DEEP in 2003 and 2005; Imfundo in 2004; and SchoolNet Africa in 2004, have carried out extensive research on the use and implementation of ICTs in Africa. For instance in its 2003 report on teachers and technology in Egypt and South Africa, the DEEP project highlights the potential of ICTs for transforming teacher development and learning, as well as professional support. The project reaches the following conclusions:

- ICTs have enormous potential for facilitating teacher training and enabling new forms of teaching and learning.
- Training that focuses first and foremost on curriculum skills and processes, rather than ICTs skills, can empower teachers to use ICTs purposefully and effectively in the classroom.

- Working together and sharing laptops can result in effective peer support, create more enthusiasm and ensure high levels of equipment usage, making ICTs provision more cost-effective.

- Providing teachers and schools with 'professional' equipment and enabling them to use it for professional learning can raise their knowledge and status and that of their community; especially in contexts which might have previously undermined their dignity and self-esteem. (Magambo , 2007)

Unquestionably, teachers valued the use of technologies in class and that it had an impact on students' content acquisition; the use of technology added to class performance (Kadzera, 2006). Besides students' performance, it has positive impact on teacher performance as technology in education contributes to both teacher effectiveness and student achievement. (Newa, 2007)

The palpable benefits to be derived from a full scale deployment of ICTs in the education and training of teachers include exposure to different technologies for teachers and learners; enhancement of teaching and learning effectiveness; Enhancement of varieties of teaching and learning methods; Flexibility and the provision of self-directed learning; increased participation through online communication, access to information; management of large classes; increased lifelong learning skills for teachers and students alike; access to a wider student body in different learning centers across the country; personal development of teachers standardized content. These technologies have many benefits for both the learner and

the teacher, including the promotion of shared working space and resources, better access to information, the promotion of collaborative learning and radical new ways of teaching and learning. (Wheeler, 2001)

If implemented properly, computers and the Internet can enhance student learning, teacher development, school management, and community development. Computers and computer technology are powerful motivators for getting today's students more interested in their class work and assignments (Blankenship, 1998). These provide access to new learning resources, including content, lesson plans and assessments. Enable self-directed learning using resources from CDs and the Internet, or via online distance-learning courses. (Info Dev, 2005)

It is need of the day that teachers must be well equipped with ICTs skills as this is the information era. Therefore, for getting full advantages from these technologies teachers should have skills in the use of:

- Word-processing
- Spreadsheets
- E-mail and
- Internet browsing (UNESCO, 2002)

Keeping at par with international standards The Higher Education Commission of Pakistan, besides other gigantic initiatives and reforms, revised the curriculum of B.Ed teachers in 2006. According to this scheme of study the subject

of computer literacy was placed in first semester and following necessary skills were expressed in this course:

- E-mail
- Spreadsheets
- Presentations
- Word-processing and
- Internet browsing (HEC, 2006)

In 2009, Policy and Planning Wing, Ministry of Education, Government of Pakistan, set following 10 professional standards for initial preparation of teachers in Pakistan.

- Subject matter knowledge
- Knowledge of Islamic ethical values/ social life skills
- Human growth and development
- Assessment
- Instructional planning and strategies
- Learning environment
- Effective communication and proficient use of information and communication technologies
- Continuous professional development and code of conduct
- Collaboration and partnership
- Teaching of English as second / foreign language (ESL/EFL)

Teachers should enrich their teaching by using information and communication technologies in instruction, assessment and evaluation of learning outcomes. They should have knowledge and understanding to use these technologies for word-processing, filing, research, data storage, presentation of information and evaluation. (Ministry of Education, 2009)

2.8.1 **ELECTRONIC MAIL (E-mail)**

E-mail is an instantaneous electronic message from a sender to recipient(s). It is the most used application on the internet. It is ever increasing tool of communication among teachers and educationists especially researchers seems eager to open their mail box, read and answer mails indigenously and internationally as well. E-mail provides the student not only a sense of connectedness, but also offers the ability for convenient and quick transfer of information. E-mail now has emerged as a major source for scholarly communication. Email has changed the way of communication. It has positive impact on users and edge over other methods of communication as well. Here are five advantages of using Email:

- Managing e-mail is easy
- Email is fast
- Email is less expensive
- Email is easy to filter
- Transmission is secure and reliable.

The ubiquitous use of email for feedback in the classroom is lending the medium a new level of credence as an educational tool. Moreover, email correspondence in the educational environment provides many relative advantages such as speed of delivery, improved and more immediate communication, freedom from the constraints of location and time, potential for increased interaction, development of writing skills, decreased social isolation, increased internet experience, and extended learning opportunities.

This technology is not only helpful in increasing students' satisfaction but learner attention can also be promoted through e-mailing. No doubt course-related use of email is becoming the single most powerful force for integrating information technology into teaching and learning.

2.8.2 **WORD-PROCESSING (MS WORD)**

Word-processing is the most commonly used tool of documentation among educationists and researchers. Through this software programme user can easily create, edit and print documents and this technology is the most enabling and beneficial of all the computer software. (Farhan, 2006) While some teachers, especially those with younger students, may be hesitant about their pupils using word processing programs rather than writing papers by hand, there are actually many advantages associated with using a word processing. Following are the major benefits of word-processing:

- Organization of sentences and the material as well

- Less wastage of time
- Expression by different modes
- Legibility of words and sentences
- Collections of material
- Spelling and Grammar check
- Format and Appearance of material
- Technical Abilities for setting material

2.8.3 SPREADSHEETS (MS EXCEL)

Spreadsheet is of prime importance for teachers, researchers and managers of business organization. Through this programme teachers prepare results, attendance sheet, charts, graphs, survey and check list etc. Researchers can easily and accurately analyze the collected data from any phenomena through different statistical formulas and disclose the solution of focused problems. Similarly, managers keep an eye on the overall performance of an organization. Microsoft Office's spreadsheet application is known as MS Excel. Its function and formula enable the user to perform complicated calculation, statistical, graphing and general data analysis and is a useful management tool for educators. Spreadsheet can be used to create interactive worksheet that enables students to control various variables to display data and graphs. Students can be engaged in active learning using spreadsheet as a teaching and learning tool. Spreadsheet provides opportunities for the students to study real-life issues by manipulating variables.

The power of spreadsheets lies in their capacity to take children beyond what can be achieved in the normal classroom with pencil and paper. Spreadsheets permit the exploration of relationships without tedious calculations, and present opportunities for the development of self-directed learning and acquisition of higher order skills such as analyzing, interpreting, critical thinking, and question posing.

2.8.4 **INTERNET**

Being an ocean of electronic information, Internet has presented immense collection of knowledge at the threshold of users. Due to its matchless characteristics, it is called the Adam of knowledge. Millions of electronic journals, e-books and such other information are accessible without any dissemination of area, creed or tribe at very low cost. Before the advent of this millennium 552.5 billion web pages or documents had been composed of over Internet and was growing by 7.3 million pages per day. It is an information superhighway that provides unlimited access to a wealth of information on different topics contributed by people throughout the world. (Griffin, 2003)

The Internet is a global system of interconnected computer networks to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope that are linked by a broad array of electronic and optical networking technologies. (Wikipedia Encyclopedia, 2010)

The Internet offers a world of information in one place. It is a helpful tool in communicating and researching all different subjects. It is also a great way for students to use computers with proper supervision. There are many advantages to Internet access in the classroom:

- Communication
- School Projects and Homework
- News
- Student's Future
- Sharing Information
- Collection of Information
- Searching Jobs
- Advertisement
- Communication (Chatting, Video conferencing, E-mail and Internet telephony etc.)
- Entertainment
- Online Education
- Online Airlines and Railway Schedules and
- Online Medical Advice etc.

However there are some problems in the use of Internet, some of them are as under:

- Viruses
- Security Problems

- Immorality
- Filtration of Information
- Inaccuracy of Information
- Wastage of time and
- English language problems etc.

2.8.5 PRESENTATIONS (MS POWER POINT)

The power point technology has made teaching and learning process eye catching and interesting. Learners are motivated and attracted towards the presentation due to its captivation. Presentation software is increasingly being used to deliver classroom teaching. Remember that a picture can be worth a thousand words. Some good reasons to use presentations are as under:

- Appropriate use of presentations can enhance the teaching and learning experience for both staff and students
- It provides encouragement and support to staff by facilitating the structuring of a presentation in a professional manner.
- By careful mixing of media, a presentation can appeal to a number of different learning styles and be made more stimulating.
- The electronic file format allows distribution and modification for/by students unable to be present or who have impaired visual or auditory difficulties.

- Editing of each presentations file is very easy with minimal associated reprinting costs.
- The printing of handouts in a variety of formats is facilitated with a number of embedded options to print either the slides themselves (useful if there are graphics involved) or the text from the slides (Jones, 2002).

2.8.6 TEACHERS' ATTITUDE TOWARDS ICTs

Attitude plays an important role in determining people reactions to situations. Achieving a meaningful use of computer technology in the field of education can be influenced by many factors. One of these factors is teachers' attitudes towards the use of technology in teaching and learning process. The success of technology use in the educational settings largely depends on teachers attitudes toward technology use (Albirini, 2006, Baylor & Ritchie, 2002). Teachers' attitudes are considered as a major predictor of the use of new technologies in the educational settings (Albirini, 2006). It was also found that there was a positive correlation between teachers' experience and knowledge of ICT, computer and Internet attitudes. Findings revealed that more the teachers' level of knowledge, the more their positive attitudes (Tezci, 2010). Thus, their attitudes toward computer can play an important role in the acceptance and actual use of computers. The successful utilization of technologies in the classroom depends mainly on the teachers' attitudes toward these tools (Kluever, Lam and Hoffman, 1994).

Attitudes are key factors in whether teachers accept computer as a teaching tool in their teaching practices. Correspondingly, a number of studies were carried

out to determine teacher attitudes toward computer use. Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. Teachers' attitudes toward ICTs can determine the extent to which technologies are used in the process of teaching and learning. The attitude towards computer use is generated by an individual's salient beliefs about the consequences of continued use and his evaluation of these consequences.

The teachers' attitudes levels towards the use of ICT had a direct relation with the use of ICT for educational purposes. In other words, the correlation findings revealed that there was significant positive correlation between teachers' level of ICT use and their attitudes levels. (Al-Zaidiyeen, Mei, & Fook, 2010)

2.9 BARRIERS TO THE UPTAKE OF ICTs

There is a little literature on barriers of ICT tools integration in the developing countries. Factors that affect the technology use in developed countries are summarized as: availability of equipment, sufficient equipment, up-to-date equipment, maintenance of the equipment, infrastructure, staff training and development, technical staff support, vision and incentives, time factor, and other relevant support. (BESA, 2002)

According to Carlson and Gadio as quoted by Magambo (2007, p.79) designing and implementing successful teacher professional development programmes which employ ICTs is neither easy nor inexpensive. They also pointed

out that new technologies, when first encountered, bring mixed feelings of anxiety, fear, as well as frustration, which sometimes lead to not using the new technologies. They observed similar reactions among tutors in the teacher training colleges, where the training of tutors did not fully materialize because the trained tutors who were expected to train others were not knowledgeable enough to competently train others.

According to British Educational Communication and Technology Agency (BECTA, 2004) report, "A Review of the Research Literature on Barriers to the uptake of ICT by Teachers", barriers to ICTs use were categorized into two groups: external barriers and internal barriers. External barriers included: lack of access to resources; lack of time; lack of effective training; technical problems; whereas internal barriers included: lack of confidence; resistance to change and negative attitudes; no perception of benefits. Findings showed that although student teachers in their study had good ICTs skills in terms of their own personal use, they were unable to transfer these skills to using ICTs in the classroom. These barriers were grouped in another way related to teacher level barrier and institutional level barriers:

Institutional Level Barriers:

- Lack of time
- Technical problems
- Lack of effective training

- Lack of access to resources i.e. lack of hardware, poor quality software and inappropriate organization etc.

Teacher Level Barriers:

- Lack of time
- Lack of Confidence
- No perception of benefits
- Resistance to change and negative attitude
- Lack of access to resources (personal and home) (BECTA, 2004)

In the Dutch 1999 report "Impacts of ICTs in education: the role of the teacher and teacher training", the major concern of European ministries of education was that teachers did not receive the appropriate training in ICT use (BECTA, 2004). Thus it was urged to stress "teachers' role in the process of educational innovation and implementation of ICTs and recommendations were made to support this process.

Studies in the UK identified three main obstacles that limited ICTs uptake by student teachers: student access to computers, the ICTs policy adopted by initial teacher training providers as well as lack of encouragement for students to use ICTs in teaching practices (Murphy, 2000).

A recent study in Singapore (Teo 2006, pp-98-99), based on the observations of ICTs mediated Lessons and face-to-face interviews with teachers, ICTs heads-of-

department and school principals, identified six major barriers to teacher ICTs integration: (a) inadequate appointment of technical support staff, (b) inadequate appointment and training of student ICTs helpers, (c) lack of sufficient time for teachers to prepare for ICTs mediated lessons, (d) insufficient collaboration among teachers in preparing ICTs mediated lessons, (e) lack of support provided by school leaders in addressing teachers' ICTs concerns, and (f) insufficient training, demonstrations or advice for teachers on how to incorporate ICTs into classroom instruction. Barriers to integration of technology in schools have also been defined as lack of time, adequate resources, supportive leadership, and technical and pedagogical assistance. (Griffin, 2003)

Across Africa and most developing countries there are many challenges in bringing ICTs into the education process in general. There is a range of physical and cultural factors that affect ICTs use by teachers, including lack of reliable access to electricity, limited technology infrastructure (especially internet access, bandwidth, hardware and software provision), language of instruction and available software; geographical factors such as country size, terrain and communications; demographic factors such as population size, density and dispersion.

There are some problems that hinder the effective use of computers: lack of training, lack of time, lack of knowledge of using computers, lack of hardware and lack of software (Hamid, 1999). In addition, educational factors including levels of teachers own education and literacy rates, and access to professional development play an important role. Indeed many studies indicate that it is teachers' attitudes,

expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICTs in teaching (or technophobia in teachers) that are the prominent factors hindering teachers' readiness and confidence in using ICTs support. There is also a general inadequacy of learning resources, course curricula and other learning materials that incorporate ICT use. (Hennessy, Harrison & Wamakot, 2010)

2.9.1 **Lack of Hardware**

One of the basic barriers in the uptake of ICTs is lack of hardware especially for developing countries. In a worldwide study of the obstacles to the integration of ICT in education, Pelgrum (2001) found that the most frequently mentioned problem when teachers were asked about obstacles to their use of ICT was the insufficient number of computers available to them. Many teachers surveyed indicating that the number of computers in their classrooms was insufficient, and that if teachers were to continue to implement ICTs into their work then they required the appropriate hardware and software to familiarize themselves with first, then guide their students accordingly. Interestingly, Guha also found that it was the teachers who used the technology most who were more likely to complain about a lack of equipment. This would suggest that as well as being a barrier to teachers' first use of ICTs, it can also be a barrier to the further development of ICT in creative and innovative ways. (BECTA, 2004)

Mumtaz (2000) points out that evidence of very good practice in the use of ICTs is invariably found in those schools that also have high quality ICTs resources, and that a lack of computers and software can seriously limit what teachers can do in

the classroom with regard to the implementation of ICTs. Teachers' low level of access to school computers may have played a role in teachers' modest computer competence, so essential to future computer use (Albirini, 2006). The importance of schools being well resourced in ICTs equipment is also highlighted by a recent publication, "Primary Schools – ICT and Standards (BECTA, 2004). This study, which explored the relationship between schools' use of ICTs and pupils' achievements in national tests, presented strong evidence to show that those schools which were well resourced in ICTs tended to have better achievements than schools with unsatisfactory levels of ICTs. (BECTA, 2004)

2.9.2 **Lack of Quality Hardware**

Another factor which may cloud the issue when considering schools' low pupil: computer ratios, is that of the quality of the hardware available. In a report by the British Educational Suppliers Association (BESA, 2002), the average UK school in 2000 reported that a third of its desktop computer stock was ineffective for teaching the curriculum. The report suggests that the effectiveness of computers is closely related to their age. There is evidence to suggest that teachers are less enthusiastic about using ICTs where the equipment available is old and unreliable. Preston et. al. (2000) found this to be a particular problem for teachers, who complained about out of date resources, and the fact that hardware became obsolete very quickly. The authors note that this problem was exacerbated by the fact that many students had more up to date equipment at home, and that this caused further difficulties for teachers trying to use the older technology at school. One teacher's comment was that, "poorly specified and maintained machines mean that they are

unreliable and likely to cause disruption to even the best planned lessons. (BECTA, 2004)

2.9.3 **Lack of Software**

A number of respondents to the BECTA survey suggested that although there might be an array of software now available for use in the classroom, much of this software is not appropriate or would not actually enhance a lesson in any way. As two respondents noted: 'Some software is inappropriate and covers too many areas rather than building on small skills first'; and 'A reinforcement activity program either has plenty of graphics and so not enough maths is done or it is just presented as sums and might as well be done with paper / whiteboard etc.'. Poorly designed software, and a lack of time for teachers to design their own software, often cause teachers to "give up" and choose not to make use of ICTs.

Inappropriate software is also identified as a barrier in the research undertaken by the Centre for Guidance Studies (Bosley and Moon, 2003). Bosley and Moon's work was carried out with a focus on careers education and guidance, but their findings are worth considering when looking at ICTs barriers in education as a whole. Bosley and Moon noted that inappropriate software design can disengage the pupils from the intended learning processes, and as a result can create a barrier to ICTs use. (BECTA, 2004)

2.9.4 **Lack of Quality Software**

Another common barrier is lack of quality software as in a BECTA survey two respondents noted: 'Some software is inappropriate and covers too many areas

rather than building on small skills first'; and 'A reinforcement activity program either has plenty of graphics and so not enough mathematics is done or it is just presented as sums and might as well be done with paper / whiteboard etc.'. Poorly designed software, and a lack of time for teachers to design their own software, often cause teachers to "give up" and choose not to make use of ICT.

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2.9.5 **Lack of Training**

In a study by Bosley and Moon (2003), for example, inconsistencies were found between the amount of ICTs training received by a teacher and the extent to which the teacher applied that training in the classroom. Teacher trainers would need to be skilled to impart ICTs training on student teachers. Teacher trainers must be made to undergo compulsory ICTs training to the level of advanced application. (Abolade, 2005) For the successful integration of IT into teaching and learning in schools is a challenging task that hinges on a lot of factors, including effective teacher training (Tan et al, 2003). Newer technologies are emerging at a rapid rate. It

is not realistic to expect teachers to keep up on the latest technological trends or maintain a skill-set at the same rate technologies are emerging. Teachers need to maintain a certain level of technological literacy and to be provided with guidelines on how to become facilitators with technologies. It would be unrealistic to assume that teachers need to be expert users of all technologies. (Henry, 2007)

Training is a key factor in promoting effective use of instructional technologies, includes consideration of the required knowledge of and skills on how the technologies should be operated and used by the teachers. Training was the most common predictor followed by attitude, support, access, and age of teachers (Blankenship, 1998). If the training of this technology is continual, use of computers will be ultimately increased because continuous training of computer technology expands the use of computers (Felton, 2006). The availability factor has an impact on training because, when the technologies are available, training on how to use them can easily be done and is more credible to the teachers. Training has a two-way impact on the use of the instructional technologies because it is through training that the tutors know how to use the technologies. When the effective use is not up to the expected standard, if tutors still have problems in using the technologies, more training has to be done to iron out the problems faced by the tutors. (Kadzera, 2006)

2.9.6 **Lack of Confidence**

A very significant determinant of teachers' levels of engagement in ICTs is their level of confidence in using the technology". Surely, teachers having lack of confidence in using computers will try to avoid them altogether. There is a close relationship between levels of confidence to use ICTs and usage of these

technologies by the teachers. In the BECTA survey of practitioners, the issue of lack of confidence was the area that attracted most responses from those that took part and much of the research evidence suggests that this is indeed a major barrier to the uptake of ICT by teachers in the classroom.

2.9.7 **Lack of Knowledge**

Many researchers identified lack of confidence as a barrier particularly focused on a fear of admitting to their pupils that they had limited knowledge in the area of ICTs. As one respondent commented, "Too many teachers are too afraid of public humiliation in front of knowledgeable pupils' parents." (BECTA, 2004) There is urgent need for curricular reforms so that more single courses are introduced and complemented by integration of ICTs in all courses. This will ensure that teachers acquire their knowledge and skill in an organic whole manner (Abolade, 2005).

2.9.8 **Lack of Interest**

Lack of interest among teachers is another important barrier in the use of information and communication technologies. Interested educators get optimal benefits from the available gadgets while many teachers are starting to ask for newer computers. There is a school of thought that believes it is not the provision of new equipment that improves the effectiveness of ICTs but that best use is made from the available resources.

2.9.9 **Relevancy**

One of the most significant barriers to women's access to education (with or without ICTs) is the lack of relevancy of the content. When learning strategies fail to

value women's knowledge, wisdom and experience, the education is not perceived as valuable to them. This is a pivotal barrier for women to access educational opportunities. The issue of lack of relevancy was often raised in the regional reports. The report from Kenya points out the need for local and meaningful content in the country's radio and television programmes, since most programming is foreign and irrelevant to the needs of women. The report from Zambia also emphasizes that too little attention is being paid to collecting locally produced information. Most of what is on the Internet tends to be foreign and there is a lack of local information resources and services for people in their local conditions.

2.9.10 **Internet Access**

Lack of Internet access poses a problem for most of the countries. There are few subscribers overall, of which women likely represent a minority. Statistics on overall Internet access were only provided for the region of Africa, where only 0.1% of the African population has basic Internet services. The report from Malaysia cites estimates from two Internet Service Providers (ISPs) that about 30% of their subscribers are female, although the percentage of the overall population that subscribes to the Internet is not provided. Initiatives are being taken in some Caribbean countries to improve Internet access. In Jamaica, as part of a new national telecommunications strategy, the telephone company must install 60 Internet terminals at post offices to allow greater public access. In Dominica private cybercasters allow users to access the Internet for a fee. The report from Dominica concludes that both males and females are increasingly accessing the Internet and,

while users tend to be concentrated in the urban areas, the disparity between urban and rural users is not as great as in other Caribbean countries. (Smith, 2003)

2.9.11 **Poverty**

Poverty and lack of economic power is borne much more by women than men, especially as reported in the African and Asian research. As a result, women have much less access to disposable income for expenditures related to education. As the report from Zambia described the problem, women are generally not engaged in their own economic activities and very few women have money. In many cases, their husbands bar them from making money. Since they need consent from husbands to obtain loans, some women may have no access to lending institutions.

Although there is interplay between costs and all the other barriers, costs can pose such a significant barrier, they need to be highlighted on their own. Either acquiring or accessing the necessary equipment required to use ICTs for ODL may have significant cost components. If learners need to incur the capital cost of purchasing the equipment, they also face the high costs of maintenance and of obsolescence. In addition, the costs of powering the technology, whether by electricity or battery, can be prohibitive.

2.9.12 **Technical Support**

Technical support is also an important barrier in uptaking the use of ICTs. Access to computer equipment is short-lived without access to technical support and,

in most countries, this is at a premium. We have so far dealt with teachers' perceptions of how computers and technology can break down, and how this causes barriers to prevent them from considering using ICT, even before the potential faults could occur. Another barrier originates from actual breakdowns of equipment, and the subsequent disruption that these can cause. If there is a lack of technical support available in a school, then it is likely that preventative technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns. Technical support personnel should be available for all educator types, whether in the university setting or in a school district. (Robinson, 2002)

The schools that cannot afford technicians, there are often, "software glitches and servers that crash, torpedoing lessons again and again." Once the breakdowns do occur, a lack of technical support may mean that the equipment remains out of use for a longer period of time. Preston et al (2000) provide evidence of the fact that the breakdown of equipment inhibits the use of ICTs in schools. The authors report on comments made about technical problems resulting in the "de-motivation of students" and the removal of "time/resources from other important curriculum areas".

Clearly, there is a close relationship between these two 'technical' barriers; the more frequently that actual breakdowns occur (perhaps due to the lack of preventative technical maintenance), the more likely teachers are to avoid using the technology in the first place. Teachers who tried to carry out a task on a computer, but who were unsuccessful due to technical problems, would then avoid using the

computer for several days. This, then, further highlights the need for adequate technical support in schools.

2.9.13 **Lack of Realization of Advantages**

Lack of realization of advantages to use these technologies is another barrier in the uptake of ICTs by the teachers. Teachers who do not realize the advantages of using technology in their teaching are less likely to make use of ICTs. Any training programme needs to ensure that teachers are made aware of the benefits of using ICTs because this awareness makes them more motivated and interested towards the use of these technologies. Teacher educators and prospective teachers should be aware of the benefits of ICTs.

2.9.14 **ICT Policy**

Government should ensure that ICTs policy statements are translated into reality and ICTs policy implementation commission should be created. This commission should be funded and given the power to provide ICTs facilities in the schools and monitor their use. Professional development policies must support ICTs related teaching models, especially those that support both students and teachers in playing an active role in teaching learning activities. Additionally, emphasis should be given on the pedagogy underlying the use of these technologies for teaching and learning. (Hennessy, Harrison and Wamakote, 2010)

2.9.15 **Lack of Time**

A problem that exists for teachers in many aspects of their work is that of the lack of time available for them to complete given tasks, and teaching ICTs is certainly an area that is affected by this. Learning new skills in any profession requires time, but teachers have little time left after spending most of their day teaching, and with other commitments such as liaising with parents and attending staff meetings. Yet they do need that time to experiment with the technology, share their experiences with colleagues, and attend technology related in-service training programmes. Teachers are very concerned about the lack of time for technology; they feel that they need more time to learn computer basics, plan how to integrate technology into their lessons, and actually use the technology in the classroom. In Preston et al. (2000), teachers pointed out that a great deal of work is required in preparing accurate ICTs materials for use by children with a range of abilities, and complained of the lack of time restricting them from exploring materials for potential use with ICTs.

Teachers explained that they would need hours to preview web sites, prepare multimedia materials for lessons, and to undertake training. In the same study it was found that this problem did not only apply to those teachers who made little use of ICTs; similar complaints were made by teachers who were attempting to make full use of the technology in their lessons, as they were working longer hours in order to make their ICTs use successful, paying the price in exhaustion for this kind of dedication. The authors also note that these dedicated computer-using teachers often

eventually leave the teaching profession or move on to other technical or teaching positions that provide them with more time, and this teacher turnover itself undermines the implementation of technological innovations in teaching (BECTA, 2004).

2.9.16 **Peer Support**

Peer support is very important factor in the use of ICTs. Educators will be likely to integrate ICTs tools in teaching if their students give good feedback on ICTs tools integration. Teachers would like to hear positive comments on ICTs tools integration from peers as well. Positive feedback and comments increase teachers' attitude and skills to use these technologies.

2.9.17 **Lack of Administration**

Pelgrum (2001) makes the observation that if teachers at schools with low pupil: computer ratios are still complaining of a lack of computers, then it could be that those teachers and their school managers need to consider whether or not they are optimizing the use of the available equipment, suggesting that in some cases it is the organization of resources, rather than the physical lack of them, which is creating a barrier to the use of ICTs by teachers. Numbers of computers alone do not necessarily ensure adequate access, and that it is important to locate the proper amount and right types of technology where teachers and students can effectively use them.

2.9.18 **Power Failure**

Electricity failure is a main problem fro developing countries. Electricity remains a major problem in Eritrea and inhibits the use of ICTs, especially in rural areas. The national electricity grid is limited to commercially viable areas, missing out most rural areas. The use of ICTs can therefore be mapped with areas that have electricity. Electricity failure has been a persistent problem militating against ICTs application and use in Nigeria (Kadzera, 2006). No doubt, power outages has affected access and limited training in developing countries.

Problems with access to electricity are most extreme for the African countries and were also raised by other countries such as Vanuatu and Belize, where lack of electricity is a problem in rural areas. In many African countries electricity is available only in towns and in a very few rural areas. In Malawi, 84% of the population lives in rural areas that do not have electricity. Only 8% of Kenyan homes have power, largely in the urban areas, and only 10% of the population in Tanzania has access to electricity. In Zimbabwe rural areas are not wired electronically. Only clinics, hospitals, shops and about half of the secondary schools are linked to the electric grid. However, there are some plans for improvement; e.g., Lesotho plans to install electricity in all households and make more use of solar power systems. (Magambo, 2007)

ICTs equipment is electrical equipment that requires electricity for operation. Most rural areas of Nigeria do not have electricity facility and in urban area electricity supply is epileptic, and this reduces the life span of hardware and also

militates against effective usage. Even enthusiastic teacher educators and students who have access to computers may be debarred from using them as a result of power outage. (Abolade, 2005)

CHAPTER 3

METHODOLOGY OF THE STUDY

This chapter deals with the method of study that covers population, selection of the sample, development of the tools their administration and statistical techniques used for the data analysis. After discussing related literature about information and communication technologies (ICTs) in 21st century, millennium development goals (MDGs) and ICTs, UNESCO and ICTs, promotion of ICTs in Pakistan, role of higher education commission of Pakistan in the promotion of ICTs, ICTs and teacher education and barriers to the uptake of ICTs in Chapter-2, three questionnaires were developed, administered and analyzed through SPSS XIV. On the basis of analysis, findings were drawn, conclusions were made and recommendations were proposed. The consolidated bibliography has been included at the end of the thesis. Two questionnaires (Appendixes) were developed in accordance with the theoretical conceptual overview.

3.1 DESIGN OF THE STUDY

The study was descriptive in nature and survey was considered appropriate. The data were collected in order to answer research questions concerning the current status of the use of information and communication technologies in the teacher training institutions of Pakistan. Population was defined for the selection of sample. A sample was carefully selected so that the result of the study may be generalized on

the population. For this study a questionnaire was used as tool. The data were analyzed cumulatively through simple as well as advance statistical formulas.

3.2 DELIMITATIONS OF THE STUDY

Due to financial and time constraints the study was delimited to:

1. Public Sector General Universities (Conventional System) of Pakistan having:

   Institute of Education and Research, Faculty/Department of Education

2. Colleges of Education

3. Information and communication technologies described in the revised syllabus of B.Ed by HEC in 2006:

   - Electronic Mail (E-mail)
   - Word-processing (MS word)
   - Presentations (MS Power Point)
   - Spreadsheets (MS Excel)
   - Internet Browsing (Net Surfing)

3.3 POPULATION

The study was conducted to evaluate the utilization of ICTs in the teacher training institutions of Pakistan. Therefore, the information was gathered from the teachers and students of the teacher training institutions imparting B.Ed (one year),

M.Ed (one year) and MA Education programmes through conventional system of education. Detailed list of these institutions has been given in the Appendix-C.

3.4 SAMPLE

It was multistage sampling and at first stage one university and one College of Education from each province, Azad Jammu and Kashmir (AJK) and Federal Area (Wazim, 1998) were taken randomly as a sample of the study. If there was no College of Education then another Institute of Education and Research (IER), Faculty/Department of Education was taken as a sample. Further, if there was no IER then the Department/Faculty was taken as sample. At this stage following universities and colleges were taken as a sample:

1. IER, Punjab University Lahore
2. Department of Education, University of Sargodha
3. Faculty of Education, University of Sindh, Hyderabad
4. College of Education Sukkar
5. IER, University of Peshawar
6. Federal College of Education Gilgit
7. Department of Education, University of Balochistan
8. College of Education Quetta
9. Department of Education, International Islamic University Islamabad
10. Federal College of Education Islamabad
11. College of Education AJK

At second stage 50 percent students of B.Ed, and M.Ed/MA Education in IERs/Faculties/Departments (1072/2144) and 50% (733/1465) from colleges of education were taken randomly as sample. At third stage, since the number of teachers was small, 100 percent population (442) was taken as sample by using universal sampling technique. University/college wise break up of sample is as under:

Sr. No	Institution	Category	Male	Female	Total
		Teachers	72	47	119
1	Universities	Students	472	600	1072
		Teachers	91	32	123
2	Colleges	Students	291	442	733
3	Grand Total		926	1121	2047

3.5 DEVELOPMENT OF RESEARCH TOOLS

Keeping in view the nature of the problem, descriptive i.e. survey type study was considered appropriate and a questionnaire was used as research tool for the collection of data. The questionnaire items for this study were in the form of Likert Scale. The questionnaire was designed to collect information on students' and teachers' attitude, skills and utilization of ICTs in teacher training programmes.

Basically, the questionnaire was designed in the light of some other studies on the use of ICTs in teacher training institutions, elementary schools, high schools

and universities Hamid 1999, Robinson 2002, Griffin 2003, Dawson 2003, Herring 2003, UNESCO 2003, Yutdhana 2005, Kadzera 2006, Zeinab 2006, Felton 2006, Henry, 2007 and Magambo 2007).

The questionnaire consisted of two parts:

A: Demographic information

This part consists of statements related to name, institution, gender, age, qualification, experience, having computer and internet connection at home and e-mail address etc.

B: Use of ICTs

This part is further divided into six segments;

1. Attitude towards the use of ICTs

In this part thirteen questions were asked about their attitude towards the use of these technologies. Reverse quoted statements were also included so that respondents' care may be checked.

2. Utilization of ICTs

This part consists of assessment of five compulsory technologies expressed by UNESCO 2002 and in the revised syllabus of B.Ed course for teachers by the HEC in 2006 i.e. e-mail, word-processing, spreadsheets, power point and Internet surfing.

3. Reasons for never/seldom use of ICTs

In this part respondents were asked about nineteen factors affecting the use of these technologies i.e. Lack of hardware, Lack of Quality hardware, Lack of training, Lack of software, Lack of quality software, Lack of knowledge, Not enough Internet connections, Slow connectivity, Lack of technical support, Lack of peer support, Lack of time, Lack of interest, It is expensive, Limited lab hours, Lack of administrative support, Lack of realization of advantages, Lack of confidence, Power failure and No relevancy with B.Ed/M.Ed and MA education course.

4. Level of skills

This part consists of the skill level of respondents regarding these technologies. These skills were assessed through questionnaire as ascertained by Griffin 2003, Kadzera 2006, Henry 2007 and Zainab 2006 etc. in their doctoral studies.

5. Use of ICTs in instruction and research

In this part ten questions regarding the use of these technologies in teaching/ learning i.e. preparation of assignments, preparing handouts for students, giving feedback to the students, presentation of their lectures, assessing students' assignments, recording students' marks/ results, searching national or international conferences, communicating with their students, preparing conference papers and publishing research papers were asked from the respondents.

6. Barriers to the uptake of ICTs

Respondents were asked to describe top ten barriers/problems from the above mentioned (in segment 3) nineteen reasons for seldom/never use of these technologies.

7. Finally, open ended statement was given and respondents were asked to kindly mention three positive points, three minus negative and three suggestions regarding use of ICTs and promotion in the use of these technologies in teacher training institutions of Pakistan.

3.6 PILOT TESTING

The research tools was pilot tested on 100 students, 20 teachers. The purpose of pilot study was to (a) eliminate ambiguity from items, (b) clarity of wording, (c) identify problems in administering the questionnaires, and (d) identify the aspects for the improvement of research tools. After the pilot testing, several changes were made to the instrument in the light of suggestions given by the respondents. Item 4 in part-A, which looked at the age ranges of participants, was lowered from 30-35 years to 20-25 years because there were some respondents in the pilot test who were below 30 years of age. In part-B, scale value for each level of agreement was given before each table i.e. attitude towards ICTs, utilization of these technologies, reasons for never/seldom use of ICTs, level of skills to use these technologies and use of ICTs in instructions and research. A confusion was witnessed during filling the reasons for never/seldom use of these technologies part of the questionnaire. Hence, a note "If

you never/seldom use these technologies, then please fill in this part otherwise move to the next part level of skills on page 6" was added before this section. Some difficult words were replaced by clear words and structure of some sentences was improved accordingly. Moreover, questionnaire for BEd students was translated into Urdu for their proper understanding. The reliability of the instrument was checked through SPSS XVII software which was 0.84 (Chronbach's alpha) as shown in the table below.

Sr.No.	Focused Area	No. of Items	alpha
1	Attitude toward the use of ICTs	13	0.945
2	Utilization of ICTs	5	0.786
3	Reasons for seldom/never use of ICTs	19	0.779
4	Skills to Use ICTs	5	0.772
5	Instructional use of ICTs	10	0.958
6	Barriers/Problems in the use of ICTs	19	0.815
7	Overall	71	0.84

3.7 DATA COLLECTION

The researcher personally visited the above mentioned institutions except of University of Balochistan and College of Education Quetta due to uncertainty created by miscreants and terrorists. However, for research tool administration in these institutions, friends' assistance was taken. A reference letter was presented

before the heads of the institutions and teachers' cooperation was sought through their heads. With the help of teachers, majority of the students returned the filled in questionnaires on the spot while several visits and post reminders were made for the collection of data.

Category wise summary of data collection is given below:

No	Subject	No. of Questionnaires Delivered	No of Questionnaire Returned	Percentage
1	Students	1805	1643	90
2	Teachers	242	206	85

3.8 STATISTICAL ANALYSIS OF DATA

For the documentary comparison the researcher qualitatively analyzed and compared the documentary evidences in Chapter No. 2 and for the analysis of data, the researcher used SPSS XVII programme. For demographic analysis and gauging overall strengths of responses, percentages and mean score were run while Chi-square was used through the software for indicating the significance of relationship between the items responses of either students or teachers and in some instances a combination of both.

CHAPTER 4

ANALYSIS OF DATA

This chapter contains analysis of data and its interpretation. As the study was a combination of documentary and survey research, data were collected through questionnaires as well as printed material and electronic media. A questionnaire was drafted after the study of related literature. This draft had been professionally validated and tried out then finally typed and photocopied. This questionnaire was presented in the form of five point rating scale; last statement of the questionnaire was open-ended which was not covered in the questionnaire. All the questionnaires were administered through prepaid post, personally and wherever applicable through friends. Analysis of the collected data was made through percentages and mean score to indicate the frequency and overall trend of the respondents while level of significance was measured through Chi-square formula.

4.1 ANALYSIS OF QUESTIONNAIRE FORTEACHERS

TABLE 4.1.1: Gender wise frequencies of respondents

S.No	Gender	Frequency	%age	Ranks
1	Male	138	71	1
2	Female	57	29	2
3	Total	195	100	

Table 4.1.1 indicates that out of 195 respondents 71% respondents were male and 29%.were female.

TABLE 4.1.2: Age wise frequencies of respondents

S. No	Age/Years	Frequency	%age	Ranks
1	20-30	30	15	4
2	31-40	57	29	2
3	41-50	66	34	1
4	51-60	36	18	3
5	61 and above	06	3	5
6	Total	195	100	

Table 4.1.2 shows that out of 195 teachers 34% were between 41-50 years and this group ranked 1st while 29% belonged to the age group of 31-40 and ranked 2nd. Age group 51-60 has 3rd position with 18%. Age group of 20-30 ranked at 4th position with 15% while aged teachers were ranked at 5th number with only 3%.

TABLE 4.1.3: Qualification wise frequencies of respondents

S.No	Qualification	Frequency	%age	Ranks
1	Post Doc.	10	6	4
2	PhD	69	35	2
3	M.Phil	23	12	3
4	MA/MSc/M.Ed	93	47	1
5	Total	195	100	

Table 4.1.3 shows that out of 195 teachers majority has MA/MSc degree and they are ranked 1st with 74%. Highest qualification is post doc and these are ranked at 4th with 3%. PhD degree holders are 12% and MPhil qualified are also 11%.

TABLE 4.1.4: IT diploma wise frequencies of respondents

S.No	Sex	Respondents	Having IT Diploma	%age	Rank
1	Male	138	9	7	2
2	Female	57	24	42	1
3	Total	195	33	17	

Table 4.1.4 shows that out of 195 teachers 33 have got diploma in IT and these are 17%. However female are ahead in this area as they their ratio is 46% as compared to 7% male ratio.

TABLE 4.1.5: Designation wise frequencies of respondents

S.No	Designation	Frequency	%age	Ranks
1	Lecturer	48	25	2
2	SS/SSS	114	58	1
2	Assistant Professor	15	8	3
3	Associate professor	03	1	6
4	Professor	09	5	4
5	HOD/Dean	06	3	5
6	Total	195	100	

Table 4.1.5 shows that out of 195 teachers, 58% were subject specialist/ senior subject specialist. 25% were lecture, 8% assistant professor, 1% associate professor, 5% professor and 3% were HODs/Deans.

TABLE 4.1.6: Teaching experience wise frequencies of respondents

S.No	Age/Years	Frequency	%age	Ranks
1	1-5	30	15	5
2	6-10	45	23	2
3	11-15	33	17	4
4	16-20	36	18	3
5	21 and above	51	26	1
6	Total	195	100	

Table 4.1.6 shows that majority of the respondents (23%) have more than 20 years teaching experience.

TABLE 4.1.7: Administrative experience of respondents

S.No	Age/Years	Frequency	%age	Ranks
1	1-5	45	23	1
2	6-10	18	9	2
3	11-15	03	2	4
4	16-20	02	01	5
5	21 and above	09	5	3
6	Total	27	40	

Table 4.1.7 shows that out of 195 respondents', 40% have administrative experience and among them majority have only up to five years administrative experience.

TABLE 4.1.8: Computers and Internet connection at home

			Computer at home		Internet at home	
			Frequency	%age	Frequency	%age
S.No	Sex	Respondents				
1	Male	138	84	61	63	46
2	Female	57	42	74	39	68
3	Total	195	126	65	102	52

Table 4.1.8 shows that out of 195 teachers 65% teachers have computer at home and 52% have internet connection at home. Interestingly female teachers are ahead in both categories with 74% and 68%.

TABLE 4.1.9: E-mail address

S.No	Sex	Respondents	Have e-mail		Given the address	
			Frequency	%age	Frequency	%age
1	Male	138	131	95	36	19
2	Female	57	55	96	27	47
3	Total	195	186	95	63	32

Table 4.1.9 shows that out of 195 teachers 95% teachers have e-mail addresses and 32% have mentioned their e-mail addresses on the questionnaires.

Table 4.1.10: Easiness of ICTs use

Statement	Respondents	SA	A	UNC	DA	*SDA*
	Observed (fo)	66	117	6	3	3
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	27	78	-33	-36	-36
	$(fo - fe)^2$	729	6084	1089	1296	1296
Use of ICTs is easy	$\frac{(fo - fe)^2}{fe}$	18.69	156	27.92	33.23	33.23

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 53.81^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.10 indicates that the calculated value of χ^2 is 53.81, which is greater than table value at 0.05 level. It shows that respondents are inclined towards the use of ICTs and they have positive attitude toward the use of these technologies. As the trend of respondents is towards 'agree', hence the statement "Use of ICTs is easy" is accepted.

Table 4.1.11: Use of ICTs is pleasant

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	39	109	11	26	10
	Expected (fe)	39	39	39	39	39
Use of ICTs	(fo _ fe)	0	70	-28	-13	-29
is pleasant	$(fo - fe)^2$	0	4900	784	169	841
	$\frac{(fo - fe)^2}{Fe}$	0.0	125.64	20.10	4.33	21.56

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 34.32^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.11 indicates that the calculated value of χ^2 was 34.32, which is greater than table value at 0.05 level. It deems that teachers feel pleasure to use these technologies and their attitude towards ICTs is positive.

Table 4.1.12: Importance of ICTs

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	69	101	12	07	06
	Expected (fe)	39	39	39	39	39
Use of ICTs	(fo _ fe)	30	72	-27	-32	-33
is very	$(fo - fe)^2$	900	5184	729	1024	1089
important	$\frac{(fo - fe)^2}{Fe}$	23.07	132.92	18.69	26.26	27.92

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 45.77^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.12 indicates that the calculated value of χ^2 was 45.77, which is greater than table value at 0.05 level. It shows that teachers are mindful about the importance of these technologies which represents their positive attitude towards ICTs. As the trend of respondents is towards 'agree', hence the statement "Use of ICTs is very important" is accepted.

Table 4.1.13: ICTs are interesting

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	82	81	18	08	06
	Expected (fe)	39	39	39	39	39
Use of ICTs	(fo _ fe)	53	52	-21	-31	33
is interesting	$(fo - fe)^2$	2809	2704	441	961	1089
	$\frac{(fo - fe)^2}{Fe}$					
	Fe	72.02	69.33	11.30	24.64	27.92

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 41.04^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.13 shows that the calculated value of χ^2 was 41.05, which is greater than table value at 0.05 level. It deems that teachers feel interest to use these technologies which indicates their attitude towards ICTs is positive.

Table 4.1.14: ICTs are comfortable

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	69	95	15	06	08
	Expected (fe)	39	39	39	39	39
I feel	(fo _ fe)	30	56	-24	-33	-31
comfortable	$(fo - fe)^2$	900	3136	576	1089	961
when I use	$\frac{(fo - fe)^2}{Fe}$					
ICTs						
	Fe	23.07	80.41	14.76	27.92	24.64

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 34.16^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.14 indicates that the calculated value of χ^2 was 34.16, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence it shows they have positive attitude towards the use of ICTs.

Table 4.1.15: Confidence in ICTs use

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	39	108	22	16	10
	Expected (fe)	39	39	39	39	39
I feel	(fo _ fe)	0	79	-17	-23	-29
confident	$(fo - fe)^2$	0	6241	289	529	841
when I use	$\frac{(fo - fe)^2}{Fe}$					
ICTs		0.0	160.02	7.41	13.56	21.56

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 40.51^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.15 indicates that the calculated value of χ^2 was 40.51, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, teachers feel confident when they use ICTs.

Table 4.1.16: Value of ICTs

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	40	81	41	30	14
	Expected (fe)	39	39	39	39	39
Use of ICTs	(fo _ fe)	-30	42	22	31	-15
is valuable	$(fo - fe)^2$	900	1764	484	961	225
	$\frac{(fo - fe)^2}{Fe}$					
		23.07	45.23	12.41	24.64	5.77

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 22.23^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.16 indicates that the calculated value of χ^2 was 22.23, which is greater than table value at 0.05 level. It deems that teachers give importance and value to these technologies which shows their positive attitude towards ICTs.

Table 4.1.17: ICT Policy

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	82	81	21	06	05
	Expected (fe)	39	39	39	39	39
Teachers	(fo _ fe)	43	42	18	33	34
should aware	$(fo - fe)^2$	1849	1764	324	1089	1156
about ICTs	$\frac{(fo - fe)^2}{Fe}$					
policy		47.41	45.23	8.31	27.92	29.64

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 31.70^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.17 shows that the calculated value of χ^2 was 31.70, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence they have positive attitude towards the use of these technologies.

Table 4.1.18: Computer at home

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	92	71	19	08	05
	Expected (fe)	39	39	39	39	39
Teachers	(fo _ fe)	53	32	-20	-31	-34
should have	$(fo - fe)^2$	2809	1024	400	961	1156
computer at	$\frac{(fo - fe)^2}{Fe}$					
home		72.03	26.26	10.26	24.64	29.64

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 32.56^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.18 indicates that the calculated value of χ^2 was 32.56, which is greater than table value at 0.05 level. It shows that majority of the respondents are agreed with the statement "Teachers should have internet connection at home" which indicates their positive attitude towards these technologies.

Table 4.1.19: Internet connection at home

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	82	93	09	06	05
	Expected (fe)	39	39	39	39	39
Teachers	(fo _ fe)	43	54	-30	-33	-34
should have	$(fo - fe)^2$	1849	2916	900	1089	1156
internet	$\frac{(fo - fe)^2}{Fe}$	47.41	74.76	23.07	27.92	29.64
connection at home	$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 40.56^*$					

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.19 indicates that the calculated value of χ^2 was 40.56, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence they are inclined towards the statement that "Teachers should have internet connection at home" which shows their positive attitude regarding Internet technology.

Table 4.1.20: E-mailing

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	61	49	31	50	4
	Expected (fe)	39	39	39	39	39
For sending	(fo _ fe)	22	10	-8	11	-35
e-mails	$(fo - fe)^2$	484	100	64	121	1225
	$\frac{(fo - fe)^2}{Fe}$	12.41	2.56	1.64	2.08	31.41
	$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 50.10^*$					

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.20 indicates that the calculated value of χ^2 was 5.10, which is greater than table value at 0.05 level. 56% respondents are frequent user of this technology, 16% occasionally user and 28% are seldom or never user of this technology. Hence, they are good user of email technology.

Table 4.1.21: Word-processing

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	51	63	48	33	--
	Expected (fe)	39	39	39	39	39
For word-processing (MS Word)	(fo _ fe)	12	24	09	-6	-39
	$(fo - fe)^2$	144	576	81	36	1521
	$\frac{(fo - fe)^2}{Fe}$	3.69	14.77	2.08	0.92	39

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 12.09^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.21 indicates that the calculated value of χ^2 was 12.09, which is greater than table value at 0.05 level. 58.46% respondents are agreed with the statement that they use these technologies for word-processing.

Table 4.1.22: Use of Spreadsheets

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	09	29	21	100	36
	Expected (fe)	39	39	39	39	39
For creating spreadsheets (MS Excel)	(fo _ fe)	-30	-10	-18	61	-03
	$(fo - fe)^2$	900	100	324	3721	09
	$\frac{(fo - fe)^2}{Fe}$	23.08	2.56	8.30	95.41	.23

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 129.58$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.22 indicates that the calculated value of χ^2 was 129.58, which is greater than table value at 0.05 level. 69.74% respondents are disagreed with the statement that they use these technologies for spread sheeting.

Table 4.1.23: Use of Presentations

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	36	45	63	48	03
	Expected (fe)	39	39	39	39	39
For	(fo _ fe)	-03	06	24	09	-36
Presentation	$(fo - fe)^2$	09	36	576	81	1296
(Power Point)	$\frac{(fo - fe)^2}{Fe}$	0.23	0.92	14.77	8.31	32.21

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 56.44^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.23 indicates that the calculated value of χ^2 was 56.44, which is greater than table value at 0.05 level. 41.53% respondents are agreed with the statement that they use these technologies for preparation and presentation of their lectures.

Table 4.1.24: Use of Internet for academic related studies

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	91	48	33	21	02
Use of	Expected (fe)	39	39	39	39	39
Internet for	(fo _ fe)	52	09	-06	-18	-37
academic	$(fo - fe)^2$	2704	81	36	324	1369
related	$\frac{(fo - fe)^2}{Fe}$					
studies		69.33	2.08	.92	8.31	35.10

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 115.74^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.24 indicates that the calculated value of χ^2 was 115.74, which is greater than table value at 0.05 level. 71.28% respondents are agreed with the statement that they use these technologies for the search of academic related studies.

Table 4.1.25: Reasons for never/seldom use of e-mail

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	04	06	07	20	17	68.51	2.26
2	Lack of quality hardware	14	21	09	06	04	64.81	3.65
3	Lack of software	05	07	06	18	18	66.67	2.31
4	Lack of quality software	13	21	10	06	05	62.96	3.63
5	Lack of knowledge	15	21	09	05	04	66.67	3.70
6	Lack of training	18	18	08	08	03	66.66	3.80
7	Not enough Internet connections	02	05	10	20	17	68.60	2.26
8	Slow connectivity	12	19	13	07	03	57.40	3.56
9	Lack of technical support	15	20	10	05	04	64.81	3.69
10	Lack of peer support	14	20	09	07	04	62.96	3.61
11	Lack of time	10	25	06	08	05	73.98	3.5
12	Lack of interest	13	16	10	12	03	53.70	3.44
13	It is expensive	05	06	08	21	15	66.67	2.40
14	Limited lab hours	06	07	06	22	13	64.81	2.46
15	Lack of administrative support	13	18	09	09	05	57.41	3.46
16	Lack of realization of advantages	12	24	08	06	04	66.66	3.44
17	Lack of confidence	14	16	13	08	03	51.56	3.56
18	Power failure	16	19	11	05	04	61.72	3.76
19	No relevancy with Bed/MEd	04	07	06	25	12	68.52	1.96

Table 4.1.25 indicates that the main reason for seldom or never use of e-mail are lack of training (66.67% and 3.80 $\bar{x}$) and power failure (61.72% and 3.76 $\bar{x}$). After that lack of knowledge (66.67% and 3.70 $\bar{x}$), lack of technical support (64.81% and 3.69 $\bar{x}$), lack of quality hardware (64.81% and 3.65 $\bar{x}$), lack of quality software (62.96% and 3.63 $\bar{x}$), lack of peer support (62.96% and 3.61 $\bar{x}$), lack of confidence (51.56% and 3.56 $\bar{x}$), lack of realization of advantages (61.11% and 3.54 $\bar{x}$), lack of time 73.98% and 3.5 $\bar{x}$), slow connectivity (57.40% and 3.56$\bar{x}$), lack of administrative support (57.41% and 3.46 $\bar{x}$), and lack of interest (66.67% and 3.4 $\bar{x}$). While it has no relevancy with the course of B.Ed/M.Ed and MA Education course (68.52% and 1.96 $\bar{x}$), lack of hardware (68.51% and 2.26 $\bar{x}$), not enough Internet connections (68.60% and 2.26 mean score), lack of software (66.67% and 2.31 $\bar{x}$), limited lab hours (64.81% and 2.46 $\bar{x}$) and expensive (66.67% and 2.40 $\bar{x}$) were not reasons in seldom or never use of e-mail technology.

Ranking of these reasons will be as follow:

1. lack of training
2. power failure
3. lack of knowledge
4. lack of technical support
5. lack of quality hardware
6. lack of quality software
7. lack of peer support
8. lack of confidence
9. lack of realization of advantages
10. lack of time and
11. lack of interest
12. slow connectivity and
13. lack of administrative /organizational support

Table 4.1.26: Reasons for never/seldom use of word-processing (MS Word)

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	01	06	08	11	07	54.55	2.45
2	Lack of quality hardware	07	15	05	05	01	66.67	3.67
3	Lack of software	02	06	07	09	09	54.55	2.48
4	Lack of quality software	10	13	06	04	--	69.70	3.94
5	Lack of knowledge	09	10	08	05	01	57.58	3.64
6	Lack of training	11	15	06	01	--	78.79	4.09
7	Lack of technical support	08	13	07	04	01	63.64	3.70
8	Lack of peer support	10	15	04	05	01	75.76	3.91
9	Lack of time	08	10	08	04	03	54.55	3.48
10	Lack of interest	07	11	06	05	04	54.55	3.36
11	It is expensive	01	02	07	14	09	69.70	2.15
12	Limited lab hours	03	05	04	14	07	63.64	2.48
13	Lack of administrative support	02	06	05	12	08	60.61	2.45
14	Lack of realization of advantages	07	12	05	07	02	57.58	3.45
15	Lack of confidence	07	11	08	06	01	54.55	3.51
16	Power failure	12	14	06	05	02	78.79	4.42
17	No relevancy with BEd/MEd	--	03	08	14	08	66.67	1.88

Table 4.1.26 shows that the main reason for seldom or never use of word-processing are power failure (78.60% and 4.42 mean score), lack of training (78.79% and 4.09 $\bar{x}$) and lack of quality software (61.72% and 3.76 $\bar{x}$). After that lack of

peer support (75.76% and 3.91 $\bar{x}$), lack of time 54.55% and 3.48 $\bar{x}$), lack of realization of advantages (57.58% and 3.45 $\bar{x}$), lack of technical support (63.64% and 3.70 $\bar{x}$), lack of quality hardware (66.67% and 3.67 $\bar{x}$), lack of interest (54.55% and 3.36 $\bar{x}$), lack of knowledge (57.58% and 3.64 $\bar{x}$), lack of confidence (54.55% and 3.51 $\bar{x}$). While it has no relevancy with B.Ed/M.Ed and MA Education course (66.67% and 1.88 $\bar{x}$), it is expensive (69.70% and 2.15 $\bar{x}$), lack of hardware (54.55% and 2.45 $\bar{x}$) and limited lab hours (63.64% and 2.48 $\bar{x}$) lack of software (54.55% and 2.48 $\bar{x}$) and lack of administrative support (60.61 and 2.45 $\bar{x}$) were not reasons in seldom or never use of word-processing (MS Word) technology.

Ranking of these reasons will be as follow:

1. power failure
2. lack of training
3. lack of quality software
4. lack of peer support
5. lack of technical support
6. lack of quality hardware
7. lack of knowledge
8. lack of confidence
9. lack of time
10. lack of realization of advantages
11. lack of interest

Table 4.1.27: Reasons for never/seldom use of spreadsheets (MS Excel)

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	02	08	06	21	17	70.37	2.20
2	Lack of quality hardware	12	17	10	09	06	53.70	3.37
3	Lack of software	05	08	04	18	19	68.52	2.30
4	Lack of quality software	10	19	14	09	02	53.70	3.48
5	Lack of knowledge	10	19	15	07	03	53.70	3.48
6	Lack of training	12	21	12	06	03	61.11	3.72
7	Lack of technical support	14	17	10	09	04	57.41	3.59
8	Lack of peer support	12	20	11	08	03	59.26	3.56
9	Lack of time	12	14	07	19	02	51.85	3.28
10	Lack of interest	11	19	14	08	02	55.56	3.57
11	It is expensive	06	07	05	19	19	70.37	2.41
12	Limited lab hours	05	06	05	21	17	70.37	2.37
13	Lack of administrative support	04	08	04	20	18	70.37	2.26
14	Lack of realization of advantages	11	22	06	09	06	61.11	3.43
15	Lack of confidence	11	21	09	07	06	59.26	3.44
16	Power failure	13	22	11	05	03	64.81	3.68
17	No relevancy with BEd/MEd	04	07	09	22	12	62.96	2.43

Table 4.1.27 depicts that the main reason for seldom or never use of spreadsheets (MS Excel) are lack of training (61.11% and 3.72 $\bar{x}$), power failure

(64.81% and 3.68 mean score), lack of technical support (57.41% and 3.59 $\bar{x}$), and lack of interest (55.56% and 3.57 $\bar{x}$). After that lack of peer support (59.26% and 3.59 $\bar{x}$), lack of quality software (53.70% and 3.48 $\bar{x}$), lack of knowledge (53.70% and 3.48 $\bar{x}$), lack of confidence (54.55% and 3.44 $\bar{x}$) lack of realization of advantages (61.11% and 3.43 $\bar{x}$), lack of quality hardware (66.67% and 3.67 $\bar{x}$) and lack of time 51.85% and 3.28 $\bar{x}$). While it has no relevancy with B.Ed/M.Ed and MA Education course (62.96% and 2.43 $\bar{x}$), it is expensive (70.37% and 2.41 $\bar{x}$), limited lab hours (70.37% and 2.37 $\bar{x}$) lack of hardware (70.37% and 2.20 $\bar{x}$), and lack of administrative support (70.37 and 2.26 $\bar{x}$) were not reasons in seldom or never use of spreadsheets (MS Excel) technology.

Ranking of these reasons will be as follow:

1. lack of training
2. power failure
3. lack of technical support
4. lack of interest
5. lack of peer support
6. lack of quality software
7. lack of knowledge
8. lack of confidence
9. lack of realization of advantages
10. lack of quality hardware
11. lack of time

Table 4.1.28: Reasons for never/seldom use of MS Power Point

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	02	06	08	20	12	66.67	2.29
2	Lack of quality hardware	09	16	08	07	08	52.08	3.23
3	Lack of software	03	08	08	19	10	60.42	2.48
4	Lack of quality software	12	14	12	08	02	54.17	3.54
5	Lack of knowledge	13	17	09	07	02	62.5	3.67
6	Lack of training	14	18	07	06	03	66.67	3.79
7	Lack of technical support	12	19	07	08	02	64.58	3.64
8	Lack of peer support	11	20	07	07	05	62.5	3.56
9	Lack of time	11	16	09	10	02	56.25	3.5
10	Lack of interest	13	20	07	06	02	68.75	3.75
11	It is expensive	04	06	09	18	11	60.42	2.46
12	Limited lab hours	03	05	08	21	11	66.67	2.33
13	Lack of administrative support	04	05	09	21	10	64.58	2.48
14	Lack of realization of advantages	04	06	10	16	12	58.33	2.46
15	Lack of confidence	10	16	14	06	02	54.17	3.54
16	Power failure	15	20	09	03	01	72.92	3.94
17	No relevancy with BEd/Med	03	06	09	20	10	62.5	2.42

Table 4.1.28 illustrates that the main reason for seldom or never use of presentations (MS Power Point) are power failure (72.92% and 3.92 mean score), lack of training (66.67% and 3.79 $\bar{x}$) and lack of interest (68.75% and 3.75 $\bar{x}$), lack

of knowledge (62.5% and 3.67 $\bar{x}$), lack of technical support (64.58% and 3.64 $\bar{x}$), lack of peer support (62.5% and 3.56 $\bar{x}$), lack of confidence (54.17% and 3.54 $\bar{x}$) lack of quality software (54.17% and 3.54 $\bar{x}$), lack of time (56.25% and 3.5 $\bar{x}$) and lack of quality hardware (52.08% and 3.23 $\bar{x}$). While lack of hardware (66.67% and 2.29 $\bar{x}$), it has no relevancy with B.Ed/M.Ed and MA Education course (62.5% and 2.42 $\bar{x}$), lack of realization of advantages (58.33% and 2.46 $\bar{x}$), it is expensive (60.42% and 2.46 $\bar{x}$), limited lab hours (64.58% and 2.48 $\bar{x}$), lack of software (60.42% and 2.48 $\bar{x}$) and lack of administrative support (64.58 and 2.48 $\bar{x}$) are not reasons in seldom or never use of 'MS power Point' technology.

Ranking of these reasons will be as follow:

1. power failure
2. lack of training
3. lack of interest
4. lack of knowledge
5. lack of technical support
6. lack of peer support
7. lack of confidence
8. lack of quality software
9. lack of time
10. lack of quality hardware

Table 4.1.29: Reasons for never/seldom use of Internet for academic related studies

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	01	04	06	14	08	69.70	2.33
2	Lack of quality hardware	06	13	05	06	03	57.58	3.39
3	Lack of software	01	05	07	11	09	60.61	2.33
4	Lack of quality software	07	15	04	05	01	66.67	3.58
5	Lack of knowledge	05	13	06	06	03	54.55	3.79
6	Lack of training	11	15	06	01	--	78.79	4.09
7	Not enough Internet connections	03	04	05	14	07	63.64	2.45
8	Slow connectivity	06	13	05	08	01	57.58	3.42
9	Lack of technical support	08	17	05	02	01	75.76	3.87
10	Lack of peer support	06	15	04	06	02	63.64	3.52
11	Lack of time	05	13	05	08	02	54.55	3.33
12	Lack of interest	08	13	05	06	01	63.64	3.64
13	It is expensive	01	03	06	15	08	69.70	2.21
14	Limited lab hours	03	05	04	14	07	63.64	2.48
15	Lack of administrative support	04	11	04	08	03	45.45	2.88
16	Lack of realization of advantages	9	13	06	03	2	66.67	3.73
17	Lack of confidence	06	13	07	05	02	57.58	3.48
18	Power failure	11	15	03	03	01	78.79	3.97
19	No relevancy with BEd/MEd	2	04	07	14	06	60.61	2.27

Table 4.1.29 indicates that the main reason for seldom or never use of Internet for searching academic related studies are lack of training (78.79% and 4.09

$\bar{x}$), power failure (78.79% and 3.97 $\bar{x}$) and lack of technical support (75.76% and 3.87 $\bar{x}$). After that lack of knowledge (54.55% and 3.79 $\bar{x}$), lack of realization of advantages (66.67% and 3.73 $\bar{x}$), lack of interest (63.64% and 3.64 $\bar{x}$), lack of quality software (66.67% and 3.58 $\bar{x}$), lack of peer support (63.64% and 3.52 $\bar{x}$), lack of confidence (57.58% and 3.48 $\bar{x}$), slow connectivity (57.585 and 3.42 x) and 4.26 lack of quality hardware (57.58% and 3.39 $\bar{x}$), lack of time 54.55% and 3.33 $\bar{x}$) and lack of administrative support (45.46% and 2.88 $\bar{x}$). While use of Internet is expensive (69.70% and 2.21 $\bar{x}$), it has no relevancy with the course of B.Ed/M.Ed and MA Education course (60.61% and 2.27 $\bar{x}$), lack of hardware (69.70% and 2.33 $\bar{x}$), lack of software (60.61% and 2.33 $\bar{x}$), not enough Internet connections (63.64% and 2.39 $\bar{x}$), and limited lab hours (63.64% and 2.48 $\bar{x}$), were not reasons in seldom or never use of Internet technology for searching material for academic related studies.

Ranking of these reasons will be as follow:

1. lack of training
2. power failure
3. lack of technical support
4. lack of knowledge
5. lack of realization of advantages
6. lack of interest
7. slow connectivity
8. lack of quality software
9. lack of peer support
10. lack of confidence
11. lack of quality hardware and
12. lack of time
13. lack of administrative support

Table 4.1.30: Skill level to use E-mail

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	75	66	12	24	18
Teachers'	Expected (fe)	39	39	39	39	39
skill level to	(fo _ fe)	36	27	-27	-15	-21
use e-mail	$(fo - fe)^2$	1296	729	729	225	441
technology	$\frac{(fo - fe)^2}{fe}$	33.23	18.69	.18.69	5.77	11.31

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 17.54^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.30 indicates that the calculated value of χ^2 was 17.54, which is greater than table value at 0.05 level. It shows that majority (71.79%) of the respondents have satisfactory skills for emailing.

Table 4.1.31: Skill Level to Use Word-processing

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	42	84	36	21	12
	Expected (fe)	39	39	39	39	39
Teachers'	(fo _ fe)	03	45	-3	-18	-27
skill level to	$(fo - fe)^2$	09	2025	09	324	729
use MS Word	$\frac{(fo - fe)^2}{fe}$					
technology		0.23	51.92	0.23	8.31	18.69

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 15.88^*$$

*Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.31 indicates that the calculated value of χ^2 was 15.88, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence they have adequate skills to use word-processing.

Table 4.1.32: Skills to Use Spreadsheets

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	09	29	21	100	36
Teachers'	Expected (fe)	39	39	39	39	39
skill level to	(fo _ fe)	-30	-10	-18	61	-3
use MS Excel	$(fo - fe)^2$	900	100	324	3721	09
technology	$\frac{(fo - fe)^2}{fe}$	23.08	2.56	8.30	95.41	0.23

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 129.58^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.32 indicates that the calculated value of χ^2 was 129.58, which is greater than table value at 0.05 level. As majority of the respondents (64.62%) is disagreeing with the statement hence, teachers' skill level to use spreadsheets is inadequate.

Table 4.1.33: Skills to Use Presentations

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	13	95	48	27	12
	Expected (fe)	39	39	39	39	39
Teachers'	(fo _ fe)	-26	56	09	-12	-27
skills to use	$(fo - fe)^2$	676	3136	81	144	729
power point	$\frac{(fo - fe)^2}{fe}$					
technology		17.33	80.41	2.07	3.69	18.69

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 122.19^*$$

*Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.33 indicates that the calculated value of χ^2 was 122.19, which is greater than table value at 0.05 level. 55.38% teachers have satisfactory skills to use power point technology.

Table 4.1.34: Searching Academic Related Studies on Internet

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
Teachers' use Internet for searching academic related studies	Observed (fo)	72	48	30	33	12
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	33	09	-9	-6	-27
	$(fo - fe)^2$	1089	81	81	36	729
	$\frac{(fo - fe)^2}{fe}$	27.92	2.08	2.08	0.92	18.69

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 10.34^*$$

* Significant df = 4 Table value at 0.05 = 9.488

A Table 4.1.34 indicates that the calculated value of χ^2 was 10.34, which is greater than table value at 0.05 level. As the trend of respondents is towards 'well skilled', hence, teachers' skill level to use Internet for academic related studies is adequate.

Table 4.1.35: Use of ICTs for the Preparation of Lectures

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for the preparation of lectures	Observed (fo)	75	93	09	15	03
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	36	54	-30	-24	-30
	$(fo - fe)^2$	1296	2916	900	576	900
	$\frac{(fo - fe)^2}{fe}$	33.23	74.77	23.08	14.77	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 33.78^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.35 indicates that the calculated value of χ^2 was 33.78, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (86.15)', hence, teachers use ICTs for preparation of their lectures.

Table 4.1.36: Use of ICTs in Lectures

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for the presentation of their lectures	Observed (fo)	60	93	12	21	09
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	21	54	-27	-18	-30
	$(fo - fe)^2$	441	2916	729	324	900
	$\frac{(fo - fe)^2}{fe}$	11.31	74.77	18.69	8.31	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 27.23^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.36 indicates that the calculated value of χ^2 was 27.23, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (78.46)', hence, teachers use ICTs for the presentation of their lectures.

Table 4.1.37: Use of ICTs for Handouts

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for preparing handouts for students	Observed (fo)	48	99	33	12	03
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	09	60	-6	-27	-30
	$(fo - fe)^2$	81	3600	36	729	900
	$\frac{(fo - fe)^2}{fe}$	2.08	92.31	0.92	18.69	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 27.42^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.37 indicates that the calculated value of χ^2 was 27.42, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (75.38)', hence, majority of the teachers use these technologies for preparing handouts for their students.

Table 4.1.38: Use of ICTs for Feedback

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for giving feedback to their students	Observed (fo)	36	102	33	21	03
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	-3	63	-3	-18	-36
	$(fo - fe)^2$	09	3969	09	324	1296
	$\frac{(fo - fe)^2}{fe}$	0.23	101.77	0.23	8.31	33.23

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 28.75^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.38 indicates that the calculated value of χ^2 was 28.75, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (70.77)', hence, majority of the teachers use ICTs for giving feedback to their students.

Table 4.1.39: Use of ICTs for Assessing Students' Assignments

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for assessing students' assignments	Observed (fo)	24	102	27	33	09
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	-15	63	-12	-6	-30
	$(fo - fe)^2$	225	3969	144	36	900
	$\frac{(fo - fe)^2}{fe}$	5.77	101.77	3.69	0.92	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 25.51^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.39 indicates that the calculated value of χ^2 was 25.51, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (64.62)', hence, majority of the teachers use ICTs for assessing students' assignments.

Table 4.1.40: Use of ICT for recording students' marks/results

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for recoding students' marks/results	Observed (fo)	66	81	18	21	09
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	27	42	-21	-18	-30
	$(fo - fe)^2$	729	1764	441	324	900
	$\frac{(fo - fe)^2}{fe}$	18.69	45.23	11.31	8.31	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 21.32^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.40 indicates that the calculated value of χ^2 was 21.32, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (75.38)', hence, majority of the teachers use ICTs for recording students' marks/results" is accepted.

Table 4.1.41: Use of ICTs for Communication

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for 1communicating with their students	Observed (fo)	45	81	36	24	09
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	06	42	-3	-15	-30
	$(fo - fe)^2$	36	1764	09	225	900
	$\frac{(fo - fe)^2}{fe}$	0.92	45.23	0.23	5.77	23.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 15.05^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.41 indicates that the calculated value of χ^2 was 15.05, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (64.10)', hence, majority of the teachers use ICTs for communicating with their students.

Table 4.1.42: Use of ICTs for Searching National/International Conferences

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use these technologies for searching national and international conferences	Observed (fo)	45	53	11	47	39
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	06	14	-28	08	0
	$(fo - fe)^2$	36	196	784	64	0
	$\frac{(fo - fe)^2}{fe}$	192	5.03	20.10	1.64	0

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 27.60^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.42 indicates that the calculated value of χ^2 was 27.60, which is greater than table value at 0.05 level. As the trend of respondents is towards 'disagree (75.38)', hence, majority of the teachers do not use ICTs for searching national and international conferences.

Table 4.1.43: Use of ICTs for Conference Papers

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for the preparation of conference papers	Observed (fo)	41	54	08	50	42
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	02	15	-31	11	3
	$(fo - fe)^2$	04	225	961	121	09
	$\frac{(fo - fe)^2}{fe}$	.10	5.77	24.64	.62	.05

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 31.18^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.43 indicates that the calculated value of χ^2 was 31.18, which is greater than table value at 0.05 level. As the trend of respondents is towards 'disagree (69.23)', hence, majority of the teachers do not use these technologies for the preparation of conference papers.

Table 4.1.44: Use of ICTs for Publications

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use these technologies for publications	Observed (fo)	27	30	45	59	34
	Expected (fe)	39	39	39	39	39
	(fo _ fe)	-12	-9	06	20	-5
	$(fo - fe)^2$	144	81	36	400	25
	$\frac{(fo - fe)^2}{fe}$	3.69	2.08	.92	10.26	.64

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 17.59^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.1.44 indicates that the calculated value of χ^2 was 17.59, which is greater than table value at 0.05 level. As the trend of respondents is towards 'disagree (75.38)', hence, majority of the teachers do not use these technologies for the publication of their papers.

Table 4.1.45: Top Ten Barriers/Problems in the Use of ICTs

Sr. No	Barriers	Top Ten Barriers										f	$\bar{x}$	R
		1	2	3	4	5	6	7	8	9	10			
1	LHW	03	--	09	02	16	26	09	--	14	21	100	4.27	15
2	LQHW	23	22	07	09	46	11	28	16	08	05	175	6.10	8
3	LTR	53	62	08	08	07	06	14	11	--	--	169	8.10	1
4	LSW	01	03	02	03	02	03	04	05	05	07	35	4.25	17
5	LQSW	06	03	07	02	01	01	02	03	01	04	30	6.36	6
6	L.Know	15	15	12	09	03	08	07	08	10	--	85	6.44	4
7	N.Net	09	18	03	07	08	06	05	19	16	04	105	5.01	14
8	Slw.Con	10	05	17	08	03	12	05	08	01	01	70	6.31	7
9	LTS	15	37	12	14	19	06	04	14	11	11	145	6.43	5
10	LPS	12	09	08	11	37	16	12	09	05	11	130	5.69	11
11	LT	17	08	07	09	06	03	11	14	12	08	95	5.58	13
12	L. Intr	10	17	14	16	15	09	11	9	11	08	120	5.94	9
13	Expn	04	03	07	08	12	07	24	05	31	29	130	3.75	18
14	Lab.H	02	01	03	11	08	14	09	13	15	09	85	4.26	16
15	L. Admn	04	07	03	11	03	02	14	08	01	02	55	5.75	10
16	L. Advn	16	13	06	08	02	01	09	17	10	08	90	5.6	12
17	LCON	20	19	16	14	13	12	07	03	08	03	115	6.88	3
18	PF	36	23	18	09	17	16	13	14	--	--	146	7.21	2
19	NR	05	04	01	02	02	08	01	03	21	24	70	3.41	19

Scale value for this table is 1=10, 2=09, 3=08, 4=07, 5=06, 6=05, 7=04, 8=03, 9=02 and 10=01 While abbreviations used in this table are as; LQHW=lack of quality hardware, LHR=Lack of hardware, LSW=lack of software, LQSW=lack of quality software, L.Know=lack of knowledge, LTR=lack of training, Slw.Con=slow connectivity, LTS=lack of technical support, N.Net=not enough Internet connections, LPS=lack of peer support, LT=lack of time, Expn=It is expensive, Lab. H=limited lab hours, L.Intr=lack of interest, L. Admn=lack of administrative support, L.Conf=lack of confidence, L. Advn=lack of realization of advantages, PF=power failure and NR=no relevancy with B.Ed/M.Ed and MA education course.

Table 4.1.45 illustrates that on asking the top ten barriers/problems in the use of ICTs, the respondents rated them as; lack of training (men score, 8.10), power failure (mean score, 7.21), lack of confidence (mean score, 6.88), lack of knowledge (mean score, 6.44), lack of technical support (mean score, 6.43), lack of quality software (mean score, 6.36), slow Internet connectivity(mean score, 6.31), lack of quality hardware (mean score, 6.10), lack of interest (mean score, 5.94), lack of administrative support (mean score, 5.75), lack of peer support (mean score, 5.69), lack of realization of advantages (mean score, 5.6), lack of time (mean score, 5.58), not enough Internet connections (mean score, 5.01), lack of hardware (mean score, 4.27), limited lab hours (mean score, 4.26), lack of software (mean score, 4.25), these technologies are expensive (mean score, 3.75), and these technologies have has no relevancy with B.Ed/M.Ed and MA Education course (mean score, 3.41).In a nutshell ranking of these barriers are as follow:

1. lack of training
2. power failure
3. lack of confidence
4. lack of knowledge
5. lack of technical support
6. lack of quality software
7. slow Internet connectivity
8. lack of quality hardware
9. lack of interest
10. lack of administrative/organizational support

4.2 ANALYSIS OF QUESTIONNAIRE FOR STUDENTS

TABLE 4.2.1: Age wise frequencies of respondents

S.No	Age/Years	Frequency	%age	Ranks
1	20-25	1081	71	1
2	26-30	298	19.45	2
3	31-35	89	5.76	3
4	36-40	56	3.60	4
5	40 and above	06	0.39	5
6	Total	1530	100	

Table 4.2.1 shows that out of 1530 students 71% were between 20-25 years and this group ranked 1st while 19.45% belonged to the age group of 26-30 and ranked 2nd. Age group 31-35 has 3rd position with 5.76%. Age group of 36-40 ranked at 4th position with 3.60% while above 40 is only 06, ranked at 5th number with only 3%.

TABLE 4.2.2: Qualification wise frequencies of respondents

S.No	Qualification	Frequency	%age	Ranks
1	MA/MSc/MEd/MBA	835	55	1
2	BA/BSC	692	45	2
3	Total	1527	100	

Table 4.2.2 shows that out of 1527 students majority has MA/MSc degree and they are ranked 1st with 55% while remaining 45% have BA/BSc degree and are ranked 2nd.

TABLE 4.2.3: IT diploma wise frequencies of respondents

S.No	Sex	Having IT Diploma	%age	Rank
1	Male	168	11	1
2	Female	229	15	2
3	Total	397	26	

Table 4.2.3 shows that out of 1527 students 397 have got diploma in IT and these are 26%. However female are ahead in this area as they their ratio is 15% as compared to 11% male ratio.

TABLE 4.2.4: Computers and Internet connection at home

S.No	Sex	Computer at home		Internet at home	
		Frequency	%age	Frequency	%age
1	Male	512	34	414	27.18
2	Female	603	40	334	22
3	Total	1115	74	748	49.18

Table 4.2.4 shows that out of 1527 students 74% teachers have computer at home and 49.18% have internet connection at home. Interestingly female students are ahead in computer at home category with 40% and in Internet connection at home vice versa male students with 27.18%.

Table 4.2.5: E-mail address

S.No	Sex	Have e-mail		Given that address	
		Frequency	%age	Frequency	%age
1	Male	262	17.15	123	8.1
2	Female	247	16.18	168	11
3	Total	509	33.33	291	19.09

Table 4.2.5 shows that out of 1527 students 33.33% have e-mail addresses and 19.09% have written their e-mail addresses.

Table 4.2.6: Easiness of ICTs use

Statement	Respondents	SA	A	UNC	DA	SDA
Use of ICTs is easy	Observed (fo)	293	995	107	123	09
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-13	689	-199	-183	-297
	$(fo - fe)^2$	169	474721	39601	33489	88209
	$\frac{(fo - fe)^2}{fe}$	0.55	1551.37	129.41	109.44	294.12

$$\sum \frac{(fo - fe)^2}{fe} = \chi^2 = 415.81^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.6 indicates that the calculated value of χ^2 is 415.81, which is greater than table value at 0.05 level. It shows that majority of the respondents inclines towards 'agree', hence, they have positive attitude towards the use of ICTs.

Table 4.2.7: Use of ICTs is pleasant

Statement	Respondents	SA	A	UNC	DA	SDA
Use of ICTs is pleasant	Observed (fo)	359	772	66	317	13
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	53	469	-240	11	-293
	$(fo - fe)^2$	2809	219961	57600	121	85849
	$\frac{(fo - fe)^2}{fe}$	1.91	274.45	37.65	20736	56.49

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 239.44^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.7 indicates that the calculated value of χ^2 was 239.44, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, students' attitude towards the use of ICTs seems positive.

Table 4.2.8: Importance of ICTs

Statement	Respondents	SA	A	UNC	DA	SDA
Use of ICTs is very important	Observed (fo)	537	905	42	26	17
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	231	599	-264	-287	-289
	$(fo - fe)^2$	53361	358801	69696	82369	83521
	$\frac{(fo - fe)^2}{fe}$	174.38	1172.55	227.76	269.18	272.94

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 423.36^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.8 indicates that the calculated value of χ^2 was 423.36, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, their attitude towards the use of ICTs is positive.

Table 4.2.9: ICTs are Interesting

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	559	780	78	67	43
	Expected (fe)	306	306	306	306	306
Use of ICTs	(fo _ fe)	253	474	-228	-239	-260
is interesting	$(fo - fe)^2$	64009	224676	51984	57121	67600
	$\frac{(fo - fe)^2}{fe}$	209.18	734.24	169.88	186.67	220.92

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 304.18^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.9 indicates that the calculated value of χ^2 was 304.18, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, they have positive attitude towards the use of ICTs.

Table 4.2.10: ICTs are Comfortable

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	337	771	212	180	27
	Expected (fe)	306	306	306	306	306
I feel	(fo _ fe)	-8	364	-124	-143	-289
comfortable	$(fo - fe)^2$	64	132496	15376	20449	83521
when I use	$\frac{(fo - fe)^2}{fe}$					
ICTs		0.21	432.99	50.25	66.85	272.94

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 164.64^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.10 indicates that the calculated value of χ^2 was 164.64, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, their attitude towards the use of ICTs seems positive.

Table 4.2.11: Confidence in ICTs Use

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	392	697	231	150	57
	Expected (fe)	306	306	306	306	306
I feel	(fo _ fe)	86	391	-75	-156	-246
confident	$(fo - fe)^2$	7396	152881	5625	24336	60516
when I use	$\frac{(fo - fe)^2}{fe}$					
ICTs		24.17	499.61	18.38	79.53	197.76

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 163.89^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.11 indicates that the calculated value of χ^2 was 163.89, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, they have positive attitude towards the use of these technologies.

Table 4.2.12: Value of ICTs

Statement	Respondents	SA	A	UNC	DA	SDA
	Observed (fo)	470	598	166	171	122
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	164	292	-240	-135	-181
Use of ICTs	$(fo - fe)^2$	26896	85264	57600	18225	32761
is valuable	$\frac{(fo - fe)^2}{fe}$					
		87.90	278.64	188.24	59.56	107.06

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 144.28^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.12 indicates that the calculated value of χ^2 was 144.28, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, their attitude towards the use of ICTs is positive.

Table 4.2.13: ICT Policy

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers should aware about ICTs policy	Observed (fo)	631	125	300	62	409
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	325	-181	-6	-244	107
	$(fo - fe)^2$	105625	32761	36	59536	11449
	$\frac{(fo - fe)^2}{fe}$	345.18	107.06	0.12	1194.56	37.41

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 136.87$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.13 indicates that the calculated value of χ^2 was 136.87, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, they have positive attitude towards the use of these technologies.

Table 4.2.14: Computer at Home

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers should have computer at home	Observed (fo)	373	707	172	160	118
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	67	401	-134	-136	-188
	$(fo - fe)^2$	4489	160801	17956	18496	35344
	$\frac{(fo - fe)^2}{fe}$	14.67	525.49	58.68	60.44	115.50

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 154.96^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.14 indicates that the calculated value of χ^2 was 154.96, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, their attitude towards the use of these technologies seems positive.

Table 4.2.15: Internet Connection at Home

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers should have internet connection at home	Observed (fo)	476	541	196	166	148
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	187	245	-102	-130	-146
	$(fo - fe)^2$	34969	60025	10404	16900	21316
	$\frac{(fo - fe)^2}{fe}$	114.28	196.16	34	55.29	69.66

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 93.86^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.15 indicates that the calculated value of χ^2 was 93.86, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree', hence, students' attitude towards the use of these technologies is positive.

Table 4.2.16: E-mailing

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
For sending e-mails	Observed (fo)	223	275	456	409	167
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-83	-31	150	103	-139
	$(fo - fe)^2$	6889	961	22500	10609	19321
	$\frac{(fo - fe)^2}{fe}$	22.51	3.14	73.53	34.67	63.14

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 39.40^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.16 indicates that the calculated value of χ^2 was 39.40, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence, they are frequent user of this technology.

Table 4.2.17: Word-processing

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	335	461	330	265	139
	Expected (fe)	306	306	306	306	306
For word-processing (MS Word)	(fo _ fe)	29	155	24	-41	-167
	$(fo - fe)^2$	841	24025	576	1681	27689
	$\frac{(fo - fe)^2}{fe}$	2.75	78.51	1.88	5.49	90.49

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 35.82^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.17 indicates that the calculated value of χ^2 was 35.82, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence, students seem fluent user of word-processing (MS Word).

Table 4.2.18: Use of Spreadsheets (MS Excel)

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	15	37	340	627	511
	Expected (fe)	306	306	306	306	306
For creating spreadsheets (MS Excel)	(fo _ fe)	-291	-269	34	321	205
	$(fo - fe)^2$	84681	72361	1156	103041	42025
	$\frac{(fo - fe)^2}{fe}$	276.74	236.47	3.78	336.74	137.34

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 991.07^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.18 indicates that the calculated value of χ^2 was 991.07, which is greater than table value at 0.05 level. As the trend of respondents is towards 'infrequent users', hence, students are not infrequent user of spreadsheets (MS Excel).

Table 4.2.19: Use of Presentations

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	18	41	337	624	510
	Expected (fe)	306	306	306	306	306
For	(fo _ fe)	-288	-265	31	318	204
Presentation	$(fo - fe)^2$	82944	70225	961	101124	41616
(Power Point)	$\frac{(fo - fe)^2}{fe}$	271.06	229.49	3.14	330.47	136

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 970.16^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.19 indicates that the calculated value of χ^2 was 970.16, which is greater than table value at 0.05 level. As the trend of respondents is towards 'infrequent user', hence, the students are infrequent user of Presentation.

Table 4.2.20: Internet for academic related studies

Statement	Respondents	Always	Frequently	Occasionally	Seldom	Never
	Observed (fo)	407	365	283	260	215
Use of	Expected (fe)	306	306	306	306	306
Internet for	(fo _ fe)	101	59	-23	-46	-91
academic	$(fo - fe)^2$	10201	3481	529	2116	8281
related	$\frac{(fo - fe)^2}{fe}$					
studies		33.34	11.38	1.73	6.92	27.06

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 16.08^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.20 indicates that the calculated value of χ^2 was 16.08, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence, the students are fluent user of Internet for searching academic related studies.

Table 4.2.21: Reasons for never/seldom use of e-mail

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	151	273	50	73	29	94.44	4.78
2	Lack of quality hardware	89	203	88	139	57	50.69	3.22
3	Lack of software	34	90	87	234	131	53.99	2.40
4	Lack of quality software	133	227	60	117	39	62.5	3.53
5	Lack of knowledge	171	264	49	77	15	75.52	3.87
6	Lack of training	175	289	53	42	17	80.56	3.98
7	Not enough Internet connections	144	229	55	112	36	64.76	3.78
8	Slow connectivity	143	261	48	99	25	70.14	3.69
9	Lack of technical support	67	255	125	91	38	55.38	3.39
10	Lack of peer support	120	222	90	81	63	59.38	3.44
11	Lack of time	80	205	85	127	79	49.47	3.15
12	Lack of interest	81	179	92	153	71	45.14	3.08
13	It is expensive	140	235	97	71	33	65.10	3.66
14	Limited lab hours	111	252	93	119	11	63.02	3.63
15	Lack of administrative support	108	290	87	75	16	69.10	3.69
16	Lack of realization of advantages	141	209	115	67	44	60.76	3.58
17	Lack of confidence	199	211	75	50	41	71.18	3.83
18	Power failure	201	243	52	51	29	77.08	3.93
19	No relevancy with B.Ed/M.Ed	31	98	86	234	131	53.99	2.44

Table 4.2.21 indicates that the main reason for seldom or never use of e-mail are lack of hardware (94.44% and 4.78 $\bar{x}$), lack of training (80.56% and 3.98 $\bar{x}$), power failure (77.08% and 3.93 $\bar{x}$), lack of knowledge (75.52% and 3.87 $\bar{x}$), lack of confidence (71.18% and 3.83 $\bar{x}$), not enough Internet connections (64.76% and 3.78 mean score), slow connectivity (70.14% and 3.69 $\bar{x}$), lack of administrative support (69.10% and 3.69 $\bar{x}$), it is expensive (65.10% and 3.66 $\bar{x}$), limited lab hours (63.02% and 3.63 $\bar{x}$), lack of realization of advantages (60.76% and 3.58 $\bar{x}$), lack of quality software (62.5% and 3.52 $\bar{x}$), lack of peer support (59.38% and 3.44 $\bar{x}$), lack of technical support (55.38% and 3.39 $\bar{x}$), lack of quality hardware (50.69% and 3.22 $\bar{x}$), lack of time 49.47% and 3.15 $\bar{x}$) and lack of interest (45.14% and 3.08 $\bar{x}$). While it has no relevancy with the course of B.Ed/M.Ed and MA Education course (52.99% and 2.44 $\bar{x}$), and lack of software (53.99% and 2.40 $\bar{x}$) were not reasons for seldom or never use of e-mail technology.

Ranking of these reasons will be as follow:

1. lack of hardware
2. lack of training
3. power failure
4. lack of knowledge
5. lack of confidence
6. not enough Internet connections
7. slow connectivity
8. lack of administrative / organizational support

9. it is expensive
10. limited lab hours
11. lack of realization of advantages
12. lack of quality software
13. lack of peer support
14. lack of technical support
15. lack of quality hardware
16. lack of time and
17. lack of interest

Table 4.2.22: Reasons for Never/Seldom Use of Word-processing

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	122	171	38	38	35	72.52	3.85
2	Lack of quality hardware	83	121	47	99	54	51	2.8
3	Lack of software	30	51	54	135	124	66.59	2.28
4	Lack of quality software	135	90	29	98	52	55.69	3.24
5	Lack of knowledge	81	126	53	79	65	51	3.44
6	Lack of training	119	170	41	39	35	71.75	3.74
7	Lack of technical support	24	80	75	214	111	80.45	2.98
8	Lack of peer support	82	127	36	70	89	52	3.11
9	Lack of time	33	45	48	193	85	68.81	2.18
10	Lack of interest	65	77	44	84	134	53.96	3.33
11	It is expensive	67	63	21	201	52	62.62	2.58
12	Limited lab hours	78	123	47	90	56	49.75	3.17
13	Lack of administrative support	110	161	29	80	24	67	3.38
14	Lack of realization of advantages	88	133	59	74	50	54.70	3.33
15	Lack of confidence	75	159	48	79	63	57.92	3.41
16	Power failure	117	123	41	73	50	59.41	3.46
17	No relevancy with B.Ed/M.Ed	24	89	41	143	107	61.89	2.01

Table 4.2.22 indicates that the main reasons for seldom or never use of word-processing are lack of hardware (72.52% and 3.85 $\bar{x}$), lack of training (71.75% and 3.74 $\bar{x}$), power failure (59.41% and 3.46 $\bar{x}$), lack of knowledge (51% and 3.44$\bar{x}$), lack of confidence (57.92% and 3.41 $\bar{x}$), lack of administrative support (67% and

3.38 $\bar{x}$), lack of realization of advantages (54.70% and 3.33 $\bar{x}$), lack of interest (53.96% and 3.33 $\bar{x}$), lack of quality software (55.69% and 3.24 $\bar{x}$), limited lab hours (49.75% and 3.17 $\bar{x}$), lack of peer support (52% and 3.11 $\bar{x}$), lack of technical support (80.45% and 2.98 $\bar{x}$), lack of quality hardware (51% and 2.8 $\bar{x}$) and it is expensive (62.62% and 2.58 $\bar{x}$). While lack of software (66.59% and 2.28 $\bar{x}$), lack of time (68.81% and 2.18 $\bar{x}$) and it has no relevancy with the course of B.Ed/M.Ed and MA Education course (61.89% and 2.01 $\bar{x}$) were not reasons for seldom/never use of MS Word technology. Ranking of these reasons will be as follow:

1. lack of hardware
2. lack of training
3. power failure
4. lack of knowledge
5. lack of confidence
6. lack of administrative / organizational support
7. lack of realization of advantages
8. lack of interest
9. lack of quality software
10. limited lab hours
11. lack of peer support
12. lack of technical support
13. lack of quality hardware
14. it is expensive

Table 4.2.23: Reasons for never/seldom use of spreadsheets

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	290	106	14	105	85	66.0	3.77
2	Lack of quality hardware	85	145	35	161	174	55.83	2.67
3	Lack of software	31	80	294	80	115	68.17	2.36
4	Lack of quality software	229	91	50	125	105	53.33	3.19
5	Lack of knowledge	224	188	62	51	75	68.66	3.72
6	Lack of training	201	199	39	101	65	66.66	3.79
7	Lack of technical support	175	208	27	129	61	63.83	3.46
8	Lack of peer support	197	157	55	101	90	59	3.30
9	Lack of time	191	163	52	105	89	59	2.84
10	Lack of interest	100	154	35	201	110	51..83	2.88
11	It is expensive	100	149	40	209	101	51.66	2.55
12	Limited lab hours	170	108	31	229	62	48.50	3.16
13	Lack of administrative support	185	240	40	61	74	70.83	3.65
14	Lack of realization of advantages	189	209	41	94	65	66.33	3.59
15	Lack of confidence	215	199	56	55	75	69	3.71
16	Power failure	225	160	35	95	85	64.16	3.74
17	No relevancy with B.Ed/M.Ed	29	78	80	295	116	68.5	2.33

Table 4.2.23 indicates that the main reason for seldom or never use of MS excel are lack of training (66.66% and 3.79 $\bar{x}$), lack of hardware (66% and 3.77 $\bar{x}$), power failure (64.16% and 3.74 $\bar{x}$), lack of knowledge (68.67% and 3.72$\bar{x}$), lack of

confidence (69% and 3.71 $\bar{x}$), lack of administrative support (70.83% and 3.65 $\bar{x}$), lack of realization of advantages (66.33% and 3.59$\bar{x}$), lack of technical support (63.83% and 3.46$\bar{x}$), lack of peer support (59% and 3.30 $\bar{x}$), lack of quality software (53.33% and 3.19 $\bar{x}$), limited lab hours (48.50% and 3.16 $\bar{x}$), lack of interest (51.83% and 2.88$\bar{x}$), lack of time (59% and 2.84 $\bar{x}$), lack of quality hardware (55.83% and 2.67 $\bar{x}$) and it is expensive (51.66% and 2.55$\bar{x}$). While it has no relevancy with the course of B.Ed/M.Ed and MA Education course (69% and 2.33 $\bar{x}$), lack of software (68.17% and 2.36 $\bar{x}$), and were not reasons for seldom or never use of spreadsheet technology. Ranking of these reasons will be as follow:

1. lack of training
2. lack of hardware
3. power failure
4. lack of knowledge
5. lack of confidence
6. lack of administrative / organizational support
7. lack of realization of advantages
8. lack of technical support
9. lack of peer support
10. lack of quality software
11. it is expensive
12. limited lab hours
13. lack of interest
14. lack of time and
15. lack of quality hardware

Table 4.2.24: Reasons for never/seldom use of presentations

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	219	171	13	79	53	72.89	3.79
2	Lack of quality hardware	124	225	37	101	48	65	3.33
3	Lack of software	50	36	09	131	309	82.24	1.85
4	Lack of quality software	96	250	40	111	38	64.67	3.48
5	Lack of knowledge	125	315	10	35	50	62.24	3.80
6	Lack of training	256	144	26	74	35	74.76	3.92
7	Lack of technical support	159	201	21	64	90	67.28	3.51
8	Lack of peer support	175	212	22	76	50	72.36	3.53
9	Lack of time	160	198	27	58	92	66.91	3.45
10	Lack of interest	153	196	36	93	57	65	3.55
11	It is expensive	115	231	64	88	37	64.67	3.56
12	Limited lab hours	156	204	25	60	90	67.28	3.51
13	Lack of administrative support	165	185	34	75	76	65.42	3.54
14	Lack of realization of advantages	178	209	19	79	50	72.33	3.72
15	Lack of confidence	157	195	48	80	55	65.79	3.59
16	Power failure	237	154	17	41	86	73.08	3.77
17	No relevancy with B.Ed/M.Ed	47	35	10	134	309	82.80	1.84

Table 4.2.24 indicates that the main reason for seldom or never use of MS power Point are lack of training (74.76% and 3.92 $\bar{x}$), lack of knowledge (62.24% and 3.80 $\bar{x}$), Lack of hardware (72.89% and 3.79 $\bar{x}$), power failure (73.08% and

3.77 $\bar{x}$), lack of realization of advantages (72.33% and 3.72 $\bar{x}$), lack of confidence (65.79% and 3.59 $\bar{x}$), it is expensive (64.67% and 3.56 $\bar{x}$), lack of interest (65% and 3.55 $\bar{x}$), lack of administrative support (65.42% and 3.54 $\bar{x}$), lack of peer support (72.36% and 3.53 $\bar{x}$), lack of technical support (67.28% and 3.51 $\bar{x}$), limited lab hours (67.28% and 3.51 $\bar{x}$), lack of quality software (64.67% and 3.48 $\bar{x}$), lack of time 66.91% and 3.45 $\bar{x}$) and lack of quality hardware (65% and 3.33 $\bar{x}$). While lack of software (82.24% and 1.85 $\bar{x}$) and it has no relevancy with the course of B.Ed/M.Ed and MA Education course (82.80% and 1.84 $\bar{x}$), were not reasons for seldom or never use of power point technology. Ranking of these reasons will be as follow:

1. lack of training
2. lack of knowledge
3. lack of hardware
4. power failure
5. lack of realization of advantages
6. lack of confidence
7. it is expensive
8. lack of interest
9. lack of administrative / organizational support
10. lack of peer support
11. lack of technical support
12. limited lab hours
13. lack of quality software
14. lack of time and
15. lack of quality hardware

Table 4.2.25: Reasons for never/seldom use of Internet

S.No	Reason	SA	A	UNC	DA	SDA	%	$\bar{x}$
1	Lack of hardware	159	188	41	48	39	73.05	3.8
2	Lack of quality hardware	27	87	35	225	101	68.63	2.39
3	Lack of software	52	93	45	155	130	60.0	2.35
4	Lack of quality software	52	97	41	149	136	60.0	2.54
5	Lack of knowledge	120	238	08	69	40	75.36	3.69
6	Lack of training	157	211	31	42	34	77.47	3.87
7	Not enough Internet connections	129	232	14	47	53	76.00	3.71
8	Slow connectivity	170	182	36	40	47	74.10	3.82
9	Lack of technical support	112	231	23	64	45	72.21	3.63
10	Lack of peer support	45	89	50	200	91	61.26	2.57
11	Lack of time	48	95	42	188	102	61.05	2.58
12	Lack of interest	127	188	32	73	55	66.32	3.55
13	It is expensive	142	180	23	75	55	67.78	3.59
14	Limited lab hours	145	170	13	57	90	66.31	3.47
15	Lack of administrative support	141	174	11	59	90	66.31	3.46
16	Lack of realization of advantages	119	237	10	65	44	74.94	3.47
17	Lack of confidence	134	227	17	51	46	76.00	3.74
18	Power failure	153	215	29	44	34	74.47	3.79
19	No relevancy with B.Ed/M.Ed	97	18	20	129	211	71.57	2.29

Table 4.2.25 indicates that the main reason for seldom or never use of internet for academic related studies are lack of training (77.47% and 3.87 $\bar{x}$), slow connectivity (74.10% and 3.82$\bar{x}$), lack of hardware (73.05% and 3.8 $\bar{x}$), power failure (74.47% and 3.79 $\bar{x}$), lack of confidence (76% and 3.74 $\bar{x}$), not enough Internet connections (76% and 3.71 mean score), lack of knowledge (75.36% and 3.69 $\bar{x}$), lack of technical support (72.21% and 3.63 $\bar{x}$), it is expensive (67.78% and 3.59 $\bar{x}$), lack of realization of advantages (66.32% and 3.55 $\bar{x}$), limited lab hours (74.94% and 3.47 $\bar{x}$), lack of administrative support (66.31% and 3.46 $\bar{x}$), lack of time 61.05% and 2.58 $\bar{x}$) lack of peer support (61.26% and 2.57 $\bar{x}$), lack of quality software (60% and 2.54 $\bar{x}$), and lack of interest (45.14% and 3.08 $\bar{x}$). While it has no relevancy with the course of B.Ed/M.Ed and MA Education course (71.57% and 2.29 $\bar{x}$), lack of software (60% and 2.35 $\bar{x}$) lack of quality hardware (68.63% and 2.39 $\bar{x}$), were not reasons for seldom or never use of internet technology. Ranking of these reasons will be as follow:

1. lack of training
2. slow connectivity
3. lack of hardware
4. power failure
5. lack of confidence
6. not enough Internet connections
7. lack of knowledge
8. lack of technical support
9. it is expensive
10. lack of realization of advantages
11. limited lab hours
12. lack of administrative / organizational support
13. lack of time
14. lack of peer support
15. lack of quality software
16. lack of interest

Table 4.2.26: Skill level to use E-mail

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	312	372	318	330	198
	Expected (fe)	306	306	306	306	306
Students'	(fo _ fe)	06	66	12	24	-108
skill level to	$(fo - fe)^2$	36	4356	144	576	11664
use e-mail	$\frac{(fo - fe)^2}{fe}$					
technology		0.12	14.24	0.47	1.88	38.12

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 10.96^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.26 indicates that the calculated value of χ^2 was 10.96, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence, the students have adequate skills to use e-mail technology.

Table 4.2.27: Skill Level to Use word-processing

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	252	450	522	162	144
	Expected (fe)	306	306	306	306	306
Students'	(fo _ fe)	-54	144	216	-144	-162
skill level to	$(fo - fe)^2$	2916	20736	46656	20736	26244
use MS Word	$\frac{(fo - fe)^2}{fe}$					
technology		9.53	67.76	152.14	67.76	85.76

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 76.66^*$$

*Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.27 indicates that the calculated value of χ^2 was 76.66, which is greater than table value at 0.05 level. As the trend of respondents is towards 'good user', hence, the students have satisfactory skills to use word-processing

Table 4.2.28: Skills to Use spreadsheets

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	16	38	335	630	511
	Expected (fe)	306	306	306	306	306
Students'	(fo _ fe)	-290	-268	29	324	205
skill level to	$(fo - fe)^2$	84100	71824	841	104976	42025
use MS Excel	$\frac{(fo - fe)^2}{fe}$					
technology		274.84	234.72	2.75	343.06	137.34

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 992.71^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.28 indicates that the calculated value of χ^2 was 992.71, which is greater than table value at 0.05 level. As the trend of respondents is towards 'infrequent user', hence, the students have inadequate skills to use spreadsheets.

Table 4.2.29: Skills to Use Presentations

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
	Observed (fo)	100	137	303	669	301
	Expected (fe)	306	306	306	306	306
Students'	(fo _ fe)	-206	-169	-3	363	-5
skills to use	$(fo - fe)^2$	42436	28561	9	131769	25
power point	$\frac{(fo - fe)^2}{fe}$					
technology		138.68	93.24	.03	430.62	.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 662.75^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.29 indicates that the calculated value of χ^2 was 662.75, which is smaller than table value at 0.05 level. As the trend of respondents is towards 'poor unskilled or no capability', hence, the students have inadequate skills to use power point technology.

Table 4.2.30: Searching Academic Related Studies on Internet

Statement	Respondents	Excellent	Good	Fair	Poor	No Capability
Students use Internet for searching academic related studies	Observed (fo)	294	366	384	318	168
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-12	60	78	12	-138
	$(fo - fe)^2$	144	3600	6084	144	19044
	$\frac{(fo - fe)^2}{fe}$	0.47	11.76	19.88	0.47	62.24

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 18.96^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.30 indicates that the calculated value of χ^2 was 18.96, which is greater than table value at 0.05 level. As the trend of respondents is towards 'well skilled', hence, the students have adequate skills to use Internet for academic related studies.

Table 4.2.31: Use of ICTs for the Preparation of Assignments

Statement	Respondents	SA	A	UNC	DA	SDA
Students use ICTs for the preparation of assignments	Observed (fo)	472	602	160	179	117
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	166	296	-146	-127	-189
	$(fo - fe)^2$	27556	87616	21316	16129	35721
	$\frac{(fo - fe)^2}{fe}$	90.05	286.33	69.66	52.71	116.74

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 123.1^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.31 indicates that the calculated value of χ^2 was 123.1, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (70.20%)', hence, students use these technologies for the preparation of their assignments.

Table 4.2.32: Use of ICTs in Presentations

Statement	Respondents	SA	A	UNC	DA	SDA
Students use ICTs for the presentation of their assignments / projects	Observed (fo)	361	501	272	265	131
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	55	195	-34	-41	-175
	$(fo - fe)^2$	3025	38025	1156	1681	30625
	$\frac{(fo - fe)^2}{fe}$	9.89	124.26	3.78	5.49	100.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 48.70^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.32 indicates that the calculated value of χ^2 was 48.70, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (56.34%)', hence, students use these technologies for the presentation of their assignments/projects.

Table 4.2.33: Use of ICTs for Handouts

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for preparing handouts for students	Observed (fo)	362	500	276	225	167
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	56	194	-30	-71	-139
	$(fo - fe)^2$	3136	37636	900	5041	19321
	$\frac{(fo - fe)^2}{fe}$	10.25	122.99	2.94	16.47	63.14

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 43.16^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.33 indicates that the calculated value of χ^2 was 43.16, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (56.34%)', hence, teachers use these technologies for the preparation of hand outs for students.

Table 4.2.34: Use of ICTs for Feedback

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for giving feedback to their students	Observed (fo)	296	411	275	283	265
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-10	105	-31	-23	-41
	$(fo - fe)^2$	100	11025	961	529	1681
	$\frac{(fo - fe)^2}{fe}$	0.33	36.03	3.14	1.73	1.1

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 9.34$$

Non-Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.34 indicates that the calculated value of χ^2 was 9.34, which is smaller than table value at 0.05 level. As the trend of respondents is towards 'disagree (46.21%)', hence, teachers use these technologies for giving feedback to their students.

Table 4.2.35: Use of ICTs for Assessing Students' Assignments

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for assessing students' assignments	Observed (fo)	294	391	278	292	275
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-12	85	-38	-14	-31
	$(fo - fe)^2$	144	7225	1444	196	961
	$\frac{(fo - fe)^2}{fe}$	0.47	23.61	4.72	0.64	3.14

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 6.51$$

Non-Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.35 indicates that the calculated value of χ^2 was 6.51, which is smaller than table value at 0.05 level. As the trend of respondents is towards 'agree (44.75%)', hence, teachers use these technologies for assessing students' assignments.

Table 4.2.36: Use of ICT for recording students' marks/results

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for recoding students' marks/results	Observed (fo)	397	593	291	129	120
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	91	287	-15	-177	-186
	$(fo - fe)^2$	8281	82369	225	31329	34596
	$\frac{(fo - fe)^2}{fe}$	27.06	269.18	0.74	102.38	113.06

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 102.48^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.36 indicates that the calculated value of χ^2 was 102.48, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (64.71%)', hence, teachers use these technologies for recording students' marks/results.

Table 4.2.37: Use of ICTs for Communication

Statement	Respondents	SA	A	UNC	DA	SDA
Teachers use ICTs for communicating with their students	Observed (fo)	397	423	250	285	175
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	91	117	-56	-21	-131
	$(fo - fe)^2$	8281	13689	3136	441	17161
	$\frac{(fo - fe)^2}{fe}$	27.06	44.74	10.25	1.44	56.08

$$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 27.91^*$$

* Significant df = 4 Table value at 0.05 = 9.488

Table 4.2.37 indicates that the calculated value of χ^2 was 27.91, which is greater than table value at 0.05 level. As the trend of respondents is towards 'agree (53.59%)', hence, teachers use these technologies for communicating with their students.

Table 4.2.38: Use of ICTs for Searching National/International Conferences

Statement	Respondents	SA	A	UNC	DA	SDA
Students use these technologies for searching national and international conferences	Observed (fo)	76	139	364	650	301
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-230	-167	344	58	-5
	$(fo - fe)^2$	52900	27889	118336	3364	25
	$\frac{(fo - fe)^2}{fe}$	172.88	91.14	386.72	10.99	.08
	$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 661.81^*$					
* Significant	df = 4	Table value at 0.05 = 9.488				

Table 4.2.38 indicates that the calculated value of χ^2 was 661.81, which is smaller than table value at 0.05 level. As the trend of respondents is towards 'disagree (62.16%)', hence, majority of the students do not use these technologies for searching national and international conferences.

Table 4.2.39: Use of ICTs for Conference Papers

Statement	Respondents	SA	A	UNC	DA	SDA
Students use ICTs for the preparation of conference papers	Observed (fo)	88	127	359	653	303
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-218	-179	53	347	-3
	$(fo - fe)^2$	47524	32041	2809	120409	9
	$\frac{(fo - fe)^2}{fe}$	155.31	104.71	9.18	393.49	.03
	$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 662.72^*$					
* Significant	df = 4	Table value at 0.05 = 9.488				

Table 4.2.39 indicates that the calculated value of χ^2 was 662.72, which is smaller than table value at 0.05 level. As the trend of respondents is towards 'disagree (62.48%)', hence, majority of the students do not use these technologies for the preparation of conference papers.

Table 4.2.40: Use of ICTs for Publications

Statement	Respondents	SA	A	UNC	DA	SDA
Students use these technologies for publications	Observed (fo)	68	147	362	651	302
	Expected (fe)	306	306	306	306	306
	(fo _ fe)	-238	-159	56	345	-4
	$(fo - fe)^2$	56644	25281	3136	119025	16
	$\frac{(fo - fe)^2}{fe}$	185.11	82.62	10.25	388.97	.05
	$\sum \frac{(fo - fe)^2}{Fe} = \chi^2 = 667^*$					
* Significant	df = 4	Table value at 0.05 = 9.488				

Table 4.2.40 indicates that the calculated value of χ^2 was 667, which is greater than table value at 0.05 level. As the trend of respondents is towards 'disagree (62.29%)', hence, it deems that students do not use these technologies for the preparation of their lectures.

Table 4.2.41: Top Ten Barriers/Problems in the Use of ICTs

Sr. No	Barriers	Top Ten Barriers										f	$\bar{x}$	R
		1	2	3	4	5	6	7	8	9	10			
1	LHW	494	127	70	79	73	38	105	46	125	112	1269	6.89	1
2	LQHW	--	72	95	103	54	68	62	38	99	75	666	5.15	12
3	LTR	87	84	49	25	48	06	43	71	18	52	484	6.17	4
4	LSW	47	79	55	73	89	118	24	107	200	144	936	4.51	18
5	LQSW	15	14	25	16	39	32	31	38	50	33	293	4.96	13
6	L.Know	70	78	251	26	175	103	192	115	70	44	1354	5.96	5
7	N.Net	191	55	73	105	183	104	50	76	159	38	1031	5.94	7
8	Slw.Con	56	34	32	59	20	28	33	41	27	35	365	5.86	8
9	LTS	22	34	39	46	65	80	28	73	71	57	515	4.82	14
10	LPS	49	44	62	44	47	30	66	55	71	59	468	4.75	15
11	LT	36	27	174	275	81	93	175	119	230	192	1402	4.58	16
12	L. Intr	--	37	75	120	74	45	189	166	72	93	864	4.53	17
13	Expn	35	99	217	204	105	168	83	71	80	56	1118	5.94	6
14	Lab.H	63	49	126	95	120	221	130	105	54	68	1031	5.41	10
15	L. Admn	223	47	110	33	54	65	166	192	47	86	1023	5.7	9
16	L. Advn	07	63	98	184	140	79	120	72	103	46	912	5.36	11
17	LCON	65	295	31	28	32	23	36	89	47	60	706	6.55	3
18	PF	145	57	20	16	71	08	38	12	34	40	436	6.83	2
19	NR	--	07	21	--	25	70	50	25	23	176	397	3.09	19

Scale value for this table is 1=10, 2=09, 3=08, 4=07, 5=06, 6=05, 7=04, 8=03, 9=02 and 10=01 While abbreviations used in this table are as; LHR=Lack of hardware, LQHW=lack of quality hardware, LSW=lack of software, LQSW=lack of quality software, L.Know=lack of knowledge, LTR=lack of training, N.Net=not enough Internet connections, Slw.Con=slow connectivity, LTS=lack of technical support, LPS=lack of peer support, LT=lack of time, L.Intr=lack of interest, Expn=It is expensive, Lab. H=limited lab hours, L. Admn=lack of administrative support, L. Advn=lack of realization of advantages, L.Conf=lack of confidence, PF=power failure and NR=no relevancy with B.Ed/M.Ed and MA education course.

Table 4.2.41 illustrates that on enquiring the top ten barriers/problems in the use of ICTs, the respondents rated them as; lack of hardware (mean score, 6.89), power failure (mean score, 6.83), lack of confidence (mean score, 6.55), lack of training (men score, 6.17), lack of knowledge (mean score, 5.96), these technologies

are expensive (mean score, 5.94), not enough Internet connections (mean score, 5.94), slow Internet connectivity(mean score, 5.86), lack of administrative support (mean score, 5.7), limited lab hours (mean score, 5.41), lack of realization of advantages (mean score, 5.36), lack of quality hardware (mean score, 5.15), lack of quality software (mean score, 4.96), lack of technical support (mean score, 4.82), lack of peer support (mean score, 4.75), lack of time (mean score, 4.58), lack of interest (mean score, 4.53), lack of software (mean score, 4.51), and these technologies have has no relevancy with B.Ed/M.Ed and MA Education course (mean score, 3.09).In a nutshell ranking of these top ten barriers are as follow:

1. lack of hardware
2. power failure
3. lack of confidence
4. lack of training
5. lack of knowledge
6. these technologies are expensive
7. not enough Internet connections
8. slow Internet connection
9. lack of administrative/organizational support
10. limited lab hours

Table 4.2.42: Comparison of Teachers' and Students' Attitude towards ICTs

S.No	Item	Percentage		Mean	
		Teachers	Students	Teachers	Students
1	Use of ICTs is easy	93. 84	84.18	4.20	3.90
2	It is pleasant to use ICTs	75.89	73.92	3.86	3.54
3	Use of ICTs is very important	87.18	94.25	4.39	3.86
4	Use of ICTs is very interesting	83.59	85.83	4.00	3.98
5	I feel comfortable when I use ICTs	84.10	72.42	3.88	3.09
6	I feel confident when I use ICTs	75.38	71.18	3.58	2.83
7	Use of ICTs is valuable	62.05	69.80	4.05	3.79
8	Teachers should aware about ICTs policy	83.89	49.41	4.19	3.37
9	Teachers should have computer at home	83.89	70.59	4.20	3.69
10	Teachers should have Internet connection at home	89.74	68.24	4.14	3.69

Table 4.2.42 indicates that both teachers and students have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements as the mean score is more than 3.29 in all the statements. . Interestingly, mean score of teachers in all the statements is ahead of students and more than 3.58 while in some (2) statements students' mean score is below 3.58 which indicates that teachers have more positive attitude than their students.

Table 4.2.43: Comparison of Teachers' and Students' Utilization of ICTs

S.No	Item	Percentage		Mean	
		Teachers	Students	Teachers	Students
1	Sending e-mails	68.72	37.64	3.74	3.01
2	Writing documents (word-processing)	58.46	52.03	3.68	3.38
3	Creating spreadsheets	69.74	39.22	2.35	1.97
4	Presentations	41.53	74.12	3.35	1.98
5	Internet for academic related studies	71.28	50.46	4.05	3.32

Table 4.2.43 indicates that both teachers and students are frequent user of emailing, word-processing and net surfing (teachers' mean score is 3.01 (emailing), 3.68 (word-processing) and 4.05 (net surfing) while students' mean score is 3.01 (emailing), 3.38 (word-processing) and 3.32 (net surfing). Both teachers and students are infrequent user of spreadsheet technology as mean score of teachers is 2.35. Similarly, mean score for students is1.97. Interestingly, teachers are fluent user of presentations technology (3.35 $\bar{x}$) while students are not fluent user of this technology (1.98 $\bar{x}$).

Table 4.2.44: Comparison of Teachers' and Students' Skills to Use ICTs

S.No	Item	Percentage		Mean	
		Teachers	Students	Teachers	Students
1	For sending e-mails	71.79	44.70	3.80	3.18
2	For writing documents (word-processing)	64.62	45.88	3.63	3.3
3	For creating spreadsheets	64.62	74.58	2.4	1.97
4	For presentations	55.38	63.40	3.35	2.35
5	For academic related studies	61.54	43.14	3.69	3.20

Table 4.2.44 depicts that both teachers and students have sufficient skills for emailing, word-processing and net surfing (teachers' mean score is 3.80 (emailing), 3.63 (word-processing) and 3.69 (net surfing) while students' mean score is 3.18 (emailing), 3.3 (word-processing) 3.20 (net surfing). Both teachers and students have not sufficient skills to use spreadsheet technology as mean score of teachers is 2.4. Similarly, mean score for students is 1.97. Interestingly, teachers are fluent user of presentations technology (3.35 $\bar{x}$) while students are not fluent user of this technology (2.35 $\bar{x}$).

Table 4.2.45: Comparison of Teachers' and Students' Instructional Use of ICTs

S.No	Item	Percentage		Mean	
		Teachers	Students	Teachers	Students
1	For preparation of assignments	86.15	70.20	4.14	3.74
2	For presentation of lectures	78.46	56.34	3.89	3.45
3	For preparing handouts for students	75.38	56.34	3.91	3.43
4	For giving feedback to the students	70.77	46.21	2.30	2.00
5	For assessing students' assignments	64.62	44.77	2.28	1.98
6	For recording students' marks/ results	75.38	64.71	3.89	3.67
7	For communicating with your students	64.10	53.59	2.98	2.69
8	For searching national or international conferences	75.38	62.16	3.09	2.37
9	For preparing conference papers	69.23	62.48	3.01	2.38
10	For publishing research papers	75.38	62.29	2.78	2.36

Table 4.2.45 indicates that both teachers and students use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students, giving feedback to the students, assessing students' assignments, recording students' marks/ results, and communicating with their students (teachers' mean score is 4.14 (preparation of assignments), 3.89 (presentation of lectures), 3.91 (preparation of handouts), 2.30 (giving feedback to the students), 2.28 (assessing students' assignments) 3.89 (recording students' marks/ results), and similarly, 2.98 (communicating with students).

Students' mean score in the same usage of these technologies is 3.74 (preparation of assignments), 3.45 (presentation of lectures) 3.43 (preparation of handouts) 2.00 (giving feedback to the students), 1.98 (assessing students' assignments), 3.67 (recording students' marks/ results), and similarly 2.69 (communicating with students).

While in the use of these technologies for searching national or international conferences, preparing conference papers and publishing research papers, there is a difference in the results of teachers and students. Teachers' mean score 3.09 (for searching national or international conferences), 3.01 (preparing conference papers) 2.78 (publishing research papers). Surprisingly, students' mean score is 2.37 (for searching national or international conferences), 2.38 (preparing conference papers) 2.36 (publishing research papers).

Table 4.2.46: Comparison of Institutions w.r.t. Teachers' Attitude towards ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	Use of ICTs is easy	95. 85	78.37	4.55	3.86
2	It is pleasant to use ICTs	85.96	63.95	4.72	3.00
3	Use of ICTs is very important	97.10	80.19	4.73	4.05
4	Use of ICTs is very interesting	93.52	74.56	4.66	3.35
5	I feel comfortable when I use ICTs	84.10	72.42	4.50	3.26
6	I feel confident when I use ICTs	85.33	61.17	4.15	3.00
7	Use of ICTs is valuable	83.07	61.84	4.58	3.52
8	Teachers should aware about ICTs policy	93.79	69.46	4.73	3.65
9	Teachers should have computer at home	93.80	80.73	4.72	3.68
10	Teachers should have Internet connection at home	93.44	78.45	4.64	3.64

Table 4.2.46 indicates that teachers either from IERs or from colleges' side have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Mean score of university teachers in all the statements is more than 3.58 which indicates there positive attitude.

Table 4.2.47: Comparison of Institutions w.r.t. Students' Attitude towards ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	Use of ICTs is easy	94.65	83.74	4.75	3.04
2	It is pleasant to use ICTs	78.66	74.91	4.00	3.08
3	Use of ICTs is very important	91.78	88.54	4.35	3.37
4	Use of ICTs is very interesting	92.89	86.35	4.50	3.45
5	I feel comfortable when I use ICTs	75.47	56.78	3.64	2.53
6	I feel confident when I use ICTs	70.63	52.60	3.00	2.65
7	Use of ICTs is valuable	88.75	76.39	4.57	3.00
8	Teachers should aware about ICTs policy	80.77	64.38	3.86	2.88
9	Teachers should have computer at home	88.89	74.33	4.34	3.04
10	Teachers should have Internet connection at home	89.90	70.56	4.50	2.88

Table 4.2.47 indicates that students of either IERs or colleges have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Interestingly, mean score of students of IERs in all the statements is more than 3.00 while college students' mean score is more than 2.53. All the statements are indicating respondents' positive attitude towards the use of ICTs. However, university students have more positive attitude as compared to their college counterparts.

Table 4.2.48: Comparison of Institutions w.r.t. Teachers' Utilization of ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	Sending e-mails	88.45	37.64	4.75	3.50
2	Writing documents (word-processing)	78.46	52.03	3.86	3.34
3	Creating spreadsheets	69.74	38.22	2.34	1.97
4	Presentations	74.12	41.53	3.44	2.45
5	Internet for academic related studies	91.28	50.46	4.50	2.88

Table 4.2.48 indicates that teachers of IERs and colleges are frequent user of emailing, word-processing, presentations and net surfing (mean score is 4.75 (emailing), 3.86 (word-processing), 3.44 (presentations) and 4.50 (net surfing) while college teachers' mean score is 3.50 (emailing), 3.34 (word-processing) and 2.88 (net surfing). Teachers from both the sides (either from IERS or from colleges) are infrequent user of spreadsheet technology as mean score of teachers from IERs is 2.34. Similarly, mean score for college teachers' is1.97. Interestingly, IERs' teachers are fluent user of presentations technology (3.44 $\bar{x}$) while college teachers are influent user of this technology (2.45 $\bar{x}$).

Table 4.2.49: Comparison of Institutions w.r.t. Students' Utilization of ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	Sending e-mails	94.72	57.63	3.05	2.58
2	Writing documents (word-processing)	88.45	62.45	3.20	2.69
3	Creating spreadsheets	78.79	37.23	1.96	1.56
4	Presentations	40.55	34.16	1.98	1.78
5	Internet for academic related studies	91.28	50.64	3.13	2.55

Table 4.2.49 indicates that students from IERs are more users of these technologies as compared to their college counterparts in the college side. These students are frequent user of emailing, word-processing and net surfing (mean score is 3.05 (emailing), 3.20 (word-processing) and 3.13 (net surfing) while college students' mean score is 2.58 (emailing), 2.69 (word-processing) and 2.55 (net surfing). Students from both sides are infrequent user of spreadsheets and presentations technologies as mean score of IERs students is 1.96and 1.98. Similarly, mean score for college students' is1.56 and 1.78 respectively.

Table 4.2.50: Comparison of Institutions w.r.t. Teachers' Skills to Use ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	For sending e-mails	87.09	65.78	3.93	3.15
2	For writing documents (word-processing)	75.62	61.14	3.96	3.14
3	For creating spreadsheets	64.62	65.35	2.41	2.04
4	For presentations	70.38	50.66	3.79	2.78
5	For academic related studies	81.54	67.82	4.29	3.36

Table 4.2.50 depicts that teachers from both sides either IERs or colleges have sufficient skills for emailing, word-processing, presentations and net surfing (IERs teachers' mean score is 3.93 (emailing), 3.96 (word-processing), 3.79 (presentations) and 4.29 (net surfing) while college teachers' mean score is 3.15 (emailing), 3.14 (word-processing), 2.78 (presentations), and 3.36 (net surfing). Teachers from both sides have insufficient skills to use spreadsheet technology as mean score of teachers is 2.41 and 2.02 respectively.

Table 4.2.51: Comparison of Institutions w.r.t. Students' Skills to Use ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	For sending e-mails	68.98	54.70	3.48	2.74
2	For writing documents (word-processing)	66.75	51.88	3.33	2.67
3	For creating spreadsheets	68.88	74.58	2.09	1.85
4	For presentations	66.67	63.40	2.35	2.02
5	For academic related studies	65.83	52.14	3.26	2.60

Table 4.2.51 depicts that students from both sides either IERs or colleges have sufficient skills for emailing, word-processing and net surfing (IERs students' mean score is 3.48 (emailing), 3.33 (word-processing) and 3.26 (net surfing) while college students' mean score is 2.74 (emailing), 32.67 (word-processing) and 2.60 (net surfing). Students from both sides have insufficient skills to use spreadsheets and presentations technologies as mean score of IERs' students is 2.00 an 2.35 respectively while 1.85 and 2.02 respectively.

Table 4.2.52: Comparison of Institutions w.r.t. Teachers' Instructional Use of ICTs

S.No	Item	Percentage		Mean	
		IERs	Colleges	IERs	Colleges
1	For preparation of assignments	88.65	60.28	4.00	3.15
2	For presentation of lectures	88.58	66.84	3.96	3.22
3	For preparing handouts for students	76.89	61.77	3.43	3.00
4	For giving feedback to the students	60.62	75.34	2.46	2.14
5	For assessing students' assignments	69.88	78.13	2.37	2.08
6	For recording students' marks/ results	78.49	65.68	3.88	3.26
7	For communicating with your students	65.16	74.61	3.82	2.13
8	For searching national or international conferences	85.35	67.83	4.12	1.87
9	For preparing conference papers	79.26	68.72	4.16	1.75
10	For publishing research papers	85.38	64.89	3.50	2.09

Table 4.2.52 indicates that teachers from both sides either from IERs and colleges use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students and recording students' marks/ results. Mean score for both IERs and college students' is 4.00 and 3.15 (preparation of assignments), 3.96 and 3.22 (presentation of lectures), 3.43 and 3.00 (preparation of handouts) and 3.88 and 3.26 (recording students' marks/ results).

Regarding giving feedback to the students and assessing students' assignments, both IERs and college teachers are influent users of these technologies

as mean score is 2.36 and 2.37 for IERs teachers and 2.14 and 2.08 for college teachers.

In the use of these technologies for communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, IERs teachers are frequent while college teachers are infrequent users of these technologies. IERs teachers' mean score is 3.82 (for communicating with students) 4.12 (for searching national or international conferences), 4.16 (preparing conference papers) and 4.35 (publishing research papers) while college teachers' have2.13, 1.87, 1.75 and 2.09 respectively.

Table 4.2.53: Comparison of Institutions w.r.t. Students' Instructional Use of ICTs

		Percentage		Mean	
S.No	Item	IERs	Colleges	IERs	Colleges
1	For preparation of assignments	72.98	63.77	3.67	2.75
2	For presentation of lectures	63.77	60.00	3.74	2.76
3	For preparing handouts for students	72.83	60.15	3.56	2.89
4	For giving feedback to the students	77.25	79.21	2.2	1.79
5	For assessing students' assignments	78.44	78.76	2.17	1.78
6	For recording students' marks/ results	66.79	63.14	3.69	2.77
7	For communicating with students	64.56	60.27	2.67	2.20
8	For searching national or international conferences	60.17	69.82	2.58	1.78
9	For preparing conference papers	61.69	70.75	2.58	1.77
10	For publishing research papers	62.32	73.81	2.65	1.88

Table 4.2.53 indicates that students from both sides either from IERs and colleges use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students and recording students' marks/ results. Mean score for both IERs and college students' is 3.67 and 2.75 (preparation of assignments), 3.74 and 2.76 (presentation of lectures), 3.56 and 2.89 (preparation of handouts) and 3.69 and 2.79 (recording students' marks/ results).

Regarding giving feedback to the students and assessing students' assignments, both IERs and college teachers are influent users of these technologies as mean score is 2.2 and 1.79 for IERs teachers and 2.17 and 1.79 for college teachers.

In the use of these technologies for communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, IERs teachers are frequent while college teachers are infrequent users of these technologies. IERs teachers' mean score is 2.67 (for communicating with students) 2.58 (for searching national or international conferences), 2.58 (preparing conference papers) and 2.65 (publishing research papers) while college teachers' have2.20, 1.78, 1.77 and 1.88 respectively.

Table 4.2.54: Comparison of Means of Teachers' and Students' Attitude towards ICTs

S.No	Item	Teachers		Students	
		IERs	Colleges	IERs	Colleges
1	Use of ICTs is easy	4.55	3.86	4.75	3.04
2	It is pleasant to use ICTs	4.72	3.00	4.00	3.08
3	Use of ICTs is very important	4.73	4.05	4.35	3.37
4	Use of ICTs is very interesting	4.66	3.35	4.50	3.45
5	I feel comfortable when I use ICTs	4.50	3.26	3.64	2.53
6	I feel confident when I use ICTs	4.15	3.00	3.00	2.65
7	Use of ICTs is valuable	4.58	3.52	4.57	3.00
8	Teachers should aware about ICTs policy	4.73	3.65	3.86	2.88
9	Teachers should have computer at home	4.72	3.68	4.34	3.04
10	Teachers should have Internet connection at home	4.64	3.64	4.50	2.88

Table 4.2.54 indicates that teachers either from IERs or from colleges' side have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Mean score of university teachers in all the statements is more than 3.58 which indicates there positive attitude.

Regarding students' attitude, both, either from IERs or colleges have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Interestingly, mean score of students of IERs

in all the statements is more than 3.00 while college students' mean score is more than 2.53. All the statements are indicating respondents' positive attitude towards the use of ICTs. However, university students have more positive attitude as compared to their college counterparts.

University teachers and students have more positive towards the use of ICTs as compared to the college teachers, university students and college students. Comparatively sequence wise teachers' and students positive attitude towards the use of ICTs is:

1. University teachers
2. University students
3. College teachers and
4. College students

Table 4.2.55: Comparison of Means of Teachers' and Students' Utilization of ICTs

S.No	Item	Teachers		Students	
		IERs	Colleges	IERs	Colleges
1	Sending e-mails	4.75	3.50	3.05	2.58
2	Writing documents (word-processing)	3.86	3.34	3.20	2.69
3	Creating spreadsheets	2.34	1.97	1.96	1.78
4	Presentations	3.44	2.45	1.98	1.56
5	Internet for academic related studies	4.50	2.88	3.13	2.55

Table 4.2.55 indicates that teachers of IERs and colleges are frequent user of emailing, word-processing, presentations and net surfing (mean score is 4.75 (emailing), 3.86 (word-processing), 3.44 (presentations) and 4.50 (net surfing) while college teachers' mean score is 3.50 (emailing), 3.34 (word-processing) and 2.88 (net surfing). Teachers from both the sides (either from IERS or from colleges) are infrequent user of spreadsheet technology as mean score of teachers from IERs is 2.34. Similarly, mean score for college teachers' is1.97. Interestingly, IERs' teachers are fluent user of presentations technology (3.44 $\bar{x}$) while college teachers are not fluent user of this technology (2.45 $\bar{x}$).

Regarding students' utilization of ICTs, students from IERs are more users of these technologies as compared to their college counterparts in the college side. These students are frequent user of emailing, word-processing and net surfing (mean score is 3.05 (emailing), 3.20 (word-processing) and 3.43 (net surfing) while college

students' mean score is 2.58 (emailing), 2.69 (word-processing) and 2.55 (net surfing). Students from both sides are infrequent user of spreadsheets and presentations technologies as mean score of IERs students is 1.96 and 1.98 while mean score for college students' is1.78 and 1.56 respectively.

Comparatively sequence wise utilization of these technologies among teachers and students is:

1. University teachers
2. College teachers
3. University students and
4. College students

Table 4.2.56: Comparison of Means of Teachers' and Students' Skills to Use ICTs

S.No	Item	Teachers		Students	
		IERs	Colleges	IERs	Colleges
1	For sending e-mails	3.93	3.15	3.00	2.74
2	For writing documents (word-processing)	3.96	3.14	2.99	2.57
3	For creating spreadsheets	2.41	2.02	2.00	1.85
4	For presentations	3.79	2.78	2.35	2.02
5	For academic related studies	4.29	3.36	3.16	2.60

Table 4.2.56 depicts that teachers from both sides either IERs or colleges have sufficient skills for emailing, word-processing, presentations and net surfing (IERs teachers' mean score is 3.93 (emailing), 3.96 (word-processing), 3.79 (presentations) and 4.29 (net surfing) while college teachers' mean score is 3.15 (emailing), 3.14 (word-processing), 2.78 (presentations), and 3.36 (net surfing). Teachers from both sides have insufficient skills to use spreadsheet technology as mean score of teachers is 2.41 and 2.02 respectively.

Regarding students' skills to use these technologies, students from both sides either IERs or colleges have sufficient skills for emailing, word-processing and net surfing (IERs students' mean score is 3.00 (emailing), 2.98 (word-processing) and 3.16 (net surfing) while college students' mean score is 2.74 (emailing), 2.57 (word-processing) and 2.60 (net surfing). Students from both sides have insufficient skills

to use spreadsheets and presentations technologies as mean score of IERs' students is 2.00 an 2.35 respectively while 1.85 and 2.02 respectively is of college students.

Comparatively sequence wise skills to these technologies among teachers and students are:

1. University teachers
2. College teachers
3. University students and
4. College students

Table 4.2.57: Comparison of Means of Teachers' and Students' Instructional Use of ICTs

		Teachers		Students	
S.No	Item	IERs	Colleges	IERs	Colleges
1	For preparation of assignments	4.00	3.15	3.67	2.75
2	For presentation of lectures	3.96	3.22	3.74	2.76
3	For preparing handouts for students	3.43	3.00	3.56	2.89
4	For giving feedback to the students	2.46	2.14	2.2	1.79
5	For assessing students' assignments	2.37	2.08	2.17	1.78
6	For recording students' marks/ results	3.88	3.26	3.69	2.77
7	For communicating with your students	3.82	2.13	2.67	2.20
8	For searching national or international conferences	4.12	1.87	2.58	1.78
9	For preparing conference papers	4.16	1.75	2.58	1.77
10	For publishing research papers	3.50	2.09	2.65	1.88

Table 4.2.57 indicates that teachers from both sides either from IERs and colleges use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students and recording students' marks/ results. Mean score for both IERs and college students' is 4.00 and 3.15 (preparation of assignments), 3.96 and 3.22 (presentation of lectures), 3.43 and 3.00 (preparation of handouts) and 3.88 and 3.26 (recording students' marks/ results).

Regarding giving feedback to the students and assessing students' assignments, both IERs and college teachers are influent users of these technologies

as mean score is 2.36 and 2.37 for IERs teachers and 2.14 and 2.08 for college teachers.

In the use of these technologies for communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, IERs teachers are frequent while college teachers are infrequent users of these technologies. IERs teachers' mean score is 3.82 (for communicating with students) 4.12 (for searching national or international conferences), 4.16 (preparing conference papers) and 4.35 (publishing research papers) while college teachers' have2.13, 1.87, 1.75 and 2.09 respectively.

Students from both sides either from IERs and colleges use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students and recording students' marks/ results. Mean score for both IERs and college students' is 3.67 and 2.75 (preparation of assignments), 3.74 and 2.76 (presentation of lectures), 3.56 and 2.89 (preparation of handouts) and 3.69 and 2.79 (recording students' marks/ results).

Regarding giving feedback to the students and assessing students' assignments, both IERs and college teachers are influent users of these technologies as mean score is 2.2 and 1.79 for IERs teachers and 2.17 and 1.79 for college teachers.

In the use of these technologies for communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, IERs teachers are frequent while college teachers are infrequent users of these technologies. IERs teachers' mean score is 2.67 (for communicating

with students) 2.58 (for searching national or international conferences), 2.58 (preparing conference papers) and 2.65 (publishing research papers) while college teachers' have2.20, 1.78, 1.77 and 1.88 respectively.

Comparatively sequence wise instructional use of these technologies among teachers and students is:

1. University teachers
2. University students
3. College teachers and
4. College students

Table 4.2.58: Comparison of Regions w.r.t. Teachers' Attitude towards the Use of ICTs (Mean Score)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Use of ICTs is easy	4.24	4.19	4.10	4.00	3.98	4.35
2	It is pleasant to use ICTs	3.79	3.68	3.62	3.57	3.55	4.00
3	Use of ICTs is very important	4.26	4.15	4.09	4.05	3.88	4.12
4	Use of ICTs is very interesting	4.23	4.20	4.14	3.93	3.86	4.20
5	I feel comfortable when I use ICTs	3.76	3.78	3.69	3.58	3.50	3.86
6	I feel confident when I use ICTs	3.72	3.77	3.63	3.57	3.55	3.73
7	Use of ICTs is valuable	4.27	4.28	3.97	3.90	3.87	4.29
8	Teachers should aware about ICTs policy	3.89	3.82	3.66	3.65	3.64	4.14
9	Teachers should have computer at home	4.18	4.23	4.00	3.88	3.79	4.25
10	Teachers should have Internet connection at home	4.25	4.21	4.12	4.00	4.14	4.28

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.58 indicates that teachers from all regions have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Interestingly, mean score of teachers in all the statements is more than 3.50. However, there is a region wise slight difference among the mean scores of teachers. Comparatively region wise teachers' positive attitude towards the use of ICTs is:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.59: Comparison of Regions w.r.t. Students' Attitude towards the Use of ICTs (Mean Score)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Use of ICTs is easy	3.85	3.81	3.77	3.62	3.60	3.89
2	It is pleasant to use ICTs	3.66	3.72	3.68	3.66	3.63	3.87
3	Use of ICTs is very important	4.00	3.98	3.85	3.78	3.64	4.16
4	Use of ICTs is very interesting	3.96	3.87	3.89	3.72	3.57	4.10
5	I feel comfortable when I use ICTs	3.87	3.68	3.70	3.66	3.52	3.92
6	I feel confident when I use ICTs	3.41	3.49	3.50	3.40	3.50	3.65
7	Use of ICTs is valuable	3.92	3.85	3.83	3.77	3.86	3.98
8	Teachers should aware about ICTs policy	3.69	3.60	3.65	3.58	3.57	3.99
9	Teachers should have computer at home	3.98	3.89	3.99	3.92	3.85	4.16
10	Teachers should have Internet connection at home	3.70	3.84	3.81	3.87	3.83	4.00

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.59 indicates that students from all regions have positive attitude towards the use of ICTs. In all the statements dominant majority of the respondents agreed with the statements. Interestingly, mean score of teachers in all the statements is more than 3.40. However, there is a region wise slight difference among the mean scores of teachers. Comparatively region wise teachers' positive attitude towards the use of ICTs is:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh

4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.60: Comparison of Regions w.r.t. Teachers' Utilization of ICTs (Means)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Sending e-mails	4.14	4.10	3.78	3.33	3.55	4.65
2	Writing documents (word-processing)	3.88	3.67	3.66	3.00	3.12	4.33
3	Creating spreadsheets	2.36	2.22	2.15	2.10	2.00	2.45
4	Presentations	3.55	3.50	3.12	3.00	3.10	3.95
5	Internet for academic related studies	4.15	4.11	3.88	3.12	3.00	4.22

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.60 indicates that teachers of all regions are frequent users of emailing, word-processing, presentations and net surfing as lowest mean score in all the regions is over 3.00. Teachers of all regions are infrequent user of spreadsheets technology as mean score is below 2.45. However, there is a region wise slight difference among the mean scores of teachers. Comparatively region wise teachers' utilization of these technologies is as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Azad Jammu & Kashmir (AJK) and
6. Balochistan

Table 4.2.61: Comparison of Regions w.r.t. Students' Utilization of ICTs (Means)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Sending e-mails	3.94	3.67	3.76	3.33	2.76	4.05
2	Writing documents (word-processing)	3.88	3.58	3.63	3.54	3.00	3.99
3	Creating spreadsheets	2.36	1.99	1.87	1.43	1.11	2.38
4	Presentations	2.25	2.11	2.10	2.00	1.98	2.32
5	Internet for academic related studies	4.15	3.62	3.74	3.11	3.22	4.20

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.61 indicates that students of all regions are frequent user of emailing, word-processing and net surfing as lowest mean score in all the regions is over 2.76. Students of all regions are infrequent user of spreadsheets and presentations technologies as mean score is below 2.38 and 2.32 respectively. However, there is a region wise slight difference among the mean scores of students. Comparatively region wise students' utilization of these technologies is as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.62: Comparison of Regions w.r.t. Teachers' Skills to Use ICTs (Means)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Sending e-mails	3.86	3.77	3.76	3.55	2.85	3.90
2	Writing documents (word-processing)	3.94	3.95	3.58	3.60	2.96	3.97
3	Creating spreadsheets	2.25	2.16	2.10	1.95	1.78	2.26
4	Presentations	3.35	3.28	3.14	3.00	2.67	3.40
5	Internet for academic related studies	4.18	3.94	3.93	3.10	2.73	4.26

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.62 depicts that teachers from all regions have sufficient skills for emailing, word-processing, net surfing and presentations technologies as mean score is over 2.73. While teachers from all regions have not sufficient skills to use spreadsheets technology as mean score is below 2.25 in all regions. However, there is a region wise slight difference among the mean scores of teachers. Comparatively region wise teachers' skills for the utilization of these technologies are as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.63: Comparison of Regions w.r.t. Students' Skills to Use ICTs (Means)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	Sending e-mails	3.45	3.33	3.35	2.58	2.55	3.40
2	Writing documents (word-processing)	3.54	3.55	3.50	3.00	2.56	3.77
3	Creating spreadsheets	2.13	2.00	2.00	1.85	1.77	2.06
4	Presentations	2.35	2.25	2.14	2.00	1.67	2.40
5	Internet for academic related studies	3.95	3.60	3.13	3.00	2.52	3.99

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.63 depicts that students from all regions have sufficient skills for emailing, word-processing and net surfing as mean score is over 2.55. While students from all regions have not sufficient skills to use spreadsheets and presentations technologies as mean score is below 2.13 and 2.40 respectively in all regions. However, there is a region wise slight difference among the mean scores of students. Comparatively region wise students' skills for the utilization of these technologies are as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.64: Comparison of Regions w.r.t. Teachers' Instructional Use of ICTs (Mean Score)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	For preparation of assignments	4.35	3.98	3.77	3.55	3.00	4.65
2	For presentation of lectures	3.78	3.63	3.03	3.00	2.88	3.95
3	For preparing handouts for students	3.66	3.25	3.00	2.95	2.88	3.57
4	For giving feedback to the students	2.45	2.33	2.23	2.12	2.00	2.48
5	For assessing students' assignments	2.35	2.22	2.14	2.00	1.77	2.42
6	For recording students' marks/ results	3.75	3.20	3.00	2.99	3.10	3.66
7	For communicating with your students	3.30	3.25	3.10	3.00	3.20	3.45
8	For searching national or international conferences	3.50	2.55	2.66	2.50	1.88	2.55
9	For preparing conference papers	3.85	2.66	2.68	2.50	1.55	3.18
10	For publishing research papers	3.60	2.75	2.60	2.5	1.50	3.55

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.64 indicates that teachers from all regions use these technologies for preparation of assignments, presentation of their lectures, preparing handouts for students, recording students' marks/ results, and communicating with their students (mean score is over 2.95. This table depicts that Punjab is rather ahead of other provinces and areas in the use of these technologies. However, in all regions use of these technologies for giving feedback to the students, assessing students' assignments is infrequent as mean score is below 2.48 in all the regions.

While in the use of these technologies for searching national or international conferences, preparing conference papers and publishing research papers, teachers from all the regions are frequent users (to some extent) as mean score is over 2.50 in

all regions. Anyhow, teachers of AJK seem infrequent users of these technologies as mean score is below 1.88. However, there is a region wise slight difference among the mean scores of teachers. Comparatively region wise teachers' use of these technologies for different instructional purposes is as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

Table 4.2.65: Comparison of Regions w.r.t. Students' Instructional Use of ICTs (Mean Score)

S.No	Item	Punjab	Sindh	KP	Balochistan	AJK	ICT
1	For preparation of assignments	4.12	3.83	3.76	3.25	3.70	4.25
2	For presentation of lectures	3.33	3.13	3.03	2.66	2.78	3.85
3	For preparing handouts for students	3.26	3.00	2.98	2.56	2.88	3.57
4	For giving feedback to the students	2.35	2.18	2.13	2.00	2.00	2.40
5	For assessing students' assignments	2.40	2.00	1.98	1.66	1.77	2.42
6	For recording students' marks	3.75	3.20	3.00	2.99	3.10	3.86
7	For communicating with your students	2.30	2.25	2.10	2.00	2.20	2.45
8	For searching national or international conferences	2.35	2.30	2.00	2.00	2,15	2.45
9	For preparing conference papers	1.85	1.66	1.68	1.50	1.55	1.98
10	For publishing research papers	1.80	1.75	1.60	1.45	1.50	2.00

KP (Khyber Pakhtoonkha), AJK (Azad Jammu and Kashmir) and ICT (Islamabad Capital Territory)

Table 4.2.65 indicates that both teachers and students use technologies for preparation of assignments, presentation of their lectures, preparing handouts for students and recording students' marks/ results. Interestingly, students of Islamabad Capital Territory (ICT) are little ahead of their other counterparts.

While in the use of these technologies for giving feedback to students, assessing students' assignments, communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, students of all regions are infrequent users of these technologies. However, students of ICT are rather frequent users of these technologies as compared to their counterparts in the other five regions. However, there is a region wise slight

difference among the mean scores of students. Comparatively region wise students' use of these technologies for different instructional purposes is as under:

1. Islamabad Capital Territory (ICT)
2. Punjab
3. Sindh
4. Khyber Pakhtoonkhah (KP)
5. Balochistan and
6. Azad Jammu & Kashmir (AJK)

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Present study deals with the Emerging Paradigm of Information and Communication Technologies (ICTs) in Teacher Training Institutions of Pakistan. Existing utilization of ICTs in these institutions was assessed in this study. Documents about importance of ICTs and use of these technologies in education and especially in teacher education were studied in Chapter No.2. After study of related literature, a questionnaire was constructed in English language on five point rating scale for teachers and students of teacher training institutions. The last question of each questionnaire was open for suggestion to improve the utilization of ICTs in teacher training. After professional validation and try out, these were administered on the respective sample personally and wherever applicable by friends. 242 questionnaires presented to the teachers of these institutions and out of these 206 were received back. Due to some ambiguities out of 206, only 195 were used for data analysis. Similarly researcher delivered 1805 questionnaires and out of them 1643 questionnaires were returned back. Out of them 1530 questionnaires were used for data analysis and remaining were excluded due to some ambiguities in them.

Each response was given a numeric value. Collected data were analyzed through mean score, percentages, ranking and Chi-square formulas. Detailed

interpretation of the data analysis is reported in the Chapter-4. On the basis of analysis of data, findings were drawn, conclusions were made and recommendations were proposed.

5.2 FINDINGS

5.2.1 Findings of the Questionnaires for Teachers

On the basis of analysis, these findings were drawn.

1. Majority of the respondents (93.85 %) agreed that use of ICTs is easy. (Table 4.1.10)
2. Majority of the respondents (75.90 %) agreed that use of these technologies is very pleasant. (Table 4.1.11)
3. Majority of the respondents (87.18 %) agreed that use of ICTs is important (Table 4.1.12)
4. Majority of the respondents (83.59 %) agreed that use of these technologies is very interesting. (Table 4.1.13)
5. Majority of the respondents (84.10 %) agreed that they feel comfortable on using ICTs. (Table 4.1.14)
6. Majority of the respondents (75.38 %) agreed that they feel confident when use these technologies. (Table 4.1.15)
7. Majority of the respondents (62.05 %) agreed that use of these technologies is valuable. (Table 4.1.16)

8. Majority of the respondents (82.56 %) agreed that teachers should get awareness about the ICT policy. (Table 4.1.17)
9. Majority of the respondents (83.59 %) agreed that teachers should have computer at home. (Table 4.1.18)
10. Majority of the respondents (89.74 %) agreed that teachers should have Internet connection at home. (Table 4.1.19)
11. Majority of the respondents (68.72 %) opined that they were frequent user of e-mail technology. (Table 4.1.20)
12. Majority of the respondents (58.46 %) opined that they were frequent user of word-processing (MS Word). (Table 4.1.21)
13. Majority of the respondents (69.74 %) opined that they were infrequent user of spreadsheets and 10.77 % respondents were occasionally user of this technology while 19.78 % respondents were frequent user of this technology. (Table 4.1.22)
14. Majority of the respondents (56.93 %) opined that they were frequent user of presentations technology. (Table 4.1.23)
15. Majority of the respondents (72.31 %) opined that they were frequent user of Internet for searching their subject related material. (Table 4.1.24)
16. Majority of the respondents opined that lack of training (66.67 % & 3.80 mean score), power failure (61.72 % & 3.76 mean score) and lack of knowledge (66.67 % & 3.70 mean score) were main three reasons for seldom or never use of e-mail technology. (Table 4.1.25)

17. Majority of the respondents opined that power failure (78.60 % & 4.42 mean score), lack of training (78.79 % & 4.09 mean score), and lack of quality software (61.72 % & 3.76 mean score) were main three reasons for seldom or never use of word-processing technology. (Table 4.1.26)

18. Majority of the respondents opined that lack of training (61.11 % & 3.72 mean score), power failure (64.81 % & 3.68 mean score), and lack of technical support (57.41 % & 3.59 mean score) were main three reasons for seldom or never use of spreadsheets (MS Excel) technology. (Table 4.1.27)

19. Majority of the respondents opined that power failure (72.92 % & 3.92 mean score), lack of training (66.67 % & 3.79 mean score), and lack of interest (68.75 % & 3.75 mean score) were main three reasons for seldom or never use of presentations technology. (Table 4.1.28)

20. Majority of the respondents opined that lack of training (78.79 % & 4.09 mean score), power failure (78.79 % & 3.97 mean score), and lack of technical support (75.76 % & 3.87 mean score) were main three reasons for seldom or never use of Internet technology for searching academic related studies. (Table 4.1.29)

21. Majority of the respondents (72.31 %) opined that they have good (33.84 %) and excellent (38.46 %) skills to use e-mail technology. (Table 4.1.30)

22. Majority of the respondents (64.62 %) opined that they have well (43.08 %) and excellent (21.54 %) skills to use word-processing technology. (Table 4.1.31)

23. Majority of the respondents (69.74 %) opined that they have insufficient skills to use spreadsheets technology, 10.77 % have fair skills to use this technology while 19.49 % have sufficient skills to use spreadsheets technology. (Table 4.1.32)

24. Majority of the respondents (55.38 %) opined that they have sufficient (48.72 %) and excellent (6.67 %) skills to use presentations technology. (Table 4.1.33)

25. Majority of the respondents (61.54 %) opined that they have good (24.62 %) and excellent (36.92 %) skills to use Internet technology for searching academic related studies. (Table 4.1.34)

26. Majority of the respondents (86.15 %) agreed that they use ICTs for the preparation of their lectures. (Table 4.1.35)

27. Majority of the respondents (78.46 %) agreed that they use these technologies for the presentation of their lectures. (Table 4.1.36)

28. Majority of the respondents (86.15 %) agreed that they use ICTs for the preparation of handouts for their students. (Table 4.1.37)

29. Majority of the respondents (75.38 %) agreed that they use these technologies for giving feedback to their students. (Table 4.1.38)

30. Majority of the respondents (64.62 %) agreed that they use ICTs for the assessment of their students' assignments. (Table 4.1.39)

31. Majority of the respondents (86.15 %) agreed that they use these technologies for recording students' marks/results. (Table 4.1.40)

32. Majority of the respondents (64.62 %) agreed that they use these technologies for communicating with their students. (Table 4.1.41)

33. Majority of the respondents (75.38 %) agreed that they use ICTs for searching national and international conferences. (Table 4.1.42)

34. Majority of the respondents (69.23 %) agreed that they use these technologies for preparing conference papers. (Table 4.1.43)

35. Majority of the respondents (75.38 %) agreed that they use ICTs for the publication of their research papers. (Table 4.1.44)

36. Majority of the respondents opined that top ten barriers or problems in the utilization of these technologies were; lack of training (mean score, 8.10), power failure (mean score, 7.21), lack of confidence (mean score, 6.88), lack of knowledge (mean score, 6.44), lack of technical support (mean score, 6.43), lack of quality software (mean score, 6.36), slow Internet connectivity(mean score, 6.31), lack of quality hardware (mean score, 6.10), lack of interest (mean score, 5.94) and lack of administrative support (mean score, 5.75). (Table 4.1.45)

5.2.2 Findings of the Questionnaires for Students

On the basis of analysis following findings were drawn;

1. Majority of the respondents (84.18 %) agreed that use of ICTs is easy. (Table 4.2.6)
2. Majority of the respondents (74.12 %) agreed that use of these technologies is pleasant. (Table 4.2.7)
3. Majority of the respondents (94.25 %) agreed that use of ICTs is very important. (Table 4.2.8)
4. Majority of the respondents (67.91 %) agreed that use of these technologies is very interesting. (Table 4.1.2.9)
5. Majority of the respondents (63.27 %) agreed that they feel comfortable on using ICTs. (Table 4.1.2.10)
6. Majority of the respondents (71.18 %) agreed that they feel confident when use these technologies. (Table 4.2.11)
7. Majority of the respondents (69.80 %) agreed that use of these technologies is valuable. (Table 4.2.12)
8. Regarding teachers should get awareness about the ICT policy, 49.41 % respondents agreed while 31.05 % disagreed and 19.61 remained uncertain about the statement. (Table 4.2.13)
9. Majority of the respondents (70.59 %) agreed that teachers should have computer at home. (Table 4.2.14)

10. Majority of the respondents (68.24 %) agreed that teachers should have Internet connection at home. (Table 4.2.15)
11. Regarding use of e-mail, 37.65 % respondents opined that they were infrequent user of e-mail technology as they were seldom or never user of this technology. 32.55 % respondents use this technology frequently and 29.41 % were occasionally user of e-mailing (Table 4.2.16)
12. Majority of the respondents (65.1 %) opined that they were using word-processing software frequently. (Table 4.2.17)
13. Majority of the respondents (74.38 %) opined that they were infrequent (seldom or never) user of spreadsheets while 3.40 % respondents were fluent user of this technology. Remaining 22.22 % respondents were occasionally user of this technology. (Table 4.2.18)
14. Majority of the respondents (74.12 %) opined that they were infrequent user of presentations technology while 3.86 % were fluent user of this technology and 22.03 % remained uncertain about the statement. (Table 4.1.19)
15. Majority of the respondents (50.46 %) opined that they were frequent user of Internet for searching their subject related material. (Table 4.2.20)
16. Majority of the respondents opined that lack of hardware (94.44 % & 4.78 mean score), lack of training (80.56 % & 3.98 mean score) and power failure (77.08 % & 3.93 mean score) were main three reasons for seldom or never use of e-mail technology. (Table 4.2.21)

17. Majority of the respondents opined that lack of hardware (72.52 % & 3.85 mean score), lack of training (71.75 % & 3.74 mean score) and power failure (59.41 % & 3.46 mean score) were main three reasons for seldom or never use of word-processing technology. (Table 4.2.22)

18. Majority of the respondents opined that lack of training (66.66 % & 3.79 mean score), lack of hardware (66.10 % & 3.77 mean score), and power failure (64.16 % & 3.74 mean score) were main three reasons for seldom or never use of spreadsheets technology. (Table 4.2.23)

19. Majority of the respondents opined that lack of training (74.76 % & 3.92 mean score), lack of knowledge (62.24 % & 3.80 mean score), and lack of hardware (72.89 % & 3.79 mean score) were main three reasons for seldom or never use of presentations technology. (Table 4.2.24)

20. Majority of the respondents opined that lack of training (74.76 % & 3.92 mean score), lack of knowledge (62.24 % & 3.80 mean score), and lack of hardware (72.89 % & 3.79 mean score) were main three reasons for seldom or never use of Internet technology. (Table 4.2.25)

21. Regarding skills to use e-mail, 44.71 % respondents opined that they have good (24.31 %) and excellent (20.39 %) skills to use e-mail technology while 34.51 % were those who had poor skilled or have no capability to use this technology. 20.78 % have fair skills to use this technology. (Table 4.2.26)

22. Regarding use of word-processing, 45.88 % respondents opined that they have well (29.41 %) and excellent (16.47 %) skills to use word-processing

technology while 20 % respondents were poor skilled or have no capability to use this technology. (Table 4.2.27)

23. Regarding use of spreadsheets, 39.35 % respondents were not skilled to use spreadsheet technology as 18.36 % have poor level of skills and 20.98 % have no capability to use MS Excel technology. While 38.56 % respondents were well skilled to use this technology as 22.16 % have well and 16.41 % have excellent (10.77 %) skills to use spreadsheets technology. Remaining 22.09 have fair skills to use this technology. (Table 4.2.28)

24. Majority of the respondents (47.06 %) opined that they were well skilled as 23.46 % have good skills to use presentations technology and 23.59 % have excellent skills to use this technology. While 17.58 % respondents have fair skills, 17.19 % have poor skills and remaining 18.17 % have no capability to use this technology. (Table 4.2.29)

25. Regarding use Internet technology, 43.14 % respondents opined that they have well (23.92 %) and excellent (19.22 %) skills to use Internet technology for searching academic related studies while 31.76 % have poor skills (20.78 %) or no capability (10.98 %) to use this technology. However 25. 1 % respondents have fair skills to use Internet for searching subject related material. (Table 4.2.30)

26. Majority of the respondents (70.19 %) agreed that they use ICTs for the preparation of their assignments. (Table 4.2.31)

27. Majority of the respondents (56.34 %) agreed that they use these technologies for the presentation of their assignments and projects. (Table 4.2.32)

28. Majority of the respondents (56.33 %) agreed that teachers use ICTs for the preparation of handouts for their students. (Table 4.2.33)

29. Regarding use of ICTs, 46.21 % respondents agreed that teachers use these technologies for giving feedback to their students while 35.81 % disagreed with statement and 17.97 % remained uncertain about the statement. (Table 4.2.34)

30. Regarding assessing the assignments, 44.77 % respondents agreed that teachers use ICTs for the assessment of their assignments while 37.05 % disagreed with statement and 18.17 % remained uncertain about the statement. (Table 4.2.35)

31. Majority of the respondents (64.51 %) agreed that teachers use these technologies for recording students' marks/results. (Table 4.2.36)

32. Majority of the respondents (53.59 %) agreed that teachers use these technologies for communicating with their students. (Table 4.2.37)

33. Regarding use of ICTs, 47.03 % respondents agreed that they use ICTs for searching national and international conferences while 35.1 % disagreed with the statement and 17.58 % remained uncertain about the statement. (Table 4.2.38)

34. Regarding use of ICTs, 46.27 % respondents agreed that they use these technologies for preparing conference papers while 41.90 % disagreed with statement and 18.28 % remained uncertain about the statement. (Table 4.2.39)

35. Regarding publication, 39.22 % respondents disagreed with the statement that they use these technologies for the publication of their research papers while 38.76 % agreed with the statement and 22.06 % remained uncertain with the statement. (Table 4.2.40)

36. Majority of the respondents opined that top ten barriers or problems in the utilization of ICTs were; lack of hardware (mean score, 6.89), power failure (mean score, 6.83), lack of confidence (mean score, 6.55), lack of training (men score, 6.17), lack of knowledge (mean score, 5.96), these technologies are expensive (mean score, 5.94), not enough Internet connections (mean score, 5.94), slow Internet connectivity(mean score, 5.86), lack of administrative support (mean score, 5.7), limited lab hours (mean score, 5.41). (Table 4.2.41)

37. Regarding attitude towards the use of these technologies, mean score of teachers (3.58-4.24) in all the statements is more than students' (3.29-4.14) which shows that teachers' attitude is more positive than the students'. (Table 4.2.42)

38. Teachers are more frequent than their students in emailing, word-processing and netsurfing (teachers' mean score is 3.01, 3.68 and 4.05 while students' mean score is 3.01, 3.38 and 3.32 respectively). Students are more infrequent users of spreadsheet technology (teachers' mean score is 2.35 while mean score for students' is 1.97). However, teachers are fluent user of presentations technology (3.35 $\bar{x}$) while students are not fluent user of this technology (1.98 $\bar{x}$). (Table 4.2.43)

39. Comparatively teachers have sufficient skills than their students for emailing, word-processing and net surfing (teachers' mean score is 3.80, 3.63 and 3.69 while students' mean score is 3.18, 3.3 and 3.20 respectively. Students are less skilled in using spreadsheet technology (teachers' mean score is 2.4. while mean score for students is 1.97). However, teachers have sufficient skills to use presentations technology (3.35 $\bar{x}$) while students have insufficient skills to use this technology (2.35 $\bar{x}$). (Table 4.2.44)

40. Teachers use these technologies more frequently than their students for preparation of assignments, presentation of their lectures, preparing handouts for students, recording students' marks/ results, and communicating with their students (teachers' mean score is 4.14, 3.89, 3.91, 3.89, and 3.66 while students' mean score is 3.74, 3.45, 3.43, 3.67, and 3.39 respectively. While in the use of these technologies for giving feedback to the students, assessing students' assignments, searching national or international conferences, preparing conference papers and publishing research papers, there is a difference in the results of teachers and students. Teachers frequently use these technologies for such purposes while students are infrequent users of these technologies for such purposes. Teachers' mean score is 3.75, 3.89, 3.09, 3.01 and 2.78 while students' mean score is 2.12, 2.09, 2.37, 2.38 and 2.36 respectively. (Table 4.2.45)

41. Regarding attitude towards the use of these technologies, mean score of university teachers (4.15-4.75) in all the statements is more than college

teachers (3.00-4.05) which shows that university teachers' attitude is more positive than the college teachers. (Table 4.2.46)

42. Regarding attitude towards the use of these technologies, mean score of university students (3.00-4.57) in all the statements is more than college students' (2.65-3.86) which shows that university students' attitude is more positive than the college students'. (Table 4.2.47)

43. University teachers are more frequent than college teachers in emailing, word-processing and netsurfing (university teachers' mean score is 4.75, 3.86 and 4.50 while college teachers' mean score is 3.5, 3.34 and 2.88 respectively). College teachers are more infrequent users of spreadsheet technology (university teachers' mean score is 2.34 while mean score for college teachers' is 1.97). University teachers are fluent user of presentations technology (3.44 $\bar{x}$) while college teachers are not fluent user of this technology (2.88 $\bar{x}$). (Table 4.2.48)

44. University students are more frequent than college students in emailing, word-processing and netsurfing (university students'' mean score is 3.05, 3.2 and 3.13 while college students' mean score is 2.5, 2.69 and 2.65 respectively). College students are more infrequent users of spreadsheets and presentations technologies (university students' mean score is 1.96 and 1.98 while mean score for college students' is 1.56 and 1.78). (Table 4.2.49)

45. Comparatively university teachers have sufficient skills than college teachers for emailing, word-processing, presentations and net surfing (university teachers' mean score is 3.93, 3.96, 3.79 and 4.29 while college teachers'

mean score is 3.15, 3.14, 2.78 and 3.36 respectively. College teachers are less skilled in using spreadsheet technology (university teachers' mean score is 2.41. while mean score for college teachers is 2.04). (Table 4.2.50)

46. Comparatively university students have sufficient skills than college students for emailing, word-processing and net surfing (university students' mean score is 3.48, 3.33 and 3.26 while college students' mean score is 2.74, 2.67 and 2.60 respectively. College students are less skilled in using spreadsheets and presentations technologies (university students' mean score is 2.09 and 2.35. while mean score for college students is 2.02). (Table 4.2.51)

47. University teachers use these technologies more frequently than their college counterparts for preparation of assignments, presentation of their lectures, preparing handouts for students, recording students' marks/ results (university teachers' mean score is 4.00, 3.96, 3.43, and 3.88 while college teachers' mean score is 3.15, 3.22, 3.00 and 3.26 respectively. While in the use of these technologies for giving feedback to the students, assessing students' assignments, communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, there is a difference in the results of teachers and students. Teachers frequently use these technologies for such purposes while students are infrequent users of these technologies for such purposes. University teachers' mean score is 3.75, 3.89, 2.98, 3.09, 3.01 and 2.78 while college teachers' mean score is 2.12, 2.09, 2.37, 2.38 and 2.36 respectively. (Table 4.2.52)

48. University students use these technologies more frequently than college students for preparation of assignments, presentation of their lectures, preparing handouts, recording marks/ results (university students' mean score is 3.67, 3.74, 3.56 and 3.69 while college students' mean score is 2.75, 2.76, 2.89 and 2.77 respectively. While in the use of these technologies for giving feedback to the students, assessing students' assignments, communicating with students, searching national or international conferences, preparing conference papers and publishing research papers, there is a difference in the results of university students and college students. University students frequently use these technologies for such purposes while college students are infrequent users of these technologies for such purposes. University students' mean score is 3.75, 3.89, 2.98, 3.09, 3.01 and 2.78 while college students' mean score is 1.79, 1.78, 1.78, 1.77 and 1.88 respectively. (Table 4.2.53)

49. University teachers ($\bar{x}$ is 4.15-4.55) and students ($\bar{x}$ is 3.00-4.75) have more positive towards the use of ICTs as compared to the college teachers ($\bar{x}$ is 3.00-4.05) and students ($\bar{x}$ is 2.53-3.86). Interestingly, university students are more positive towards the use of ICTs than college teachers. (Table 4.2.54)

50. Regarding utilization of ICTs university teachers and students are frequent users of these technologies as compared to college teachers and students. Comparatively sequence wise utilization of these technologies among teachers and students is; University teachers ($\bar{x}$ is 2.34-4.75), College

teachers (¯x is 1.97-3.50), University students (¯x is 1.96-3.05), and College students (¯x is 1.56-2.9). (Table 4.2.55)

51. Regarding skills to use these technologies, university teachers and students are frequent users of these technologies as compared to college teachers and students. Comparatively sequence wise utilization of these technologies among teachers and students is; University teachers (¯x is 2.41-4.29), College teachers (¯x is 2.02-3.36), University students (¯x is 2.00-3.16), and College students (¯x is 1.85-2.74). (Table 4.2.56)

52. Regarding teachers' and students' instructional use of these technologies, university teachers and students are frequent users of these technologies as compared to college teachers and students. Comparatively sequence wise instructional use of these technologies among teachers and students is; University teachers (¯x is 2.37-4.16), University students (¯x is 2.17-3.74), College teachers (¯x is 1.75-3.22), and College students (¯x is 1.78-2.89). (Table 4.2.57)

53. Comparatively region wise teachers' positive attitude towards the use of these technologies, ICT is ahead of other regions i.e. ICT; (¯x is 3.73-4.29), Punjab (¯x is 3.76-4.26), Sindh (¯x is 3.77-4.28), KP (¯x is 3.66-4.14), Balochistan ((¯x is 3.65-4.05) and AJK (¯x is 3.50-4.14). (Table 4.2.58)

54. Comparatively region wise students' positive attitude towards the use of these technologies, ICT is ahead of other regions i.e. ICT; (¯x is 3.65-4.16), Punjab (¯x is 3.66-4.00), Sindh (¯x is 3.49-3.98), KP (¯x is 3.50-3.99), Balochistan ((¯x is 3.40-3.92) and AJK (¯x is 3.50-3.86). (Table 4.2.59)

55. In the regional comparison of teachers' utilization of these technologies, ICT is leading other regions. Teachers' utilization of these technologies in ICT (¯x is 2.45-4.65), Punjab (¯x is 2.36-4.15), Sindh (¯x is 2.22-4.11), KP (¯x is 2.15-3.88), AJK (¯x is 2.00-3.55) and Balochistan (¯x is 2.10-3.33). (Table 4.2.60)

56. In the regional comparison of students' utilization of these technologies, ICT is leading other regions. Students' utilization of these technologies in ICT (¯x is 2.32-4.20), Punjab (¯x is 2.25-4.15), Sindh (¯x is 1.99-3.67), KP (¯x is 1.87-3.76), Balochistan (¯x is 1.43-3.54) and AJK (¯x is 1.11-3.22). (Table 4.2.61)

57. Comparatively region wise teachers' skills to the use of these technologies, ICT is ahead of other regions i.e. ICT; (¯x is 2.26-4.26), Punjab (¯x is 2.25-4.18), Sindh (¯x is 2.16-3.95), KP (¯x is 2.10-3.93), Balochistan ((¯x is 1.95-3.60) and AJK (¯x is 1.78-2.96). (Table 4.2.62)

58. Comparatively region wise students' skills to the use of these technologies, ICT is ahead of other regions i.e. ICT; (¯x is 2.06-3.99), Punjab (¯x is 2.13-3.95), Sindh (¯x is 2.00-3.60), KP (¯x is 2.00-3.50), Balochistan ((¯x is 1.85-3.00) and AJK (¯x is 1.77-2.56). (Table 4.2.63)

59. Comparatively region wise teachers' use of these technologies for different instructional purposes, ICT is once again leading other regions i.e. ICT ((¯x is 2.42-4.65), Punjab (¯x is 1.85-4.12), Sindh (¯x is 1.66-3.83), KP (¯x is 1.98-3.76), Balochistan (¯x is 1.50-3.25) and AJK (¯x is 1.77-3.70). (Table 4.2.65)

60. Comparatively region wise students' use of these technologies for different instructional purposes, ICT is once again leading other regions i.e. ICT ((¯x is

1.98-4.25), Punjab ($\bar{x}$ is 2.35-4.35), Sindh ($\bar{x}$ is 2.22-3.98), KP ($\bar{x}$ is 2.23-3.77), Balochistan ($\bar{x}$ is 2.12-3.55) and AJK ($\bar{x}$ is 1.77-3.20). (Table 4.2.64)

5.3 DISCUSSION

With regards to teachers' attitude towards information and communication technologies, teacher's own beliefs and attitudes to ICTs and pedagogical innovation are both primary facilitators and barriers to teachers' use of technology in the classroom (Hennessy, Harrison & Wamakote, 2010). The data indicates that Pakistani teachers and students have positive attitude towards these technologies. Surely, it is an indicator of their good user of these technologies as Huang & Liaw (2005) revealed that teachers attitude towards computers is a key factor in the successful use of computers in the classroom. The participants seemed to have accepted the rationale for using ICTs in teaching learning and these technologies have the potential to bring improvements in their methodologies and the output. However this study revealed that teachers' attitude towards these technologies is more positive as compared to the students' attitude. It is an indication of teachers' frequent use of ICTs as compared to the students. Similarly, Myers & Halpin (2002) investigated that teachers' attitude towards computer use is a major predictor for future computer use in the classroom.

Many studies supported the findings of this study and proved that teacher' attitudes toward computers have significant correlations in the use of these technologies in education. Certainly, due to paramount importance of these

technologies in this information era, computer experience has been the most frequently cited variable correlated to positive attitudes in different studies conducted in different countries. (Albirini, 2006; Blankenship, 1998; Smith, Caputi & Rawstorne, 2000; Gaudron & Vignoli, 2002; Francis, Katz, & Jones, 2000; Kadzera, 2006; Kellenberger & Hendricks, 2003; Yutdhana, 2005; Magambo, 2007; Newa, 2007; Samak, 2006; Yunus, 2007; Yıldırım, 2000, and Zeinab, 2006).

Regarding use of these technologies, both students and teachers are frequent user of word-processing, net surfing and e-mailing. Comparatively, teachers are more frequent user of these technologies than students. Both teachers and students are infrequent user of spreadsheet technology. Regarding presentations technology, teachers are fluent user of this technology while students are infrequent user of this technology. Similarly, Hamid (1999) found that word-processing; e-mail and net surfing for research are most commonly used technologies in instructions. In another study it was found that head of institutions were competent and frequent users in net surfing (Seay, 2004). It was confirmed with the additional use of presentation by (Felton, 2006) when he found in his study that computers are used for e-mailing, word processing, retrieving students' information, and presentations.

Herring (2003) supported the findings of our study when he found that students used database, word processing, presentation, spreadsheet, and on-line browser software for the preparation of their assignments. Similarly, Henry (2007) corroborated these findings as he found that teachers were very consistently using e-mail and web technology. However, they were inconsistent user of word-processing,

presentations, spreadsheets. These findings support our findings nevertheless, contrast is in the use of word-processing. Our respondents are frequent users of this technology while they were inconsistent user of word-processing technology. Both teachers and students are far behind the required use of spreadsheets as identified by Egbert, Paulus, and Nakamichi (2002). They found that there was a gap between technology coursework and teachers' practice. Our teachers indicated lack of training, power failure and lack of confidence as major barriers in the proper use of these technologies. However, our students showed lack of hardware, power failure and lack of training as the major barriers I the proper utilization of these technologies.

In the instructional use, teachers use these technologies for preparation of assignments, presentation of their lectures, preparing handouts for students, giving feedback to the students, recording students' marks/ results, and communicating with their students. However, they are not fluent users of these technologies for assessing students' assignments. Anyhow, students frequently use these technologies for preparation of assignments and communicating with other students. While they are influent users of these technologies for their presentations, preparing handouts, getting feedback from their teachers, recording marks/ results. In the use of these technologies for searching national or international conferences, for preparing conference papers and publishing research papers, there is a difference in the results of teachers and students. Teachers are inclined towards the use these technologies for conference papers or publication of research papers while students are infrequent user of these technologies for these purposes. These results again indicate that

perhaps students are not practiced to use these technologies for their presentations, preparing handouts, getting feedback from their teachers, recording marks/ results and assessment of their assignments. Hence, practice of these purposes may be made customary during their training. Similarly, assessment of students' assignments through these technologies is weakened aspect and requires necessary attention.

Regarding, skills to use these technologies, perception and skills are universally recognized factors for the successful integration of ICTs in education. This study revealed that both teachers and students have sufficient skills for emailing, word-processing and net-surfing. Both teachers and students have insufficient skills to use spreadsheet technology. Anyhow, teachers are fluent user of presentations technology. Similarly, Ilomäki, (2008) found that majority of teachers have sufficient skills for everyday and routine working practices, but many of them still have difficulties in finding a meaningful pedagogical use of technology. Intermediary level skills of word processing, presentation software, spreadsheets were found in teachers by Henry (2007), however, they were expert in e-mailing and browsing the web.

This situation indicates that after provision of ICTs paraphernalia, focus may be given on the training (according to the need of the time) which is weakened aspect of teachers because lack of training at pre-service level is closely related to lack of experience and skills among teachers (Magambo, 2007).

Regarding barriers in up-taking ICTs, students arrayed these barriers in this sequence: lack of hardware, power failure, lack of confidence, lack of training, lack of knowledge, these technologies are expensive, not enough Internet connections,

slow Internet connectivity, lack of administrative support, limited lab hours. While teachers assorted top ten barriers or problems in the utilization of these technologies as; lack of training, power failure, lack of confidence, lack of knowledge, lack of technical support, lack of quality software, slow Internet connectivity, lack of quality hardware, lack of interest and lack of administrative support.

Balanskat, Blamire and Kefala (2006) supported the study, when they revealed that poor ICT skills, low motivation and lack of confidence to use new technologies in teaching are the most important barriers to teachers' ICTs usage for instructional purposes. Similarly, Robinson (2002) investigated that technical support and peer support are top choices for effective learning of technology incorporation skills. Lack of training was the key problem in the use of these technologies and it was also confirmed by the study of Preston et al (2000).

After lack of training; power failure, lack of hardware, lack of technical support and lack of software were major problems in the use of these technologies. Level of confidence is a significant determinant of teachers' level of use of ICTs. Teachers having little or no confidence in using computers will try to avoid using these technologies. (Abdullah, 2009; Dawes, 2000 & 2001; Larner and Timberlake, 1995; Russell and Bradley, 1997). Some other studies revealed that lack of access, technical support, and quality of training determines the level of confidence in teachers to use these technologies. (Abdullah, 2009; Ozden, 2007; and Toprakci, 2006).

Lack of realization of advantages is also a problem faced by teachers during the use of these technologies. Balanskat et al (2006) confirmed the study when he

found that lack of knowledge to use ICTs creates anxiety in teachers during the use of these technologies. Along with this factor, Newhouse (2002) assessed that lack of skills to use these technologies is another factor which effects teachers' level of confidence to use these technologies. Level of access establishes the level of use of these technologies. (Pelgrum, 2001). For the full use of these technologies, sometimes teachers face the problems of lack of time and improper training (Sicilia, 2005). Technical faults with these technologies and lack of technical support to use ICTs (Bradley and Russell, 1997) reduce the level of confidence in teachers to use these technologies.

Virtually, both teachers and students have positive attitude towards the use of these technologies which shows they would be good users of these technologies. Moreover, teachers' data indicates that there is no lack of access to the ICTs paraphernalia for teachers. Hence, judicious training can address the other remaining barriers (Kedzera, 2006) except of power failure which is a national dilemma. However, students' data indicates lack of hardware, lack of training and the power failure as major barriers in the uptake of ICTs. Therefore, besides judicious training, proper provision of these technologies may be ensured because access to these technologies is the first requirement for the integration of ICTs in education (Pelgrum, 2001).

5.4 CONCLUSIONS

The researcher has drawn the following conclusions in the light of above findings:

1. Both students' and teachers' attitude towards the use of ICTs is positive. Interestingly, teachers' attitude seems more positive as compared to the students. University teachers have more positive attitude than their college counterparts and university and college students. Similarly, university students have more positive attitude towards the use of these technologies as compared to their college counterparts. Both teachers and students from Islamabad Capital Territory (ICT) have more positive attitude towards the use of these technologies than the teachers and students of other regions i.e. Punjab, Sindh, Khyber Pakhtoonkha (KP), Balochistan and Azad Jammu and Kashmir (AJK).
2. Regarding use of e-mail technology, teachers are more frequent users of this technology than students. Though students' utilization of this technology is satisfactory to some extent, yet needs to be increased. University teachers are frequent users of e-mail technology than college teachers and both university and college students. Similarly, university students are more frequent users of this technology than college students. Both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of e-mail technology than the teachers and students of other regions i.e. Punjab, Sindh, KP, AJK and Balochistan.

3. In the use of word-processing software, both students and teachers are frequent users of this technology. Like use of e-mail technology, teachers are ahead of students in the use of word-processing technology. Here again, university teachers are ahead of their college counterparts and both university and college students. Both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of this technology than the teachers and students of other regions i.e. Punjab, Sindh, KP, AJK and Balochistan.
4. Both teachers and students are infrequent user of spreadsheet editing software and as usual, comparatively, university teachers are more fluent users of this technology as compared to college teachers, university and college students. Comparatively, both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of this technology than the teachers and students of other regions i.e. Punjab, Sindh, KP, Balochistan and AJK.
5. University teachers have good practice of presentation software while college teachers, university students and college students were infrequent users of this technology. Comparatively, both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of this technology than the teachers and students of other regions i.e. Punjab, Sindh, KP, Balochistan and AJK.
6. University teachers, university students, college teachers and college students are frequent users of Internet technology for academic related studies. However, university teachers are ahead of their college counterparts and university and college students. Interestingly, university students are more

frequent users of this technology as compared to college teachers and college students. College side teachers and students are less inclined towards the use of Internet technology than university side teachers and students. Comparatively, both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of this technology than the teachers and students of other regions i.e. Punjab, Sindh, KP, Balochistan and AJK.

7. Both university and college teachers seem efficient user of these technologies for the preparation of their lectures, assignments and handouts. Students (university and college) also frequently use these technologies for preparation of assignments. As usual, university teachers are more frequent than their college counterparts and interestingly, university students are ahead of college teachers and students in the use of these technologies for such purposes. Comparatively, both teachers and students from Islamabad Capital Territory (ICT) are more frequent users of these technology for above mentioned functions than the teachers and students of other regions i.e. Punjab, Sindh, KP, Balochistan and AJK.

8. Assessment of students' assignments through these technologies is not frequently practiced in these institutions. Especially in the college side, where, both teachers and students in all the regions (ICT, Punjab, Sindh, KP, Balochistan and AJK) are infrequent users of these technologies.

9. Teachers use these technologies for recording students' marks and results etc is prepared and saved through these technologies. In this regard, both university teachers and students are frequent users of these technologies than

their college counterparts. Record keeping of students' marks and results through these technologies is frequently practiced in all the regions.

10. University teachers and to some extent university students use these technologies for communicating with their students and colleagues while college teachers and students are less users of these technologies for such purposes, especially the college students. Overall, both teachers and students of all regions are infrequent users of these technologies for communication with one another.

11. Teachers, especially the university teachers are frequent users of these technologies for searching national and international educational conferences, preparation of papers for these conferences and publication of papers. Teachers of AJK are behind of their counterparts in all other four regions (ICT, Punjab, Sindh, KP, and Balochistan). While students of all regions, especially the college students are not fluent users of these technologies for such purposes.

12. Though both teachers and students have good skills to use e-mail and word-processing technologies yet, university teachers are ahead of their college counterparts and students (both university and college). As usual, university teachers have more skills to use these technologies than college teachers. Similarly, university students have more skills to use these technologies than college students. Notably, there are a lot of students who have poor skills or no capability to use these technologies.

13. Teachers of ICT are more skilled to use e-mail and word-processing technologies than their counterparts in the other four regions while students of Punjab are more skilled to use e-mail technology than their counterparts in the other regions. Students of ICT have more skills to use word-processing technology than their counterparts in the other regions.

14. Neither, teachers nor students of all five regions have meaningful skills to use spreadsheets editing software. However, comparatively, university teachers are more skilled than their college counterparts and the students both from university and college sides. Notably, there are a lot of students and teachers who have poor skills or no capability to use this technology.

15. Both university and college teachers have sufficient skills to use presentations technology. However, neither university students nor college students have meaningful skills to use presentations software. However, comparatively, university students are more skilled than their college counterparts. Notably, there are a lot of students who have poor skills or no capability to use this technology. Both teachers and students from ICT are more skilled to use this technology than their counterparts in all other regions.

16. Both teachers (university and college) and students (university and college) have sufficient skills to use Internet technology for searching subject related material. As usual, university teachers are more fluent in the use of this technology than college teachers, university and college students. Interestingly, university students are more fluent users of this technology as

compared to college teachers and the college students. Both teachers and students from ICT are more skilled to use this technology than their counterparts in all other regions.

17. There is a variation in the identification of top ten barriers and problems confronted by teachers and the students during the use of these technologies. Sequence wise top ten barriers to uptake ICTs among teachers are; lack of training, power failure, lack of confidence, lack of knowledge, lack of technical support, lack of quality software, slow Internet connectivity, lack of quality hardware, lack of interest and lack of administrative support .

18. Sequence wise top ten barriers in the utilization of these technologies among students are; lack of hardware, power failure, lack of confidence, lack of training, lack of knowledge, these technologies are expensive, not enough Internet connections, slow Internet connectivity and lack of administrative support.

19. Regarding reasons for seldom or never use of these technologies, there is a little difference between teachers' and students' opinions. According to teachers, sequence wise three major reasons are; lack of training, power failure and lack of knowledge. While sequence wise three major reasons according to students are; lack of hardware, lack of training and power failure.

5.5 RECOMMENDATIONS

On the basis of findings and conclusions following recommendations were made:

1. Both students and teachers may be encouraged to increase their utilization level of e-mailing and especial emphasis may be given on students who are less users of this technology. Teachers may send e-mails to their students and motivate them to reply through this technology so that seldom or never use of this technology may be decreased to lowest level.
2. Maximum provision of hardware may me ensured so that barrier of lack of hardware for students may be removed. Trainee-teachers may be provided with technology rich environment during their training especially in AJK and Balochistan. Collaboration with donor agencies and NGOs may be very beneficial for this purpose. Moreover, teachers and students may be facilitated with subsidized rates in purchasing and utilizing these technologies.
3. Pre and in-service practice of spreadsheets may me increased and ensured by the supervision of teachers and IT training programmes may be launched in summer vacation.
4. Students may be encouraged to use presentations technology initially under the supervision of teachers and then independently.
5. Students' net-surfing for subject related material may be increased.
6. Assessment of students' assignments may be done through these technologies e.g. using website and e-mail etc.

7. Students' involvement in searching, preparing and participating in educational conferences and publication of research papers may be encouraged.
8. Maximum Internet connectivity with upper limit facility of bandwidth may be ensured to address the "not enough Internet connections" and "slow connectivity" problems among students.
9. Both teachers' and students' confidence may be enhanced by developing niche and continuous IT training programmes because these technologies are advancing at unprecedented rate and it would be unrealistic for teachers to maintain a skill-set at the same rate. Training programmes may be revamped and emphasis may be given on the practical aspect because best use of the available resources ensures the effectiveness of these technologies.
10. Continuous seminars and workshops for the training of teachers may be developed and launched so that teachers may update them according to the current advances in the field of ICTs.

5.6 SUGGESTED STUDIES

1. Same type of the study may be replicated after four years to determine what changes have been occurred.

2. Same study may be done in all the provinces and at all levels i.e. primary, secondary, college and university.
3. Comparison between public and private sector institutions at all levels and in all regions regarding use of these technologies may be conducted.
4. Province wise comparison on the use of these technologies may be conducted.
5. A study on the impact of ICTs training on the utilization of ICTs may be conducted at all levels primary, secondary, college and university.
6. A study on the impact of ICTs training on the performance of students and teachers may be conducted at college and university level.
7. Studies on the availability and usability of ICTs at all levels i.e. primary, secondary, college and university and in all the above mentioned regions may be conducted.

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Appendix-A

INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD
DEPARTMENT OF EDUCATION

Dear Sir/ Madam,

I am doing PhD Education at International Islamic University Islamabad (IIUI) and I am working on my thesis entitled **"Emerging Paradigm of Information and Communication Technologies (ICTs) in Teacher Training Institutions of Pakistan"**

Your experience and opinion as a **teacher/student in university/college** is important. Therefore, it is requested you to please fill the enclosed questionnaire. Please feel free while responding. It is being assured that the information so collected shall be kept confidential and shall only be used for research purpose. A prepaid self addressed envelop is also sent.I hope that you will return the filled in questionnaire on the following address as early as possible.Your cooperation in this regard shall enable the researcher to complete this study well in time. Thanks in advance for your kind cooperation.

Yours truly,

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Part - A

Personal Particulars

1. Your name: ----------
   (Optional)
2. Name of Institution----------

3. Sex: Male / Female: ----------
4. Age: **Tick any one**

   20 ..... 25 Years
   26 ..... 30 Years
   31.....35 Years
   36 ..... .40 Years
   41.....And Above

5. Highest qualification, please also mention your specialization or master level subject
   a. Academic: _____
   b. Professional: _____
   c. Any special diploma about computer/Internet usage: ----------

6. Designation: ----------
7. Experience: ---------- Years
   a. Teaching: ----------Years
   b. Administrative:----------Years

8. You have your own computer at home: Yes/No ----------
9. You have Internet connection at home: Yes/No ----------
10. Have you e-mail address: Yes/No ----------
    If yes, then please write it----------

Part - B

- Some statements regarding the use of ICTs are given below please tick (√) against each statement as per given rating:

Level of Agreement	**Scale Value**
SA----------Strongly Agreed----------	5
A----------Agreed----------	4
UNC----------Uncertain----------	3
DA----------Disagreed----------	2
SDA----------Strongly Disagreed----------	1

Attitude

S.No	Item	SA	A	UNC	DA	SDA
11	Use of ICTs is easy					
12	It is pleasant to use ICTs					
13	Use of ICTs is very important					
14	Use of ICTs is very interesting					
15	I feel comfortable when I use ICTs					
16	I feel confident when I use ICTs					
17	Use of ICTs is valuable					
18	Teachers should aware about ICTs policy					
19	Teachers should have computer at home					
20	Teachers should have internet connection at home					

* Some statements about the common usage of ICTs in teacher training courses are given on the next page. Please tick (√) against each statement about your use of ICTs.

Scale value for this table is Always =5, Frequently =4, Occasionally =3, Seldom=2 and Never =1

Utilization of ICTs

S.No	Item	Always	Frequently	Occasionally	Seldom	Never
21	For sending e-mails					
22	For writing documents (MS Word)					
23	For creating spreadsheets (MS Excel)					
24	For presentations (MS Power Point)					
25	Internet for academic related studies					

* If you never/seldom use these technologies, then please fill in this part otherwise move to the next part **Level of Skills on page 6.**
Please tick (√) against each statement which one is affecting your use of these ICTs and to what extent. **Scale value for this table is SA (Strongly Agreed) =5, A (Agreed) =4, UNC (Uncertain) =3, DA (Disagreed) =2 and SDA (Strongly Disagreed) =1**

Reasons for never/seldom use of technologies

S.No	Item	Reason	SA	A	UNC	DA	SDA
26	E-mail	Lack of hardware					
		Lack of quality hardware					
		Lack of software					
		Lack of quality software					
		Lack of knowledge					
		Lack of training					
		Not enough Internet connections					
		Slow connectivity					
		Lack of technical support					
		Lack of peer support					
		Lack of time					
		Lack of interest					
		It is expensive					
		Limited lab hours					
		Lack of administrative support					
		Lack of realization of advantages					
		Lack of confidence					
		Power failure					
		No relevance to your course					
		Any other(please specify)----------					
27	Word-processing	Lack of hardware					
		Lack of quality hardware					
		Lack of software					
		Lack of quality software					
		Lack of knowledge					
		Lack of training					
		Lack of technical support					
		Lack of peer support					
		Lack of time					
		Lack of interest					
		It is expensive					
		Limited lab hours					
		Lack of administrative support					
		Lack of realization of advantages					
		Lack of confidence					
		Power failure					
		No relevance to your course					
		Any other(please specify) ----------					

		Lack of hardware
		Lack of quality hardware
		Lack of software
		Lack of quality software
		Lack of knowledge
		Lack of training
		Lack of technical support
		Lack of peer support
		Lack of time
		Lack of interest
		It is expensive
28	Spreadsheets	Limited lab hours
		Lack of administrative support
		Lack of realization of advantages
		Lack of confidence
		Power failure
		No relevance to your course
		Any other (please specify)----------
		Lack of hardware
		Lack of quality hardware
		Lack of software
		Lack of quality software
		Lack of knowledge
		Lack of training
		Lack of technical support
29	Presentations	Lack of peer support
		Lack of time
		Lack of interest
		It is expensive
		Limited lab hours
		Lack of administrative support
		Lack of realization of advantages
		Lack of confidence
		Power failure
		No relevance to your course
		Any other (please specify)----------

		Lack of hardware
		Lack of quality hardware
		Lack of software
		Lack of quality software
		Lack of knowledge
		Lack of training
		Not enough Internet connections

		Slow connectivity
		Lack of technical support
		Lack of peer support
		Lack of time
		Lack of interest
		It is expensive
30	Internet for academic related research	Limited lab hours
		Lack of administrative support
		Lack of realization of advantages
		Lack of confidence
		Power failure
		No relevance to yourcourse
		Any other (please specify)----------

---

* Some statements are given below regarding your skills for using the following technologies. Please tick (√) against each statement.

Scale value for this table is Excellent =5, Good =4, Fair =3, Poor=2 and No Capability =1

Level of Skills

S.No	Item	Excellent	Good	Fair	Poor	No Capability
31	Email					
32	Word processing					
33	Spreadsheets					
34	Presentations					
35	Internet research					

* Some statements regarding your use of ICTs in teaching learning and research are given below. Please tick (√) against each statement.
Scale value for this table is SA (Strongly Agreed) =5, A (Agreed) =4, UNC (Uncertain) =3, DA (Disagreed) =2 and SDA (Strongly Disagreed) =1

Use of ICTs in instruction and research

S.No	Item	SA	A	UNC	DA	SDA
36	For preparation of your lectures					
47	For presentation					
38	For preparing handouts for students					
39	For giving feedback to my students					
40	For assessing students' assignments					
41	For recording students' marks/ results					
42	For communicating with your students					
43	For searching conferences					
44	For preparing conference papers					
45	For publishing research papers					
46	Any other (please specify)----------					

Barriers/Problems in the utilization of ICTs

47. Following barriers/problems are often cited regarding the use of ICTs. Please indicate the top ten barriers/problems by assigning 1 to the most frequent barrier/ problem, 2 to the second frequent barrier/problem and 3 to the third most frequent barrier/problem continuing likewise till the 10th barrier/problem.

- Lack of hardware
- Lack of Quality hardware
- Lack of training
- Lack of software
- Lack of quality software
- Lack of knowledge
- Not enough Internet connections
- Slow connectivity
- Lack of technical support
- Lack of peer support
- Lack of time
- Lack of interest
- It is expensive
- Limited lab hours
- Lack of administrative support
- Lack of realization of advantages

- Lack of confidence
- Power failure
- No relevancy with your course

48. Please give **three plus points, three minus points** and **three suggestions** regarding use of ICTs in teacher training institutions of Pakistan:

Signature (please) ----------

Thank you for taking the time to answer this questionnaire. Comments that you might wish to make about the use of ICTs would be most welcome. Once again thank you for your assistance.

Muhammad Safdar

PhD Scholar

Department of Education

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Appendix-B

INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD

Department of Education

جناب محترم/محترمہ _____

السلام علیکم!

میں INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD سے Ph.D (ایجوکیشن) کا کورس کر رہا ہوں۔ میری تحقیق کا عنوان "پاکستان میں تربیت اساتذہ کے اداروں میں انفارمیشن اینڈ کمیونیکیشن ٹیکنالوجیز (Information and Communication Technologies) کے استعمال کا رجحان" ہے۔

اس تحقیقی مطالعے کی تکمیل کیلئے آپ کی قیمتی رائے درکار ہے۔ اس لئے آپ سے گزارش ہے کہ اپنے قیمتی وقت میں سے کچھ لمحات اس سوالنامہ کے مطالعہ کو دیجئے اور مکمل طور پر پُر کیا ہوا سوالنامہ مجھے درج ذیل پتہ پر واپس ارسال کیجئے۔

میں آپ کو یقین دلاتا ہوں کہ آپ کی رائے کو صرف تحقیقی مقاصد کیلئے استعمال کیا جائے گا اور صیغہ راز میں رکھا جائے گا۔

اس بارے میں آپ کا تعاون محقق کو اپنی تحقیق بروقت مکمل کرنے کے قابل بنائے گا۔ اس لئے آپ سے استدعا ہے کہ جتنا جلدی ممکن ہو سکے مکمل طور پر پُر شدہ سوالنامہ واپس ارسال کریں۔

آپ کا پیشگی شکریہ ادا کرتا ہوں۔

والسلام

محمد صفدر
پی ایچ ڈی سکالر
ڈیپارٹمنٹ آف ایجوکیشن
انٹرنیشنل اسلامک یونیورسٹی اسلام آباد

ذاتی معلومات

1. آپ کا نام: _____

2. ادارے کا نام: _____

3. جنس: مرد/عورت: _____

4. عمر مندرجہ ذیل میں سے کسی ایک پر صحیح کا نشان لگائیں۔

20.....25Years

26.....30Years

31.....35Years

36.....40Years

41.....And Above

5. آپ کی زیادہ سے زیادہ تعلیم۔

a. تعلیمی قابلیت .....

b. پیشہ وارانہ قابلیت .....

c. کمپیوٹر/انٹرنیٹ میں کوئی ڈپلومہ .....

6. آپ کے پاس گھر میں کمپیوٹر ہے۔ ہاں/نہیں .....

7. آپ کے پاس گھر میں انٹرنیٹ کنکشن ہے۔ ہاں/نہیں .....

8. آپ کا e-mail ایڈریس ہے۔ ہاں/نہیں .....

اگر ہے تو مہربانی کر کے اس کو یہاں لکھیے۔ .....

انفارمیشن اینڈ کمیونیکیشن ٹیکنالوجیز (ICTs) کے استعمال کے بارے میں کچھ فقرات دیئے ہوئے ہیں مہربانی کر کے نیچے دی ہوئی درجہ بندی کے مطابق متعلقہ خانے میں ( ) کریں۔

بہت متفق	5
متفق	4
غیر یقینی	3
غیر متفق	2
بہت غیر متفق	1

ICTs کے بارے میں رویہ

نمبر	آئیٹم	بہت متفق	متفق	غیر یقینی	غیر متفق	بہت غیر متفق
9	ان ٹیکنالوجیز کا استعمال آسان ہے۔					
10	ان ٹیکنالوجیز کا استعمال کر کے خوش ہوتا ہوں۔					
11	ان ٹیکنالوجیز کا استعمال بہت اہم ہے۔					
12	یہ ٹیکنالوجیز بہت دلچسپ ہیں۔					
13	میں جب یہ ٹیکنالوجیز استعمال کرتا ہوں تو اپنے آپ کو پر سکون محسوس کرتا ہوں۔					
14	میں ان ٹیکنالوجیز کو اعتماد سے استعمال کرتا ہوں۔					
15	ان ٹیکنالوجیز کا استعمال مشکل ہے۔					
16	ان ٹیکنالوجیز کا استعمال بہت اہم ہے۔					
17	ان ٹیکنالوجیز کے استعمال سے مجھے دباؤ اتنا محسوس ہوتا ہے۔					
18	ان ٹیکنالوجیز کے استعمال کیلئے بہت وقت چاہئے۔					
19	طلباء کے پاس گھر پر کمپیوٹر ہونا چاہئے۔					
20	طلباء کے پاس گھر پر انٹرنیٹ کنکشن ہونا چاہئے۔					

تربیت اساتذہ کے کورس کے دوران ICTs کے استعمال کے بارے میں کچھ فقرات دیئے گئے ہیں۔ مہربانی کر کے ان ٹیکنالوجیز کے اپنے استعمال کے بارے میں متعلقہ خانے میں ( ) کا نشان لگائیں۔
اس عمل کیلئے درجہ بندی اس طرح ہے۔

بمیشہ =5 اکثر و بیشتر =4 موقع کے مطابق =3 کبھی کبھار =2 کبھی نہیں =1

ICTs کا استعمال

نمبر	آئیٹم	بمیشہ	اکثر و بیشتر	موقع کے مطابق	کبھی کبھار	کبھی نہیں
21	ای میل (E-mail) بھیجتا کیسے۔					
22	مائیکروسافٹ ورڈ (MS.Word) کا استعمال کرتا ہوں۔					
23	مائیکروسافٹ ایکسل (MS.Excel) کا استعمال کرتا ہوں۔					
24	مائیکروسافٹ پاور پوائنٹ (MS.Power Point) کا استعمال کرتا ہوں۔					
25	اپنی تعلیمی معلومات کیلئے انٹرنیٹ استعمال کرتا ہوں۔					

اگر آپ ان ٹیکنالوجیز کا استعمال **کبھی کبھار** یا **کبھی نہیں** کرتے تو اس حصے کو پُر کریں ورنہ اگلے حصہ دوجہ مہارت صفحہ 9 پر چلے جائیں۔

ان ٹیکنالوجیز کے استعمال میں جو چیز آپ پر اثر انداز ہو رہی ہے اور جس درجہ پر اثر انداز ہو رہی ہے اس پر ( ) کا نشان لگائیں۔ اس تکمیل کیلئے درجہ بندی اس طرح ہے۔

بہت متفق=5 متفق 4= غیر یقینی=3 غیر متفق= 2 بہت غیر متفق=1

ان ٹیکنالوجیز کو کم استعمال کرنے یا نہ استعمال کرنے کی وجوہات

نمبر	میٹر	وجوہات	بہت متفق	متفق	غیر یقینی	غیر متفق	بہت غیر متفق
		ہارڈ ویئر (Hardware) کی کمی۔					
		کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
		سافٹ ویئر (Software) کی کمی۔					
		کوالٹی سافٹ ویئر (Software) کی کمی۔					
		معلومات کی کمی۔					
		ٹریننگ (Training) کی کمی۔					
		ہائی انٹرنیٹ کنکشن۔					
26	ای میل E-Mail	سلو (Slow) انٹرنیٹ کنکشن۔					
		تکنیکی مدد (Technical Support) کی کمی۔					
		دوستوں کی مدد کی کمی۔					
		وقت کی کمی۔					
		فیس کی کمی۔					
		یہ ٹیکنالوجیز بہت مہنگی ہیں۔					
		کمپیوٹر لیب کا تھوڑے وقت کیلئے دستیاب ہونا۔					
		انتظامی مدد کی کمی۔					
		ان ٹیکنالوجیز کے فوائد کے بارے میں آگاہی۔					
		اعتماد کی کمی۔					
		بجلی کا بند ہونا۔					
		کورس سے متعلقہ نہ ہونا۔					
		اس کے علاوہ اگر کوئی وجہ ہو تو مہربانی کر کے یہاں لکھیں۔					
		ہارڈ ویئر (Hardware) کی کمی۔					
		کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
		سافٹ ویئر (Software) کی کمی۔					
		کوالٹی سافٹ ویئر (Software) کی کمی۔					
		معلومات کی کمی۔					
27	مائیکروسافٹ ورڈ	ٹریننگ (Training) کی کمی۔					
		تکنیکی مدد (Technical Support) کی کمی۔					
		دوستوں کی مدد کی کمی۔					

	وقت کی کمی۔					
	دلچسپی کی کمی۔					
	یہ ٹیکنالوجیز بہت مہنگی ہیں۔					
	کمپیوٹر لیب کا تھوڑے وقت کیلئے دستیاب ہونا۔					
	انتظامی مدد کی کمی۔					
	ان ٹیکنالوجیز کے فوائد کے بارے میں ناآگاہی۔					
	اعتماد کی کمی۔					
	بجلی کا بند ہونا۔					
	کورس سے متعلقہ نہ ہونا۔					
	اس کے علاوہ اگر کوئی وجہ ہو تو مہربانی کر کے یہاں لکھیں۔					
	ہارڈ ویئر (Hardware) کی کمی۔					
	کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
	سافٹ ویئر (Software) کی کمی۔					
	کوالٹی سافٹ ویئر (Software) کی کمی۔					
28 مائیکروسافٹ ایکسل	معلومات کی کمی۔					
	ٹریننگ (Training) کی کمی۔					
	ناکافی انٹرنیٹ کنکشن۔					
	سلو (Slow) انٹرنیٹ کنکشن۔					
	تکنیکی مدد (Technical Support) کی کمی۔					
	دوستوں کی مدد کی کمی۔					
	وقت کی کمی۔					
	دلچسپی کی کمی۔					
	یہ ٹیکنالوجیز بہت مہنگی ہیں۔					
	کمپیوٹر لیب کا تھوڑے وقت کیلئے دستیاب ہونا۔					
	انتظامی مدد کی کمی۔					
	ان ٹیکنالوجیز کے فوائد کے بارے میں ناآگاہی۔					
	اعتماد کی کمی۔					
	بجلی کا بند ہونا۔					
	کورس سے متعلقہ نہ ہونا۔					
	اس کے علاوہ اگر کوئی وجہ ہو تو مہربانی کر کے یہاں لکھیں۔					
	کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
	سافٹ ویئر (Software) کی کمی۔					
	کوالٹی سافٹ ویئر (Software) کی کمی۔					
	ٹریننگ (Training) کی کمی۔					
	تکنیکی مدد (Technical Support) کی کمی۔					
	دوستوں کی مدد کی کمی۔					

29	ہائیکر و سافٹ ہاور پوائنٹ	معلومات کی کمی۔					
		ٹریننگ (Training) کی کمی۔					
		تکنیکی مدد (Technical Support) کی کمی۔					
		دوستوں کی مدد کی کمی۔					
		وقت کی کمی۔					
		دلچسپی کی کمی۔					
		یہ ٹیکنالوجیز بہت مہنگی ہیں۔					
		انتظامی مدد کی کمی۔					
		ان ٹیکنالوجیز کے فوائد کے بارے میں ناآگاہی۔					
		اعتماد کی کمی۔					
		بجلی کا بند ہونا۔					
		کورس سے متعلقہ نہ ہونا۔					
		اس کے علاوہ اگر کوئی وجہ ہو تو مہربانی کر کے یہاں لکھیں۔					
30	تعلیمی مواد کیلئے انٹرنیٹ کا استعمال	ہارڈ ویئر (Hardware) کی کمی۔					
		کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
		سافٹ ویئر (Software) کی کمی۔					
		کوالٹی سافٹ ویئر (Software) کی کمی۔					
		معلومات کی کمی۔					
		ٹریننگ (Training) کی کمی۔					
		ناکافی انٹرنیٹ کنکشن۔					
		سلو (Slow) انٹرنیٹ کنکشن۔					
		تکنیکی مدد (Technical Support) کی کمی۔					
		دوستوں کی مدد کی کمی۔					
		وقت کی کمی۔					
		دلچسپی کی کمی۔					
		یہ ٹیکنالوجیز بہت مہنگی ہیں۔					
		کمپیوٹر لیب کا تھوڑے وقت کیلئے دستیاب ہونا۔					
		انتظامی مدد کی کمی۔					
		بجلی کا بند ہونا۔					
		کورس سے متعلقہ نہ ہونا۔					
		اس کے علاوہ اگر کوئی وجہ ہو تو مہربانی کر کے یہاں لکھیں۔					
		ہارڈ ویئر (Hardware) کی کمی۔					
		کوالٹی ہارڈ ویئر (Hardware) کی کمی۔					
		سافٹ ویئر (Software) کی کمی۔					
		کوالٹی سافٹ ویئر (Software) کی کمی۔					
		معلومات کی کمی۔					

ICTs کے استعمال میں آپ کی مہارت کے بارے میں کچھ فقرات نیچے دیئے گئے ہیں۔
آپ مہربانی کرکے متعلقہ خانے میں ( ) کا نشان لگائیں۔

درجہ مہارت

اس کیٹیگری میں درجہ بندی اس طریق ہے۔

کچھ مہارت نہیں	کمزور	اچھی	بہت اچھی	شاندار	آئیٹم	نمبر
					ای میل	31
					مائیکروسافٹ ورڈ	32
					مائیکروسافٹ ایکسل	33
					مائیکروسافٹ پاور پوائنٹ	34
					انٹرنیٹ کا استعمال	35

ICTs کے درس وتدریس اور تحقیق میں استعمال کے بارے میں کچھ فقرات اگلے صفحے پر دیئے گئے ہیں۔ آپ مہربانی فرما کر متعلقہ خانے میں ( ) کا نشان لگائیں۔
اس کیٹیگری میں درجہ بندی اس طریق ہے۔

بہت متفق =5 متفق =4 غیر یقینی =3 غیر متفق = 2 بہت غیر متفق =1

ICTs کا درس وتدریس اور تحقیق میں استعمال

بہت غیر متفق	غیر متفق	غیر یقینی	متفق	بہت متفق	آئیٹم	نمبر
					مشقیں (Assignments) دیجیے	36
					پاور پوائنٹ سلائیڈز دیکھیے	37
					ٹیسٹ لیجیے	38
					طلباء کو فیڈ بیک (Feed Back) دیجیے	39
					طلباء کا مواد چیک کرنے کیلئے	40
					طلباء کا نتیجہ تیار کرنے کیلئے	41
					طلباء سے رابطہ کیلئے	42
					کسی وبین الاقوامی کانفرنس میں شرکت کرنے کیلئے	43
					کانفرنس پیپر تیار کرنے کیلئے	44
					ریسرچ پیپر چھپوانے کیلئے	45
					اس کے علاوہ اگر کوئی استعمال ہو تو مہربانی کرکے یہاں لکھیں۔	46

مہربانی کرکے پاکستان میں اساتذہ کے تربیتی اداروں میں ICTs کے استعمال کے بارے میں تین (3) فوائد تین (3) نقصانات اور تین (3) تجاویز درج کریں۔

دستخط (مہربانی کرکے).....

اس سوالنامہ کو پر کرنے کیلئے آپ نے کافی وقت صرف کیا اس پر میں آپ کا شکر گزار ہوں۔

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Appendix-C

Population of the study was consisted of following teacher training institutions:

1. Federal College of Education Islamabad
2. Department of Education, International Islamic University Islamabad
3. IER, Punjab University Lahore
4. University College of Education Faisalabad
5. Department of Education, University of Sargodha
6. Department of Education, Bahawuddin Zikria University Multan
7. University of Education Lahore
8. Faculty of Education, Islamia University, Bahawalpur
9. Faculty of Education, University of Sindh, Hyderabad
10. College of Education Sukkar
11. Institute of Education, Shah Abdul Latif Bhattai University Khairpur
12. Federal College of Education, F.B. Karachi
13. IER, University of Peshawar, Peshawar
14. IER, Gomal University D. I. Khan
15. Federal College of Education Gilgit
16. Krakaram International University Gilgit
17. Hazara University Mansehra
18. Department of Education, University of Balochistan
19. College of Education, Quetta
20. College of Education AJK