DEVELOPMENT OF A MODEL PLAN FOR ENHANCEMENT OF TECHNICAL EDUCATION IN PAKISTAN

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DEVELOPMENT OF A MODEL PLAN FOR
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IN PAKISTAN

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DEDICATION

I earnestly dedicate this feeble effort to those who are
symbol of pride for me my father

Muhammad Tufail Naseem

My loving and caring mother and all family members for their
inspirations and continuous support
Title of Thesis: Development of a Model Plan for Enhancement of Technical Education in Pakistan

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DEVELOPMENT OF A MODEL PLAN FOR ENHANCEMENT OF TECHNICAL EDUCATION IN PAKISTAN

ABSTRACT

With advancement in technology our native planet Earth has become a global village, the bad or good effect of these developments in technology are being transferred from one country to another rapidly. The world of work is demanding more knowledge-able and skilled man power to run the industry, that’s why almost all developed and developing countries are concentrating more and more on development of technical education and are using technical education as a master-key for industrial and economic development, to control the increasing un-employment, promoting entrepreneurship (self-employment) and alleviate poverty. Pakistan is facing an ever increasing ratio of un-employment in youth, while the industry is lacking for appropriately trained manpower but it is a general opinion that technical education is not delivering quality. Realizing the potential role of technical education the researcher has aimed to devise a model plan for enhancement of technical education in Pakistan.

The objectives of the study were: (i) to highlight the global trends regarding Technical Education, (ii) to identify the main factors which play key-role in enhancement of Technical Education, (iii) to highlight the present scenario of technical education in Pakistan, (iv) to diagnose the causes for not achieving the quality in Technical Education of Pakistan, (V) to devise a model plan for enhancement of Technical Education in Pakistan. The study was a descriptive
research and mixed in its nature. The population of the study was all the experts of technical education, principals of all the (government) technical colleges, all the placement officers of technical colleges and alumnae of all the technical education.

Through a focused group discussion the main factors that play key role in enhancement of technical education, global trends and the profile of technical education in Pakistan regarding these key factors were explored. The participants of the focused group discussion were the experts from planning commission, Education and especially the experts of technical education. Three instruments (questionnaires) were developed that were based on the key factors explored through focused group discussion and then survey from principals, placement officers and ten alumnae members from each technical colleges, was conducted to acquire there opinion regarding the present scenario of technical education in Pakistan and key factors that play role in enhancement of technical education. This second phase (survey) was followed by third phase focusing on detailed qualitative interviews. Few of the substantial findings of the study showed that world over the technical education is considered as a master key for the in most of countries fund allocation for technical education is being enhanced and considered as an investment on the youth, which returns in the form of poverty alleviation, country’s economic growth, availability of jobs in market, self-employment of the youth and in most of the countries curricula are being made flexible and job market oriented, industry and business men are involved in the process of curriculum development, students and faculty training and evaluation of students. The study also pointed out that the condition of Infrastructure, curricula, teaching effective-ness, and intake was least satisfactory in technical colleges. The main recommendations suggested were the revision of curricula, social marketing of technical education, development of National Qualification Framework
(NQF) and Proper legislation for involvement of the industry in process of enhancement of technical education. In the light of conclusions and recommendations, a model plan for enhancement of technical education in Pakistan was devised and sent to experts for its validation and improvements were made in light of expert’s opinion.
ACKNOWLEDGEMENT

I bow my head with the feelings of humbleness and submissiveness before Almighty and omnipotent Almighty Allah, Whose blessings enabled me to complete this study, and contribute a little drop to the already existing ocean of knowledge. Next to His holy prophet Muhammad (Salalahu elehi wassalam) who is the greatest source of knowledge, guidance and inspiration for humanity.

I appreciates and pay my heartily thanks to a well versed, learned and dynamic personality, my kind and worthy supervisor Prof. Dr. Muhammad Ibrahim Khalid whose unfailing patience, vast experience, consistent encouragement and commitment, accommodating and motivating behavior paved the way for the completion of this laborious task.

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Ahmed Raza
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CHAPTER 1

INTRODUCTION

Role of Education is significant not only in life of every individual but it plays a vital role in development of a country and a nation. Change in the country is totally dependent on human resource development. It is the education that makes the individuals a responsible person of society and nation because education prepares individuals to realize their aims and objectives and gives them a sense of responsibility to fulfill those objectives. In running education system of Pakistan there are two main systems of education i.e. formal education system and distance & non-formal education system. In formal education system, technical and vocational education is the branch of professional education.

“While Education is a key to any development strategy, the Technical and Vocational Education (TVE) is the master key that can transform the world of work and the economy, alleviate poverty, save the environment, and improve the quality of life” (Quisumbing, 2004).

Javied and Hyder (2009) have the point of view that in the Pakistani background, the world or term “Technical Education” is mostly used for post-matric programs of theoretical and hands-on training, the purpose of this training is to prepare technicians who can perform the duties of bridging between unskilled labor and top-management or engineers. The major program offered at the polytechnic institutes or colleges of
technology is a three year Diploma of Associate Engineer (DAE). The education sector in Pakistan has been growing gradually over the past 67 years; Gujjar and Chaudhry (2009) state that the technical and vocational education stream did not spread out at the same pace as compared to general education stream.

“The need for improvement of Technical Education has always been felt” (Mirza,1999). In Pakistan rhetoric emphasis on Vocational and Technical Education has been given in every educational policy. Every government has realized the importance of trained, skilled workers in the country. We could not achieve the set targets especially regarding the role of Technical Education in economical and industrial development; Ahsan (2003) felt that in past we could not utilize our full potential, this prevailing circumstances not only demands for formulation of a sound policy and plan but implementation plan too.

If we want to be a developed nation we have to analyze the development plans of the countries, made development on the bases of Technical Education and compare it with our development plans developed in past and have to re-think about present global trends and challenges and consult with experts, to enhance the role and weight-age of Technical Education in future. The National Education Policy (NEP, 1998-2010) has also acknowledged the need and importance of planning for national education system including the Technical Education for the rapid industrial economic growth of the nation.

Several studies have been conducted in connection with history and role of Technical Education in national development, Ali (1990) in his doctorate dissertation focused the Development of Technical Education in Pakistan, and discussed the objectives of Technical Education and their achievement. Gillani (1994) has also focused
on the development of technical in Pakistan, Dr Mirza (1999) has conducted a research on “Recasting Diploma of Associate Engineer Program to the Need of Industry” which is mainly focused on curricula of different technologies, its relation with market demand and need for induction of new technologies, Nasir and Nazli in 1999 developed a research report on “Education and Earning in Pakistan” for “Pakistan Institute of Development Economics”, Islamabad. In which they reported, a positive and significant impact of technical training on individuals’ earnings and they have divided the training into three different stages (less than one year or only one year, one year but not more than three years, and three or more than three years). These results highlight that if the duration of technical education or training is less than three years it makes no significant impact on the earning whereas In contrast to this, three or more years training provide better returns to individuals and state. Iftikhar Shah (2004) in his PhD thesis worked on “Problems and Prospects Technical Education in Pakistan” along with other recommendations he has recommended further research in this field, Hasan (2007) submitted a PhD thesis on “Relevence of Diploma of Associate Engineer Curricula With The Job Requirement” Gujjar and Chaudhry (2009) wrote an article on the enhancement of Technical Education and Vocational Training in country: A Historical Review” in Journal of Social Sciences some other studies have been conducted by “World Bank” and Asian Development Bank regarding “Technical Education”.

A change has been taken place in Technical Education in respect to its vision and mission, aims, policies and practices, content and methodology. Its innovative and improved idea is leading to an extended and tactical role in new age of speedy and remarkable changes in global and democratic societies. Human being never experienced such massive level changes throughout its history. In result to this, remarkable changes in education in general,
and particularly in TVE are happening. This situation is grasping our attention to meet up the challenges not only for our own interest but also for the development of coming generations too (Quisumbing, 2004). The researcher has a point of view that each of the above discussed studies were good effort in their place, but the researcher could not find any pertinent work focused on development of an integrated model plan for enhancement of Technical Education based on; analytical review of Technical Education and identifying the global trends, to fill this gap, the researcher has aimed to; Devise a Model Plan for Improvement of Technical Education in Pakistan”.

1.1 Statement of the Problem

The purpose of this sequential mixed method study is to; at first phase through focus group discussion, explore factors effecting the enhancement of Technical Education (e.g. gender/class access, equity & employability, quality assurance for intake, process and pass outs, staff development, knowledge management and industry-institute linkage etc), at Second phase to develop an instrument and conduct a broad survey, identify the barriers and emerging issues with respect to the enhancement of Technical Education, and Then at third phase provide conclusions and recommendations for change or improvements through “development of model plan for enhancement of Technical Education in Pakistan.”
1.2 Significance of the Study

A large number of populations are consisted upon youngsters in Pakistan. It is the biggest number today ever in history of Pakistan. The total number of youngsters under age of twenty nine was comprised of seventy percent in census of 1998. Whereas the population data released on world fact book (2013) by Central Intelligence Agency (CIA) of United States of America (USA) shows that youth below the age of 24 comprise 56% of the total population of Pakistan. Unfortunately, there is a significant gap between the dreams of young Pakistanis and opportunities available to them. The youngsters of Pakistan are trapped in a large number of troubles like, lack of skill oriented education and career planning, unemployment and poverty etc. Moreover the traditional styles of education, non planned and non-proficient education are all major drawbacks in the success of youth. In result to this the economy is unstable, lawlessness and a break-up of the social fabric & a shattered confidence of foreign investors.

Pakistan’s economy earns major benefits by sending and using this skilled labor abroad; researches showed the decline in jobs abroad. The increasing population is an alarming situation and this may result as an increase in unemployment ratio in Pakistan. It has been acknowledged that technical education and training is considered as indispensable pre-requisite for the social and economic development of a country (Rutayuga & Kondo, 2004).
A highly educated and trained professional and competent manpower can only be produced if an appropriate plan for educational system is developed and implemented properly (Khan, 1994). Right from the independence of Pakistan, the importance of Technical Education has been felt and different plans and policies have been made by governments from time to time, but what measures have been taken for promotion of technical education in these plans? To what extent these plans were implemented? What was the factor if targets could not meet? What are the global trends now a days? What steps should be taken to meet the national and international challenges? These are the questions, researchers should search and experts should
answer, for better future planning and development of the country. Many studies have discussed the development plans of Pakistan, but the researcher could not find any pertinent work focused on development and suggestion of a model plan for enhancement of Technical Education. This study is an effort in this way to find out answers of above discussed issues.

This study may be helpful for:

a. The national planners and policy makers to plan for improvement of situation regarding unemployment and grooming & properly utilizing the skills & talents of our younger generation and making them learn and develop their skills in different aspects through the route of Technical Education.

b. The government officials in building-up the framework needed to enhance the quality of Technical Education and make it job market oriented.

c. The planners of Technical Education to create better chances for TEVT to produce skilled man power to face global challenges and development of trade and industry.

d. The officials of Technical Education to enhance the industry-institute linkage for better training and employment of TEVT graduates.

e. The national planners and policy makers, in better planning for preparation and export of skilled man power and earning more foreign exchange.

1.3 Objectives of the Study

The objectives of this study were to:

1. Highlight the global trends regarding Technical Education
2. Identify the main factors which play key-role in enhancement of Technical Education.

3. Highlight the present scenario of technical education in Pakistan.

4. Diagnose the causes for not achieving the quality in Technical Education of Pakistan.

5. Devise a model plan for enhancement of Technical Education in Pakistan.

1.4 Research questions

Following research questions were framed for the study:

1. What are the global trends regarding Technical Education?

2. What measures are being taken globally for the enhancement of Technical Education?

3. What are the factors that play key-role in enhancement of Technical Education?

4. What is the present scenario of Technical Education in Pakistan?

5. What are the main causes for not achieving the required quality in Technical Education of Pakistan?

6. What should be the necessary measures for the promotion of Technical Education in Pakistan?

1.5 Delimitation

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

1. Technical institutions/colleges of public sector only.
2. Technical institutions/colleges which offer at least diploma of associate engineering or B.Tech. degree.

1.6 Operational Definitions

**Administration.** It is total of the activities and process to utilize available human and material resources to achieve the set goals of an institution or organization.

**Alumnae.** Graduates or former students of three year diploma of associate engineers (DAE) programs of any technology.

**Competencies.** A competency is the expressive behavior based on numerous skills, attitudes, knowledge and understandings (Kalara, 1997)

**Principal.** Any person (male or female) who is incharge of an educational institution. He/She is responsible for the supervision of all educational and correlated activities in institute/college.

**Placement Officer**

Any faculty member who looks after the training and placement activities of the students. He/she have close liaison with industry for students’ training and placement.
**Technical Education.** The term “Technical Education” refers to the post-secondary course of study and practical training aimed at preparation of technician to work as middle level supervisory staff (Aly, 2007)

**Technical college.** The term “Technical college” refers to the Government Colleges of Technology (GCT), Government Polytechnic Institute (GPI) or Government Monotechnic Institute (GMI).

**Diploma of Associate Engineer (DAE):**

A three year technical education program equalant to F.Sc. offered by the polytechnic institutes.
### ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AJK</td>
<td>Azad Jammu And Kashmir</td>
</tr>
<tr>
<td>BTE</td>
<td>Board of Technical Education</td>
</tr>
<tr>
<td>B.Tech</td>
<td>Bachelor of Technology</td>
</tr>
<tr>
<td>BTEVTA</td>
<td>Baluchistan Technical Education and Vocational Training Authority</td>
</tr>
<tr>
<td>CBT</td>
<td>Competency Based Training</td>
</tr>
<tr>
<td>CIA</td>
<td>Central Intelligence Agency</td>
</tr>
<tr>
<td>DAE</td>
<td>Diploma of Associate Engineer</td>
</tr>
<tr>
<td>DTE</td>
<td>Directorate of Technical Education</td>
</tr>
<tr>
<td>GCT</td>
<td>Government Colleges of Technology</td>
</tr>
<tr>
<td>GMI</td>
<td>Government Monotechnic Institute</td>
</tr>
<tr>
<td>GPI</td>
<td>Government Polytechnic Institute</td>
</tr>
<tr>
<td>HEC</td>
<td>Higher Education Commission</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labor Organization</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>MTDF</td>
<td>Medium Term Development Framework</td>
</tr>
<tr>
<td>NEP</td>
<td>National Education Policy</td>
</tr>
<tr>
<td>NISTE</td>
<td>National Institute of Science and Technical Education</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>NAVTEC</td>
<td>National Vocational and Technical Education Commission</td>
</tr>
<tr>
<td>NAVTTTC</td>
<td>National Vocational and Technical Training Commission</td>
</tr>
<tr>
<td>NQF</td>
<td>National qualification framework</td>
</tr>
<tr>
<td>NWFP</td>
<td>North Western Frontier Province</td>
</tr>
<tr>
<td>TEVTA</td>
<td>Technical Education and Vocational Training Authority</td>
</tr>
<tr>
<td>STEVTA</td>
<td>Sindh Technical Education and Vocational Training Authority</td>
</tr>
<tr>
<td>TVE</td>
<td>Technical and Vocational Education</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education &amp; Training</td>
</tr>
<tr>
<td>TEVT</td>
<td>Technical education and Vocational Training</td>
</tr>
<tr>
<td>TQM</td>
<td>Total Quality Management</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational and Scientific Cultural Organization</td>
</tr>
</tbody>
</table>
CHAPTER 2

REVIEW OF RELATED LITERATURE

This study was designed to appraise the system of “Technical Education” in Pakistan, its importance in the development of a society, efforts made in the country for its improvement; global scenario and opinion of the experts of education, keeping in view devise a model plan for its enhancement in Pakistan.

This chapter focuses on the review of related literature; it starts by defining and understanding the concepts and importance of education, particularly Technical Education, it also comprises of a historical look on its development and efforts made by governments for its promotion in Pakistan, the global trends and main models adopted for advancement of Technical Education in different countries, have also been discussed.

2.1 Education

The paramount significance of education in the socio-economic development of a country is known to all of us, Education is believed as a key that opens the doors of
socio-economic development of a country. The term “education” has been defined in Oxford English dictionary (1989) as “the systematic instruction, schooling or training given to young in preparation for the work of life”. Whereas Asif Iqbal Khan (1994), has defined education as a process that “enables one to know and distinguish true from false and do what is reasonable and shun what is unreasonable”.

According to Allama Zarhuji, as quoted by Hafeez (2008, p.17), “Knowledge is a quality which illumines the mind, and education provides insight into the secrets of learning and methods of treatment, and the object of education is to attain the pleasure and goodwill of the Almighty and win eternal life”. Whereas the World Bank (2011) has defined education as “education is a powerful tool for the growth of individuals and societies. Education is a basic constructing slab for human growth. It is the powerful tool to alleviate poverty, improvement of health, equality in gender, for peace, and steadiness”.

Magnitude of education in any country is considered as a symbol of stability and peace. Which is taken as paved path for development and prosperity? To estimate or measure this Magnitude of education in masses is described as literacy rate of the country concerned through which specific reading and writing skill of masses are considered. No doubt it is a reality that the progress of any country is measured through its literacy rate (Government of Pakistan, 2003). In short we can say education is a practice that has influential effects on the intelligence, personality or bodily talent of a person. Thus, we may conclude that, it is education through which societies transfer their values, sum of knowledge and skills from one generation to the next successfully.
Pakistan was created under the outstanding leadership of Quaid-e-Azam Muhammad Ali Jinnah. The state’s policy placed great emphasis on education. The Holy Prophet Hazrat Muhammad (PBUH) declared compulsory for every Muslim man and woman to get educated. As quoted by Hafeez (2008, p.17), the great philosopher of Pakistan, Allama Muhammad Iqbal too has highlighted the importance of education, “the highest ideal is a continued life with the highest quality of knowledge, power, perfection, goodness, wisdom and creativity”. The Quaid’s message to the (1st) Pakistan Educational Conference (1947) also highlighted its importance for the new nation, “You know that importance of education and the right type of education cannot be over-emphasised... If we are to make real, speedy and substantial progress, we must earnestly tackle this question ... having regard to the modern conditions and vast developments that have taken place all over the world”.

Education provides access to knowledge and orientation in a progressively more and more complex world. Education plays the role of fundamental pillar of human rights and sustainable development (UNESCO, 1998). Education is the key to the job market and only education make able us to take part and move ahead with a confidence in social life and society. The researches show that literacy rate has a crucial role in a national development and all the developed nations like America, Australia, Britain, Japan and Germany have made economic growth by giving priority to education, especially education in science and technology (IIASA, 2008). “To neglect education is a national offense which results in the form of degeneration and devolution in various sectors national growth and development” (Khan, 1994).
Unfortunately, despite high and frequent rhetoric by the different governments in the past, education remained the most neglected feature of national life in Pakistan, during the last sixty six years. The literacy level is quite low; the quality of education is not satisfactory; the teachers are less-paid, un-trained and discouraged, on the other hand the emphasis in education is still on a general education, like B.A. or M.A. degrees. No considerable long-term plan has been made to attract and motivate the youth to join technical education. The students are interested in white-collar jobs, they want to achieve good positions in the society, but find no relationship between technical education and higher earnings and prominent positions in society, that is why the switchover towards scientific and technical education has still not taken place.

2.2 Education System in Pakistan

The present education system in Pakistan is mainly consisted upon elementary, secondary and higher education. Elementary education is being divided into Primary part (five years of schooling) from class one to five, Middle component is consisted upon 6th to 8th class. Secondary stage comprises on 9th to 10th classes, whereas Higher Secondary (H/S) stage consists of 11th and 12th levels. After H/S stage, Higher Education (HE) starts from bachelor to PhD level. Formerly each degree program consisted of two years education at university level but, in recent times Higher Education Commission (HEC) has converted two year degree programs into four years programs. Whereas, professional degrees like engineering and medical are offered with four and five year’s duration respectively. Similarly, for other professions various
programs like Bachelor and Master degree are offered in Information Technology (IT), Education, Home Economics, veterinary sciences and agriculture etc.

For producing skilled labor and man power, there is another stream that is called vocational and technical education that consists of three years education (Diploma of associate engineer) after Matriculation whereas vocational training Certificate courses of different durations like, three, six, twelve, eighteen or twenty four months, after eighth (8th) or tenth (10th) class. This diploma education is being offered in more or less all technologies for both male and female students in all provinces of Pakistan.
The integrated view of different streams and levels of education is shown below:

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Class/Grade</th>
<th>Pre-requisite</th>
<th>Duration of Education</th>
<th>Qualification/Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>1st to 5th</td>
<td>--</td>
<td>5 years</td>
<td>Primary Pass</td>
</tr>
<tr>
<td>Elementary</td>
<td>6th to 8th</td>
<td>Primary</td>
<td>3 years</td>
<td>Middle Pass</td>
</tr>
<tr>
<td>Secondary</td>
<td>9th &amp; 10th</td>
<td>Middle</td>
<td>2 years</td>
<td>Secondary School Certificate (SSC)/ Matriculation/ Matric Tech (Subjects: Science/ Humanities/ Commerce/Technical)</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>13th &amp; 14th</td>
<td>Higher Secondary</td>
<td>2 years</td>
<td>- Bachelor of Arts / commerce(BA/B.Com)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Bachelor of Science (B.Sc.)</td>
</tr>
<tr>
<td></td>
<td>13th to 16th (New scheme)</td>
<td>Higher Secondary</td>
<td>4 years</td>
<td>-BS (Science/Arts)</td>
</tr>
<tr>
<td>Master Degree</td>
<td>15th &amp; 16th</td>
<td>Bachelor Degree</td>
<td>2 years</td>
<td>- Master of Science/ -Arts/Commerce M.Sc./ MA/M.Com/MBA etc</td>
</tr>
<tr>
<td>Engineering Degree</td>
<td>13th to 16th</td>
<td>Fsc(pr-Engg)/DAE (limited seats)</td>
<td>4 years</td>
<td>-Bachelor of Engg. (BE/BSc. Engg.)</td>
</tr>
<tr>
<td>Medical</td>
<td>13th to 17th</td>
<td>Fsc(pr-medical)</td>
<td>5 years</td>
<td>MBBS</td>
</tr>
<tr>
<td>Vocational</td>
<td>8th to onwards</td>
<td>Middle/ Matric</td>
<td>6 month to 2 years</td>
<td>Trade/Vocational Certificate(G-II &amp; G III)</td>
</tr>
<tr>
<td>Technical</td>
<td>11th to 13th</td>
<td>Matric/ Matric Tech.</td>
<td>3 years</td>
<td>Diploma of Associate Engineers (DAE)</td>
</tr>
<tr>
<td>Technology</td>
<td>14th to 17th</td>
<td>(DAE)</td>
<td>4 years</td>
<td>B-Tech. (Honours)</td>
</tr>
</tbody>
</table>

Figure 2. Different streams and levels of education in Pakistan.

2.3 Technical Education

The term “Technical education” is flexible in its meanings and is used for a wide range of education; but in general it is used for organized training programs and education aimed to produce manpower which is one step ahead the semi-skilled or
skilled labour and plays the role of bridge between labour and engineers as defined in Encyclopedia Britannica, Technical Education (TE) has the goal to prepare youngsters for different occupations which are above the skilled crafts class but comes under the scientific or engineering class. These people are generally considered as technicians (Encyclopedia Britannica). The encyclopedia further explains it as, applied science and modern technology is being involved for the academic and vocational preparation of students for jobs market. During the course of action, the basic emphasizes is given to the comprehension and to apply this knowledge in practice in converse to the ability and expertise in physical skills that is the apprehension of vocational education.

The Great Soviet Encyclopedia, (1979) described it as an academic and vocational preparation of students’ for employment involving applied sciences and modern technologies. The main aim of technical education is to produce manpower for different occupations which are considered above the skilled crafts but comes under professions of engineering. These people are generally known as technicians. UNESCO, (2004) has described, “Technical education” as a broad term which is concerned with the educational objectives to nurture knowledge, skills, attitudes and understandings required to gain competencies in various sectors of social and economic life.

In National Education Policy (NEP) 1998-2010 ministry of education (1998), the term “Technical Education” has been used for the courses offered after matriculation containing both theory and practical, whose objective is to produce manpower and who can work as middle level managerial employees.
Zainab Javied and Asma Hyder (2009) have defined technical education in context of Pakistan as “the term technical education is used for post secondary courses of study and practical training intended to educate technicians who work as middle level managerial workforce; whereas the vocational education is used for lower level education and training for the preparation of semi-skilled and skilled workers for different trades”.

The terms “Technical education and Vocational Training” (TEVT) and “Technical and Vocational Education and Training” (TVET) are also being used internationally as an alternate to the term “technical education” (UNESCO, 2004). Whereas the terms “Technical education” and “Vocational Training” are too, occasionally used synonymously. However, as per present practice, The term “Vocational Training” is used for the practical training at lower level and education for producing semi-skilled manpower, whereas, as discussed above, the term “Technical education” is mainly used for post-secondary courses of study (mostly three years diploma) and practical training, the pass-outs are called technicians or associate engineers, who mostly work as supervisory staff in industry.

As cited by Hassan (2007) and Ali(1997) used the term “technician” for one who plays the main role in planning process, in communication and application of scientific and technical knowledge for process of production, in development of innovations and research and in training of workers.
2.4 Role of Technical Education in National and Societal Development

Technical education has a fundamental role for developing human resource of any nation by producing skilled labour force, for the enhancement of industrial efficiency and improvement in living standard. Majumdar, (2010) has described technical education as a “power full tool for reducing poverty” and a strategy for the preparation of skilled manpower that can adapt the accelerated and changing demand of employers and the economy. The International Labor Organization (ILO, 2005) has acknowledged that the well-trained manpower is a key to provide domestic firms with a competitive edge, and workforce require advanced level of skills to settle in the acceleration of technological and market changes. It has been pointed-out by Samady (1989) too that the significance of Technical and Vocational Education for social and financial growth has been recognized extensively. The stress of the economy influence both developed and developing countries. Especially the need for youth having technical skills in developing countries is essential and places immense pressure on systems for technical education and Vocational Training and the limited national resources.

It is accepted all over world that, for a quicker economic development, Quicker growth of Technical education is required. Therefore, it is the need of developing countries to stress on the Technical education as it is an important factor in building the capacity for the economic growth and industrial development. (Rutayuga & Kondo, 2004).

Quisumbing, (2004) has the point of view that; if we consider education is a key for development of a nation, Technical Education is the master key that can save the environment, boost up the economy of a country through industrial development, alleviate poverty, and develop the quality of life.
(Hans-Heinrich Wrede, 2004) has highlighted that technical education development provides individuals and the nations chances to improve employability improve their income and earning abilities. As a result, they have a good effect on the capacity to afford life style and health care, dress and residence.

Recognizing the significance of technical education, the 122 educational experts from member states of UNESCO met in a conference held at Bonn, Germany, from 25th to 28th October 2004, stated unanimously that “skill development leading to age-appropriate Technical and Vocational Education should be integrated in general education at all levels that may be viewed as elective. (UNESCO-UNIVOC 2004).

Across the global spectrum, technical education is viewed as social and economic investment on education and plans used to improve the technical education, skill development of workforce and to improve the chances for their jobs. The purpose of these efforts is to increase the Production level of countries and competition in the international industry (Keating et al. 2002). many states have undertook this task as a challenge for nation and have mended their ways countries are focusing more and more on Technical education to provide a sound base for their industrial and economic development. In many countries all over the world technical education is being used as an operative tool to improve employability and reduce Poverty, technical education has been made an integral part of the general education the technical education has played key role in the economic development (Shaikh, 2009).

Adepoju and Famade, (2010) are also with the opinion that the efficiency of the Vocational and Technical Education (VTE) system of a country plays a significant role
in determining its economic comfort, its prospective growth, its living standard and security situation.

“Technical Education” has become essential supporting instrument for enlightening living environments. The challenge for a developing country like Pakistan is to reform its Technical education system and link it with the country’s existing and future economic and social developmental needs and trends, as Technical education has a unique role in providing knowledge and skills that facilitate citizens to improve the quality of their lives. Associated with satisfactory employment opportunities, Technical education can support people in growing their skills, raising their productivity and improve their personal incomes, by this means leading to overall raised living standards and more competitive, stronger economies. Approached holistically, Technical education can support with the all-round development of individuals and prepare them to play more active role in society, leading towards greater stability and harmony. Ali (2007) has supported this opinion and has pointed out that the demand for skilled workers is increasing quicker as compare to the demand for unskilled workers and as a result the growth ratio of wages among the skilled workers is far better than un-skilled labour.

The participants of, The Congress of vocational and technical education In Islamic Countries, (2009) concluded that, In many countries all over the world technical education is being used as an operative tool to improve employability and reduce Poverty, technical education has been made an integral part of the general education the technical education has played key role in the economic development As mentioned by World Bank, (2010) human resource development is a key component of
–economic and industrial development of the nation; the education system of a nation must be equipped with graduates who are able to contribute to economic growth of the nation.

The policy makers of the whole world are with the opinion especially in developing countries about the significant role that Technical and Vocational Education & Training (TVET) can play in progress of a country. Technical education is considered more important as compared to general education due to its ability to improve employability, the flexible curriculum produce the stuff having command on more skills. TVET delivery systems are therefore well focused on production of the skilled and entrepreneurial manpower that the country needs to grow economically and fight against poverty. Another important feature of Technical education is that it can fulfill the different training needs of learners from different educational and socio-economic backgrounds, and prepare them for rewarding employment and sustainable means of support. The underprivileged, the youth and the financially weak of society are direct beneficiaries of a TVET program.

Pakistan is the sixth most populated country of the globe; the Gross Domestic Product (GDP) of Pakistan is 161 billion dollars (WB, dataset, 2009). In 2009 the Gross National Income (GNI) per capita of Pakistan was 1020 dollars. The total population of the country was over 160 million in 2009; whereas the age of more than 40 percent of its total inhabitants were below 18 years (UNICEF, 2010). 43 million people live below the poverty line of dollar a day (FCO, 2011). These figures prove that Pakistan is a developing country with very useful and enormous resource of young human resource.
Countries like Pakistan with a huge man-power support must start focusing on vocational skill development and technical education from an early stage—While technical and vocational training is addressed in the Education Strategy, it needs to be tackled more thoroughly. Along with inculcating entrepreneurship from an early age, the education sector should also focus on association between the higher education system and the job market. (World Bank, 2010).

Globalization and technological advances have encouraged the diversification of many countries’ economies, which in turn has strengthened economic competition between nation-states. This progression has called into question the forthcoming role of Technical education in supporting a country’s economic progress.

There is also greater than ever awareness across nations of the need to develop connections between Academic and Technical education. With employment opportunities moving from craft industries toward the new organizations of the information age, there is a tendency in some of the systems to allow greater flexibility in pathways that connect academic and technical courses as a source of encouraging cognitive skillfulness development. “Worldwide trends in the development of education show that considerable efforts have been made by many countries to expand and modernize technical and vocational education.”(UNESCO,1989).

Core competencies, soft skills, and basic skills that contribute to lifelong learning are increasingly recognized as vital to employment in workplaces that require flexible production methods, product and production innovation, and the generation of new knowledge (Keating et al. 2002; Sellin 2002).
A country deficient in natural resources may become highly developed through the commitment, talent, skills and efforts of his young skilled man power. Japan, China, Germany, Malaysia, Singapore, Australia, Korea and Turkey are the examples, these countries have made progress by properly focusing on maximum utilization of their human and material resources through Technical education and industrial development. Data available with UNESCO (1999) shows that; Korea, Jordan, Israel, and Turkey had improved their technical education systems considerably, the enrolments in technical Education forming more than 20 percent share of the total enrolments at secondary level. Whereas countries of East Asia like China, Japan, Indonesia, and Thailand have also better enrolments in Technical Education. whereas on the other hand, countries of South Asia like Pakistan, India, and Bangladesh have minute Technical Educational systems (Pakistan less than 2%). China has a special position which had made noteworthy development in Technical Education; it is also notable that it also experienced very fast industrial and economic development through this period. China had emphasized Technical Education curriculum at school level. After 1978, a large number of government secondary schools were transformed into technical schools (Yan & Lin, 2004) Polytechnic institutions, vocational schools, institutes of Technical education, and technical colleges figure prominently in the Educational systems in Japan, Korea, Taiwan, Singapore and India. Technical institutes received a great consideration in Japan during the 19th century” (Yamamoto, 1994). For economic and industrial development youth having particular skills, training and knowledge are needed, Technical education produces such people. “No doubt, to face the worldwide growth challenges, countries will need people having
necessary skill and values to cope with different developmental changes” (Rutayuga & Kondo, 2004).

While discussing international trends, in the Human Development Report of South Asia (1998, p. 5), Mahbub-ul Haq had pointed out that:

Below two percent of youth in the related age group at the school level are enrolling them in technical education in South Asian countries, compared to over 10 percent in East Asia. Not only have low enrolment, but about 50% of the students leave before completion of their studies. Moreover, the skills taught in many technical schools are often inappropriate for the job market. Many graduates of polytechnics and vocational schools fail to land worthwhile jobs. For instance, approximately one hundred thousand technical school graduates in India are either unemployed or under-employed at present. South Asia faces a perplexing dilemma. It is producing so few technically trained people and yet about half of them remain unemployed.” (Hassan. 1997).

The same is true for Pakistan; as mentioned by M. Tariq and J. Abid in “Country Report of Islamic Republic of Pakistan”, presented in experts’ meeting held in Korea University of technology and education, republic of Korea (2007), that, the TVET share in the overall structure of education is very small in terms of physical and financial resources. The following statistics show situation of Technical education in the education system of Pakistan:-
Table 1. Share technical education in the education system of Pakistan

<table>
<thead>
<tr>
<th>Level</th>
<th>Institutions</th>
<th>Enrolment</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>157,158</td>
<td>21,333,206</td>
<td>450,136</td>
</tr>
<tr>
<td>Middle</td>
<td>30,418</td>
<td>4,550,473</td>
<td>246,666</td>
</tr>
<tr>
<td>Secondary</td>
<td>16,590</td>
<td>1,880,021</td>
<td>282,113</td>
</tr>
<tr>
<td>Higher Secondary</td>
<td>1,604</td>
<td>268,595</td>
<td>44,663</td>
</tr>
<tr>
<td>Secondary Tech/Voc Institutions</td>
<td>474(0.23%)</td>
<td>113,664(0.34%)</td>
<td>7,356(0.6%)</td>
</tr>
</tbody>
</table>

Basic Educational data of Pakistan  
Source: Survey of Pakistan (2005-06)

The statistics show that growth in general education is many times as compare to development in Technical education. We have to focus on Technical education and to cope with these challenges not only for present but for the persistence and advancement of future youth too (Quisumbing, 2004).

In the last 66 years most of the educationist has documented that Pakistan's system is still following Macualay's emphasis on producing generalists with basic knowledge of languages to be efficient clerks or subordinate government servants which was basically requirement of a colonial power. Although some developments have been made in establishing a few middle level polytechnics across the country and setting up new engineering colleges/universities during the last few years but the amounts allocated to technical education has been insufficient and the courses and teaching methods have not been reformed to compete the global market. We have a huge number of unemployed engineers but still need properly skilled technicians.

The young generation of Pakistan is country’s most gifted reserve and is available in mass; they are a huge source of energy. If we can use this source to
constructive use it can bring a social, cultural economic and even ideological change in
Pakistan. This would contribute expressively to the industrial and economic
development. There is a great need for this nation-building mission and we need to
focus on skill-based Education. “The man power should be trained commensurate to
the present as well as future needs of industrial world” (Mirza, 1999). The need is to
create more and more chances for the Pakistani youth to develop their technical skills,
practical capabilities and to make them more productive and useful for society. If they
are provided with the opportunities for strong careers and guidelines to achieve the best
careers suitable to them, then they become unbeatable assets for the country.
“Technical education” offers an very vital empowering instrument for cultivating living
environments (Hans, 2004).

The Commission on National Education (1959) realizing the importance of
Technical education suggested strengthening renovating and restructuring of technical
education, as a result West Pakistan Board of technical education was constituted in
1962. Emphasis on vocational and technical education has been given in every
educational policy. Whereas different governments have understood the vital role of
skilled, trained and satisfied blue collar employees with money-spinning jobs, a little
has been real invested in this part.

The present age in which we are living is an age of science and technology
where technology plays its role in every aspect of life. Which has made life so relaxed
for us is due to; we have used technology to create the thing for our ease and luxuries,
not only in our everyday life but also in the myriads of other features too. No nation
can make its upward progress without promoting technical research and learning at all
its aspects. Technical Education provides technicians for industry. The progress of a nation is based upon its Industrial development, without which an attractive economic development would not be possible. Using the technology is more easier than evolving it. We need high skill teams for developing a technology, with relevant concept and data are required not to mention huge amount of fund and time too. To fulfill all these requirements, there must exist, technical researches covering all technical education faculties.

2.5 The History and Development of Technical Education

The thrust for creation of technical training institutes in Pakistan and Indo-Pak sub-continent was developed by British rulers, and it arise out of the need for the preparation of overseers for construction and upkeep of Government buildings, ports and canals, and for the preparation of craftsmen and artisans to operate, repair and maintain machinery and equipment, required for the survey departments, navy, and the army. The engineers were generally appointed from British, and same was the case for artificers and foremen; whereas this was not possible to apply for technicians and sub-overseers who were employed from local public. The technicians were generally illiterate, potential was little. The need to make them more proficient by giving them basic coaching in reading, writing and basic mechanics, was the base for opening new industrial and technical institutes which were attached with manufacturing units and factories.
It is acknowledged that these institutions were established in Bombay and Calcutta in beginning of nineteenth century, it is stated that an industrial institution was established and attached to the Gun Carriage Factory at Guindy, Madras, in 1842.

In the meantime, in America and Europe, Engineering Institutions were being established, which drew to them men having good education, and unusual know-how of mathematics. So a new development took place and similar institutions were started in Sub-Continent.

The first technical college was started in the U.P. in mid of nineteenth century (i.e 1947) to prepare of civil engineers at Roorkee, Government buildings and the large workshops were available there which were built for the Upper Ganges Canal. In continuation of the British rulers’ policy, three more technical institutes were started by about 1856 in different cities. An Institute to prepare overseers was also operational in Poona in mid of nineteenth century (1854). In 1873 Surveying classes were started at Oriental College, Lahore. It was attached with the Punjab University. These classes were shifted to Mayo school of Arts, Lahore In 1885. In 1906 it was named as GSE (Govt. School of Engineering). It sustained for a short period and very soon, due to unavoidability of the condition Govt. School of Engineering was shifted to a new campus situated at Rasul in 1912, and now it is named as Government College of Technology Rasul. Whereas short technical training courses were in progress, in 1889 at a technician school near railway station Lahore (the present Government College of Technology, Railway Road Lahore).

This progress continued up to independence of Pakistan i.e. 14th August ,1947, but as concern to the areas came in Pakistan, as clear from the literature review,
Pakistan inherited a feeble technical education base, at the time of its independence; this argument has been reinforced by Ali, (1990), Hasan, (2007) and Shah, (2009). At the time of Independence, as discussed in the official website of Sindh Technical Education and Vocational Training Authority (STEVTA); In the beginning the total annual intake capacity of Technical education being offered that time at different technical institutes was around 350 students in three technologies (Mechanical, Electrical & Civil). In mid-fifties technical education was introduced with establishment of two polytechnic institutes in Rawalpindi and Karachi (TEVTA, 2004). Whereas in the districts gone to India there were 38 technical institutions offering degree level programs and at diploma level there number was 53 with an annual admission capacity of 2940 and 3960 respectively (Singh, 1991).

2.6 Steps taken for Development of Technical Education in Pakistan

The need for appropriate technical education at all levels has been felt, right after the independence, as pointed by Shah (2004) in this perspective it was extremely encouraging to see that the significance of technical education was also clear in the minds of leadership of Pakistan movement. Iqbal (1904), stated his views as:

“The battle for existence which is waging amongst the nations of the World today and whose result will certainly prove disastrous for some people is a battle which does not need armed soldiers. The real soldiers in this struggle are those artisans and technicians who are quietly working in the factories of their country in this era; if you want to judge the real strength of a country you should not just examine its guns and
rifles, go into factories and ponder for yourself how far that nation is depending upon others and to what extent it is able to meet all its needs by its own efforts. In the present circumstances economic freedom must be achieved before political freedom and in this respect the Muslims of the sub-continent lag far behind the other nationalities. Their basic necessity is not literature of philosophy, but technical education which will make them independent. They must devote all their energies to this particular feature of education.”

The message of founder of Pakistan Muhammad Ali Jinnah (Quaid-e-Azam) to the participants of “All Pakistan Educational Conference” (27th Nov. 1947) Karachi, emphasized the significance of Technical Education in these words:-

“Education does not mean merely academic education, there is immediate and urgent need for giving scientific and Technical education to our people to built up our future economic life and to see that out people take to science, commerce, trade and particularly to well planed industry. We should not forget that we have to compete with the world which is moving very fast in this direction”.

The message remains applicable as it was sixty six years ago and is still a guideline for the successors.

The advice was given to launch a “Council of technical education” by the 1st education conference convened by Government of newly born country of Pakistan in 1947. This shows the importance given from very beginning to the technical education. As cited by Ali (1998) the first education minister of Pakistan, Mr. Fazal-ur-Rehman, who was also chairing the education conference, stressed to formulate the education policy of the state according to the need of time and (Islamic) ideology of the country.
and he also called attention to the importance of technical Education in following words:

“It is therefore a matter of supreme concern to us that we should lose no time in strengthening and enlarging the scope of the few technician institutions that remain with us and in establishing, if necessary, as many as may be required by our own needs.”

The planning for economic development of Pakistan began in 1948. By 1950 when a six-year plan in Pakistan was made, then a sequence of five year plans were designed which included the following main steps for enhancement of technical education.

2.6.1 First Five Year Plan (1955-1960)

The allocation of Rs. Twenty seven and half millions was recommended in this plan for the improvement of technical education in Pakistan. The plan could not be applied fully because of many restraints (Ali, 1990). Under this plan three new polytechnics were established. Formation of Directorate of Technical education in every province was also suggested in the Plan.

2.6.2 Second Five Year Plan (1960-1965)

In the second five years plan the launching of seven new Polytechnic Institutes was proposed. Another improvement in this period was opening of private technical colleges. Hasan (2007) has acknowledged that though it was small in size, but
expansion of private sector’s contribution opened new doors of development in technical education. Five new polytechnics were established under this plan.

### 2.6.3 Third Five Year Plan (1965-1970)

Major emphasis was on amalgamation and development of curriculum in the prevailing technical colleges in the third five year plan. It was also suggested that by 1970 the annual admission capacity of technical colleges would be upstretched to 7,000 (Ali, 1990).

But due to war with India priority in resource allocation changed and emphasis was given to the consolidation of existing polytechnics and double shift was introduced.

### 2.6.4 Fourth Five Year Plan (1971-1976)

This period is also known as no plan period as no proper plan could be implemented in this interval due to cessation of the eastern wing, in this interval 6 new polytechnics were established, emphasis in education policy was on the massive shift towards technical education seven polytechnics were upgraded to colleges of technology offering B-tech. degree. Polytechnic curricula was revised in 1976, Matric (tech) stream was introduced in high schools.
2.6.5 Fifth Five Year Plan (1978-1983)

In this Plan priority was given to the development of prevailing polytechnics and to make the training more relevant to the job requirement. The strategy of this plan was aimed to improve utilization of manpower and to improve enrolment in polytechnics, eight new polytechnics were established whereas new technologies were introduced in 11 polytechnics.

2.6.6 Sixth Five Year Plan (1983-1988)

The focus of this plan was on the consolidation of 28 polytechnics for boys and two polytechnics for women. The Sixth Five Year Plan conferred higher priority to the development of training programmes of all categories of trained manpower both in quality and size (Hassan, 2007).

2.6.7 Seventh Five Year Plan (1988-1993)

Task Force on Improvement of Higher Education in Pakistan (2002), in its report mentioned that the this five year plan was framed under the guidance of National Education Policy (1979). It was aimed on improving the infrastructural base for technical and vocational education and provided a significant jump to technical and vocational training facilities in Pakistan.

Thirty six additional polytechnics and mono-technics in government sector whereas 14 polytechnics in private segment were established and annual capacity was
increased from 9000 to 19000 students; National Technical Teacher Training College (NTTTC) was established in Islamabad. It was proposed to set up a council of Technical education. (After merger with National Institute of Science Education, at present NTTTC is working with the new name of National Institute of Science and Technology Education).

2.6.8 Eighth Five Year Plan (1993-1998)

In this plan target was set to establish at least one boys polytechnic in each district and one women’s polytechnic in each division and raise the number of polytechnics from existing 60 to 90 including 22 polytechnics for women, with annual intake of 39,000. Polytechnic curricula were revised in 1996.

From 1999 to 2008, the government forced ministries to focus on short-term issues and ministries and departments were being guided by annual plans, named Public Sector Development Programs (PSDP). In this period the main emphasis of government seems to be on the improvement the quality of education (Hassan, 2007).

2.6.9 Education Sector Reforms (ESR) Action Plan 2001-2004

The objectives set for Education Sector Reforms (ESR) Action Plan 2001-2004 was the Integration of schooling with labour market.

Whereas the targets set for Education Sector Reforms (ESR) Action Plan 2001-2004 were as given below:
• Incorporation of skill development in general stream of education at secondary level.

• Create opportunities for employment for 120,000 young men and women.

• Introduction of a technical and vocational stream at selected secondary school level (class IX-X) parallel to science and arts groups. Secondary schools where workshop space is available.

• Upgrading existing Technical institutions and linking them with industry.

• To construct 600 additional workshops in existing Technical institutions.

• Selection and introduction of technologies according to need of area and gender.

• To develop curricula for new technologies.

• Upgrade existing vocational faculty and appoint new faculty on contract basis.

• Improve industry-institution collaboration.

2.6.10 Pakistan’s National Education Policy (1998-2010)

According to the National Education Policy of Pakistan 1998-2010 (Govt. of Pakistan. 1998, p-55), “Continued economic growth is not possible through principal investment unless it is armored with proper supply of passably equipped scientific and procedural manpower”.

In Pakistan, technical education hurts from issues of admittance as well as quality. Though theoretically it meets the job-market needs, practically it caters a very small portion of the market demand. In most of the developed and under developed countries,
the share of the practical segment of the tertiary education is more than the 18.5% in Pakistan. Hence, the base of technical education provided to the countries economy is narrow. The insufficient quality stems from both a lesser number of total years of preparation of the curriculum, related to the more progressive systems as well as the issue of accessibility of quality faculty.

The National Education Policy of Pakistan 1998-2010 (Govt.of Pakistan, 1998) further highlighted that, the technical education could not get advantage from better collaboration and linkage with the industry. As a result, there were regular complaints from employers about the substandard quality of the skills available in the market.

The policy recognized the importance of developing a broad based technical education system in the country, in a global environment that permits easy flow of investments. Technical education sector in Pakistan needs to plan aggressively to train and supply a sophisticated skilled youth. Pakistan, as already stated, has a comparative advantage in the labour market due to its population size. Unfortunately, it has so far failed to optimally benefit from this endowment. On the other hand, India has developed a wider and more qualified and skilled manpower, so that it can export high shows value added services. The forecasted demographic transition over the next few years the young population of 15-24 years to grow and peak in 2015. The current global youth shortfall is predictable to expand rapidly and Pakistan needs to be well prepared to get benefit from this increasing demand. This is an opportunity for the technical education sector to substantively contribute to the country’s growth.

2.6.10.1 Issues Identified in the National Education Policy (1998-2010)
The Education Policy (1998-2010) identified the following main issues concerning technical education in Pakistan:

1. There are 21 divisions in Pakistan which don’t have a single polytechnic for women, 65 districts are still without any polytechnic institute for boys.

2. Technical institutes do not have sufficient budgets to meet the equipment necessities for sustaining vocational and technical trainings.

3. Adequately skilled and trained faculty for these programmes is not available.

4. The curricula do not meet job-market needs.

5. Lack of industry-institute linkage.

6. Lack of local printed books and textual material.

7. Poor infrastructure.

(Govt of Pakistan. 1998, p-57).

The Policy proposed to address the following three principle problems faced by the TVET sector:

(i) weak linkages of technical education with other education sectors and the job-market

(ii) inadequate governance of the TEVT sector; and

(iii) to improve quantitative and qualitative aspects of technical education.

2.6.11.2 Proposed Actions in the National Education Policy (1998-2010)

The Policy suggested the following steps:
1. Improved and institutionalized contribution of all stakeholders to ensure their participation in all current and future modifications to enable the TEVT sector to meet job-market requirements.

2. Curriculum and Skill Standards should be standardized and developed at national level.

3. TEVT activities shall be moulded according to the demand of the area,

4. professional development of the faculty shall be focused as an ongoing process.

5. Terms and conditions of service for TEVT teachers shall be compatible with market demand of their services and skills.

6. Curricula for technical education shall be made flexible for adaptation as per need of local market and absorption of future changes of the job market (shah, 2004).

2.6.11 9th Five Year Plan 2005-10 (Medium Term Development Framework)

After a gap of years in five year plans (as discussed above) a plan for five years was proposed with the name of Medium Term Development Framework (MTDF) 2005-10. It was felt at the time of planning of MTDF that the technical education and vocational training system was unable to meet the challenges of the new work environment and was not able to meet the fast changing training requirements of the trade and industry.
Technical education was stated as the main input to guarantee the success of MTDF 2005-10 whose basic driving force was considered the technology based growth with just development and employment creation. That’s why it was accorded in this plan to give high priority to skills and training in the period from 2005-2010. It was planned to improve 650 existing institutes and to introduce new skills in 800 institutions at tehsil level. It was also planned to establish 381 new institutes for technical and vocational education and training in the country, some of them exclusively for women. Training was to be provided to 3000 instructors teaching in technical and vocational institutes and 200,000 technical textbooks were to be distributed free of cost.

Technical Stream with three technologies in each school (two thousand secondary schools) was planned. It was also intended to increase enrolment at technical colleges to 20 percent of school leavers within the next 5 years. It was planned to spend an amount of Rs. 28.18 billion on technical education and Rs.5.6 billion on skill development to meet the skill needs of the economy and overseas. It was expected to provide technical education and vocational training to nearly 700,000 persons.

It was planned to involve important stakeholders including private sector in the development process of technical education and vocational training. (MTDF, 2005-10).
2.6.12 Proposed Strategies For Technical Education in National Education Policy 2009

National Vocational and Technical Education Commission (NAVTEC) has already prepared a set of strategies for this sector. Technical Stream with three technologies in each school (two thousand secondary schools) was planned. It was also intended to increase enrolment at technical colleges to 20 percent of school leavers within the next 5 years. It was planned to spend an amount of Rs. 28.18 billion on technical education and Rs.5.6 billion on skill development to meet the skill needs of the economy and overseas. It was expected to provide technical education and vocational training to nearly 700,000 persons.

It was planned to involve important stakeholders including private sector in the development process of technical education and vocational training. Some of the strategic options that have a clear link to the above policy actions are given below (the list is inclusive and other strategic options in NAVTEC document are also relevant to the implementation process of NEP-2009);

1. A National Qualifications Framework (NQF) shall be developed along with a reformed programme structure that covers all credentials in the country. The National Qualifications Framework shall be capability based and provide entry points and advancement paths in whole of the structure of qualifications.

2. All administrative authorities and stakeholders shall be involved in a review process to develop the NQF programme. Guidelines shall be
taken from countries that have already applied the NQF approach in recent years.

3. A mechanism shall be developed for coordination between school education, technical & vocational education and higher education.

4. Government shall develop a appropriate framework for technical education and vocational training with close involvement of Chambers of Commerce and Industry.

5. Curriculum of technical education should be updated on regular basis.

6. A systematic chasing system shall be introduced for graduates of technical education to get feedback on relevancy.

7. B-Tech technologists be registered by the bodies like Pakistan Engineering Council.

8. There shall be at least one vocational training institute in every tehsil and a technical college at all Districts.

2.7 Present Profile of Technical Education in Pakistan

In Pakistan until late nineties technical education and vocational training were considered two parallel streams, and administrative structure of TEVT was split into two main streams and the control of both stream was fragmented into different departments. At federal level technical education was mainly under control of the ministry of education and education department at provincial level, vocational training was administered by manpower division whereas at provincial level it was under
control of labour and man power department, social welfare department and education department.

To streamline TEVT, to overcome duplication in TEVT administrative structure and lack of coordination between different ministries and departments measures have been taken to bring technical education and vocational training under one umbrella.

2.7.1 Establishment of National Vocational and Technical Training Commission (NAVTTC).

As mentioned in The National Skills Strategy 2009-2013 the Government of Pakistan, realising the significance and immensity of the challenges of globalization and industrialization, established in Dec. 2005, through a cabinet division notification, the National Vocational and Technical Education Commission (NAVTEC). As a National apex body for Technical & Vocational Education & Training (TVET), with the mandate to facilitate, regulate, and provide policy direction for Technical education and vocational training, to meet national and international demand for skilled manpower.

After approval of eighteenth amendment and devolution of power to provinces, NAVTEC was restructured and renamed through an act of parliament in June 2011 as National Vocational and Technical Training Commission (NAVTTC).
The main functions of commission as mentioned in the National Vocational and Technical Training Commission Act (2011), are; to plan, review and evaluate policies and develop strategy relevant to expansion, capacity building, employment of graduates, faculty development, public private partnership, co-ordination with provincial bodies Technical Education and Vocational Training (TEVT), providing scholarships for local and foreign trainings in the field of TEVT. It is also the task of the commission to give advice to Federal and Provincial Governments on accreditation, proposals for grant of diplomas and certificates by institutes of TEVT. Whereas the commission also have the authority to determine the equivalence and recognition of diplomas and certificates awarded by institutions within the country and abroad. The commission is administratively attached with prime minister’s secretariat, for better coordination, alertness and output. The commission is also responsible for development of curriculum, setting up of national occupational skill standards, national qualification frame work, and labour market information investigations.

2.7.2 Functions of NAVTTC

The main functions and objectives of the NAVTTC as mentioned in National Vocational and Technical Training Commission Act 2011 are as follows:

- To regulate, facilitate and provide coordinated & integrated policy direction for TVET
- To shift from supply-oriented to demand-driven approach
- Enhance the role of private sector in TVET implementation & management
• To ensure TVET system, as per requirement of new technologies, trades & training methods. (Government of Pakistan, 2011)

Since its establishment National Vocational and Technical Training Commission (NAVTTC) has been serving to prepare National policies and strategies for enhancement and promotion of technical education in the country. It chalks out the rules and regulations and gives guidelines for certification, accreditation, skill standards & curricula development process. NAVTTC also arranges instructors and staff training programmes, and assists to develop performance evaluation system at different levels, facilitate in national and international linkages. Labor market information system (LMIS), National Qualification Framework (NQF) and Centers of excellence (CoEs) all over the country have been established. The focus of NAVTTC is to “shift from supply oriented to demand driven TVET”. The commission also gives suggestions and funding for innovative programmes for enhancement of technical and vocational education to subordinate bodies and institutions all over the country.

As mentioned above NAVTTC is the country’s apex body to provide policy direction, control and synchronize the TVET Sector in Pakistan. NAVTTC carries out its function by means of an institutional arrangement at the field level i.e. headquarters at prime minister’s secretariat, Islamabad, Regional Directorates at Islamabad, Lahore, Karachi, Quetta and Peshawar, sub-offices at Multan, Larkana and Gawadar.

2.7.3 Provincial Bodies of TEVT
At provincial level, up to 1998, the institutions of technical education were being operated under the control of different provincial departments, such as Directorate of Technical Education, welfare department, Labour and Manpower Department etc. but now all technical institutions (in all provinces) have been brought under the single umbrella of Technical Education and Vocational Training Authority (TEVTA). In the provinces of Punjab, Sindh, and Baluchistan, including Azad Jammu and Kashmir (AJK) TEVTAs have been established. Whereas in the province of Khayber Pakhtoon Khwa, TEVT system is working in the same manner but under Directorate of Technical Education and Manpower Training.

A brief description of these provincial bodies of technical education is as follows:

2.7.3.1 Technical Education and Vocational Training Authority (TEVTA) Punjab

As Shah, et.al (2011) quoted (Javied & Hyder), Keeping the significance of technical education in view, the government of Punjab decided to set up an autonomous body to take over the control of all TEVT institutions namely Technical education and Vocational Training Authority (TEVTA) in July 1999. Prior to the establishment of TEVTA, the technical and vocational education in Pakistan lacked the responsiveness and flexibility of the training system to fulfill the requirements of the industry.
TEVTA was established through an Ordinance (No XXIV of 1999) issued by the office of Governor of the Punjab which has now been replaced by TEVTA ACT (ACT X of 2010) Punjab.

2.7.3.2 Functions of the TEVTA Punjab

The main functions of the TEVTA Punjab as mentioned in its notification are to:

- establish, administer and maintain technical institutions in the province and promote innovation in technology adoption as per industry demand
- prescribe courses of studies and develop curricula for technical education. Guide for teaching methods and strategies, organize faculty/teachers’ pre-service and in-service training (including foreign training) and research; to make sure effective technical education.
- make arrangements and facilitate for a well-disciplined, safe and favorable atmosphere for demand driven technical education and Vocational Training through innovative reforms. Promote the co-curricular, recreational, health promoting and general welfare activities in the Institutes.
- take initiatives for placement of trainees or graduates and provide professional counseling and job exploring services to the graduates and alumni.
- control and manage the affiliation, evaluation and examination system through Punjab board of technical education.
2.7.3.3 Sindh Technical Education and Vocational Training Authority (STEVTA)

In Sindh, until the establishment of STEVTA, technical education and vocational training institutions were being operated under the control of three different provincial departments i.e. 182 Institutes - Education & Literacy, 34 Institutes - Labour and 16 Institutes under Social Welfare department, in fragmented manner. Due to lack of coordination these departments were performing overlapping functions, especially in the area of vocational trainings and could not give attention towards effective control and could not support to federal / provincial policy framework. Moreover, infrastructure of these institutions in terms of buildings, faculty development, machinery and equipment could not meet the industrial needs and global challenges. Due to proficiency gaps pass outs were not acceptable to local & international labour markets.

Keeping the Globalization and Information & Communication Technology (ICT) Revolution in view, and International labor market demand and in line with the scheme of restructuring of TEVT Institutions implemented by other provinces, government established Sindh TEVTA to take over & manage TEVT Institutions in the Sindh. In order to extend complete autonomy, efficient management and optimum performance the policy making powers have been delegated to the STEVTA Board consisting of prominent professionals, from public & private sector, representatives from leading industries, universities etc. On 28th February 2009, Sindh Cabinet handed over the administrative control of all technical and vocational institutions of the Province to STEVTA.
2.7.3.4 Objectives of STEVTA

The objectives of STEVTA as mentioned in the official web site STEVTA are given below:-

- To promote technical education and vocational trainings (TEVT)
- To improve teaching methodology & administration, Infrastructure & Equipments, Employability for TEVT students and Faculty capabilities through trainings in TEVT Institutes,
- To establish model institutions through promotion of existing institutions as centers of excellence
- To improve Institute-Industry Linkages

As mentioned by the Planning & Development Department, in Sindh Development Review 2008-09, a baseline survey of technical and vocational institutions has been conducted which has indicated that the enrollment is 50%. Some of the institutions are non-functional. The condition of most of the buildings is poor. The institutions are working with only 50% staff, curricula is out dated, machinery and equipment is old-fashioned and not matching the market and graduates of these institutions are not accepted in private industry.

To overcome all the inefficiencies and ensure effective policy frame work for marked improvement in technical and vocational institutes, Govt. of Sindh has given complete autonomy to Sindh Technical Education and Vocational Training Authority (STEVTA ). Govt. has allocated adequate financial resource for developmental and non developmental funds through special account.
The affairs of the STEVTA are being supervised through a board, best part of which is from private sector. The authority has care fully planned strategies to bring constructive changes in the present scenario of TEVT in Sindh. It is anticipated that through appropriate measures and decisions the situation of technical education and vocational training in the province would be improved to fulfill job market requirements. Diploma of associate engineer is being offered in 27 disciplines and to make the admission process more transparent third party evaluation and entry test system have been introduced in STEVTA.
2.7.3.5 Directorate Of Technical Education And Manpower Training, Khyber Pakhtunkhwa

In Khyber Pakhtunkhwa province (North Western Frontier Province “NWFP” at that time) Directorate of Technical Education was established by an administrative order in 1971 as a component of Education Department whereas some technical and vocational training institutions were also functioning under the directorate of manpower and training (industries Department) The directorate of technical education NWFP has been shifted from education department to industries department, as its attached department with effect from 01.07.2001. A new name of “Directorate of Technical Education and Manpower Training” was given to “Directorate of Technical Education” after its merger with Manpower and Training from 9th February 2002. At present four Govt. Colleges of Technology and thirteen Govt. Polytechnic Institutes are imparting technical education under the Directorate of Technical Education and Manpower Training.

2.7.3.6 Objective, Functions and Responsibilities of Directorate

The main objective of the directorate is to supply skilled manpower and technical management to industry and local and international market to meet challenges of globalization, in field of technical education.

The some of the main functions and responsibilities of the directorate (regarding technical education) as laid down by provincial government and stated in its official website are as given below:
To streamline, promote and strengthen technical education and vocational training in the province and capacity building of the institutes, to ensure consistency of Education standards and to train the youth to learn skills, matching with the requirements of industry and job market, (both for domestic as well as international) and take initiatives for placement of trainees or graduates.

Khyber Pakhtunkhwa Province is believed to be the hub of the war against terrorism and if not tackled properly youth specially of the age group 15 to 25 may be trapped., if the youngsters of this age can be engaged in technical education and vocational training they can contribute a lot not only to perk up our living standard but will be the main source of security to face the national and international threats. To make it success it is need of the hour to reform and restructure TEVT system. To achieve the objective provincial government is taking following important measures:

- To focus on Competency Based Training (CBT).
- Introduction of Innovative technologies to meet local needs.
- To produce skilled pass-outs meant for the industry and market by removing divergence leaning with industry and job market.
- To set up Technical Institutions at least one at every district level.

As per strategy of the provincial government, the Directorate General Technical Education and Manpower Training is devotedly looking forward to spread out its services to nook and corner of province.
2.7.3.7 Baluchistan Technical Education and Vocational Training Authority (BTEVTA)

Up to the year 2006, in Baluchistan, the institutions of technical education and vocational training were working under different departments such as the Labour and Manpower Department, The Education Department, The Industries and Commerce Department and The Social Welfare and Women Development Department. In 2006 the prime minister advised that rovincial Governments may establish TEVTAs to match “Technical Education and Vocational Training (TEVT)” with changing situation, With an objective to provide over all umbrella administration, policy planning/ supervision, technical and financial support to make it more efficient, upgrade and strengthen the technical education and vocational training institutions of Baluchistan, working under the supervision of allied B-TEVTA departments and establish new institutes where necessary. So in 2007 Baluchistan Technical Education and Vocational Training Authority (BTEVTA) was established through a notification of authority issued on 28th February, which has now been replaced by the Baluchistan Technical Education and Vocational Training Authority ACT 2011, ACT No. II of 2011.

According to the notification chief minister Baluchistan will be the chairman of the governing body and will directly supervise the affairs of BTEVTA which is working with a vision to fabricate strong technical/ vocational human resource in the province to tackle poverty, unemployment and meet the challenges of job markets.
2.7.3.8 Functions and Responsibilities of BTEVTA

The some of the main functions and responsibilities of the authority (regarding technical education) as laid down by provincial government and stated in its official website are as follows:

To formulate and review policies in the light of guiding principles issued by the Commission (NAVTEC) to develop strategies, to collaborate with the sources of job market information, streamline, promote and strengthen technical education and vocational training in the province and capacity building of the institutes, to ensure consistency of education standards and to motivate the instructors and trainees to learn skills, matching with the requirements of industry and job market, (within the country and abroad) and take initiatives for placement of trainees or graduates.

a) To study existing training programs scientifically with respect to their relevance to job market, duration and size, develop training syllabi/curricula, establish criteria for evaluating these programmes.

b) To motivate and facilitate private sector for establishing vocational training and technical education institutions, prescribe conditions under which institutions in the public and private sector may be established and operated.

c) To Introduce joint venture schemes with retired professionals and highly skilled personnel for the promotion of micro and cottage industries and establishments;

d) Gather and compile associated statistics of vocational training and technical education; evaluate existing and proposed legislation regarding vocational training and technical education and suggest essential legislation;
e) Arrange regular training programme and refresher courses for teaching Staff to up-date their knowledge and skill both for domestic and overseas;

At present one Government College of Technology for boys and a Women Polytechnic institute (both at Quetta) are working under the control of BTEVTA. Whereas a survey report for Asian Development Bank (ADB) was prepared in 2004 under the title of “Restructuring of the technical education and vocational training system project (Baluchistan Province)” was prepared and establishment of two polytechnic institutes was recommended one at Pasnee city and other at Khuzdar, no remarkable progress has been made, a lot of work is needed to promote technical education and vocational training in the province (ADB, 2004).

2.7.3.9 Azad Jammu And Kashmir Technical Education and Vocational Training Authority:-

At the time of liberation present area of the Azad Jammu And Kashmir (AJ&K) was mainly under developed part of the State of Jammu & Kashmir and this condition lingered on up to the mid fifties, when Government of Pakistan started development plans for financial and social development in the state of Jammu & Kashmir. In spite of of economic limitations, Govt. has tried its best to provide solid foundation for rapid socio economic progress of the state. Govt. established many TVET institutions in the state which were working under different departments but as reported by UNESCO, The 2005 earthquake in Pakistan destroyed whole of the infrastructure in North West Frontier Province (NWFP) (present name Khayber Pakhtoon Khawa) and in the state of Jammu & Kashmir. About 80% of Technical and Vocational institutions had either been entirely
destroyed or damaged badly. As the damage is very big, a lot of reconstruction effort is going on and a lot further is required.


AJK. TEVTA was set up with the intention to strengthen the skill development programme, produce requisite trained youth witch can meet the National and international standards so they can contribute in poverty alleviation, dropping unemployment ratio and as a result provide a well-built base for the sustainable socioeconomic development .

With the establishment of office since July 2007 AJK TEVTA is struggling to achieve its objectives set at the time of its establishment. AJK TEVTA with the assistance of UNESCO, is working on provision of transitional buildings, supply of essential equipment and furniture for full capacity building at a number of TVET institutions; assistance for improvement of equipment at remaining institutions; develop and review curricula for women's Industrial Schools, and assistance for community-based guidance of women in conventional beadwork. It is important to note that only one (public sector) polytechnic institute is offering Diploma of associate engineer in the entire AJ&K. “Total enrolment in TVET courses requiring SSC as minimum entry qualification is miserably low; about 500 i.e. only 1.6% of matriculates. Even if the
enrolment in private sector institutions is considered the part in TVET stream may not be over 2%” (UNESCO, 2009).

This is a matter of immense concern for administration of technical institutions that the students are not meeting the initial set standards of industry. Therefore it is very much necessary that the graduates who are coming out from technical institutions must be productive and useful for industry. In order to improve the effectiveness of system of technical education in the country, some important factors affecting it, should be identified and their importance in enhancing and maximizing the effectiveness of system should be analyzed. Some Important factors identified through literature review are as follows:-

2.8 Factors Affecting the Enhancement of Technical Education

Dr. Masroor Ahmed Shaikh and Syed Jalaluddin Shah (2010) have pointed-out in their working paper “Restructuring of TEVT in Pakistan” that, Pakistan, is facing an ever increasing unemployment ratio where as on the other hand many public and private sectors are in search of properly trained persons. The country is suffering from this insufficiency of skilled manpower, due to the mismatch between education and job market demand thus accentuating unemployment. All over the world the above mentioned problems of changing nature of work and skill gaps are handled by enhancing TEVT, introducing job market oriented and flexible curriculum, and developing industry institute linkages.
In order to achieve the esteemed goal of producing well qualified and trained technicians technical education has to play its role efficiently and effectively. Every technical institution has to strive towards imparting technical skills and competence to the student by generating a healthy atmosphere for their personality development and finally empowering them to attain higher achievements in their respective fields.

Anil R. Sahu, Shrivastava, R. L., & Shrivastava, R. R. (2008) have identified that there are various factors which directly or indirectly influence the enhancement of technical education. These factors can be grouped under these broad heads:-

i) Quality Assurance

ii) Curriculum

iii) Infrastructure

iv) Teaching Effectiveness

v) Students/Intake

vi) Institute-Industry linkage

vii) Co-Curricular Activities

viii) Research and Development

A brief explanation is given below:

2.8.1 Quality in Education

Anil R. Sahu, Shrivastava, R. L., & Shrivastava, R. R. (2008) have defined Quality in Education as:


• Quality depends on the institution infrastructure, faculty’s research and development activities and industry institution interaction etc.”

(Sangeeta Sahney et al., 2007) defined Quality in education from Total Quality Management (TQM) perspective. They consider educational establishment as an open system i.e. management system, social system and a technical system …. It includes within it the quality of input/intake in the form of students, faculty, infrastructure and supporting staff, the quality of processes in the form of the learning and teaching activity and the quality of outputs include employment, earning, examination results and satisfaction.

TEVT can only be made growth oriented, capable of maintaining customer confidence, market oriented and cost effective only through quality culture in it. In Pakistan enhancement of technical education is achievable only if we can attain quality system and creativity of every person involved in this process.

2.8.2. Curriculum

The curriculum of technical education is set to prepare students for job market or to continue for higher education. The curriculum for diploma of associate engineers
(DAE) is uniform throughout the country and was last revised in 1996; curriculum of few technologies was revised after 2000 as well (UNESCO 2009). “Globalization of economy, and rapid technological innovation challenge todays work force to prepare for continuous change, due to technological innovation and restructuring of the workplace, many workers have found that there current technical skills are obsolete” (Hassan, 2010. P-68). The swift technological changes have led to the deep-seated changes in the job market so the steps need to be taken to ensure the relevance of curriculum to the work place.

In the past the government has made efforts to coordinate with employers in the development of skill standards and endorsement of curricula, but this engagement was not wide enough to be truly meaningful. As a result, only a few skill standards were developed, which have now become outdated since they were not appropriately reviewed, updated or improved according to global best practices. (The National Skills Strategy 2009-2013)

2.8.3 Infrastructure

Winston Churchill had the opinion that, we build our institutions and our institution shape us. For better teaching learning atmosphere, an institution must have sufficient land, proper and purpose-built buildings, hostels, canteen, transport, adequate library, well equipped laboratories and workshops, sufficient teaching aids like multimedia/over-head projectors, LCD projectors and other supporting facilities should be easily available. Availability of seminar room, conference halls and advance Internet
and computing facilities for students and teachers are also very supportive for an improved teaching learning atmosphere.

These facilities are initial requirement for any technical institution which must be provided to enhance performance of Technical Institution. Shah, (2004) Shaikh, (2009), have pointed out that the TEVT institutions in Pakistan are facing, shortage of budget, especially for purchase of raw material, repair and maintenance of workshop machinery /equipment, and Curriculum development so proper budget should be allocated for this purpose. UNESCO, (2009) too supported these views.

2.8.4 Teaching Effectiveness

The quality of students coming out of the Institutions largely depends upon the quality of the teaching staff employed. The frontier of science and technology are doubling by leaps and bounds to cope with it its necessary, for the faculty to be constantly in touch with the same and try to update themselves through enhancing their qualifications attend various quality improvement programs like seminars, conference, workshops, summer and winter vacation Industrial trainings etc. is the responsibility of the organizations of TEVT to provide a proper and conductive atmosphere for the development of teachers. “The required excellence in knowledge can only be achieved with the help of the teacher”. (Siddiqui, 1970, p-47).

Teacher management and training is critical for a strong education system. Teachers also need to be supported to bridge academia and education management. The role and quality of teachers needs to be linked to governance and transparency and the
accountability of the entire system—unless we focus on improving the quality of our teachers, other improvements may not be successful. (World Bank, 2010).

In achieving a creative teaching-learning atmosphere, the authorities have to emphasise on faculty development and a different structure is needed which enables teachers and students to deal, achieve and appraise the teaching process together.

More precisely, UNESCO (2002, p.13) argued that:

For education to reap the full benefits … Teacher education institutions and programmes must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. They must also provide leadership in determining how the new technologies can best be used in the context of the culture, needs, and economic conditions within their country. … Teacher education institutions also need to develop strategies and plans to enhance the teaching-learning process within teacher education programmes and to assure that all future teachers are well prepared to use the new tools for learning.”

2.8.5 Students

The students constitute the input of the whole system. The accomplishment of the process of imparting knowledge is greatly affected by environment in which the students are put and also on their self-zeal to learn and excel. A student’s own awareness and interest for learning and the inherent aptitude to grasp together with his sincerity, regularity and honesty are keys for successful accomplishment of his course. It is also necessary to boost the determination of the students by motivating them. All these
aspects when carefully implemented and nurtured bring about a total turn around in the quality of education. Shah, (2004) and UNESCO, (2009) indicated that students who take admission in technical colleges as compared to general education are of comparatively low level, situation needs to be improved.

2.8.6 Interaction with Industry and Society

The most of the industries of the Indo-Pak sub-continent and Asia Pacific Region insist constantly that TVET graduates turned out by the system, lack in the essential skills, knowledge, attitudes or standards to meet the needs of job market. In consequence, pre-mature competencies possessed by this workforce are feared to affect productivity (Majumdar: 2008). That is why it is the opinion has been developed that the fresh graduates from technical institutions need to be offered training in the relevant industries to give them immediate practical exposure. Need is felt for general modification of curricula, with job oriented programs and to develop a close link between an educational program and industrial needs (Anil R. et.al. 2008).

Standards are needed to help ensure the quality of education and the development of employees for technical level jobs. The study by Benn and Stewart (1998) with committee members for technical programs showed that the use of standards increases communication between industry and education, because the standards provide a basis for curriculum and assessment. Finch and Crunkliton (1999) distinguished between in-institute and out-of- institute technical education success standards. In-institute success standards must be closely aligned with the performance expected within the given
occupation. For instance, the criteria used by instructors should be up to the industry standards. Out-of-institute success standards are determined by the employment-related success of a program's graduates. For example, out-of-institute success standards can be occupational placement ratings, graduates' incomes, workplace competencies, technical skills, and entrepreneurial skills. In the last few years, the Institute Management Committees have been facilitating business and industry to communicate their requirements to educators. Technical education curricula should reflect these requirements so that graduates possess the competencies and skills that are critical to employer needs. Shah, (2004) pointed out that situation is not satisfactory and to improve all this situation in the country, institute-industry linkage needs to be strengthened. UNESCO, (2009) indicated that no dynamic linkage exists between TVE institutions and industry strategy needs to be formulated to mobilize the industry in the process.

2.8.7 Co-Curricular Activities

Good education in its totality must include the overall development of the student and must not restrict to training in a specialized discipline. The institution must organize various extra-curricular activities like arranging group discussions, debates, technical quizzes, extempore, guest lectures, seminars and promote NCC, NSS, sports, games, cultural and co-curricular activities. These extra-curricular activities enhance and improve the inherent capabilities and skill of the students.
2.8.8 Research and Development

Research and development activity is very much essential to survive in this competitive and global world. The organization must have proper infrastructure to carry out research and development activities. The students and faculty must have access to scientific Journals and other modern library facilities. There must be availability of qualified and experienced research oriented and motivated faculty. Adequate financial provision must be present to carry out research activities.

The need is felt to analyze the plans made in past for the enhancement of Technical Education in Pakistan and obtain benefit from the experience of the other countries.

2.8.9 Administration

The administration and management of technical establishment play vital role in its functioning and is responsible for Setting objectives for its functioning, formulating policies and programs to achieve these objectives and monitoring all the functions which directly or indirectly affect the efficiency.

The success of any organization mainly depends upon the effectiveness of its administration and management. It includes skill oriented vision, clear concepts about mission, unbiased perception, vigilance, decision making competency, problem solving capabilities, team building, honest, control and command competencies, communication
skills, art of encouraging as well as tolerating different viewpoints, including dissent in the staff (Khan, Muhammad. N. 2005).

2.9 Problems and Issues of Technical Education in Global Perspective

Addressing to the International Experts Meeting at Bonn Mr. Matsuura said “for TVET programmes to be part of the solution and not part of the problem, they must be reoriented so that they contribute to sustainable development worldwide”. (UNESCO, 2004. P-13). The role of technical education should be to facilitate learners, attain skills, knowledge and attitudes desirable to develop professional careers and enter the practical life as active and useful citizens.

As cited by Dr Lourdes R. Quisumbing (2004), Theme of the suggestions presented and affirmed at the 1999 Seoul Congress: “TVE systems must adapt to its rapidly changing demands of globalization and of knowledge-based societies.”

It is clear from the review of literature that many problems of the today’s world are not due to the lack of knowledge but are due to inappropriate skills, values and attitudes. The need for a human-centred development paradigm is highlighted by it, which considers a culture of peace and sustainable progress as its essential features. Recommendations of the “Seoul Congress” insist, “that values and attitudes, policies and practices of TVE must henceforth be founded on this paradigm, encompassing inclusiveness and wider access, a shift to human development needs and effective participation in the world of work, with focus on the needs and potentials of the individual in society.”
Dr Lourdes R. Quisumbing (2004), have the opinion that, “We have tried to educate the mind but failed to educate the emotions and the will. Overemphasis on knowledge and skills has led to the neglect of values and attitudes. The product of our educational system is an informed, knowledgeable and competent professional who may not be mature or emotionally stable, an intelligent and informed individual, a financial wizard who may turn out to be corrupt or ruthless, a skilful and competent technician but not necessarily an honest or responsible member of the workforce”.

Today’s Global and knowledge-centered society need to be values-based, committed to the respect for humanity, human dignity, and work as a source of self-actualisation and self-satisfaction, mere economic and social development, should not be underlined enough. Technical education should include values education and must focus on the needs and potentials of a person in the society too. This demands a holistic and integrated approach to technical education and development, as Quisumbing cited Delors, “the complete fulfillment of the individual in all the richness of the human personality, the complexity of the human powers of expression and commitment – as individual, as member of a family, community, as citizen, producer, inventor of techniques and creative dreamer.” (Quisumbing, 2004. P-38),
2.10 Global Trends Regarding Enhancement of TEVT

As the world swings from a traditional to the modern lifestyle through the introduction of new technological trends it demands for a more in-depth understanding and know-how about technology. This highlights more demand for skilled manpower equipped with the ability, skill and the competitive edge in performing the tasks according to the require of these emerging technologies. Technical education gives emphasis on the development of a knowledge economy (Majumdar, 2010). Skill needs are not only the requirement of wage-earning workers, but it should also focus on the agricultural and informal sectors too (Melles, F. 2009). The opening of the borders of the countries for cheering trade and sharing of ideas have also made possible the free movement of emerging technologies and economic activity, thus contributing to the extension of government activities. Thus, Technical Education is playing a vital role in developing the skillfulness and work qualifications to adapt to the modifications brought about by this enhancement of opportunities resulted by borderless exchange of economic activity.

Organizations, such like UNESCO (and UNEVOC) with the collaboration of other institutions such as the World Bank, International Labor Organization and Inter-Regional groups are working to attain the maximum benefits of technical education as a means to improve the lives of the world’s people. In the recent days, skills acquisition and development is considered as critical to “educational development, labor market inclusion and economic growth” (Majumdar, 2010).

The system of technical education in Asia is undergoing major structural changes, according to Adiviso (2009). These changes have emerged from intervention of various
nations, as well as involvement of international organizations. Major developments have been made in the following aspects:

1. **Curricular improvement** – Curricula are being modified and being reformed as demand driven with special focus on skill-competitiveness and employability of the graduates.

2. **Standards setting and Development** - An-other factor being focused is setting of standards to promote the “adaptation and development of best practices” in the field. This is the basic requirement of projects which are funded by foreign donor agencies.

3. **Social marketing of TVET** - Career guidance and social marketing have been used as tool to enhance social image of technical education, promoting social equity and reduce poverty from the society.

4. **Facilities modernization and maintenance** - The reforms are being made for the improvement of its facilities and equipment. Efforts are being made to match the training environments with the actual workplace.

5. **Increasing Access and Gender Development** - The reforms are being made to improve the access of technical education to women participants.

Majumdar, (2010) has further discussed that in the Asia-Pacific region specifically some important concerns of governments regarding technical education are:

- to improve job opportunities for TEVT graduates,
- development of new teaching learning resources,
- arrangements for job oriented training,
- recruitment of competent personals to overcome staff shortage
• arrangements of training at industry and motivating workshops (for staff)
• update curricula to meet market needs
• enhance industry-institute linkage
• control student dropout ratio
• Up gradation of Technical Education Infrastructure
• Students counseling

2.11 Problems and Issues of Technical Education in Pakistan

It was pointed out in MTDF 2005-10 of Pakistan, that technical education was facing the following main problems in Pakistan:-

i) Low Productivity

ii) Low Enrolments

iii) Teachers’ Shortage

iv) Globalization and New Emerging Environments

v) Overlapping and Duplication of Training Programs

vi) Changing Requirements for Overseas Employment

vii) Absence Of A Credible and Legitimate Database on Education

Dr. Iftikhar Shah (2007) has find out that the buildings, budget, transport and hostels of technical institutions are not sufficient; the facilities of latest reading material, on line research and guidance and counseling are not up to mark, teacher lack in industrial exposure and proper experience, graduates or students are not recognized and accepted in industry. Same findings have been reported by Adviso (2003). Shah (2007)
has further reported that the curriculum and examination system are out dated, theory oriented, less focused on practical technical know-how, neither skill oriented nor helpful in employment and there is no association between technical education and industry. Ali (1985) had similar opinion. A research study conducted by National Institute of Science and Technical Education, Islamabad for UNESCO, (2009) on “Technical and Vocational Education in Pakistan at Secondary level”, shows that the linkage with industry is very week except in Punjab. There is no proper arrangement of faculty development, TEVT in Pakistan needs to plan and develop a proper system and infrastructure for pre-service and in-service teacher training.

Likewise Shah (2007) has reported that policies set realistic targets but plans made, are not realistic and research based, relevant faculty is not consulted in process of plan preparation. No proper system has been developed for quality management and there is lack of co-ordination at national level. Political instability, adhocism, leakage of funds, improper utilization of resources and improper monitoring, has also been reported as root causes for the deterioration of technical education. “Globalization of economy, and rapid technological innovation challenge todays work force to prepare for continuous change, due to technological innovation and restructuring of the workplace, many workers have found that there current technical skills are obsolete” (Hassan, 2010. P-68). Dr. Masroor Ahmed Shaikh (2010) in his country paper “Restructuring of TEVT in Pakistan” has pointed out that TEVT needs more funds as compare to general education. Shortage of funds always remained major hurdle to transmit necessary training for the students cooping the quality skill standards and job market demands, where a greater amount of funds are required for replacement or restoration of old/outdated machinery.
and equipment, he further pointed out that; in Pakistan, almost 2.2% of GNP is allotted to Education Sector, from it TEVT receives only 0.065%.

### 2.12 Concept of Model Plan for Technical Education

Like several other concepts of the social sciences it is difficult to describe a globally accepted definition of a model. However, different professionals had made efforts to explain this concept too. As Ford (1995) express that a model can come in many shapes, sizes, and styles. It is important to highlight that a model is not the true world but simply a human construct to facilitate to understand real world systems in a better way. In general all models have an information input, an information processor, and an output of predictable outcomes.

Likewise, a model is a representation of arrangement in a physical system and/or its properties. As quoted by Chaudhry (2008) the word “model” has been used in several ways by different people. Checkland (1981, p.19) give emphasis to the importance and need of design models states, “we have learned more about the true nature of societal systems, such as education, we have realized that we need design models, methods and tools that are specifically applicable to open system”. Another comprehensive explanation of model is stated by Saleem (2009) that, it is a speculative construct used as thinking aid in the study of some physical system that are much difficult to be followed by direct conclusions from observed data. A model is generally designed by means of some definite scientific queries in mind, and researchers raising different queries about a physical system that move in all legitimacy toward the distinct model plans. A well
planned model should be as composite as it is necessary to answer the queries that have motivated its initiation. Model development facilitates us to investigate and distinguish not only the selected system but it is embedded by the components or sub-systems too.

From the above discussion it becomes obvious and clear that a model plan for enhancement of technical education refers to an intelligent organization of different elements and it is one that focuses on administrative, academic and training activities and proposes several strategies to smooth the progress of the administration, management and all the relevant teaching-learning process. It suggests learning experiences and atmosphere relevant to current and future needs for country’s continued economic & industrial development, to establish and create the conditions fundamental to enhance the quality and efficiency of the technical education system in Pakistan.

2.12.1 Types of Models in Comparative Perspective

There are numerous ways of looking at models and it is quite difficult to select a suitable criterion for presentation of a model for technical education; however few attempts have been made by different researchers in the past years to identify basic types or models of technical and vocational education:

Lauterbach compared twelve countries and differentiated between technical and vocational education by enterprises, at school, and the dual system (as in Germany), and mixed systems. Maslankowski made a distinction between the dual system, technical and vocational education at school, on-the-job training, MES training and national services. Hegelheimer presented three basic types by making a comparison of seven European
countries: dual systems, mixed systems, and full-time school. Zedler, following Hegelheimer's categorization, differentiated between four main types: on-the-job training, the dual system, mixed systems, and full-time vocational school (UNESCO, 1989).

If we view with a critical eye, the above mentioned four categorizations, it reveals that there are contradictions. For example, Maslankowski's MES training is a training method, which may be used where a training system does not exist.

If we look at Lauterbach's, Hegelheimer's, and Zedler's classification it seems that basic type of "mixed systems" is a lapse in logic, as a mixed type cannot be considered as a basic type. It is also clear from Lauterbach's explanation that the main focus is: on place(s) of learning (school, training workshop, enterprise, etc.) where the greater part of technical and vocational education is acquired, all of the four researchers classify a school-based system and a dual system; where as three of them also identify the solely enterprise-based type of on-the-job training.

However Maslankowski's basic type of national services for TEVT does not, fit into this theory. It may be noted: in the theories under discussion, the place of learning in general has become an accepted criterion for categorization of TEVT.

The place of learning may be a reasonable principle for categorization, but its worth for analysis is limited. This term is not considered precise and on the other hand, it represents a (new) academic classification. Usually Places of learning are defined as places which can be differentiated by their educational function and every place of learning is differentiated by its purposes in the learning course of action.
After the above discussion about the categorization and identification of basic types or models of technical and vocational education, one thing is found missing and that is aspect of responsibility, i.e. what social or political driving forces decide the formation and functions of the places of training and learning. This implies that systems of technical and vocational education are above all the outcome of consideration on what is convenient from the pedagogical perspective. A close look at the past progress of such systems, however, shows that they are primary and leading result of a conflict between political and economic interests; they show the distribution of power in society. (UNESCO, 1989)

That is why the place of learning seems not a suitable criterion for categorizing systems of TEVT. Beside this, the concept of the place of learning has a static dimension, which shows that, as it may serve to analyze and express structure, it does not indicate how the system functions. Where as increasing globalization has spotlighted a range of international approaches to technical education and vocational training. In these circumstances a criterion, for categorizing systems of technical and vocational education, was presented by Professor Wolf-Dietrich Greinert from the Technical University of Berlin, in a Symposium held by UNESCO in 1989 at Berlin/Germany. The criterion set was based on: The responsibility and role that governments accept in the process of technical education and vocational training. This approach of Professor Greinert, to classifying TEVT systems seems to be based on a criterion which is not only political but more dynamic too. He took the role of government in technical and vocational education as a starting-point, and arrived at three major types: Market model, Bureaucratic model
and Government controlled market model. A brief discretion of these three models is being presented below:-

2.12.1.1 Market Model

In this model government plays a minor role or no role at all in Technical qualification processes, this model is also called liberal. However, more popular term for it is “market economy system” or “market model”. Such type of model can be found in the United Kingdom, in Japan and in the USA.

Although the structures of technical and vocational education in these countries differ significantly, above all their socio-economic basis has been entirely different, but they have one common thing i.e. technical and vocational education is not connected to general education, e.g. there is no separate system which would guarantee minimum vocational qualifications for the majority of youth.

These countries have well-established general education systems, which have immense influence of government and 11 or 12 years of schooling is mandatory as a rule. As its compulsory for every one to attend a high school, so these countries also have very high ratio of high school graduates going on to college and university. The general education system is not oriented towards technical education and vocational training.

Technical and vocational education in these countries mainly is not, under the influence of government. It is directly related to the productive factor of work and to the job market. Its growth and organization is left to the individual and to the recruitment
needs of the industry, local authorities, and other training providers who offer and systematize, virtually and are not bound to any government rules.

Different government programmes and school also have been established which provide vocational training to financially weak and problem groups; yet basically it is not the responsibility of government, mainly control and financing of training recruitment of training personnel and staff is responsibility of the society and industry. The position of major or big enterprises is dominant in this system as in Japan.

Main features of the Market model are as follows:-

1. The market model establishes the quantitative relations among qualification requirements and technical education. Technical trainings are provided according to demand. Demand is determined by the clients, i.e. the industry.

2. The nature of technical trainings especially qualitative aspect is determined exclusively by the industry.

3. The market mechanism of technical trainings produces best results when the end users give training themselves and administer the results.

4. In this model training is sponsored by end user (Industry) on the principle of cost minimization. Generally main focus is on productive than to pedagogical principles (on-the-job training).

5. Industry selects the trainees irrespective of superior social values (e.g. equal opportunities); trainees have the equal legal rights as regular employees. (UNESCO, 1989).
2.12.1.2 Bureaucratic Model

The government plays the major role in planning, organization and control of technical and vocational education in this model, for this rational, the model is termed as bureaucratic; due to predominant institutional structure it may, however, be named as the school model. This sort of model is found in France, Italy and Sweden and in various Third World countries too. Bureaucratic systems of technical and vocational education, is found in few socialist countries like Poland and Hungary too.

The special feature of School/Institute-based system of technical and vocational education is its graded vocational system which is closely associated with general education at higher secondary level. It is almost similar in structure and origin in all practicing countries.

Applicant’s admission to the different training courses which offer qualification at definite levels is based on his completion of lower secondary level education. This linkage between school education and technical and vocational education is also established by another aspect of the system, namely the direct link of school leaving qualifications with technical and vocational training, which might reward a true double qualification (e.g. university access and skilled worker qualification).

Institute-based systems of technical education are in principle hierarchical elite systems and are found generally in countries having a centralized administration. Due to this exclusive character, they generally involve an education monopoly in the field of technical education which is practically a bar in the development of challenging environment of training, e.g. "dual" systems.
Mostly the private sector has no role to play in this system of technical and vocational education, except the facilitation in the students’ internship or practical work periods in industry, however there are cases in which industry assist indirectly in these systems: As in France, the chambers of commerce and industry run vocational and technical institutes which are financially supported by the government and consequently required to observe the rules and regulations issued time to time (for technical education) by the government.

Main features of the Bureaucratic model are as follows:-

- The quantitative aspects of qualification requirements and technical education are decided by public planning authorities. Planning is efficient if it is demand oriented and when it refers to a restricted number of established fundamental trades or occupations.

- The type of vocational qualification (qualitative aspect) is determined usually on base of societal and personal requirements and is not mostly determined by practical work situations. The more the technical education institutions are associated to general education together with its performance and selection criteria, the more their technical qualification activities are affected by the system-related problems met by general education institutions.

- Government has the grip (to a great extent) on planning, organization and control of the process of technical education and vocational training. The execution of the associated universal principles has the tendency to guarantee the provision of systematic training strongly influenced by pedagogical theory.
• The Governments finance School-based technical and vocational education. Since such funding is by definition, limited, there are generally no national training models intending to bestow vocational qualification for a whole age group.

School models function best for trades and professional fields which do not need much training of psychomotor skills, e.g. commercial fields. (UNESCO, 1989)

2.12.1.3 Government-Controlled Market Model (Dual System)

In this model Governments administer and design the structure for technical and vocational education in private training institutions or industry, as the process of technical education and vocational training takes place under the control of Government however the private sector shares a major responsibility for the market demand driven training of students (i.e. in the industry), that is why this model is named as government-controlled market model; where as, the more popular title, given now a days to this model is “dual system” because of two places of learning i.e. Private Industry and Government supported Technical and Vocational training institute. As far as functioning is concerned, the “dual system” has a target-oriented approach, which integrates the private law sphere of the industry with the public law sphere of the government.

Government-controlled market models of technical education and vocational training can be found above all in countries which have developed an advanced trade culture. Small industry and the practice of training provision by the crafts are not, however, essential prerequisites for dual technical education and vocational training. Examples of the countries where this model has been adopted are Federal Republic of
Germany, Egypt, Switzerland and Austria. The structure of dual system may vary from country to country to some extent but the fundamental framework and structure is almost same and is basically an example of cooperation between public and private sector.

What is crucial for the model's execution is neither the place of learning nor a specific industrial structure, but actually the support of a training sector which is designed according to private industrial rules and which can be customized by rules issued by the government.

Some important functional criteria that can be derived from above given basic pattern are listed below:

- The quantitative aspect of qualification requirements and technical education and vocational training are based on the industry (which facilitates for training); however, organizations which offer training accept government-formulated rules.
- The nature of technical and vocational qualification (qualitative aspect) is decided primarily by practical work environments in the industry. Government involves the professional associations along with industry in process of defining the qualification goals.
- The vocational and technical training process is directly or indirectly in government control. The enterprises and industry organize and provides training according to the government priorities and rules.
- The training costs are, in principle, borne by the industry. Dual training models are, however, government too co-finance to a greater or lesser extent.
- In dual vocational and technical training process, the degree to which technical training is planned systematically and administered by pedagogical principles can
be tailored according to need. The most significant instrument in that respect is the modification in financial motivations. (UNESCO, 1989)

2.12.1.4 A Comparison of Technical Education System in Pakistan

A model of technical education and vocational training system functioning successfully in one country of the world may not be replicable in any other country. Unlike a mathematical formula, which is uniformly applicable in each and every part of the world, a model is devised on the basis of unique local needs. As stated by Shah et al. (2011), technical education and vocational training system of Pakistan, mainly match the “Bureaucratic model” which is also known as institute model Government provides technical education and vocational training to the students in a limited number with a minor participation of industry. The curriculum is designed by Government administered institutions and bodies, the representation of private sector and industry in these curriculum designing, examining and accreditation bodies are in very limited ratio. In 1973 an effort was made to introduce the “dual system” in technical institutions especially in the province of Punjab, where the theoretical part and basic part of practical training is covered in technical institutes whereas at the end of three years duration of diploma of associate engineering (DAE), three months practical training (intern-ship) at industry for students is arranged, but this practice could not be implemented at all institutes. Although this idea had a good start but (due to lack of institute/industry co-ordination) the results are not as good as were expected. (Shah, 2004)
2.12.2 Process Model of Technical Education System in Pakistan

The technical education system of Pakistan may be explained in form of

Input → Process → Output

The main input to the system is the students who get admission in the technical institutions and after the process (technical education and training) come out as trained technicians (D.AE.); some of them are dropped out due to different reasons. The quality of graduates reflects the efficiency of system, which besides the graduates consists of faculty, curriculum, Infrastructure, administration and evaluation system etc. It is also subjective to the administration and managerial style of the concerned department (TEVT authority) or ministry. A conceptual modal of input-process-output for training of technicians was presented by Ali in 1990, (Shah, 2004). figure is presented on next page:
Fig.3. Process model of technical education in Pakistan
The Model of TVET Institutions for Accreditation:

Dr. Suresh K. Dhameja (NISTE, 2007, p-73) presented a model of an accredited Technical Education Institution:

Fig. 4 The Model of TVET Institutions for Accreditation:
The above model specifies the input, process and output element, which were assumed to be the pre-requisite for the award of accreditation to a Technical Institution. “The input standards include the governance and administration (management and policy), human resources (administrators, faculty, support staff and students) and physical and financial resources (classrooms, laboratories, shops, libraries, computer resources, etc.). Some of the input standards rest on the policy making body i.e. , for example, provision of medical insurance and other benefits, adequate facilities and equipment including a networking system, numbers of qualified staff and satisfactory facilities and equipment); some rests on the faculty and staff development program. Other input standards are the human resources and physical facilities and funding...

Process standards present actions steps executed by people, usually the faculty to ensure the delivery of quality services to the stakeholders. The curriculum and program of instruction provides experiences and opportunities for the acquisition of knowledge skill and values is a process standard. Four process standards, namely: institutional and industry linkage. Use of information and communication technology, continual improvement and research, and consultancy and extension services. Output standards are the performances which are dependent on the proper utilization of adequate inputs through a satisfactory process. The most important output is of course, graduates equipped with skills and qualifications that are comparable with regional or even international standards.” (NISTE, 2007, p-73-74).

Dr. A.R. Ariaratne (NISTE, 2008, p-115) presented a model for “Training Cycle”, as shown in the figure,
Teaching learning process can be made more effective, appropriate and relevant through careful and proper training need assessment, which helps in designing proper course curricula, avoiding irrelevant trainings and wastage of resources, train market oriented manpower and conquering confidence of the market and society. This training model may be implemented on training of technicians and for faculty development too.
Development plan of any country draws the road map for national economic and educational development, most of the developed countries have attained their progress through their development plans, by focusing on technical education. Inadequately production and poor implementation of education policies and plans was main barrier in the growth of the education sector in Pakistan. In the whole history of Pakistan, no lesson has been taken or remembered from the failure of previous policies and plans while preparing new policies and plans. It is the practice to extend the time period if the targets of previous policies are not achieved in due time. These circumstances emphasize the need to not only devise rational policies and plans but also develop a satisfactory system for their implementation too (Ahsan, 2003). Chau has opinion that, the sensational experience of relevant field of policy-making and planning is an effective source of learning: one should learn from the problems others faced, means they adopted to attain their objectives, the results they achieved and the unintentional outcomes they produced are significant analysis. (Chau, 2003).

“The Congress of Vocational and Technical Education in Islamic Countries” (2009). Reached at a decision that: “In vocational and technical education, it is beyond discussion that a planning and development that will enable gaining information and ability for the requirements and priorities of the business market through sliding from supply oriented approaches to demand oriented approaches is necessary”.

The above discussion concludes that, in this age of globalization, explosion of knowledge and advancement of technology; to compete the international market, reduce poverty and improve employment situation in the country, there is compelling need for proper planning, to regulate and improve quality of technical education, to impart
employable skills to the youth, to strengthen institute-industry linkage, and in short plan for best utilization of available resources.
CHAPTER 3

METHODOLOGY

The main emphasis of this study was upon the development of a model plan for the enhancement of Technical Education in Pakistan. To devise a plan for the future, it was necessary to study the efforts (regarding technical education) made by the different governments in the past, existing situation of technical education in Pakistan, key factors that play role in enhancement of technical education, different approaches and global trends regarding these key factors. This chapter covers different stepladders of methodology, procedure and all the necessary explanations of techniques adopted for this purpose.

3.1 Nature of the Study

The study “development of a model plan for the enhancement of Technical Education in Pakistan” is a descriptive research and mixed in its nature. Mixed method is a research approach in which qualitative and quantitative techniques are used in a single study. Accordingly, a mixed methods purpose of statement needs to convey both qualitative and quantitative purpose of premises (Creswell, 2002). In addition, mixed
method of research takes a realistic, eclectic and common sense approach to the research study. Mixed method utilizes both inductive and deductive methods, it collates qualitative and quantitative data, attempts to confirm and complement findings and make attempts to have a balance approach to research.

The efforts made in past, regarding technical education, existing situation of technical education in Pakistan, key factors that play role in enhancement of technical education, different approaches and global trends regarding these key factors were studied in detail by the researcher and a focused group discussion was conducted in Islamabad by researcher to explore the key factors play role in enhancement of technical education, global trends and the profile of technical education in Pakistan regarding these key factors. The participants of the focused group discussion were the experts from planning commission, Education and especially the experts of technical education. As it is quite necessary to have a look on the present scenario of technical education in Pakistan, before devising a plan for its enhancement, hence instruments (three questionnaires) were developed that were based on the key factors explored through focused group discussion and then survey from principals, placement officers and old students of technical colleges, was conducted to acquire there opinion regarding the present scenario of technical education in Pakistan and key factors that play role in enhancement of technical education. The principals were selected for this purpose as they were assumed as most informed and suitable personality, being the administrator they have an eye on the situation of technical colleges (in all aspects) and a direct link with administration of Technical Education and Vocational Training Authority (TEVTA). The placement officer of an institute is a senior faculty member who not only teaches the
classes but he is also responsible for on the job training of students and their placement in industry after completion of education, hence he is well informed about, Institute, students and industry and there relations, that is why the placement officer of each technical institute was also selected for this survey. The Alumnae of technical education (Diploma of Associate Engineer, “DAE”) working at different positions in industry were considered the best source of information regarding quality of education delivered in technical institutions and the demand of industry that is why ten pass outs (working in industry) from each institute were also selected for above said survey. This second phase (survey) was followed by third phase focusing on detailed qualitative interviews, to collect innovative and comprehensive views of the experts. Data collected was analyzed; the findings of all phases were integrated during the interpretation phase. The sequence adopted can be expressed in brief as follows:-

3.2 Research Design

This is a mixed (quantitative + qualitative) method sequential study, conducted as per below given design.

Focus Group Discussion → Development of questionnaires → Conduct of survey → Data Analysis → Conduct of interviews → Data Analysis → integration of entire analysis (Sequential explanatory strategy).
3.3 Population

As the focus of the study was to study the existing situation of “Technical Education” in Pakistan and devise a plan for its enhancement, so its population comprises all the stakeholders of technical education. The detail is given below:

a) All the experts of technical education working in NISTE and NAVTEC and other concerned departments at Islamabad.

b) All the experts of technical education working in TEVTAs (of Punjab, Sindh, Khayber Pakhtoon Khaw (KPK) and Baluchistan Provinces).

c) All the principals of technical colleges (male and female) of Punjab, Sindh, KPK and Baluchistan, Capital city Islamabad, federally administered areas of FATA, and Azad Jammu & Kashmir.

d) All the placement officers of technical colleges (male and female) of Punjab, Sindh, “KPK” and Baluchistan, Capital city Islamabad and Azad Jammu & Kashmir.

e) All the alumnae (Diploma “DAE” holders) of technical colleges (male and female) of Punjab, Sindh, “KPK” and Baluchistan, Capital city Islamabad, and Azad Jammu & Kashmir.

3.4 Sampling

3.4.1 Sample for focus group discussion

A focused group discussion was conducted in Islamabad by researcher to explore the key factors play role in enhancement of technical education. The participants of the
focused group discussion were the experts from Planning Commission of Pakistan, Educationists (Ph.D. holders or having more than 10 year teaching experience), especially the experts from technical education and alumni (Appendix-B). Participants of focus group discussion were selected from Islamabad and Punjab province because practically it was very difficult to invite participants from all provinces. Due to financial and other residential constraints the researchers selected participants from Islamabad and Punjab province. Purposive sampling technique was adopted for the selection of sample from target population. The detail of the selected sample is as under:

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Planning commission officers</td>
<td>02</td>
</tr>
<tr>
<td>2</td>
<td>Educationists</td>
<td>06</td>
</tr>
<tr>
<td>3</td>
<td>Technical experts</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Alumnae</td>
<td>02</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

3.4.2 Sample for Survey

There were three types of participants which were considered best as sample of this study i.e. principals, placement officers and alumni. The detail of these all three types of individuals is given below:

1. As the principals were limited therefore, all the principals were selected as sample of this study. In this way 126 principals were the sample of this study.
2. As earlier discussed in principal sample, the numbers of placement officers were also limited therefore; all the 126 placement officers from all the institutions were selected as sample of this survey study.

3. While on the other side, old students were selected as convenient sampling technique. To maintain the representation of sample 10 old students were selected from each institution. In this way a sample 1260 students were selected as sample of this study.

The detail of all the three groups of sample is given below:

Table 3. Detail of sample selected for survey

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Province</th>
<th>Principals</th>
<th>Placement Officer</th>
<th>Alumni</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Capital city</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Islamabad</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Punjab</td>
<td>30</td>
<td>30</td>
<td>300</td>
<td>360</td>
</tr>
<tr>
<td>3</td>
<td>Sindh</td>
<td>70</td>
<td>70</td>
<td>700</td>
<td>840</td>
</tr>
<tr>
<td>4</td>
<td>K.P.K.</td>
<td>24</td>
<td>24</td>
<td>240</td>
<td>284</td>
</tr>
<tr>
<td>5</td>
<td>A.J.K</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Baluchistan</td>
<td>2</td>
<td>2</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>126</td>
<td>126</td>
<td>1260</td>
<td>1512</td>
</tr>
</tbody>
</table>

3.4.3 Sample for Interviews

As purposeful sampling is considered more effective because the researcher decided who would be better for information collection in interview. Sample of the interviewees is comprised of total thirty (30) participants and was selected purposefully, followed by snow ball sampling technique as follows:
1) Four senior policy makers and planners from the ministry of education, planning commission and its affiliated organizations involved in policy making process as they have a better vision about planning at national level.

2) Six senior experts of technical education working at management posts in National Institute of Science and Technical Education (NISTE) and National Vocational and Technical Education Commission (NAVTEC) Islamabad as they have a better vision about technical education at national level and are involved in plan implementation process.

3) Seventeen senior experts of technical education working at management posts (having knowledge and experience regarding plan making/implementation) in TEVTAs (of Punjab, Sindh, “KPK” and Baluchistan) as they are involved in plan implementation process at provincial level and are more aware about the ground realities.

4) Three senior experts of technical education working at management posts in federally administered areas of FATA, Gilgit, Swat and Azad Kashmir to give representation to these areas too.

3.5. Instrumentation

After the review of literature and discussion with different experts of “technical education” and “educational research” three different types of instruments were developed. The detail of these three instruments is given below:
3.5.1 Questionnaire for Focus Group Discussion

The basic purpose of focus group discussion was to explore the main directions and trends which may affect the enhancement of technical education globally and particularly in Pakistan. For this purpose three questions were developed to maintain then right direction of discussion in focus group session. These three questions were i) what are the global trends regarding technical education ii) what is the present scenario of technical education in Pakistan iii) what are the main factors that play key-role in enhancement of technical education. (Appendix-A)

3.5.2 Questionnaires for Survey

After discussions with educationists from technical education and instrument development experts, three different questionnaires on five point likert scale were developed. There were twenty statements in each questionnaire with two open ended questions. The detail of survey questionnaires is given below:

1. Questionnaire for principals; the questionnaire for principals was comprised of main categories i.e. Curriculum, Institute-industry linkage, Infrastructure, Teaching effectiveness, Intake, Research culture, Quality assurance, Administration, Co-curricular activities.

2. Questionnaire for placement officers; the categories asked from placement officers were Curriculum, Institute-industry linkage, Infrastructure, Teaching effectiveness, Intake, Research culture, Quality assurance, Administration, Co-curricular activities.
3. Questionnaire for Alumni; students were asked about Curriculum, Industry-linkage, Infrastructure, Teaching effectiveness, Intake, Research culture, Administration, Co-curricular activities. (Appendices-E,F&G)

3.5.3 Interview Schedule

Semi-Structured interview was scheduled to collect information from thirty policy makers and planners from the Ministry of Education, Planning Commission and affiliated Organizations involved in policy implementation process and experts of technical education. The interviews were audio recorded by the researcher himself and with the help of two trained associates. These associates were junior PhD scholars and they were trained for this purpose. As the interview was semi structured therefore, the time for interview remained between 30 minutes to 50 minutes. The core questions in interview were about the global trends in technical education, measures taken worldwide for enhancement of technical education, causes for not achieving the required quality level in Pakistan, suggestions for the promotion of technical education in Pakistan.

3.6. Pilot Testing of Instruments

To validate the survey instruments the researcher conducted a pilot study. Pilot study was conducted on a sample of five head of departments, five teachers and ten old students. Three rating scale questionnaires were administered on the selected sample and on the bases of their analysis these instruments were improved and modified. On the
other side, these instruments were also presented to experts. (Appendix-H) to get feedback. Experts’ opinions were also incorporated for the final preparation of instruments.

3.7. Data Collection

Data was collected by using four ways i.e. e-mail, telephonic conversation, by post and personal visits. Only few rating scale questionnaire of principals and placement officers were got from e-mail. The focus group discussion with the experts from Planning Commission of Pakistan, Educationists and especially the experts from technical education, (list of the participants attached in the annexure) was organized on 20-03-2012, at 10. A.M. in the conference room of National Institute of Science and Technical Education (NISTE), Islamabad. The discussion was conducted by the researcher him-self to keep the discussion on track and the discussion was continued for three hours. The notes of discussion were taken by the researcher himself with the help of two associates. The discussion was recorded audio visually and was transcribe later on. The rating scale questionnaires were basically administered through post and from few places by research associates. Almost all the interviews were conducted personally face by face and only three interviews were conducted by telephonic conversation.
3.8. Data Analysis

The information/data collected through focus group discussion was transcribed and analyzed by the researcher himself manually. Rating scale questionnaires were analyzed by using Statistical Package Social Sciences (SPSS) and only descriptive statistics. As the rating scale was on five point scale therefore, coding was as under: strongly agree = 5, agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree = 1.

The interview was audio taped and later on transcribed and analyzed by the researcher himself manually.
CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

This research study was aimed to appraise the scenario of “Technical Education” in Pakistan, efforts made by governments in the country for its improvement and keeping in view the global scenario and opinion of the experts of technical education, devise a model plan for the enhancement of Technical Education in Pakistan.

To address the objectives of the study; mixed research method was applied, which comprises of both quantitative and qualitative collection and analysis of the said data. Therefore, as the methodology described in chapter-3, to find out accurate responses of research questions, data were collected in three steps, i.e., (i) qualitative data through a focus group discussion (with the experts from Planning Commission of Pakistan, senior educationists and especially the experts from technical education) for quantification of concept and to finalize the key factors that play key role in enhancement of technical education, then three questionnaires (for principals, placement officers and alumnae of government colleges offering Diploma of Associate Engineer) were developed these questionnaires were based on the guide lines provided by focus group discussion and literature review, (ii) quantitative data was collected through these three structured questionnaires, and (iii) qualitative data collection through interviews. Research question wise analyses of the collected data are being presented below:
Research Question No 1.

What are the global trends regarding Technical Education?

The above mentioned research question was addressed in focus group discussion and through interviews which were conducted with experts of planning and technical education, the detail is given below:

Focus group:

Global trends in technical education according to the views of focus group discussion participants:

The focus group discussion with the experts from Planning Commission of Pakistan, Educationists and especially the experts from technical education, (list of the participants attached in the annexure) was organized on 20-03-2012, at 10. a.m. in the conference room of National Institute of Science and Technical Education (NISTE), Islamabad. The discussion continued for three hours. The objectives of the focus group discussion were to discuss and get diverse views of the experts on the following points:-

- The global trends regarding technical education.
- The present profile of technical education in Pakistan.
- The key factors that play key-role in enhancement of technical education.

In context of global trends regarding technical education the participants were with the view that, the globalization of economies has carried in importance of skill based knowledge workers worldwide, technical education is being promoted all over the world to overcome the threat of increasing unemployment, short term and long term policies are
being made to promote technical education and vocational training (TEVT) throughout the world, under umbrella of UNIVOC and UNESCO, competency based curriculum is being introduced, representatives of industry are involved in the process of curriculum development to make it job market oriented. Most of the countries especially developed countries are focusing on skill standards, National Qualification Frame-Works (NQF) have been developed and implemented in these countries for better linkage of the technical education with vocational and general education and resolve the problem of the degrees’ equivalence among vocational, technical and general education. Accreditation councils have been established world over to enhance the quality of education. Strong institute-industry linkage is being focused and improved, where institute and industry support each other in different forms e.g. students’ internship and training of faculty at industry and research & development work and theoretical coaching of industrial staff at institute. “Dual education program” (i-e theory in institute and practical training at industry) is an important example of public private partnership being successfully applied in different countries e.g. Germany, Austria, Vietnam, Switzerland and Egypt. The participants told that the implementation style of dual system differs from country to country to certain extent but the major agenda is basically an example of collaboration and sharing of sources between institute and industry.

New legislation is being made worldwide to support technical education, one participant was of the opinion that, “in many developed and developing countries, the license for practice of any profession (even hair dressing) is not issued without having a certificate of that profession in that specific field, in Pakistan government should also apply these rules to enhance quality in every profession and to encourage technical
education.” The other participants reinforced the views. Participants pointed-out that under developed and developing countries especially belonging to the Continents 0f Asia and Africa are supporting their economies through export of skilled man power to other countries and in return earning foreign exchange.

**Interview Data:**

*Global trends in technical education according to the responses of interviewees*

**Table 4. Interview results regarding global trends in technical education**

<table>
<thead>
<tr>
<th>Sr.#</th>
<th>Statement</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The technical education is considered as a master-key for economic growth of the nation in most of developed and developing countries.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>2</td>
<td>The supporting role of industry and business community is being improved through healthier industry-institute linkage.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Technical education is being used as a tool to alleviate poverty and curtail un-employment.</td>
<td>19</td>
<td>73</td>
</tr>
<tr>
<td>4</td>
<td>The technical education is being embedded into mainstream education.</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>5</td>
<td>The technical education is being used as a tool to prepare and then export skilled manpower to other countries and earn foreign exchange.</td>
<td>17</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>The technical education is being used as a source of input for entrepreneurship to curtail increasing ratio of un-employment.</td>
<td>09</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>Distinctions between general education and technical education are being eliminated.</td>
<td>07</td>
<td>27</td>
</tr>
<tr>
<td>8</td>
<td>The reforms are being made to reduce gender discriminations from technical education.</td>
<td>04</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Funding for TEVT is considered as investment on economy.</td>
<td>03</td>
<td>12</td>
</tr>
</tbody>
</table>
Figure 6. Interview results regarding global trends in technical education

In context of global trends regarding technical education the table 4 shows that 77% of the respondents were with the opinion that the technical education is considered as a master-key for economic growth of the nation in most of developed and developing countries. Seventy seven percent of the respondents consider that globally the supporting role of industry and business community is being improved through better industry-institute linkage. Seventy three percent respondents were with the opinion that; globally technical education is being used as a tool to alleviate poverty and control unemployment from society.

Sixty nine percent of the respondents stated that the technical education is being embedded into mean stream education. Sixty five percent of the respondents were of the
opinion that the technical education is being used as a tool to prepare and then export skilled manpower to other countries and earn foreign exchange. Thirty five percent of the respondents stated that the technical education is being used as a source of input for entrepreneurship to curtail increasing ratio of un-employment. Twenty seven percent of the respondents stated that Distinctions between general education and technical education are being eliminated globally. Fifteen percent of the respondents stated that the reforms are being made globally to eliminate gender distinctions from technical education. Twelve percent of the respondents were with opinion that in most of the developed and under-developing countries fund allocation for technical education is made as an investment for economic growth.

The analysis of the responses collected through the interview of experts of technical education reveals that almost all of respondents were of the views that economies of nations are facing crises and un-employment has become hovering threat around the globe, Technical and Vocational Education is being considered the master key which can transform the economy, counterattack un-employment, response poverty, and improve the quality of life. Technical education being used as a source to educate, prepare and motivate youth for self-employment and entrepreneurship to curtail increasing ratio of un-employment, subject of entrepreneurship education curricula is being incorporated at DAE level and in other technical and vocational courses in most of the countries. These programs deliver services such as mentoring, own business development facilities, or business formalization, guideline for easier access to financial support, including loans, and other youth friendly financial schemes. These programs
also concentrate on Information and Communication skills training to improve access to job-market and reinforce business skills.

Respondents indicated that differences and divergences between general education and technical education are being eliminated; the technical education is being embedded into mean stream education, technical subjects are being introduced in school education. Worldwide efforts were being made to increase the share of technical education as compare to general education, in few countries technical education has attained fifty or more than fifty percent share in total strength of students. Few of the respondents were of the view that the reforms are being introduced globally to eliminate gender discriminations to enhance female contribution in technical education and to improve the role of women in national economic growth. Reforms are being introduced to improve public-private partnerships in an effort to develop more comprehensive training structures, to extend the involvement of industry and other stakeholders and to confirm that training is of high quality, job-market relevant and serves the training needs of the society. In most of the developed and under-developing countries fund allocation for technical education is being enhanced and considered as an investment on youth for economic growth, which pays in future in the form of self-employment of the youth, industrial development and economic stability, examples of such countries are Germany, Australia, Vietnam, Malaysia, and Sri-lanka.
Research Question No. 2.

What measures are being taken globally for the enhancement of Technical Education?

Table 5 Measures being taken globally for enhancement of technical education

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Statement</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The reforms are being made to improve the access to technical education.</td>
<td>21</td>
<td>81</td>
</tr>
<tr>
<td>2</td>
<td>Curricula are made flexible and job market oriented.</td>
<td>21</td>
<td>81</td>
</tr>
<tr>
<td>3</td>
<td>The supporting role of industry and business community is being improved through better industry-institute linkage.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>4</td>
<td>Funding for TEVT is being enhanced.</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>5</td>
<td>National Qualification Frame works have been developed.</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>The social image of technical education has been improved through career guidance and social marketing.</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>Technical education is being made not only knowledge-oriented and skill-based but also values-centered education.</td>
<td>09</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>The technical education is being embedded into mainstream education.</td>
<td>08</td>
<td>31</td>
</tr>
<tr>
<td>8</td>
<td>The reforms are being made to improve the women contribution in technical education.</td>
<td>04</td>
<td>15</td>
</tr>
</tbody>
</table>
Figure 7. Measures being taken globally for enhancement of technical education

It is evident from table 5 that eighty one percent of the respondents were of the opinion that the new reforms are being introduced worldwide to improve the access to technical education. Eighty one percent respondents stated that; worldwide curricula are made flexible and job market oriented.

Seventy seven percent of the respondents stated that the supporting role of industry and business community is being improved through better industry-institute linkage. Sixty nine percent of the respondents were of the opinion that the funding for TEVT is being enhanced worldwide. Fifty percent of the respondents indicated that National Qualification Framework have been developed in most of the developed and many developing countries. Thirty eight percent of the respondents indicated that the social image of technical education is being improved through career guidance and social marketing. Thirty five percent of the respondents stated that technical education is being
made not only knowledge-oriented and skill-based but also values-centered education. Thirty one percent of the respondents stated that the technical education is being embedded into mean stream education. Fifteen percent of the respondents stated that the reforms are being made to improve the women contribution in technical education.

The analysis of the responses collected through the interview of experts of technical education shows the respondents’ views that worldwide reforms are being introduced under the umbrella of UNESCO and UNIVOC to improve the access of all segments of humanity to technical education and to alleviate poverty from the society. Curricula are being made flexible and market oriented, so that these can adapt to ever changing world of work. Experts from industry are involved in curriculum development process to make it job market oriented, industry helps the institute to overcome lack of financial resources and lack of equipment and machinery whereas institute provides research & development and staff educating facilities for industry. Governments are providing more funds to improve the infrastructure and provide other pertinent facilities to improve teaching learning atmosphere. As the public is not well aware with the importance of blue collar jobs, special social marketing and career guidance campaigns are launched to improve the intake and enrich social image of technical education. Most of the respondents indicated that National Qualification Frame works (NQF) have been developed in most of the advanced countries and in many developing countries NQF have been developed or are being finalized for inter linking and integration between different streams of education. Technical education is being embedded into mean stream education, technical subjects are implanted in school education to develop aptitude required to enter technical education at diploma level.
Some respondents further articulated that knowledge based societies of economically developed and technologically sound countries are now planning to develop value-centered civilization anchored on human dignity, spiritual values, honesty, integrity, well-being of all segments and protection of natural environment. Technical education in these countries is aimed to prepare the individual to become a responsible, mature, honest person equipped not only with the appropriate skills and expertise of latest technologies but also have the knowledge about reality of oneself, this world and others around him, with ability to resolve conflicts, problems and issues in varying situations. A few respondents indicated that the reforms are being made to improve the women contribution in technical education and as a result play their role in economic growth of the society.
Research Question No. 3

What are the factors that play key-role in enhancement of Technical Education?

The participants of the focus group also discussed a number of factors that can play key role in enhancement of technical education (few were overlapping), these were converted into statements, enlisted and distributed among the participants with a request to priorities these factors. The main factors as prioritized by participants are given below:

1. Curriculum
2. Institute-industry linkage
3. Infrastructure
4. Teaching effectiveness
5. Students/Intake
6. Research and development
7. Quality assurance
8. Administration
9. Co-curricular activities

Based on above listed key factors explored through focused group discussion, three questionnaires (to be administered on principals, placement officers and alumnae of technical colleges) were developed, then survey from above said respondents was conducted to acquire their opinion regarding the present scenario of technical education in Pakistan reference to the key-factors that play role in enhancement of technical education.
Research Question No.4

What is the present scenario of Technical Education in Pakistan?

Regarding “the profile of technical education in Pakistan” most of the participants of focus group discussion were of the view that, “the proper weightage has not been given to technical education, which is facing lack of funding, the institutions does not have the proper infrastructure, laboratories and workshops doesn’t have proper machinery, tools and equipment, available machinery is out dated, even sufficient consumable material is not available in sufficient quantity.” One participant who had done doctorate on topic of curriculum of technical education told that the curriculum was out dated and revised last time in 1996 and most of the participants were with the opinion that curriculum needs to be updated according to the requirements of job market.

Most of the participants were with the view that, curricula of technical education are not job market oriented and the situation of institute-industry linkage in Pakistan is not satisfactory. A few participants were also with the opinion that technical education was the secondary choice of the students and majority of students of technical education in Pakistan were low achievers and belonging to low income families. Most of the participants emphasized on strengthening the early education, encouraging youngsters to join technical and vocational education, develop aptitude of students towards technical education and to improve intake of technical education through career counseling at school level. One of the participants suggested that time to time, government may conduct open for public exhibitions of the DAE students’ projects for this purpose and the faculty along with students from schools of the surrounding areas may be invited to
visit the exhibitions, presentation of documentaries of the technical colleges may prove supportive in these situations to motivate students to join technical education.

4.2 Analysis and Interpretation of Questionnaires (Quantitative Data)

The responses of principals, placement officers and DAE alumnae was compiled and analyzed respondent’s category wise, the statements were grouped together in the form of clusters and broad areas of each key-factor that can play key role in enhancement of technical education. The mean response value of each statement as well as each key factor was calculated to determine its condition and level of satisfaction in Pakistan’s present scenario of technical education. The criterion for interpreting the degree of satisfaction, set after consultation with the experts of both statistics and technical education is given below:

<table>
<thead>
<tr>
<th>Range of Mean Response Value</th>
<th>Degree of Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 4.0 to ≤ 5.0</td>
<td>Most satisfactory</td>
</tr>
<tr>
<td>≥ 3.0 to &lt; 4.0</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>≥ 2.0 to &lt; 3.0</td>
<td>Least satisfactory</td>
</tr>
<tr>
<td>≥ 1.0 to &lt; 2.0</td>
<td>Not satisfactory</td>
</tr>
</tbody>
</table>

Respondent’s category and factor wise analysis of quantitative data (questionnaires) is as follows:

SECTION I Analysis of Alumnae’s Questionnaire
The table 6 indicates the responses of alumnae regarding the condition of administration in Govt. colleges of technology, the mean response value of 3.38 shows the agreement of alumnae with the statement that the administration of the government colleges of technology (GCTs) implements the rule for students, to meet the minimum requirement of attendance (i.e. 80% lectures) strictly in the college. Regular attendance of students is encouraged and maintained. The mean response value 3.40 shows the agreement of alumnae with the statement that classes were being conducted regularly on time. The alumnae’s aggregate mean response value 3.39 indicates that the overall condition of administration in Govt. colleges of technology is satisfactory.
Table 7 Responses of Alumnae about Infrastructure

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>The present building fulfills the educational needs of college.</td>
<td>7</td>
<td>37</td>
<td>0</td>
<td>35</td>
<td>21</td>
<td>3.26</td>
<td>1.33</td>
</tr>
<tr>
<td>6</td>
<td>The latest relevant books are available in college Library.</td>
<td>12</td>
<td>45</td>
<td>1</td>
<td>19</td>
<td>22</td>
<td>2.91</td>
<td>1.45</td>
</tr>
<tr>
<td>7</td>
<td>The equipment, tools and machines are sufficient for the practical needs of total students in a class.</td>
<td>15</td>
<td>33</td>
<td>1</td>
<td>32</td>
<td>19</td>
<td>3.17</td>
<td>1.40</td>
</tr>
<tr>
<td>8</td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to students.</td>
<td>24</td>
<td>46</td>
<td>1</td>
<td>20</td>
<td>10</td>
<td>2.46</td>
<td>1.30</td>
</tr>
<tr>
<td>9</td>
<td>Sufficient material is provided to students in laboratories for practical.</td>
<td>11</td>
<td>36</td>
<td>1</td>
<td>34</td>
<td>18</td>
<td>3.11</td>
<td>1.36</td>
</tr>
</tbody>
</table>

Aggregate mean 2.98

Table 7 indicates the condition of Infrastructure and facilities available in GCTs; the simple majority of alumnae responses showed that the present buildings of the government colleges of technology fulfills the educational needs of colleges as indicated by mean response value (3.26) that the situation regarding buildings is satisfactory. The mean response value of 2.91 shows the dis-agreement of alumnae with the statement that latest relevant books were available in their college library and the situation regarding availability of latest relevant books is least satisfactory as per stated criterion. The mean response value of 3.17 shows the agreement of alumnae with the statement that the equipment but the level of agreement cannot be considered as clear agreement, tools and machines are sufficient for the practical needs of total students in a class. According to the set criterion for mean response value the condition of the availability equipment, tools and machines for practical, to the students in Govt. colleges of technology is satisfactory. A great majority (70%) of old students had the opinion that on-line access to latest relevant books, research journals and other library facilities was not easily available to
students. The mean response value of 2.46 shows the slight dis-agreement of alumnae with the statement that on-line access to latest relevant books, research journals and other Library facilities is easily available to students, the situation is least satisfactory according to set criterion in this regard. The mean response value of 3.11 shows the agreement of alumnae with the statement that that sufficient material was provided to students in laboratories for practical, condition is satisfactory as per set criterion. The alumnae’s aggregate mean response value 2.98 indicates that the over-all situation of infrastructure in Govt. colleges of technology in Pakistan is least satisfactory.

**Table 8 Responses of Alumnae about Teaching Effectiveness**

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The teachers come to the class well prepared.</td>
<td>5</td>
<td>11</td>
<td>0</td>
<td>49</td>
<td>35</td>
<td>4.00</td>
<td>1.11</td>
</tr>
<tr>
<td>3</td>
<td>The classes are conducted regularly on time.</td>
<td>7</td>
<td>29</td>
<td>3</td>
<td>41</td>
<td>21</td>
<td>3.40</td>
<td>1.28</td>
</tr>
<tr>
<td>11</td>
<td>Proper number of teachers is available for each subject.</td>
<td>13</td>
<td>26</td>
<td>0</td>
<td>38</td>
<td>23</td>
<td>3.32</td>
<td>1.41</td>
</tr>
<tr>
<td>12</td>
<td>The teachers have updated practical knowledge and training for their Professional needs.</td>
<td>7</td>
<td>33</td>
<td>0</td>
<td>40</td>
<td>20</td>
<td>3.33</td>
<td>1.30</td>
</tr>
<tr>
<td>13</td>
<td>The teachers use multimedia and other audio visual aids during lecture.</td>
<td>21</td>
<td>47</td>
<td>2</td>
<td>18</td>
<td>12</td>
<td>2.54</td>
<td>1.33</td>
</tr>
<tr>
<td>14</td>
<td>Sufficient opportunities of higher education for diploma holders (D.A.E.) are available in the country.</td>
<td>23</td>
<td>28</td>
<td>1</td>
<td>30</td>
<td>18</td>
<td>2.91</td>
<td>1.49</td>
</tr>
<tr>
<td>15</td>
<td>Experts from industry and job market (external examiners) are involved in examination process.</td>
<td>14</td>
<td>43</td>
<td>2</td>
<td>32</td>
<td>9</td>
<td>2.80</td>
<td>1.27</td>
</tr>
<tr>
<td>16</td>
<td>Examination and evaluation system is appropriate to evaluate the competency of the students in professional know-how.</td>
<td>18</td>
<td>29</td>
<td>3</td>
<td>34</td>
<td>16</td>
<td>3.01</td>
<td>1.41</td>
</tr>
</tbody>
</table>

Aggregate mean 3.16
In context of the teaching effectiveness, Table 8 indicates that, a great majority of the diploma holders (84%) had the opinion that, “the teachers come to the class well prepared”. The mean response value of 4.00 shows the clear agreement of alumnae with the said statement, as per set criterion the condition in this regard is most satisfactory. The mean response value of 3.40 shows the agreement of alumnae with the statement that the classes in their colleges were conducted regularly on time. According to the set criterion for mean response value the condition regarding on time regular conduct of classes is satisfactory. The mean response value of 3.32 indicates that the condition regarding availability of proper number of teachers is satisfactory according to the opinion of alumnae. The mean response value of 3.40 shows the agreement of alumnae with the statement that, the teachers have updated practical knowledge and training required to perform their Professional duties. The mean response value of alumnae i-e, 2.54 indicates that the condition in reference to the use of multimedia and other audio visual aids by teachers of Government colleges of technology during their lecture is least satisfactory. As far as concern to the availability of the opportunities for higher education in the country for diploma (D.A.E.) holders, the mean response value of 2.90 indicates that the condition is least satisfactory. The mean response value of 2.80 shows the slight dis-agreement of alumnae with the statement that, “the experts from industry and job market (external examiners) are involved in examination process”. The situation is least satisfactory according to set criterion in this regard. As far as concerned to the evaluation system of the professional competencies of students, mean response value of 3.01 shows that the conditions are at the lowest level of satisfaction in the opinion of alumnae members. The alumnae’s aggregate mean response value 3.16 indicates that the
over-all condition regarding teaching effectiveness Govt. colleges of technology in Pakistan is just satisfactory.

Table 9 Responses of Alumnae about Curriculum

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Present diploma of associate engineer (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
<td>21</td>
<td>49</td>
<td>3</td>
<td>18</td>
<td>9</td>
<td>2.45</td>
<td>1.26</td>
</tr>
<tr>
<td>27</td>
<td>Two three months training (at industry) is compulsory for every student</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aggregate mean 2.45

In the context of Curriculum, the majority (70%) of the diploma holders disagreed with the statement that; “the present diploma of associate engineer (D.A.E.) curriculum fulfills the future needs of industry and job market”. The mean response value of alumnae i-e, 2.45 indicates that the condition in reference to the curricula is least satisfactory.

Table 10 Responses of Alumnae about Curriculum (internship)

<table>
<thead>
<tr>
<th>Statement</th>
<th>No (%)</th>
<th>Yes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 Two three months training (at industry) is compulsory for every student</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

In the context of Curriculum, table 10, shows that majority of the respondent (60%) has told that internship in industry was not compulsory for students in their college.
### Table 11 Responses of Alumnae about Industry-Institute Linkage

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Present diploma of associate engineer (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
<td>21</td>
<td>49</td>
<td>3</td>
<td>18</td>
<td>9</td>
<td>2.45</td>
<td>1.26</td>
</tr>
<tr>
<td>23</td>
<td>Role of industry was helping regarding your training and internship.</td>
<td>10</td>
<td>34</td>
<td>6</td>
<td>33</td>
<td>17</td>
<td>3.13</td>
<td>1.32</td>
</tr>
<tr>
<td>24</td>
<td>The employers are satisfied from the stuff produced by technical colleges.</td>
<td>13</td>
<td>36</td>
<td>3</td>
<td>34</td>
<td>14</td>
<td>2.98</td>
<td>1.33</td>
</tr>
<tr>
<td>25</td>
<td>Professionals from different walks of life/ industry are regularly invited to address teachers and students.</td>
<td>25</td>
<td>35</td>
<td>2</td>
<td>21</td>
<td>17</td>
<td>2.73</td>
<td>1.60</td>
</tr>
</tbody>
</table>

**Aggregate mean** 2.82

In context of Industry-Institute linkage, the majority (70%) of the alumnae was with the opinion that; the D.A.E. curriculum didn’t fulfill the future needs of industry and job market the mean response value of 2.45 indicates that the condition in this reference is least satisfactory. The mean response value of 3.13 indicates that the condition in reference to the co-operation of industry regarding training and internship was satisfactory. The mean response value of 2.98 shows the slight dis-agreement of alumnae with the statement that, “employers are satisfied from the stuff produced by technical colleges”. The situation is least satisfactory according to set criterion in this regard. The alumnae’s aggregate mean response value 2.82 indicates that the over-all situation of industry-institute linkage regarding technical education in Pakistan is least satisfactory.
Table 12 Responses of Alumnae about Intake

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Students who take admission in diploma (D.A.E.) classes have the potential required for their relevant technology.</td>
<td>6</td>
<td>19</td>
<td>10</td>
<td>52</td>
<td>13</td>
<td>3.45</td>
<td>1.13</td>
</tr>
<tr>
<td>19</td>
<td>After matriculation, to take admission in diploma of associate engineer was my first priority.</td>
<td>3</td>
<td>31</td>
<td>3</td>
<td>29</td>
<td>34</td>
<td>3.57</td>
<td>1.32</td>
</tr>
<tr>
<td>20</td>
<td>Students are always keen to use available library resources.</td>
<td>8</td>
<td>31</td>
<td>4</td>
<td>34</td>
<td>22</td>
<td>3.28</td>
<td>1.33</td>
</tr>
<tr>
<td>21</td>
<td>Ratio of the students who leave college (drop-outs) before completion of diploma (DAE) is alarming.</td>
<td>5</td>
<td>33</td>
<td>0</td>
<td>39</td>
<td>23</td>
<td>2.58</td>
<td>1.28</td>
</tr>
<tr>
<td>22</td>
<td>Average ratio of absent students in each class is more than 20%.</td>
<td>6</td>
<td>16</td>
<td>0</td>
<td>48</td>
<td>30</td>
<td>2.20</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Aggregate mean 3.00

Table 12 indicates the situation regarding the quality of students/intake of Government colleges of technology, the mean response value of 3.45 shows the agreement of alumnae with the statement that “the students who take admission in diploma (D.A.E.) classes have the potential required for their relevant technology”, according to the set criterion for mean response value the condition regarding quality of intake in Govt. colleges of technology is satisfactory. The majority of the respondents (63%) told that after matriculation, to take admission in diploma of associate engineer was their first priority. The mean response value of 3.57 indicates that the condition in this regard is satisfactory. The mean response value of 3.31 indicates that the condition in reference to the interest of students in use of available library resources was satisfactory. The 61% of graduates agreed with the statement that: “the ratio of the students who leave college (drop-outs) before completion of diploma (DAE) is alarming”, after converting statement into positive sense and adjustment of the score allocated to the responses of alumnae, the mean response value 2.58 indicates that
condition concerned to this issue are least satisfactory. 78% of the alumnae agreed the statement that, “Average ratio of absent students in each class is more than 20%.”, the mean response value of alumnae regarding presence of 80% students in class i-e, 2.20 shows that situation is least satisfactory. The alumnae’s aggregate mean response value 3.00 indicates that the over-all situation in connection with intake of Govt. colleges of technology in Pakistan is at lowest level of satisfaction as per set criteria.

**Table 13 Responses of Alumnae about Co-curricular Activities**

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>A balanced weight age is given to co-curricular activities in annual calendar of the institute.</td>
<td>8</td>
<td>36</td>
<td>2</td>
<td>35</td>
<td>19</td>
<td>3.20</td>
<td>1.32</td>
</tr>
</tbody>
</table>

The mean response value of 3.02 shows the agreement of alumnae with the statement that “A balanced weight age is given to co-curricular activities in annual calendar of the institute”, but the level of agreement cannot be considered as clear agreement and the situation co-curricular activities is just satisfactory as per stated criterion.

**Table 14 Responses of Alumnae about Research Culture**

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>On-line access to latest relevant books, research journals and other Library facilities are easily available to students.</td>
<td>24</td>
<td>46</td>
<td>1</td>
<td>20</td>
<td>10</td>
<td>2.46</td>
<td>1.30</td>
</tr>
<tr>
<td>26</td>
<td>The latest research journals are available in college Library.</td>
<td>18</td>
<td>45</td>
<td>2</td>
<td>20</td>
<td>15</td>
<td>2.68</td>
<td>1.36</td>
</tr>
</tbody>
</table>

Aggregate mean 2.57
Table 14 indicates the situation regarding research culture in Government colleges of technology, most (70%) of the diploma holders disagreed the statement that; “On-line access to latest relevant books, research journals and other Library facilities are easily available to the students”, the mean response value 2.46 indicates that condition concerned to this issue are least satisfactory. The mean response value of alumnae i-e, 2.68 shows that situation is least satisfactory regarding the availability of latest research journals in the college Library. The alumnae’s aggregate mean response value 2.57 indicates that the over-all situation of research culture in Govt. colleges of technology is least satisfactory.

SECTION II Analysis of principals Questionnaire

Table 15 Responses of Principals about Quality Assurance

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic audit of the institute is done by TEVTA/higher authority (or its nominated agencies) effectively and regularly.</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>74</td>
<td>11</td>
<td>3.83</td>
<td>.81</td>
</tr>
<tr>
<td>2</td>
<td>SWOT (strengths, weaknesses opportunities &amp; threats) analysis at college level is done regularly.</td>
<td>1</td>
<td>29</td>
<td>0</td>
<td>58</td>
<td>12</td>
<td>3.52</td>
<td>1.06</td>
</tr>
<tr>
<td>4</td>
<td>The process of internal evaluation of students (sessional marks), is continuously monitored by TEVTA/higher authorities.</td>
<td>3</td>
<td>15</td>
<td>5</td>
<td>65</td>
<td>13</td>
<td>3.71</td>
<td>.97</td>
</tr>
</tbody>
</table>

Aggregate mean 3.68

Table 15 highlights the opinion of principals regarding Quality assurance in Government colleges of technology (GCTs), in the context of Quality Assurance, the table indicates that the majority (85%) of the Principals had the opinion that, the
Academic audit of their institute was being performed by TEVTA/higher authority (or its nominated agencies) effectively and regularly, the mean response value 3.83 indicates that condition concerned to academic audit is satisfactory. Regarding the SWOT (strengths, weaknesses opportunities & threats) analysis the principals’ mean response value 3.52 indicates that condition is satisfactory. Majority (78%) of the Principals were of the opinion that the process of internal evaluation of students (sessional marks), was continuously monitored by TEVTA/ higher authorities, the mean response value 3.71 shows, the condition in this regard is satisfactory. The Principals’ aggregate mean response value 3.68 indicates that the over-all situation in connection with quality assurance steps at Govt. colleges of technology in Pakistan is satisfactory.

Table 16 Responses of Principals about Administration

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic audit of the institute is done by TEVTA/higher authority (or its nominated agencies) effectively and regularly.</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>74</td>
<td>11</td>
<td>3.83</td>
<td>.81</td>
</tr>
<tr>
<td>3</td>
<td>Sufficient administrative powers to the principals have been given for maintaining better discipline in the institute.</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>64</td>
<td>25</td>
<td>4.01</td>
<td>.92</td>
</tr>
<tr>
<td>5</td>
<td>Sufficient financial autonomy has been given to the principals to maintain and develop a better teaching learning atmosphere.</td>
<td>3</td>
<td>35</td>
<td>0</td>
<td>50</td>
<td>12</td>
<td>3.34</td>
<td>1.16</td>
</tr>
</tbody>
</table>

Aggregate mean 3.72

The above table indicates the situation regarding the “Administration”, the majority of the principals (85%) were of the opinion that; “the Academic audit of the technical institutes was done by TEVTA/higher authority (or its nominated agencies)
effectively and regularly”, the principals’ mean response value 3.83 indicates that condition concerned to academic audit is satisfactory. The majority of the respondents (89%) had opinion that sufficient administrative powers to the principals had been given for maintaining better discipline in the institute, The mean response value of principals i-e, 4.01 shows that situation is most satisfactory in this regard. The mean response value of 3.34 indicates the agreement of principals with the statement that, “sufficient financial autonomy has been given to the principals to maintain and develop a better teaching learning atmosphere”. The situation is satisfactory according to set criterion in this regard. The Principals’ aggregate mean response value 3.72 indicates that the over-all situation in connection with administration at GCTs in Pakistan is satisfactory.

*Table 17 Responses of Principals about Infrastructure (i)*

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>The present building of college fulfills the educational needs.</td>
<td>4</td>
<td>15</td>
<td>2</td>
<td>59</td>
<td>20</td>
<td>3.78</td>
<td>1.05</td>
</tr>
<tr>
<td>7</td>
<td>The latest relevant books are available in your college Library.</td>
<td>6</td>
<td>19</td>
<td>1</td>
<td>61</td>
<td>13</td>
<td>3.56</td>
<td>1.13</td>
</tr>
<tr>
<td>8</td>
<td>Sufficient funds are available to purchase material required for practical in laboratories.</td>
<td>4</td>
<td>36</td>
<td>3</td>
<td>50</td>
<td>7</td>
<td>3.77</td>
<td>1.11</td>
</tr>
<tr>
<td>9</td>
<td>The equipment, tools and machines are sufficient for the practical needs of total students in a class.</td>
<td>4</td>
<td>36</td>
<td>3</td>
<td>50</td>
<td>7</td>
<td>3.20</td>
<td>1.12</td>
</tr>
<tr>
<td>22</td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students.</td>
<td>6</td>
<td>67</td>
<td>1</td>
<td>20</td>
<td>5</td>
<td>2.51</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Aggregate mean 3.36
Table 17 indicates the situation of Infrastructure and facilities available at GCTs; the principals’ mean response value 3.78 indicates that condition concerned to academic audit is satisfactory. The mean response value of 3.56 indicates the agreement of principals with the statement that, “The latest relevant books are available in your college Library”, the condition regarding library is satisfactory according to set criterion. The mean response value of 3.77 shows the agreement of principals with the statement that “sufficient funds are available to purchase material required for practical in laboratories”, the condition is satisfactory as per stated criterion. The mean response value of 3.20 indicates the principals’ agreement with the statement that “The equipment, tools and machines are sufficient for the practical needs of total students in a class”, according to the set criterion for mean response value the condition regarding availability of machines, tools and equipment for students’ practical in (GCTs) is satisfactory. According to principals’ opinion, the mean response value of 2.54 indicates that, conditions in context of “on-line access to latest relevant books, research journals and other Library facilities for faculty members and students” are least-satisfactory. The Principals’ aggregate mean response value 3.36 indicates that the over-all situation in connection with infrastructure and facilities at Govt. colleges of technology in Pakistan is satisfactory.

Table 18 Responses of Principals about Infrastructure (ii)

<table>
<thead>
<tr>
<th>Institutes</th>
<th>No multimedia</th>
<th>One or two multimedia</th>
<th>More than two multimedia</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>69</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td>34%</td>
<td>56%</td>
<td>10%</td>
</tr>
</tbody>
</table>
In response to the question that, how much multimedia sets are available (in working condition) to the teachers? The principals’ responses indicate that in 34% institutions there was no multimedia available to the teachers or if available it was not in working-condition; one or two multimedia sets were available in 56% colleges, whereas in only 10% institutes, more than two multimedia sets were available in working condition to the faculty members.

**Table 19 Responses of Principals about Teaching Effectiveness**

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>The equipment, tools and machines are sufficient for the practical needs of total students.</td>
<td>4</td>
<td>36</td>
<td>3</td>
<td>50</td>
<td>7</td>
<td>3.20</td>
<td>1.12</td>
</tr>
<tr>
<td>12</td>
<td>The teachers need to update their practical knowledge and training for their Professional needs.</td>
<td>50</td>
<td>34</td>
<td>0</td>
<td>12</td>
<td>4</td>
<td>1.86*</td>
<td>1.17</td>
</tr>
<tr>
<td>15</td>
<td>Experts from industry and job market are involved in examination and evaluation process.</td>
<td>4</td>
<td>39</td>
<td>1</td>
<td>49</td>
<td>7</td>
<td>3.14</td>
<td>1.15</td>
</tr>
<tr>
<td>16</td>
<td>Examination and evaluation system is appropriate to evaluate the competency of the students in professional know-how.</td>
<td>7</td>
<td>27</td>
<td>4</td>
<td>58</td>
<td>4</td>
<td>3.24</td>
<td>1.12</td>
</tr>
<tr>
<td>21</td>
<td>Sufficient opportunities of higher education for diploma (D.A.E.) holders are available in the country.</td>
<td>5</td>
<td>75</td>
<td>2</td>
<td>10</td>
<td>8</td>
<td>2.41</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Aggregate mean 2.77

Table 19 shows Responses of Principals regarding teaching effectiveness, the mean response value of 3.20 shows the agreement of principals with the statement that; “The equipment, tools and machines are sufficient for the practical needs of total students.”, but the level of agreement cannot be considered as clear agreement and the situation regarding the availability of sufficient equipment, tools and machines, is
satisfactory as per set criterion. To find out the principals’ satisfaction level regarding teachers’ training needs the statement was considered negative (regarding teaching effectiveness) and the response data (value labels) of statement number 12 was reversed, a clear majority (84%) of the principals consider that the teachers need to update their practical knowledge and training to meet their professional requirements, mean response value 1.86 indicates that situation is least satisfactory in this reference. The mean response value of 3.14 indicates the principals’ agreement with the statement that, “experts from industry and job market are involved in examination and evaluation process.” according to the set criterion for mean response value the condition regarding “evaluation process” is satisfactory with a tendency towards least satisfaction. The mean response value of principals 3.24 regarding “evaluation process” indicates that the condition in this regard is satisfactory. In response to the statement that; “sufficient opportunities of higher education for diploma holders (D.A.E.) are available in the country”, the mean response value 2.41 indicates that condition concerned to this issue is least satisfactory. The aggregate mean response value of principals’ opinion i-e 2.77 indicates that the over-all situation in connection with teaching “effectiveness” at Govt. colleges of technology in Pakistan is least satisfactory.
Table 20 Responses of Principals about Curriculum

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Present diploma (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
<td>8</td>
<td>53</td>
<td>0</td>
<td>34</td>
<td>5</td>
<td>2.75</td>
<td>1.16</td>
</tr>
<tr>
<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
<td>10</td>
<td>54</td>
<td>1</td>
<td>26</td>
<td>5</td>
<td>2.46</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Aggregate mean 2.60

The table 20 indicates the situation regarding the “Curriculum”, the principals’ mean response value 2.75 indicates that in connection to” fulfillment of future needs of industry and job market” condition is least satisfactory. The principals’ mean response value of 2.46 indicates the dis-agreement of principals with the statement that, “experts from industry and job market are involved in curriculum development process”. The situation is least satisfactory according to set criterion in this regard too. The Principals’ aggregate mean response value 2.60 indicates that the over-all condition in context of curriculum of DAE classes in Pakistan is least satisfactory.

Table 21 Responses (%) of Principals about Linkage with Industry

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
<td>10</td>
<td>54</td>
<td>1</td>
<td>26</td>
<td>5</td>
<td>2.46</td>
<td>1.14</td>
</tr>
<tr>
<td>15</td>
<td>Experts from industry and job market are involved in examination and evaluation process.</td>
<td>4</td>
<td>39</td>
<td>1</td>
<td>49</td>
<td>7</td>
<td>3.14</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Aggregate mean 2.8
Regarding Industry-Institute linkage, table 21 indicates that majority of the principals (64%) replied that experts from industry and job market were not involved in curriculum development process; the mean response value 2.46 of respondents shows that the condition is least satisfactory according to set criterion in this regard. The mean response value of 3.14 shows the agreement of principals with the statement that; “experts from industry and job market are involved in examination and evaluation process”, but the level of agreement cannot be considered as clear agreement, the situation regarding the involvement of job-market experts in evaluation process is satisfactory as per set criterion but have inclination toward least satisfaction. The aggregate mean response value 2.60 of principals indicates that the over-all condition in context of Industry-Institute linkage in Pakistan is least satisfactory.

### Table 22 Responses of Principals about Intake

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Students who take admission in diploma (D.A.E.) classes, have the potential and aptitude required for their relevant technology.</td>
<td>1</td>
<td>49</td>
<td>1</td>
<td>37</td>
<td>12</td>
<td>3.10</td>
<td>1.18</td>
</tr>
<tr>
<td>19</td>
<td>Students are always keen to use available library resources.</td>
<td>5</td>
<td>39</td>
<td>4</td>
<td>47</td>
<td>6</td>
<td>3.13</td>
<td>1.12</td>
</tr>
<tr>
<td>20</td>
<td>Most of the students attend their classes with keen interest.</td>
<td>1</td>
<td>62</td>
<td>3</td>
<td>25</td>
<td>9</td>
<td>2.70</td>
<td>1.11</td>
</tr>
</tbody>
</table>

Aggregate mean \[ \bar{X} = 2.97 \]

Table 22 indicates conditions concerned with intake of government colleges of technology, the mean response value 3.10 shows the agreement of principals with the statement that; “Students who take admission in diploma (D.A.E.) classes, have the
potential and aptitude required for their relevant technology”, but the level of agreement cannot be considered as clear agreement. The mean response value 3.10 shows that, in the opinion of principals of (GCTs), the interest level of students in library resources is satisfactory. The principals’ responses show that the level of students’ interest in their classes is least satisfactory. The aggregate mean response value 2.97 indicates that the over-all condition concerned to the intake of GCTs is least satisfactory.

Table 23 Responses of Principals about Co-curricular Activities

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>A balanced weightage is given to co-curricular activities in annual calendar of the institute.</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>63</td>
<td>28</td>
<td>4.12</td>
<td>.77</td>
</tr>
</tbody>
</table>

In the context of Co-curricular Activities, the majority (91%) of the principals agreed with the statement that; “A balanced weightage is given to co-curricular activities in annual calendar of the institute”. The mean response value 4.12 indicates that the condition concerned to the Co-curricular Activities at GCTs is most satisfactory.

Table 24 Responses of Principals about Research and Development

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students.</td>
<td>6</td>
<td>67</td>
<td>1</td>
<td>20</td>
<td>5</td>
<td>2.51</td>
<td>1.05</td>
</tr>
</tbody>
</table>
Regarding the Research and Development culture, the majority of the principals (73%) disagreed with the statement that; “On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students. The mean response value 2.51 indicates that the condition concerned to research and development culture at GCTs is least satisfactory.

SECTION II Analysis of Placement Officers’ Questionnaire

Table 25 Responses of Placement Officers about Quality Assurance

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SWOT (strengths, weaknesses opportunities &amp; threats) analysis at college level is done regularly.</td>
<td>23</td>
<td>45</td>
<td>5</td>
<td>16</td>
<td>10</td>
<td>2.44</td>
<td>1.292</td>
</tr>
</tbody>
</table>

In the context of Quality Assurance, the table 25 indicates that the majority (68%) of the Placement officers of the technical colleges in government sector disagreed that SWOT (strengths, weaknesses opportunities & threats) analysis at college level was being done regularly. The mean response value 2.44 of the placement officers indicates that the condition in this regard at GCTs is least satisfactory.
Table 26 Responses of Placement Officers about Administration

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SWOT (strengths, weaknesses opportunities &amp; threats) analysis at college level is done regularly.</td>
<td>23</td>
<td>45</td>
<td>5</td>
<td>16</td>
<td>10</td>
<td>2.44</td>
<td>1.292</td>
</tr>
<tr>
<td>2</td>
<td>Annual curricular activities are planned after discussion with the faculty.</td>
<td>16</td>
<td>42</td>
<td>7</td>
<td>30</td>
<td>5</td>
<td>2.68</td>
<td>1.211</td>
</tr>
</tbody>
</table>

Aggregate mean 2.56

Regarding the “Administration of GCTs”, the majority of the placement officers (68%) disagreed with the statement that: “SWOT (strengths, weaknesses opportunities & threats) analysis at college level is done regularly”, the mean response value 2.44 of the placement officers indicates that the condition in this regard at GCTs is least satisfactory. The majority of the respondents (58%) disagreed with the statement that: “annual curricular activities are planned after discussion with the faculty”, the mean response value 2.68 shows that the condition in this regard at GCTs is least satisfactory. The aggregate mean response value 2.56 (of placement officers’ opinion) indicates that the over-all condition in this regard is least satisfactory.
Table 27 Responses of Placement Officers about Infrastructure

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>The present building of college fulfills the educational needs.</td>
<td>15</td>
<td>50</td>
<td>3</td>
<td>26</td>
<td>7</td>
<td>2.60</td>
<td>1.22</td>
</tr>
<tr>
<td>6</td>
<td>The latest relevant books are available in your college Library.</td>
<td>7</td>
<td>50</td>
<td>6</td>
<td>30</td>
<td>6</td>
<td>2.79</td>
<td>1.14</td>
</tr>
<tr>
<td>7</td>
<td>Sufficient funds are available to purchase material required for practical in laboratories.</td>
<td>15</td>
<td>44</td>
<td>5</td>
<td>29</td>
<td>8</td>
<td>2.73</td>
<td>1.26</td>
</tr>
<tr>
<td>8</td>
<td>The equipment, tools and machines are sufficient for the practical needs of total students in a class.</td>
<td>7</td>
<td>44</td>
<td>6</td>
<td>34</td>
<td>9</td>
<td>2.93</td>
<td>1.187</td>
</tr>
<tr>
<td>9</td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students.</td>
<td>12</td>
<td>31</td>
<td>0</td>
<td>45</td>
<td>12</td>
<td>3.12</td>
<td>1.310</td>
</tr>
</tbody>
</table>

Aggregate mean 2.83

Table 27 indicates the situation of Infrastructure and facilities available at GCTs; the mean response value of 2.60 shows the dis-agreement of the placement officers with the statement that; “The present building of college fulfills the educational needs”. The mean response value 2.79 (of the placement officers) indicates that the condition regarding the availability of latest relevant books at GCTs is least satisfactory. The mean response value 2.73 indicates that the condition regarding the availability of funds to purchase material for practical is least satisfactory. The placement officers’ responses show that, the condition regarding availability of sufficient equipment, tools and machines to the students at GCTs is least satisfactory as indicated by mean response value 2.93. The mean response value of 3.12 shows the agreement of placement officers with the statement that; “On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students”, but the level of agreement cannot be considered as clear agreement. The aggregate mean response
value 2.83 indicates that the over-all situation in connection with infrastructure and facilities at GCTs (in placement officers’ opinion) is least satisfactory.

Table 28 Responses of Placement Officers about Teaching Effectiveness

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Proper number of teachers is available for each subject.</td>
<td>7</td>
<td>46</td>
<td>4</td>
<td>34</td>
<td>9</td>
<td>2.91</td>
<td>1.201</td>
</tr>
<tr>
<td>4</td>
<td>Teachers are satisfied from their present salary package.</td>
<td>8</td>
<td>47</td>
<td>3</td>
<td>37</td>
<td>4</td>
<td>2.82</td>
<td>1.152</td>
</tr>
<tr>
<td>12</td>
<td>The teachers need to update their practical knowledge and training for their Professional needs.</td>
<td>10</td>
<td>16</td>
<td>0</td>
<td>41</td>
<td>33</td>
<td>3.71</td>
<td>1.348</td>
</tr>
<tr>
<td>13</td>
<td>Sufficient opportunities of higher education after three year diploma (D.A.E.) are available in the country.</td>
<td>4</td>
<td>38</td>
<td>1</td>
<td>54</td>
<td>3</td>
<td>3.13</td>
<td>1.090</td>
</tr>
<tr>
<td>14</td>
<td>Experts from industry and job market are involved in examination and evaluation process.</td>
<td>12</td>
<td>53</td>
<td>4</td>
<td>26</td>
<td>5</td>
<td>2.61</td>
<td>1.150</td>
</tr>
<tr>
<td>15</td>
<td>Examination and evaluation system is appropriate to evaluate the competency of the students in professional know-how.</td>
<td>8</td>
<td>57</td>
<td>5</td>
<td>23</td>
<td>7</td>
<td>2.65</td>
<td>1.132</td>
</tr>
<tr>
<td>21</td>
<td>Professionals from different walks of life/ industry are regularly invited to address teachers and students.</td>
<td>16</td>
<td>34</td>
<td>3</td>
<td>41</td>
<td>6</td>
<td>2.87</td>
<td>1.286</td>
</tr>
</tbody>
</table>

Aggregate mean 2.95

Table 28 shows the opinion of placement officers regarding teaching effectiveness at GCTs; the placement officers’ mean response value 2.91 indicates that condition concerned to availability of teachers is least satisfactory. The mean response value of 2.82 indicates that in placement officers’ opinion, the teachers are least satisfied with their existing salary package. To find out the placement officers’ opinion regarding teachers’ training needs the statement was considered negative (regarding teaching
effectiveness) and the response data (value labels) of statement number 12 was reversed, mean response value 3.71 indicates that situation is satisfactory in placement officers’ opinion and no urgent need of teacher training is felt. The mean response value of 3.13 shows the agreement of placement officers with the statement that “sufficient opportunities of higher education after three year diploma (D.A.E.) are available in the country”, but the level of agreement cannot be considered as clear agreement. The mean response value of 2.61 indicates that, conditions regarding involvement of industry and job market experts are least-satisfactory. The mean response value of 2.65 indicates the placement officers’ dis-agreement with the statement that “examination and evaluation system is appropriate to evaluate the competency of the students in professional know-how”. The mean response value of 2.87 indicates the least-agreement of placement officers with the statement that “Professionals from different walks of life/ industry are regularly invited to address the teachers and students”. The placement officers’ aggregate mean response value 2.95 indicates that the over-all condition in connection with teaching effectiveness at Govt. colleges of technology in Pakistan is least-satisfactory.
Table 29 Responses of Placement Officers about Curriculum

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Present diploma (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
<td>25</td>
<td>40</td>
<td>3</td>
<td>26</td>
<td>6</td>
<td>2.48</td>
<td>1.287</td>
</tr>
<tr>
<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
<td>12</td>
<td>43</td>
<td>7</td>
<td>30</td>
<td>8</td>
<td>2.80</td>
<td>1.222</td>
</tr>
</tbody>
</table>

Aggregate mean  
2.64

The table 29 indicates the situation regarding the “Curriculum”, the placement officers’ mean response value 2.48 indicates that in connection to” fulfillment of future needs of industry and job market” condition is least satisfactory. The placement officers’ mean response value of 2.80 indicates the dis-agreement of placement officers with the statement that, “experts from industry and job market are involved in curriculum development process”. The situation is least satisfactory according to set criterion in this regard too. The placement officers’ aggregate mean response value 2.64 indicates that the over-all condition in context of curriculum of DAE classes in Pakistan is least satisfactory.
Table 30 Responses (%) of Placement Officers about Linkage with Industry

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
<td>12</td>
<td>43</td>
<td>7</td>
<td>30</td>
<td>8</td>
<td>2.80</td>
<td>1.222</td>
</tr>
<tr>
<td>14</td>
<td>Experts from industry and job market are involved in examination and evaluation process.</td>
<td>12</td>
<td>53</td>
<td>4</td>
<td>26</td>
<td>5</td>
<td>2.61</td>
<td>1.150</td>
</tr>
<tr>
<td>20</td>
<td>Role of industry is helping regarding students training and internship.</td>
<td>11</td>
<td>55</td>
<td>6</td>
<td>24</td>
<td>5</td>
<td>2.56</td>
<td>1.109</td>
</tr>
<tr>
<td>21</td>
<td>Professionals from different walks of life/ industry are regularly invited to address teachers and students.</td>
<td>16</td>
<td>34</td>
<td>3</td>
<td>41</td>
<td>6</td>
<td>2.87</td>
<td>1.286</td>
</tr>
</tbody>
</table>

Aggregate mean 2.71

Regarding Industry-Institute linkage, table 30 indicates that majority of the placement officers replied that experts from industry and job market were not involved in curriculum development process; the mean response value 2.80 of respondents shows that the condition is least satisfactory according to set criterion in this regard. The mean response value of 2.61 shows the dis-agreement of placement officers with the statement that; “experts from industry and job market are involved in examination and evaluation process”, the situation regarding the involvement of job-market experts in evaluation process is least-satisfactory as per set criterion. The mean response value of 2.56 indicates the placement officers’ dis-agreement with the statement that “Role of industry is helping regarding students training and internship” The mean response value of 2.87 indicates that, conditions regarding the involvement of industry and job market experts in teaching-learning process and learning from their field experience, is least-satisfactory at GCTs. The aggregate mean response value 2.71 of placement officers indicates that the over-all condition in context of Industry-Institute linkage in Pakistan is least satisfactory.
Table 31 Responses of Placement Officers about Intake

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Students who take admission in diploma (D.A.E.) classes, have the</td>
<td>9</td>
<td>44</td>
<td>5</td>
<td>38</td>
<td>5</td>
<td>2.85</td>
<td>1.164</td>
</tr>
<tr>
<td></td>
<td>potential and aptitude required for their relevant technology.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Students are always keen to use available library resources.</td>
<td>6</td>
<td>45</td>
<td>6</td>
<td>42</td>
<td>1</td>
<td>2.88</td>
<td>1.066</td>
</tr>
<tr>
<td>19</td>
<td>Most of the students take keen interest in their classes.</td>
<td>6</td>
<td>50</td>
<td>4</td>
<td>36</td>
<td>6</td>
<td>2.86</td>
<td>1.136</td>
</tr>
</tbody>
</table>

Aggregate mean 2.86

Table 31 indicates conditions concerned with intake of government colleges of technology, the mean response value 2.85 shows the dis-agreement of placement officers with the statement that; “Students who take admission in diploma (D.A.E.) classes, have the potential and aptitude required for their relevant technology”, but the level of agreement cannot be considered as clear agreement. The mean response value 2.88 indicates that, in the opinion of placement officers, the interest level of students in library resources is least satisfactory. The placement officers’ responses show that the level of students’ interest in their classes is least satisfactory as indicated by mean response value 2.86. The aggregate mean response value 2.86 indicates that the over-all condition concerned to the intake of GCTs is least satisfactory.

Table 32 Responses of Placement Officers about Co-curricular Activities

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD</th>
<th>A</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>A balanced weightage is given to co-curricular activities in annual</td>
<td>10</td>
<td>16</td>
<td>0</td>
<td>41</td>
<td>33</td>
<td>3.71</td>
<td>1.348</td>
</tr>
<tr>
<td></td>
<td>calendar of the institute.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the context of Co-curricular Activities, the 74% of the placement officers agree with the statement that: “A balanced weight age is given to co-curricular activities in annual calendar of the institute”. The placement officers’ responses show that the level of weight age given to co-curricular activities is satisfactory as indicated by mean response value 3.71.

**Table 33 Responses of Placement Officers about Research and Development**

<table>
<thead>
<tr>
<th>S#</th>
<th>Statement</th>
<th>SDA (%)</th>
<th>DA (%)</th>
<th>UD (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>The latest research journals are available in college Library.</td>
<td>3</td>
<td>39</td>
<td>4</td>
<td>47</td>
<td>8</td>
<td>3.23</td>
<td>1.223</td>
</tr>
<tr>
<td></td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students.</td>
<td>18</td>
<td>47</td>
<td>1</td>
<td>28</td>
<td>6</td>
<td>2.58</td>
<td>1.24</td>
</tr>
<tr>
<td>24</td>
<td>The number of research papers of faculty members published in international research journals is considered as a criterion at the time of promotions to next scale.</td>
<td>17</td>
<td>31</td>
<td>4</td>
<td>40</td>
<td>8</td>
<td>2.90</td>
<td>1.255</td>
</tr>
</tbody>
</table>

Aggregate mean 2.90

The mean response value of 3.23 shows the agreement of placement officers with the statement that; “the latest research journals are available in college Library”, but the level of agreement cannot be considered as clear agreement. The mean response value of 2.58 indicates that, conditions regarding the on-line availability of latest relevant books, research journals and other Library facilities are least-satisfactory. The mean response value of 2.90 indicates the placement officers’ dis-agreement with the statement that; “the number of research papers of faculty members published in international research journals is considered as a criterion at the time of promotions to next scale”. The
placement officers’ aggregate mean response value 2.90 indicates that the over-all condition in connection with research and development culture at Govt. colleges of technology in Pakistan is least-satisfactory.

Regarding the Research and Development culture, only 17% of the placement officers agree with the statement that: “The latest research journals are available in college Library”. The majority of the placement officers (74%) disagree with the statement that; “On-line access to latest relevant books, research journals and other library facilities is easily available to faculty members and students. One fourth (27%) of the respondents agree with the statement that, the number of research papers of faculty members published in international research journals is considered as a criterion at the time of promotions.

Table: 34 Availability of hostel facility in technical institutes

<table>
<thead>
<tr>
<th>Gender</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>45(41)</td>
</tr>
<tr>
<td>Female</td>
<td>4(29)</td>
</tr>
<tr>
<td>Territory</td>
<td></td>
</tr>
<tr>
<td>Capital city Islamabad</td>
<td>1(100)</td>
</tr>
<tr>
<td>Punjab</td>
<td>16(53)</td>
</tr>
<tr>
<td>Sindh</td>
<td>15(22)</td>
</tr>
<tr>
<td>Khayber Pakhtoon Khwa</td>
<td>15(68)</td>
</tr>
<tr>
<td>Baluchistan</td>
<td>2(100)</td>
</tr>
<tr>
<td>Azad Jammu Kashmir</td>
<td>1(100)</td>
</tr>
<tr>
<td>Total</td>
<td>50(40)</td>
</tr>
</tbody>
</table>

The table 34 regarding infrastructure shows that the hostel facility is available in only 41% male technical colleges of Pakistan, whereas the facility of hostel is available in just 29% female technical institutes. Whereas if considered territory wise in capital
city Islamabad facility of hostel is available in the only institute of Islamabad i-e (100%) in Punjab the facility is available in (53%) institutes, in Sindh (22%) in Khayber Pakhtoon Khwa (68%), Baluchistan (100%) and hostel facility is available in the only institute of Azad Jammu Kashmir i-e (100%). In Pakistan this facility is available in Total 50 institutes out of 126, this shows that over all ratio in connection with availability of hostel facility is 40%.

Table: 35 Availability of transport facility in technical institutes

<table>
<thead>
<tr>
<th>Gender</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32(29)</td>
</tr>
<tr>
<td>Female</td>
<td>5(36)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Territory</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital city Islamabad</td>
<td>1(100)</td>
</tr>
<tr>
<td>Punjab</td>
<td>17(57)</td>
</tr>
<tr>
<td>Sindh</td>
<td>18(26)</td>
</tr>
<tr>
<td>Khayber Pakhtoon Khwa</td>
<td>0(0)</td>
</tr>
<tr>
<td>Baluchistan</td>
<td>1(50)</td>
</tr>
<tr>
<td>Azad Jammu Kashmir</td>
<td>0(0)</td>
</tr>
<tr>
<td>Total</td>
<td>37(30)</td>
</tr>
</tbody>
</table>

The table 35 shows that the facility of transport is available to the students in only 29% male technical colleges of Pakistan, whereas the facility of transport is available in 36% female technical institutes only. Whereas if considered territory wise in capital city Islamabad facility of transport is available in the only institute of Islamabad i-e (100%) in Punjab the facility is available in (57%) institutes, in Sindh (26%) in Khayber Pakhtoon Khwa data shows (0%), Baluchistan (50%) and transport facility is available in the only institute of Azad Jammu Kashmir i-e (0%). In Pakistan this facility is available in total
50 institutes out of 126, this shows that over all ratio in connection with availability of transport facility is 30%.

Table: 36 Availability of active website

<table>
<thead>
<tr>
<th>Gender</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41(37)</td>
</tr>
<tr>
<td>Female</td>
<td>3(21)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Territory</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital city Islamabad</td>
<td>1(100)</td>
</tr>
<tr>
<td>Punjab</td>
<td>15(50)</td>
</tr>
<tr>
<td>Sindh</td>
<td>28(41)</td>
</tr>
<tr>
<td>Khayber Pakhtoon Khwa</td>
<td>0(0)</td>
</tr>
<tr>
<td>Baluchistan</td>
<td>0(0)</td>
</tr>
<tr>
<td>Azad Jammu Kashmir</td>
<td>0(0)</td>
</tr>
<tr>
<td>Total</td>
<td>44(36)</td>
</tr>
</tbody>
</table>

The table 36 shows that only 37% male technical institutes of Pakistan have their active web-site whereas just 21% female technical institutes have their active web site.

Table 37 Aggregate Mean of Responses of Alumnae about Different key-factors

<table>
<thead>
<tr>
<th>Key-Factors</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>3.40</td>
<td>3.38</td>
<td>4.00</td>
<td>1.13</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>2.98</td>
<td>2.80</td>
<td>2.40</td>
<td>.98</td>
</tr>
<tr>
<td>Teaching effectiveness</td>
<td>3.16</td>
<td>3.12</td>
<td>3.00</td>
<td>.77</td>
</tr>
<tr>
<td>Curriculum</td>
<td>2.45</td>
<td>1.00</td>
<td>1.00</td>
<td>1.56</td>
</tr>
<tr>
<td>Institute-Industrial Linkage</td>
<td>2.28</td>
<td>2.50</td>
<td>2.00</td>
<td>1.085</td>
</tr>
<tr>
<td>Intake</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>.82</td>
</tr>
<tr>
<td>Co-Curricular activities</td>
<td>3.20</td>
<td>2.00</td>
<td>2.00</td>
<td>1.05</td>
</tr>
<tr>
<td>Research culture</td>
<td>2.57</td>
<td>3.33</td>
<td>4.00</td>
<td>.98</td>
</tr>
</tbody>
</table>

The table 37 reflects the opinions of the students;
Fig. 8. Aggregate Mean of Responses of Alumnae about Different key-factors

Table 38 Aggregate Mean of Responses of Principals about Different key-factors

<table>
<thead>
<tr>
<th>Key-Factors</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality assurance</td>
<td>3.68</td>
<td>4.00</td>
<td>4.00</td>
<td>0.73</td>
</tr>
<tr>
<td>Administration</td>
<td>3.72</td>
<td>4.00</td>
<td>4.00</td>
<td>0.65</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>3.36</td>
<td>3.45</td>
<td>3.20</td>
<td>0.73</td>
</tr>
<tr>
<td>Teaching effectiveness</td>
<td>2.77</td>
<td>2.83</td>
<td>2.83</td>
<td>0.50</td>
</tr>
<tr>
<td>Curriculum</td>
<td>2.60</td>
<td>3.00</td>
<td>3.00</td>
<td>0.90</td>
</tr>
<tr>
<td>Institute-Industrial Linkage</td>
<td>2.80</td>
<td>4.00</td>
<td>4.00</td>
<td>1.08</td>
</tr>
<tr>
<td>Intake</td>
<td>2.97</td>
<td>2.67</td>
<td>2.0</td>
<td>0.96</td>
</tr>
<tr>
<td>Co-Curricular activities</td>
<td>4.12</td>
<td>4.00</td>
<td>4.00</td>
<td>0.78</td>
</tr>
<tr>
<td>Research culture</td>
<td>2.51</td>
<td>2.00</td>
<td>2.00</td>
<td>1.05</td>
</tr>
</tbody>
</table>

The table 38 reflects the opinions of the Principals;
Table 39 Aggregate Mean of Responses of Placement Officers about Different key-factors

<table>
<thead>
<tr>
<th>Key-Factors</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality assurance</td>
<td>2.44</td>
<td>2.00</td>
<td>2.00</td>
<td>1.29</td>
</tr>
<tr>
<td>Administration</td>
<td>2.56</td>
<td>2.00</td>
<td>2.00</td>
<td>1.11</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>2.83</td>
<td>2.70</td>
<td>2.40</td>
<td>0.78</td>
</tr>
<tr>
<td>Teaching effectiveness</td>
<td>2.95</td>
<td>2.00</td>
<td>2.00</td>
<td>1.24</td>
</tr>
<tr>
<td>Curriculum</td>
<td>2.64</td>
<td>2.50</td>
<td>2.00</td>
<td>1.08</td>
</tr>
<tr>
<td>Institute-Industrial Linkage</td>
<td>2.71</td>
<td>2.67</td>
<td>2.00</td>
<td>0.82</td>
</tr>
<tr>
<td>Intake</td>
<td>2.86</td>
<td>3.00</td>
<td>3.00</td>
<td>0.82</td>
</tr>
<tr>
<td>Co-Curricular activities</td>
<td>3.71</td>
<td>2.00</td>
<td>2.00</td>
<td>1.04</td>
</tr>
<tr>
<td>Research culture</td>
<td>2.90</td>
<td>3.33</td>
<td>4.00</td>
<td>0.94</td>
</tr>
</tbody>
</table>

The table 38 reflects the opinions of the Principals;
Fig. 10. Aggregate Mean of Responses of Placement Officers about Different key-factors

Research Question No. 5.

What are the main causes for not achieving the required quality of Technical Education in Pakistan?


<table>
<thead>
<tr>
<th>S. #</th>
<th>Statement</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Country is facing political instability which results as non-consistency in planning.</td>
<td>21</td>
<td>81</td>
</tr>
<tr>
<td>2</td>
<td>In most of technologies curricula for diploma of associate engineers is out dated and obsolete.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>Appropriate funds are not provided for technical education in country.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>4</td>
<td>Scope for advance professional education is restricted and limited.</td>
<td>19</td>
<td>73</td>
</tr>
<tr>
<td>5</td>
<td>Industry-institute linkage in Pakistan is weak.</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>Technical colleges are facing lack of professionally trained faculty.</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>7</td>
<td>No qualification framework has been developed in Pakistan.</td>
<td>16</td>
<td>62</td>
</tr>
<tr>
<td>8</td>
<td>There is lack of coordination and uniformity among different departments at provincial and national level.</td>
<td>16</td>
<td>62</td>
</tr>
<tr>
<td>9</td>
<td>Condition of Infrastructure at colleges of technology is not up to the mark.</td>
<td>11</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td>No skill standards have been finalized in the country.</td>
<td>08</td>
<td>31</td>
</tr>
<tr>
<td>11</td>
<td>No arrangements for carrier counseling of youth at school level.</td>
<td>08</td>
<td>31</td>
</tr>
<tr>
<td>12</td>
<td>Lack of inter linking and integration between different streams of education is felt.</td>
<td>06</td>
<td>23</td>
</tr>
<tr>
<td>13</td>
<td>Ratio of female students in technical education is very low.</td>
<td>05</td>
<td>19</td>
</tr>
</tbody>
</table>
Table 40 indicates that regarding the causes for not achieving the required quality of Technical Education in Pakistan, eighty one percent (81%) of the respondents were of the opinion that Pakistan is facing political instability which results as non-consistency in planning. Seventy seven percent (77%) respondents indicated that; in most of technologies curricula for diploma of associate engineers is out dated and obsolete. Seventy seven percent (77%) of the respondents stated that appropriate funds are not provided for technical education in country. Seventy three percent (73%) of the respondents were of the opinion that the Scope for advance professional education is restricted and limited. Sixty nine percent (69%) of the respondents indicated that Industry-institute linkage in Pakistan is weak. Sixty nine percent (69%) of the respondents indicated that, technical colleges in the country are facing lack of professionally trained faculty. Sixty two percent (62%) of the respondents pointed out that, no qualification framework have been developed in Pakistan. Sixty two percent (62%) of the respondents highlighted that, there is lack of coordination and uniformity among different departments at provincial and national level. Forty two percent (42%) of the respondents indicated that, conditions of Infrastructure at colleges of technology are not up to the mark. Thirty one percent (31%) of the respondents indicated that, no skill standards have been finalized in the country. Thirty one percent (31%) of the respondents highlighted that there are no arrangements for carrier counseling of youth especially at school level. Twenty three percent (23%) of the respondents indicated that, the lack of inter linking and integration between different streams of education is felt. Nineteen percent (19%) of the respondents stated that the ratio of female students in technical education is very low.
The analysis of the responses collected through the interviews of experts of technical education shows the respondents’ views that the country is facing political instability which results as non-consistency in planning, there is no long term planning in the country, in the experts opinion there is lack of coordination and uniformity among different departments at provincial and national level, the lack of coordination and uniformity is itself a hurdle in implementation of planning. Scope for advance professional education is restricted and limited due to non-acceptance of the equivalence of degrees and diplomas of technical education by different departments and universities especially Pakistan Engineering council, as no national qualification framework (NQF) have been developed yet, the respondents were with the view that development and finalization NQF can be helpful in improving the intake. It will open the doors of diploma of associate engineers (DAE) level education for students of vocational education; on the other hand it will also open the doors for higher education and equivalence for the pass outs of DAE and B.Tech. until the approval of NQF it is the hurdle both for intake and further higher education too. Respondents were also of the opinion that technical education needs more funds as compare to general education. Lack of funds always remained major obstacle to transmit quality education and training for the students to the required skill standards, where comparatively more funds are required for renovation or replacement of old/outdated machines and equipment along with the costly consumable material required for practical demonstration and students’ practical work but ground reality is that share of funds for technical education as compare to general education always remained insignificant in country.
The respondents indicated that the curricula of technical education is not as per requirements of job market, it is out dated and requires to be updated and revised according to new trends of market. Technical colleges in the country are facing lack of professionally trained faculty, conditions of Infrastructure at colleges of technology is not satisfactory, all this is improved world-wide with the coordination of industry but Industry-institute linkage in Pakistan is weak. There is lack of coordination and uniformity among different government departments at provincial and national level, no skill standards have been finalized in the country, there are no arrangements for carrier counseling of youth especially at school level proper guidance and counseling of students can improve the situation regarding intake, Women are more than fifty percent of the Pakistani population but the ratio of female student in technical education is very low situation needs to be planed and improved.
Research Question No. 6.

What should be the necessary measures for the promotion of Technical Education in Pakistan?

Table 41 Suggested measures for promotion of technical education in Pakistan

<table>
<thead>
<tr>
<th>S.No</th>
<th>Statement</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An influential and autonomous body should be established (which can work freely without political interference) for long term and short term planning, legislation and monitoring and coordination between different national and provincial bodies for TEVT.</td>
<td>22</td>
<td>85</td>
</tr>
<tr>
<td>2</td>
<td>Curricula of DAE should be reviewed regularly and revised systematically.</td>
<td>21</td>
<td>81</td>
</tr>
<tr>
<td>3</td>
<td>Proper arrangements for professional and industrial training of teachers and lab staff should be made.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>4</td>
<td>National Qualification frame work should be developed and implemented as soon as possible.</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>5</td>
<td>Proper funds should be allocated for technical education at national and provincial level.</td>
<td>19</td>
<td>73</td>
</tr>
<tr>
<td>6</td>
<td>Proper legislation should be done to improve the involvement of the industry in process for enhancement of technical education.</td>
<td>19</td>
<td>73</td>
</tr>
<tr>
<td>7</td>
<td>Infrastructure at colleges of technology should be improved immediately.</td>
<td>18</td>
<td>69</td>
</tr>
<tr>
<td>8</td>
<td>Skill standards should be developed immediately with consultation of industry.</td>
<td>17</td>
<td>65</td>
</tr>
<tr>
<td>9</td>
<td>Participation of private sector in technical Education needs to be improved quantitatively and qualitatively.</td>
<td>16</td>
<td>61</td>
</tr>
<tr>
<td>10</td>
<td>Technical education needs to be embedded in general education at school level.</td>
<td>12</td>
<td>46</td>
</tr>
<tr>
<td>11</td>
<td>Professional Carrier counselors and placement officers should be appointed at all educational institutions.</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>12</td>
<td>The good governance of Institutions must be maintained.</td>
<td>07</td>
<td>27</td>
</tr>
<tr>
<td>13</td>
<td>Curriculum should be modular based and flexible.</td>
<td>07</td>
<td>27</td>
</tr>
<tr>
<td>14</td>
<td>Reforms should be introduced to improve women participation in technical education.</td>
<td>05</td>
<td>19</td>
</tr>
</tbody>
</table>
In context of measures for promotion of technical education in Pakistan the table 41 shows that eighty five percent (85%) respondents suggested that an influential and autonomous body should be established (which can work freely without political interference) for long term and short term planning, legislation and monitoring and coordination between different national and provincial bodies for TEVT. Eighty one percent (81%) of the respondents consider that, curricula of DAE should be reviewed regularly and revised systematically. Seventy seven percent (77%) respondents were with the opinion that; Proper arrangements for professional and industrial training of teachers and lab staff should be made. Seventy seven percent (77%) of the respondents suggested that; National Qualification Frame-work (NQF) should be developed and implemented as soon as possible in the country. Seventy three percent (73%) respondents were with the opinion that; Proper funds should be allocated for technical education at national and provincial level.

Seventy three percent (73%) of the respondents suggested that Proper legislation should be done to improve the involvement of the industry in process for enhancement of technical education. Sixty nine percent (69%) respondents were with the opinion that; Infrastructure at colleges of technology should be improved immediately. Sixty five percent (65%) of the respondents consider that, skill standards should be developed immediately with consultation of industry. Sixty one percent (61%) of the respondents were of the opinion that the Participation of private sector in technical Education needs to be improved quantitatively and qualitatively.

Forty six percent (46%) of the respondents consider that, the technical education needs to be embedded in general education at school level. Thirty eight percent (38%) of
the respondents stated that, Professional Carrier counselors and placement officers should be appointed at all educational institutions. Twenty seven percent (27%) of the respondents stated that the good governance of Institutions must be maintained. Twenty seven percent (27%) of the respondents were with opinion that in most of the Curriculum should be modular based and flexible. Nineteen percent (19%) of the respondents stated that the Reforms should be introduced to improve women participation in technical education.

The analysis of the respondents’ views in context of measures for promotion of technical education in Pakistan collected through the interviews, shows that respondents emphasized on restructuring and reconstruction of NAVTEC as a dynamic, influential and autonomous body which can work freely without political interference for, long term and short term planning, legislation, implementation, monitoring and coordination between different national and provincial bodies for TEVT. The participants pointed out that after the 18th amendment in constitution and delegation of powers to the provinces NAVTEC has lost its influence and importance, but dire need is felt for such body at national level. Maximum of the respondents consider that, curricula of DAE should be reviewed regularly and revised systematically to meet the requirements of rapid technological advancements. Most of respondents were with the opinion that; Proper arrangements for professional and industrial training of teachers and lab staff should be made to make them ready and equipped to meet the challenges of new work dimensions. The respondents suggested that; National Qualification Frame-work (NQF) should be developed and implemented as soon as possible in the country, to attract talent toward technical education it is necessary to linkup competencies and skills taught with an
general qualifications that reply both job market needs and quality assured qualification requirements so that the graduates may join job market or move ahead for further education, this will open the doors for pass outs of vocational courses and also be helpful in improving intake of technical education at all levels especially for DAE program. As discussed above respondents were with the opinion that; to cope up the challenges brought by the rapid technological advancements and changing global scenario it is necessary to equip the students with latest technological knowledge and skills, Lack of funds always remained major obstacle to transmit quality education and training of required skill standards to the students, more funds are required for renovation or replacement of old/outdated machines and equipment along with the costly consumable material required for practical demonstration of students, so governments should allocate more funds for this purpose.

Most of the respondents were of the opinion that; industrialists and business men are reluctant to spare or provide money and time required to support the public sector technical institutions, whereas on the other hand administration and faculty of technical colleges is hesitant to accept the role of industrialists in administration or decision making bodies of the educational institutions, the respondents suggested that at national and provincial level proper and balanced legislation should be done to convince both stakeholders to support each other and play their role in national economic development. Respondents were with the opinion that; Infrastructure at colleges of technology is not of the satisfactory level steps should be taken and funds should be provided for its improvement, industrial support may be acquired in the form of practical training at industry as in German dual model respondents were of the view that around the globe
problems of changing needs of job market, skill gaps along with shortage of funding are tackled by improving Industry Institute Linkages. Many the respondents consider that, skill standards should be developed immediately with consultation of industry. Most of the respondents were of the opinion that the Participation of private sector in technical education needs to be improved quantitatively and qualitatively.

Several of the respondents consider that, the technical education needs to be embedded in general education at school level. Various respondents stated that, Professional Carrier counselors and placement officers should be appointed at all educational institutions. Many of the respondents stated that the good governance of Institutions must be maintained. Certain respondents were with opinion that in most of the Curriculum should be modular based and flexible. Some respondents stated that women are more than fifty percent of the total population of Pakistan their role in economic development should not be overlooked; the present ratio of technical colleges for female students and students enrolled in these colleges is very small, new colleges and technologies should be introduced after need assessment at local level, financial scholar ships, hostel facilities and other such reforms should be introduced to improve women contribution in technical education.
CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary

It is accepted all around the globe that, to attain a quick economic growth needs enhancement of technical education and training system in the country. Therefore, it is essential for developing countries to emphasize on their national technical education system as it is a compulsory component for the socio-economic growth of the nation, that is why most of the countries all over the world are focusing more and more on Technical education to provide a sound base for their industrial and economic development.

Pakistan is a developing country with very useful and enormous reserve of young human resource this human resource can be best utilized through enhancement of technical education. In Pakistan technical education and vocational training is divided into three cadres, vocational, commerce and technical education, in the Pakistani background, the term Technical Education represents to post-secondary courses of study intended at preparation of technicians to work as middle level supervisory staff. This research study was aimed to appraise the scenario of “Technical Education” in Pakistan, efforts made by governments in the country for its improvement and keeping in view the
global scenario and opinion of the experts of technical education, devise a model plan for the enhancement of Technical Education in Pakistan. There was a concern with applications—“what works”—and solution to problem. Focusing attention on the research problem instead of methods researcher adopted pluralistic approaches to derive knowledge about the problem and used both quantitative (survey) and qualitative data (focus group discussion & interviews) because it was assumed that they work to provide the best understanding of a research problem (Creswell, 2003). The study began with literature review and after that a focus group discussion was conducted with the experts of technical education, alumnae of diploma of associate engineer and experts from planning commission to explore global trends regarding technical education, analyze existing technical education scenario in Pakistan and explore the key-factors that influence most on the enhancement of technical education. The main factors as prioritized by participants were: 1) Curriculum 2) Institute-industry linkage 3) Infrastructure 4) Teaching effectiveness 5) Intake 6) Research and development 7) Quality assurance 8) Administration and 9) Co-curricular activities. Based on the above mentioned main factor, three questionnaires were developed and data was collected through survey from principals, placement officers and alumnae of technical colleges. This was followed by third phase focusing on detailed qualitative open ended interviews, to collect innovative and detailed views of the experts. A few of the substantial findings of the study showed that world over the technical education is considered as a master key for the industrial and economic development of a nation, in most of countries fund allocation for technical education is being enhanced and considered as an investment on the youth, which returns in the form of poverty alleviation, country’s economic growth,
availability of jobs in market and self-employment of the youth. In most of the countries curricula are being made flexible and job market oriented, industry and business men are involved in the process of curriculum development, students and faculty training and evaluation of students. National qualification frameworks have been developed in almost all of the countries of world. Reforms are being made in all corners of world to improve the female participation in technical education. In connection with the data collected through survey regarding present scenario of technical education in Pakistan, it was found that the condition of Infrastructure, teaching effective-ness, and intake (student) was least satisfactory in technical colleges, curricula was not up dated or job market oriented, on the base of findings and conclusion following main recommendations were suggested : there is urgent need to revise curricula of Diploma of associate engineer and develop an updated Competency based and flexible curriculum, representatives of industry should be involved in the process of curriculum development to make it job market oriented. Proper mechanism should be developed for regular professional and industrial training of teachers and lab staff should be made. National Qualification Framework (NQF) should be developed. Proper legislation should be done to improve the involvement of the industry in process for enhancement of technical education. The reforms should be introduced to improve women participation in technical education. The subjects of entrepreneurhsip and self-presentation should be inducted in all technologies. At last in the light of knowledge obtained the researcher devised a model plan for enhancement of technical education in Pakistan”, the plan was sent to the experts for their reviews and improvements were made accordingly.
Findings

- The globalization of economies has reinforced importance of skill based knowledge-workers worldwide (Table 4).
- The technical education is considered as a master-key for economic growth of the nation in most of developed and developing countries. Technical education is being used as a tool to alleviate poverty and curtail unemployment, technical education is being promoted all over the world to overcome the threat of increasing unemployment, short term and long term policies are being made to promote technical education and vocational training (TEVT) throughout the world, under umbrella of UNIVOC and UNESCO (Focus group & Table 4).
- Competency based curriculum is being introduced worldwide, representatives of industry are involved in the process of curriculum development to make it job market oriented (Focus group).
- National Qualification Frame-Works (NQF) have been developed and implemented in these countries for better linkage of the technical education with vocational and general education and resolve the problem of the degrees’ equivalence among vocational, technical and general education (Focus group).
- Throughout the globe supporting role of industry and business community is being improved through better industry-institute linkage. Strong institute-industry linkage is being focused and improved, where institute
and industry support each other in different forms e.g. students’ internship and training of faculty at industry and research & development work and theoretical coaching of industrial staff at institute. “Dual education program” (i.e. theory in institute and practical training at industry) is an important example of public private partnership being successfully applied in different countries e.g. Germany, Austria, Vietnam, Switzerland and Egypt. The implementation style of dual system differs from country to country to certain extent but the major agenda is basically an example of collaboration and sharing of sources between institute and industry (Table 4 & focus group).

- In most of the developed and developing countries fund allocation for technical education is being enhanced and considered as an investment on youth for economic growth, which pays in future in the form of self-employment of the youth, industrial development and economic stability, examples of such countries are Germany, Australia, Vietnam, Malaysia, and Sirilanka etc. (Table 4).

- New legislation is being made worldwide to support technical education, accreditation councils have been established world over to enhance the quality of education (Focus group).

- Technical education is being used as a source to educate, prepare and motivate youth for self-employment and entrepreneurship to curtail increasing ratio of unemployment, subject of entrepreneurship is being incorporated at DAE level and in other technical and vocational courses in
most of the countries. These programs deliver services such as mentoring, own business development facilities, or business formalization, guideline for easier access to financial support, including loans, and other youth friendly financial schemes (Table 4).

- Under developed and developing countries especially belonging to the Continents of Asia and Africa are supporting their economies through export of skilled man power to other countries and in return earning foreign exchange. (Focus group)

- Differences and divergences between general education and technical education are being eliminated; the technical education is being embedded into mean stream education, technical subjects are being introduced in school education (Table 4).

- Worldwide efforts were being made to increase the share of technical education as compare to general education, in few countries technical education has attained fifty or more than fifty percent share in total strength of students (Table 4).

- Reforms are being introduced globally to eliminate gender discriminations from technical education and to improve the role of women in national economic growth (Table 4).

- Reforms are being introduced to improve public-private partnerships in an effort to develop more comprehensive training structures, to extend the involvement of industry and other stakeholders and to confirm that
training is of high quality, job-market relevant and serves the training needs of the society (Table 4).

- Curricula are being made flexible and market oriented, so that these can adapt to ever changing world of work. Experts from industry are involved in curriculum development process to make it job market oriented (Table 5).

- The supporting role of industry and business community is being improved through better industry-institute linkage, industry helps the institute to overcome lack of financial resources and lack of equipment and machinery whereas institute provides research & development and staff educating facilities for industry (Table 5).

- Governments are providing more funds to improve the infrastructure and provide other pertinent facilities to improve teaching learning atmosphere. As the public is not well aware with the importance of blue collar jobs, special social marketing and career guidance campaigns are launched to improve the intake and enrich social image of technical education (Table 5).

- National Qualification Frame works (NQF) have been developed in most of the advanced countries and in many developing countries NQF have been developed or are being finalized for inter linking and integration between different streams of education (Table 5).
Technical education is being embedded into mean stream education, technical subjects are implanted in school education to develop aptitude required to enter technical education at diploma level (Table 5).

Technical education is being made not only knowledge-oriented and skill-based but also values-centered education. Economically developed and technologically sound countries are now planning to develop value-centered civilization anchored on human dignity, spiritual values, honesty, integrity, well-being of all segments and protection of natural environment. Technical education in these countries is aimed to prepare the individual to become a responsible, mature, honest person equipped not only with the appropriate skills and expertise of latest technologies but also have the knowledge about reality of oneself, this world and others around him, with ability to resolve conflicts, problems and issues in varying situations (Table 5).

Reforms are being made to improve the women contribution in technical education and as a result play their role in economic growth of the society (Table 5).

The main factors that play key role in enhancement of technical education as prioritized by majority of the participants of focus group discussion are i)Curriculum ii)Institute-industry-linkage iii)Infrastructure iv)Teaching effectiveness v)Intake vi)Research and development vii)Quality assurance viii) Administration ix Co-curricular activities.
The alumnae were of the view that the over-all condition of administration in Govt. colleges of technology is satisfactory (Table 6).

The alumnae’s aggregate mean response value 2.98 indicates that the over-all situation of infrastructure in Govt. colleges of technology in Pakistan is least satisfactory. (Table 7)

The alumnae’s aggregate mean response value 3.16 indicates that the over-all condition regarding teaching effectiveness Govt. colleges of technology in Pakistan is just satisfactory.

Seventy percent of the alumnae were of the view that the present diploma of associate engineer (D.A.E.) curriculum does not fulfill the future needs of industry and job market. (Table 9)

Majority of the alumnae respondent (60%) told that internship in industry was not compulsory for students in their college. (Table 10)

In the alumnae’s opinion the over-all situation of industry-institute linkage regarding technical education in Pakistan is least satisfactory. (Table 11)

The alumnae’s views indicate that the over-all situation in connection with intake of Govt. colleges of technology in Pakistan is at lowest level of satisfaction as per set criteria (Table 12).

The opinion of alumnae shows that a balanced weight age is given to co-curricular activities in annual calendar of the institute. (Table 13)

The alumnae opinion indicates that the over-all situation of research culture in Govt. colleges of technology is least satisfactory. (Table 14)
The Principals’ responses show that the over-all situation in connection with quality assurance steps taken at Govt. colleges of technology in Pakistan is satisfactory. (Table 15)

The Principals’ aggregate mean response value 3.72 indicates that the over-all situation in connection with administration at GCTs in Pakistan is satisfactory (Table 16)

The Principals’ aggregate mean response value 3.36 indicates that the over-all situation in connection with infrastructure and facilities at Govt. colleges of technology in Pakistan is satisfactory. (Table 17)

The principals’ responses indicate that in 34% institutions there was no multimedia available to the teachers or if available it was not in working-condition; one or two multimedia sets were available in 56% colleges, whereas in only 10% institutes, more than two multimedia sets were available in working condition to the faculty members. (Table 18)

In accordance with Principals’ perception the over-all situation in connection with teaching “effectiveness” at Govt. colleges of technology in Pakistan is least satisfactory. (Table 19)

The Principals’ aggregate mean response value 2.60 shows that the over-all condition in context of curriculum of DAE classes in Pakistan is least satisfactory. (Table 20)

The mean response value 2.60 of principals indicates that the over-all condition in context of Industry-Institute linkage in Pakistan is least satisfactory. (Table 21)
In accordance with Principals’ perception the over-all condition concerned to the intake of GCTs is least satisfactory. (Table 22)

The majority (91%) of the principals is with the opinion that balanced weightage is given to co-curricular activities in annual calendar of the institute. (Table 23)

Principals were of the view that condition concerned to research and development culture at GCTs is least satisfactory. (Table 24)

In the opinion of majority of the placement officers the condition in context of Quality Assurance is least satisfactory. (Table 25)

In the opinion of placement officers condition of administration at GCTs is least satisfactory. (Table 26)

In accordance with placement officers’ perception the over-all situation in connection with infrastructure and facilities at GCTs is least satisfactory. (Table 27)

In the placement officers’ opinion the over-all condition in connection with teaching effectiveness at Govt. colleges of technology in Pakistan is least-satisfactory. (Table 28)

As per views of the placement officers in context of the involvement of job market experts in process of curriculum development for DAE classes and fulfillment of future needs of industry the situation is least satisfactory. (Table 29)

The most of placement officers indicated that the over-all condition in context of Industry-Institute linkage in Pakistan is least satisfactory. (Table 30)
In accordance with placement officers’ perception the potential and interest level of students in their classes the situation concerned to intake of GCTs is least satisfactory. (Table 31)

The placement officers’ responses show that the level of weight age given to co-curricular activities is satisfactory. (Table 32)

Most of the placement officers were of the opinion that the number of research papers of faculty members published in international research journals is not considered as a criterion at the time of promotions to next scale, the on-line access to latest books and journals is not available in most of colleges and the over-all condition in connection with research and development culture at Govt. colleges of technology in Pakistan is least-satisfactory. (Table 33)

The hostel facility is available in only 41% male technical colleges of Pakistan, whereas the facility of hostel is available in just 29% female technical institutes. Whereas if considered territory wise in capital city Islamabad facility of hostel is available in the only institute of Islamabad, in Punjab the facility is available in (53%) institutes, in Sindh (22%) in Khayber Pakhtoon Khwa (68%), Baluchistan (100%) and hostel facility is available in the only institute of Azad Jammu Kashmir. (Table 34)

The facility of transport is available to the students in only 29% male technical colleges of Pakistan, whereas the facility of transport is available in 36% female technical institutes only. Whereas if considered territory wise in capital city Islamabad facility of transport is available in the only institute of Islamabad, in Punjab the facility is available in (57%) institutes, in Sindh and Khayber
Pakhtoon Khwa facility of transport is available only in few technical colleges, Baluchistan (50%) and transport facility is available in the only institute of Azad Jammu Kashmir. (Table 35)

- Only 37% male technical institutes of Pakistan have their active web-site whereas just 21% female technical institutes have their active web site. (Table 36).
- Eighty one percent (81%) of the experts of technical education were of the view that political instability is one of the main causes which results as non-consistency in planning and as a result not achieving required quality of technical education in Pakistan. (Table 40)

- Seventy seven percent (77%) respondents indicated that; in most of technologies curricula for diploma of associate engineers is out dated and obsolete. (table 40)

- Seventy seven percent (77%) of the respondents stated that appropriate funds are not provided for technical education in country. (Table 40)

- Seventy three percent (73%) of the respondents were of the opinion that the Scope for advance professional education is restricted and limited. (Table 40)

- Most of the respondents (69%) indicated that Industry-institute linkage in Pakistan is weak. (Table 40)

- Most of the respondents (69%) indicated that technical colleges in the country are facing lack of professionally trained faculty. (Table 40)

- Majority (62%) of the respondents pointed out that, no qualification framework have been developed in Pakistan. (Table 40)
➤ Majority (62%) of the respondents highlighted that, there is lack of coordination and uniformity among different departments at provincial and national level. (Table 40)

➤ Forty two percent (42%) of the respondents of interviews indicated that, conditions of Infrastructure at colleges of technology are not up to the mark. (Table 40).

➤ Almost all (85%) of the experts of technical education suggested that an influential and autonomous body should be established (which can work freely without political interference) for long term and short term planning, legislation and monitoring and coordination between different national and provincial bodies for TEVT. (Table 40)

➤ Eighty one percent (81%) of the experts consider that, curricula of DAE should be reviewed regularly and revised systematically. The Curriculum should be modular based and flexible. (Table 41).

➤ Seventy seven percent (77%) respondents were with the opinion that; Proper arrangements for professional and industrial training of teachers and lab staff should be made (Table 41).

➤ Seventy seven percent (77%) of the respondents suggested that; National Qualification Frame-work (NQF) should be developed and implemented as soon as possible in the country (Table 41).

➤ Seventy three percent (73%) interviewees were with the opinion that; Proper funds should be allocated for technical education at national and provincial level (Table 41).
Seventy three percent (73%) of the respondents suggested that proper legislation should be done to improve the involvement of the industry in efforts to improve the quality of technical education and to cover the deficiencies of infrastructure through training of staff and students at industry. (Table 41).

Sixty nine percent (69%) respondents were with the opinion that; Infrastructure at colleges of technology should be improved immediately (Table 41).

Skill standards should be developed immediately with consultation of industry (Table 41).

The technical education needs to be embedded in general education at school level and professional carrier counselors and placement officers should be appointed at all educational institutions. (Table 41).

The Reforms should be introduced to improve women participation in technical education. (Table 41).

Most (61%) of the respondents were of the opinion that the Participation of private sector in technical Education needs to be improved quantitatively and qualitatively. (Table 41).

Most (61%) of the respondents were of the opinion that the Participation of private sector in technical Education needs to be improved quantitatively and qualitatively. (Table 41).

Many of the respondents of the open ended questions and interviews were of opinion that the curriculum of each technology should be flexible, reviewed after every three to five years and revised at maximum after every five to eight years.
Conclusions

Based on the findings of the study, the researcher has drawn following conclusions:

- Worldwide, the technical education is considered as a master-key for economic growth of the nation in most of developed and developing countries. Technical education is being promoted and used as a tool to alleviate poverty and curtail unemployment.

- Around the globe supporting role of industry and business community is being improved through better industry-institute linkage. Industry is involved in the process of curriculum development, students and staff training, students’ evaluation and improving the infrastructure of technical colleges.

- Competency based and flexible curriculum is being introduced worldwide, representatives of industry are involved in the process of curriculum development to make it job market oriented.

- Governments are providing more funds to improve the infrastructure and to improve teaching learning atmosphere. Special social marketing and career guidance campaigns are launched to improve the intake and enrich social image of technical education.

- National Qualification Frame works (NQF) have been developed in most of the advanced countries and in many developing countries NQF have been developed or are being finalized for inter linking and integration between different streams of education.

- All around the world technical education is being made, not only knowledge-oriented and skill-based but also values-centered education.
The main factors that play key-role in enhancement of technical education are:

1. Curriculum
2. Institute-industry-linkage
3. Infrastructure
4. Teaching effectiveness
5. Intake
6. Research culture
7. Quality assurance
8. Administration
9. Co-curricular activities

The situation in connection with curricula for diploma of associate engineer classes in Pakistan is least satisfactory.

The curriculum of each technology should be flexible, reviewed after every three to five years and revised at maximum after every five to eight years.

The circumstances regarding institute industry linkage in Pakistan are least satisfactory.

The overall position of infrastructure and facilities in technical colleges of Pakistan is least satisfactory.

The conditions regarding teaching effectiveness in the technical education are least satisfactory.

The overall situation in connection with “intake” is also least satisfactory.

Proper steps have not been taken to develop research culture in technical education.

The steps taken for quality assurance in technical education at Pakistan are somewhat satisfactory.

The conditions concerned to the administration of technical colleges are satisfactory.

The situation regarding co-curricular activities at Government colleges of technology is satisfactory.
Proper efforts have not been made to improve women participation in enhancement of technical education.

Discussion

This research study was conducted to highlight the present scenario of “Technical Education” in Pakistan, diagnose the causes for not achieving the quality in technical education of Pakistan and keeping in view the global trends and opinion of the experts of technical education, devise a model plan for the enhancement of technical education in Pakistan. Government of Pakistan had announced different steps for improvement of technical education in different educational policies, but reviewed literature and the findings of the study exposed that these plans and policies couldn’t achieve their targets due to lack of allocated budgets for technical education, leakage of funds, political instability, adhocism in government policies and non-involvement of relevant experts of technical education in policy making process were the main causes of weakening of technical education in the country, similar results have been reported by Adviso (2003) and Shah (2004). A dire need was felt to improve funding for technical education, its proper monitoring and long term planning with involvement of concerned experts. The study indicated that curricula was outdated and not job market oriented, the curricula of most of the technologies was revised last time in 1996, Hassan (2007) had reported the same, a systematic mechanism needed to be developed for efficient and regular revision of the curricula of different technologies, representatives of industry, job market and alumnae should be involved in this process to develop the flexible and job oriented
curricula. The well-trained faculty can produce better results but the study revealed that dire need for professional and industrial training of faculty was felt, a system needed to be established for systematic regular training of faculty members at local industry and abroad. The conditions of infrastructure and facilities for practical training were found least satisfactory these deficiencies may be overcome with the help of industry; the German dual educational model may be adapted after necessary modifications according to the local situation but appropriate legislation and proper homework is desired before its implementation. The coordination between different stakeholders of technical education can boost up the teaching learning environments, the study showed that the linkage between industry and institute was very weak in the country, to produce manpower equipped with market oriented skills and competency based training an effective industry-institute linkage is necessary. An effective industry institute linkages comprises of coordination among the two stake holders in wide areas such as in improving institute administration, development of competency based and job market oriented curricula and in providing industrial training for faculty and apprenticeship to the students. This system of coordination is rapidly becoming popular in technical education around the world, for each student it is compulsory to attend apprenticeship and practical training at an industry with theoretical learning institute.

In all corners of the globe most of the countries had developed their National Qualification Framework which facilitates the better linkage between different streams and stages of education, unfortunately National Qualification framework could not be finalized and implemented, which was also found hurdle in quality assurance and improvement of intake.
Females share major part of population in Pakistan, study also found that the involvement of women in technical education need to be enhanced through development and induction of new programs for females after need assessment and proper planning.

Recommendations

On the basis of the finding of the study, the conclusions drawn and the above discussion, following recommendations were made:

**Specific Recommendations**

- Curricula of DAE should be modular based, flexible and systematically reviewed and updated regularly at least after every five years. At least 40% weightage should be given to students’ training at industry.

- National Qualification Framework (NQF) and skill standards should be developed and implemented immediately.

- The Reforms should be introduced for admission of vocational trained students in technical education (DAE) and technical diploma holders in engineering degree.

- The technical education needs to be embedded in general education at school level and Professional Carrier counselors and placement officers should be appointed at all educational institutions.

**General Recommendations**

- Proper legislation should be made to improve the involvement of the industry in process for enhancement of technical education.
 Proper mechanism should be developed for regular professional and industrial training of teachers and lab staff should be made.

 All the federal and provincial governments should allocate more funds for technical education in their respective budgets.

 Infrastructure at colleges of technology should be improved immediately.

 The Participation of private sector in technical Education needs to be improved quantitatively and qualitatively.

 The Reforms should be introduced to improve women participation in technical education.

 The subjects of entrepreneurship and self-presentation should be inducted in all technologies.

 **Proposed Model Plan for Enhancement of Technical Education in Pakistan**

 Like so many other concepts and terminologies used in social sciences it is quite difficult express a single worldwide accepted definition of model plan, different professionals may describe this concept in according to their own view and circumstances. As Ford (1995) express that a model can come in many shapes, sizes, and styles. It is important to highlight that a model is not the true world but simply a human construct to facilitate to understand real world systems in a better way. In general all models have an information input, an information processor, and an output of predictable outcomes. Hussain (2009) has expressed model as, a detailed step by step material for
the people who work to achieve some objectives in other words any model can be expressed as a step-by-step process to accomplish some jobs in particular situations, which facilitates the people to perform the job effectively.

A model is generally designed by means of some definite scientific queries in mind, and researchers raise different queries about a physical system that move in all legitimacy toward the distinct model plans. A well planned model should be as composite as it is necessary to answer the queries that have motivated its initiation.

From the above discussion it becomes obvious and clear that a model plan for enhancement of technical education refers to a systematic organization of different elements and it is one that focuses on administrative, academic and training activities and proposes several strategies to smooth the progress of the administration, management and all the relevant teaching-learning process. It suggests learning experiences and atmosphere relevant to current and future needs for country’s continued economic & industrial development, to establish and create the conditions fundamental to enhance the quality and efficiency of the technical education system in Pakistan. The researcher has reviewed different plans made for technical education from time to time in past, appraised the present scenario of technical education in Pakistan. Keeping in view the global trends in connection with the enhancement of technical education and in the light of findings of the study, researcher has recommended a model plan for enhancement of technical education in Pakistan. This proposed model plan was presented to 10 experts of technical education, improvement were made as suggested by experts. They were satisfied that this plan will be useful for enhancement of technical education in Pakistan.
Fig 11 Proposed model plan for enhancement of technical education in Pakistan

Note: description of abbreviations is given on next page
Brief Description of Proposed Model Plan for Enhancement of Technical Education in Pakistan

Following steps have been suggested in the proposed model plan for enhancement of technical education in Pakistan:

Federal Government Role and Contribution

At federal level autonomous body, national vocational and technical training commission (NAVTTC) will be responsible just like higher education commission in general education for the following activities:

a. Policy Making
b. Coordination between provincial TEVTAs
c. Development and revision of Curricula
d. Development and implementation of national qualification framework
e. Development of skill standards
(a) **Policy Making.** National level policy making is responsibility of national bodies, after the approval of 18th amendment in national constitution, powers and responsibilities of education like many other departments have been delegated to provinces but NAVTTC has been established at national level in prime minister’s secretariat at present it is not playing an active role it has been suggested and assumed in model plan, that NAVTTC will be made more functional to play its active role to develop new realistic plans and policies at national level and federal government will provide proper financial and legislative support for the implementation of these policies to enhance technical education at national level.

(b) **Coordination between Provincial TEVTAs.** NAVTTC will coordinate between different bodies (TEVTAs) established at provincial level and check and supervise the activities of TEVTAs for uniform and proper implementation of policies and plans made for the improvement of technical education in country.

(c) **Development and Revision of Curricula.** As pointed out in the study the curricula of different technologies is out dated and need to be revised, NAVTTC will make a mechanism for the development and revision of uniform, job market oriented curricula at national level. It is proposed on the base of findings of the study that curriculum of each technology should be flexible, reviewed after every three to five years and revised at maximum after every five to eight years, with the involvement of all stakeholders and in the light of need assessment made at provincial level Subjects of
entrepreneurship, self-presentation and sustainable development shall be added in all curricula to make pass outs more worthwhile.

(d) Development and Implementation of National Qualification Framework. Most of the countries around the globe have developed and implemented their national qualification framework, Pakistan is lagging behind. It will be the responsibility of NAVTETC to develop and implement national qualification framework, in Pakistan to improve and open new door of intake (like vocational certificate holders) and broaden the scope of higher education for degree holders of technical education in this way improving the worth and quality of technical education. The vocational qualification holders can be declared eligible for admission to diploma of associate engineers (DAE) after passing some additional theoretical subjects like Physics, Chemistry Math and English. The seats of diploma (DAE) holders are proposed to be increased in engineering universities and degrees of technical education should be recognized especially B.Tech and Bs. Tech. should be recognized at all levels especially by Pakistan engineering council.

(e) Development of Skill Standards. NAVTCC will also be responsible for development of skill standards with involvement of all stakeholders; this will be beneficial for both students and industry too.
Provincial Government Role and contribution

At present at provincial level all the technical and vocational institutions have been decided to bring under one umbrella of an provincial autonomous body Technical Education and Vocational Training Authority (TEVTA), this decision has been implemented almost in all provinces but could not be fully implemented at the province of Khayber Pakhtoon Khawa it is proposed that after taking in confidence to all the stakeholders the decision should be fully implemented at all provinces to maintain uniformity in all provinces, following activities and responsibilities are proposed for provincial Governments and provincial TEVTAs:

a) Legislation for involvement of industry

b) Accreditation

c) Physical and financial resources

d) Need assessment

e) Staff development

f) Research and development

g) On line knowledge bank

h) Social marketing of TEVT

i) Financial support to graduates for self-employment.

j) Career counseling at schools

k) Students’ evaluation by BTE.

a) Legislation for involvement of industry. As recommended by the study and this model plan, the provincial government will make new legislation with the
understanding of all the stake holders to increase the role of industry to overcome deficiencies in the institute and by improving participation of industry representatives in the process of planning, problem solving, curriculum development, evaluation, scholarship awarding, faculty exchange, visiting lectures of experts, industrial tours, industrial apprenticeship and students job placement. Provincial government will also make legislation for minimum salary, grade 16 or equal salary was recommended for first entry in government or private job for an associate engineer, by the experts to make the post attractive.

b) Accreditation. It is recommended that the process of accreditation and quality control and administration in technical colleges should be managed by the provincial TEVTAs through predetermined quality assurance measures. These measures can be finalized at national level for standardization at national level.

c) Physical and financial resources. As the powers has been delegated to the provinces through 18th amendment in national constitution, education and training of youth is responsibility of provinces now, that is why it has been recommended in the model plan for technical education that, to provide physical and financial resources for the delivery and enhancement of technical education will be the responsibility of provincial government.

d) Need assessment. It will also be the duty of provincial government to conduct market surveys and discussions for need assessment for launching new technologies,
opening new colleges or curriculum revision to enhance the role of technical education in providing employable skills to youth, reduce unemployment, increase employment and entrepreneurship at local level.

e) **Staff development.** Every provincial technical education and vocational training authority (TEVTA) will be responsible for the improvement of pedagogical and technical skills of its staff, for this purpose at least one staff training institute will be opened in each province where as national institute of science and technical education will play its role at national level. TEVTAs will chalk out a rotational plan for industrial and on hand training of its staff, which will be repeated periodically.

f) **Research and development.** To make technical education job oriented and meet the challenges of ever changing world of work, a research and development (R&D) department will be established under every provincial TEVTA, which will keep an eye on new global trends regarding technical education and will try to cope with technical education in developed countries. R&D department will also plan to develop research culture in technical colleges and its students.

g) **On-line knowledge bank.** The study revealed that sufficient latest relevant books and journals are not available to faculty or students, faculty needs to enhance their knowledge, to overcome these deficiencies and enhance the latest knowledge an on line knowledge bank (library) will be developed in each province under research and
development department of every provincial TEVTA where latest researches, journals and books will be made available to faculty and students.

**h) Social marketing of TEVT.** The study indicated that proper ranking is given to technical education in Pakistani society, people don’t prefer to join blue collar jobs, whereas most of the developed countries have supported their economies and have controlled increasing ratio of un-employment by focusing on technical education, The provincial government will be responsible to improve the image of technical education through social marketing and media campaigns of success stories.

**i) Students evaluation by BTE.** There will be an examining autonomous body or board of technical education (BTE), which will work under provincial government, in every province. BTE will be responsible to take exam, evaluate the students, and award diplomas and certificates to the students. The board will involve the experts from the industry in evaluation process and 15% marks will be awarded by the industry or training place of student on basis of interest taken in practical training at industry, 25% marks will be awarded by the TEVT institute on the basis of practical work performed at institute and practical exam whereas remaining 60% marks will be awarded to student on basis of theoretical exam. Conducted by BTE.

**j) Career counseling at schools.** There is no trend of career or professional counseling of students at matric level TEVTAs will appoint career counselors, one in each technical college, who will not only perform the duty of career counseling in
schools of local community and attract the talent for technical colleges but they will also
guide the student of technical colleges about job market, interview skills and how to start
own business.

k) **Financial Support to Diploma Holders for Self-Employment.** Every
provincial government will start schemes to provide financial support and loans to
diploma holders for starting their own business, as discussed above the subject of
entrepreneurship will be introduced in every technology, to guide and motivate students
for self-employment and small business to control un-employment in the country.
REFERENCES

Adiviso, B (2003). Emerging Trends and Challenges of TVET in Asia and the Pacific Region. In Colombo Plan Staff College for Technician Education (Ed.) Emerging Trends and Challenges in TVET in Asia and the Pacific Region (p.21-29), Manila


www.adb.org/documents/environment/pak/restructuring-education Ret. 6/8/11


INVITATION FOR FOCUS GROUP DISCUSSION

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Subject: REQUEST TO ATTEND A FOCUS GROUP DISCUSSION

Respected Madam./ Sir.

Assalam-o-Alaikum,

Madam, my name is Ahmed Raza and I am a Ph.D scholar in Division of Education, University of Education, Lahore. Dr. Prof Ibrahim Khalid is my supervisor.

My research topic is “Development of a Model Plan for Enhancement of Technical Education in Pakistan”.

The main purpose of the focus group discussion is to get diverse views on some issues which generally impact on enhancement of Technical Education. Following points will be specifically discussed:

1. The profile (present status and issues) of Technical Education in Pakistan.

2. The global trends regarding enhancement of Technical Education.

3. The key factors play role in enhancement of technical education.

As you have a wide experience in Technical Education, your valuable participation in the above mentioned discussion will be very helpful not only in my research, but also to promote Technical Education in the country. Kindly note and confirm the date and time:

Date: 20-03-2012

Time: 9:30 a.m. to 1:30 p.m.

Venue: National Institute of Science and Technology, H-8, Islamabad.

Thanking you advance for participation.

Yours sincerely

Ahmed Raza

(Roll No. 08-PhD-607, U.E. Cell: 0333 4254378)
LIST OF PARTICIPANTS OF FOCUS GROUP DISCUSSION

1. Dr. Tariq Curriculum wing, (Ex. Member Colombo Staff College, Phillipine)
2. Dr .M. Khalid, Director (NAVTEC),Islamabad.
4. Dr. Iftikhar Shah, Director R D, (TEVTA) Lhr. Punjab.
6. Prof. M. Tariq, Ex..Chairman/, Controller (PBTE) Lahore.
8. Mrs. Tehmina Bukhari, Principal Govt. Polytechnic College, Islamabad.
9. Jameel Bajwa National S. Coordinator (NEACE),Islamabad
10. Dr. Muhammad Idrees Asad, S. Research Officer, Curriculum Wing, Islamabad.
11. Prof.A.D. Maken, Senior Educationist.
12. A.Hameed Senior Chief (Education) Planning Commission of Pakistan
13. M. Usman Ghafoor, Manager (North) TEVTA Punjab
15. Dr. M.Idrees Asad S.Researcher Curriculum Wwing, Islamabad.
16. M. Asif , Senior Alumnae Member and Educationist, IIU Islamabad.
17. M.Aamir, Alumnai Member, Lahore.
18. M.Zarar Tariq, Representative, Industrial Zone Islamabad.
COVERING LETTER FOR QUESTIONNAIRE

Division of Education
University of Education, Lahore.

Dear Sir/Madam,

I am a Ph.D. scholar at the above mentioned department. I am pursuing doctoral research entitled, “Development of a Model Plan for Enhancement of Technical Education in Pakistan”. This questionnaire is the research instrument for data collection. I hope you will give your opinions honestly, freely and unbiassedly on the basis of your personal experience. I assure you that your responses will be treated confidentially for the purpose of research thesis.

• You are allowed to mention your identity or not.
• Please return the filled questionnaire as soon as possible.

Thanks for your cooperation.

With best wishes

Yours sincerely,

Ahmad Raza
Ph.D. (Education) Scholar
Contact: 0333 4254378
ahmedraza.pk@gmail.com
QUESTIONNAIRE FOR ALUMNAE.

Name: ______________________________Cell No: ________________ Male/Female

Name of college: ______________________________________ Session: __________

Name of Industry: __________________________Experience: ______ Salary: ______

How much you agree or disagree with each of the following statements, please (√) tick the most appropriate answer regarding your institute.

Note: SA for strongly agree, A for agree, UD for undecided, DA for disagree and SDA for strongly disagree.

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<tr>
<th>S.No</th>
<th>Statement</th>
<th>SA</th>
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<tbody>
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<td>1</td>
<td>The teachers come to the class well prepared.</td>
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<td>2</td>
<td>The rule for students, to meet the minimum requirement of attendance (i-e 80% lectures) is implemented strictly in the college. Regular attendance of students is encouraged and maintained.</td>
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<td>The classes are conducted regularly on time.</td>
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<td>The administration is strict regarding the discipline in the college.</td>
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<td>5</td>
<td>The present building fulfills the educational needs of college.</td>
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<td>6</td>
<td>The latest relevant books are available in college Library.</td>
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<td>7</td>
<td>The equipment, tools and machines are sufficient for the practical needs of total students in a class.</td>
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<td>8</td>
<td>On-line access to latest relevant books, research journals and other Library facilities is easily available to students.</td>
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<td>9</td>
<td>Sufficient material is provided to students in laboratories for practical.</td>
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<td>10</td>
<td>Present diploma of associate engineer (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
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<td>11</td>
<td>Proper number of teachers is available for each subject.</td>
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<td>12</td>
<td>The teachers have updated practical knowledge and training for their Professional needs.</td>
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<td>13</td>
<td>The teachers use multimedia and other audio visual aids during lecture.</td>
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<td>14</td>
<td>Sufficient opportunities of higher education for diploma holders (D.A.E.) are available in the country.</td>
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<td>15</td>
<td>Experts from industry and job market (external examiners) are involved in examination process.</td>
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<td>16</td>
<td>Examination and evaluation system is appropriate to evaluate the competency of the students in professional know-how.</td>
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<td>17</td>
<td>A balanced weight age is given to co-curricular activities in annual calendar of the institute.</td>
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<td>18</td>
<td>Students take admission in diploma (D.A.E.) classes have the potential and aptitude required for their relevant technology.</td>
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<td>19</td>
<td>After matriculation, to take admission in diploma of associate engineer was my first priority.</td>
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<td>20</td>
<td>Students are always keen to use available library resources.</td>
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<td>21</td>
<td>Ratio of the students who leave college (drop-outs) before completion of diploma (DAE) is alarming.</td>
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<td>Average ratio of absent students in each class is more than 20%.</td>
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<td>23</td>
<td>Role of industry was helping regarding your training and internship.</td>
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<td>24</td>
<td>The employers are satisfied from the stuff produced by technical colleges (if not give suggestions at end).</td>
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<td>25</td>
<td>Professionals from different walks of life/industry are regularly invited to address teachers and students.</td>
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<td>26</td>
<td>The latest research journals are available in college Library.</td>
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27: Two/three month internship at industry is compulsory for every student. **Yes/No**

28: Does the college arrange Education and training for “diploma” students to start and establish own small business: **Yes/No**
# QUESTIONNAIRE FOR PRINCIPALS

**Name:** ________________________  **Cell No:** _______________  **Male/Female**

**College name:** ________________________________  **B.P.S:** ____________

**Experience:**  
**Teaching:** ______  **Administration:** ______  **Qualification:** ____________

How much you agree or disagree with each of the following statement, please (√) tick the most appropriate answer regarding your institute.

**Note:** **SA** for strongly agree, **A** for agree, **UD** for undecided, **DA** for disagree and **SDA** for strongly disagree.

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<th>DA</th>
<th>SDA</th>
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<tbody>
<tr>
<td>1</td>
<td>Academic audit of the institute is done by TEVTA/higher authority (or its nominated agencies) effectively and regularly.</td>
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<td>2</td>
<td>SWOT (strengths, weaknesses opportunities &amp; threats) analysis at college level is done regularly.</td>
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<td>3</td>
<td>Sufficient administrative powers to the principals have been given for maintaining better discipline in the institute.</td>
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<td>4</td>
<td>The process of internal evaluation of students (sessional marks), is Continuously monitored by TEVTA/ higher authorities.</td>
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<td>5</td>
<td>Sufficient financial autonomy has been given to the principals to maintain and develop a better teaching learning atmosphere.</td>
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<td>The present building of college fulfills the educational needs.</td>
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<td>The latest relevant books are available in your college Library.</td>
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<td>Sufficient funds are available to purchase material required for practical in laboratories.</td>
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<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
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<td>12</td>
<td>The teachers need to update their practical knowledge and training for their Professional needs.</td>
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<td>13</td>
<td>Proper priority and funds are given to technical education at national and provincial level.</td>
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<tr>
<td>14</td>
<td>Funds allocated for technical education at national and provincial level are utilized properly.</td>
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<td>Most of the students attend their classes with keen interest.</td>
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</tbody>
</table>
21 Sufficient opportunities of higher education for diploma (D.A.E.) holders are available in the country.

22 **On-line** access to latest relevant books, research journals and other Library facilities is easily available to faculty members and students.

23 Number of multimedia available (in working condition) to the teachers

24 Total number of seats for Diploma of Associate Engineer (D.A.E.) 1st year

25 Number of students in Diploma of Associate Engineer (D.A.E.) classes (at Present):

- 1st year______
- 2nd year______
- 3rd year______

26 Ratios of students who attend 80% of planned lectures in an academic year is:

- **less than** 30%.
- **less than** 50%.
- **less than** 80%.
- **more than** 80%.

27 Kindly give reasons for not attending lectures:

a) ____________________________________________________________

b) ____________________________________________________________

c) ____________________________________________________________

d) ____________________________________________________________

28 The percentage of applicants, refused by college, for admission in 1st year (DAE) class is:

- 0 %
- **less than** 50%.
- **less than** 100%.
- **more than** 100%.
QUESTIONNAIRE FOR PLACEMENT OFFICERS

(The faculty member responsible for industrial relations, training/internship and placement of students)

Name: ________________________  Cell No: ______________  Male/Female

College name: ____________________________  B.P.S: ______________

Experience: Teaching: ______  Placement: ______  Qualification: ____________

How much you agree or disagree with each of the following statement, please (✓) tick the most appropriate answer regarding your institute.

Note: SA for strongly agree, A for agree, UD for undecided, DA for disagree and SDA for strongly disagree.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>SWOT (strengths, weaknesses opportunities &amp; threats) analysis at college level is done regularly.</td>
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<td>2</td>
<td>Annual curricular activities are planned after discussion with the faculty.</td>
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<td>3</td>
<td>Proper number of teachers is available for each subject.</td>
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<td>4</td>
<td>Teachers are satisfied from their present salary package.</td>
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<td>5</td>
<td>The present building of college fulfills the educational needs.</td>
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<td>6</td>
<td>The latest relevant books are available in your college Library.</td>
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<td>7</td>
<td>Sufficient funds are available to purchase material required for practical in laboratories.</td>
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<td>The equipment, tools and machines are sufficient for the practical needs of total students in a class.</td>
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<td>Present diploma (D.A.E.) curriculum fulfills the future needs of industry and job market.</td>
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<td>11</td>
<td>Experts from industry and job market are involved in curriculum development process.</td>
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<td>12</td>
<td>The teachers need to update their practical knowledge and training for their Professional needs.</td>
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<td>13</td>
<td>Sufficient opportunities of higher education after three year diploma (D.A.E.) are available in the country.</td>
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<td>Role of industry is helping regarding students training and internship.</td>
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<td>Professionals from different walks of life/ industry are regularly invited to address teachers and students.</td>
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<td>The latest research journals are available in college Library.</td>
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<td>The number of research papers of faculty members published in international research journals is considered as a criterion at the time of promotions to next scale.</td>
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25: Facilities available to students: **Hostel**: Yes/ No   **Transport**: Yes/ No  **Internet**: Yes/ No

26: The college has its own (active) web site: **Yes/ No**

27: Merit list for admission in D.A.E. classes is displayed on net: **Yes/ No**

28: Kindly give some reasons for not attending lectures (by students):

a) __________________________________________

b) __________________________________________

c) __________________________________________

29: Is internship/practical training of students at industry, compulsory at your institute:

a) 1<sup>st</sup> year: Yes / No if yes give duration _________ months.
b) 2<sup>nd</sup> year: Yes / No if yes give duration _________ months.
c) 3<sup>rd</sup> year: Yes / No if yes give duration _________ months.
LIST OF EXPERTS

1. Dr. Tariq Curriculum wing, (Ex. Member Colombo Staff College, Phillipine)
2. Dr .M. Khalid, Director (NAVTEC),.Islamabad.
3. Prof. Dr.Rafaqat Ali Akbar. IER. University of Punjab, Lahore.
4. Dr. Iftikhar Shah, Director R D, (TEVTA) Lhr.Punjab.
6. Prof. Dr.Ahmed Shair Awan. IER. University of Punjab, Lahore.
7. Prof. M. Tariq, Ex..Chairman,/ Controller (PBTE) Lahore.
9. Prof. Dr Ubaid Ullah. IER. University of Punjab, Lahore.
10. Jameel Bajwa National S. Coordinator (NEACE).Islamabad
11. Dr. Muhammad Idrees Asad, S. Research Officer, Curriculum Wing, Islamabad.
12. A.Hameed Senior Chief (Education) Planning Commission of Pakistan
14. Mrs. Tehmina Bukhari, Principal Govt. Polytechnic College, Islamabad.
QUESTIONNAIRE FOR INTERVIEWS WITH EXPERTS.
(Semi structured)

Q1. What is your opinion about importance of technical education in economic
development of country?

Q2. Are you satisfied with the role of technical education in Pakistan?

Q3. What role is technical education playing in country’s development, the world
over?

Q4. How the other countries have utilized and improved the quality of technical
education in their country?

Q5. Are you satisfied from the present curricula of technical education in Pakistan?

Q6. How can we cover the deficiencies of technical education to enhance its utility
and quality in country?

Q7. How can we improve the role of industry in enhancement of technical education
at Pakistan?

Q8. Please give some more suggestions to improve the quality of technical education
and its role in economic development of country.