STUDY OF VOCATIONAL TRAINING SYSTEM RELATED TO CONSTRUCTION INDUSTRY IN TECHNICAL TRAINING INSTITUTES OF PUNJAB

By

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TO

MY PARENTS

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ABSTRACT

Construction Industry has become one of the most important industries of any country (Frisk, 1997). A construction project involves craftsmen of various trades in order to complete the project in time and with quality standards. In order to obtain this, craftsmen/tradesmen need to have sufficient training and education in their respective trades. Moreover, literature suggests that human capabilities can be enhanced with better education and training. Construction vocational courses involve trades such as carpenter, mason/brick layer, building electrician, plumber, painter, polisher, welder etc. Their training programs range from few weeks to two years and entry qualifications vary from primary to secondary school pass.

Some researchers (Kardar, 2004; Iftikhar, 2004) have attempted to study the overall technical and vocational training system of the country but little to no effort have been made to focus on the vocational training related to construction industry of Pakistan. Keeping in view the importance of this, it was decided to carry out the research in this field in Punjab province and to study the structure and the factors affecting the effectiveness of vocational courses related to construction industry. An extensive literature review was carried out to develop a structured questionnaire and sixty five (65) factors were outlined which were further grouped in eight (8) categories. After obtaining data from the field, reliability test was performed in order to confirm the authenticity of the data collected. Next individual ranking of each cause was also found among students and teachers using Relative Importance Index (RII). Percentage Agreement between students and teachers was calculated in order to get degree of agreement between their views about the factors. Ten (10) top ranked factors were also indicated based on their RII which included that current curriculum is not abreast with modern day technologies and procedures, latest books are not available for the training and regular academic site visits are not conducted for the training courses etc. In the end, some recommendations have been made in order to improve the courses being taught at Punjab technical training institutes.

Chapter 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 General

Vocational education and its training system at the time of independence of Pakistan was a weak one. Vocational education system was set up in Pakistan in the mid 1950's by opening up of two Polytechnic Institutes in Karachi and Rawalpindi respectively. Since then, there has been a great increase in the number of vocational and technical institutes, enrolments and teachers. The technical and vocational (TVE) terms are mostly used synonymously. However in terms of Pakistan, technical education refers to practical training and courses given to technicians at post secondary level aimed at their preparation as middle level supervisory staff; whereas vocational education means low level education and practical training aimed at the preparation of semi skilled and skilled workers in various trades. Construction Industry is a labor intensive industry. Construction industry has become one of the most important industries of any country (Fisk, 1997). A construction project involves craftsmen of various trades in order to complete the project in time and with quality standards. In order to obtain this, craftsmen/tradesmen need to have sufficient education and training in their respective trade. Moreover, literature suggests that human capabilities can be improved through better education and training (Haq, 2002). Construction vocational courses involves trades such as carpenter, building electrician, plumber, mason/brick layer, heavy machinery operator, painter, polisher, welder, tile fixer etc. Their training programs range from a few weeks to two years and entry qualifications vary from middle to secondary school pass. Construction vocational courses provide the requisite skills to the labor to cater the needs of construction industry.

1.2 SIGNIFICANCE OF RESEARCH

Vocational education plays a pivotal role to increase the productivity of individuals, employer's profitability and growth in the national economy. It not only raises the rate of return on investment and increases employability but also ensures the implementation of various development projects within the time (Booth and Snower, 1996). Some researchers (Kardar, 2004; Iftikhar, 2004) have attempted to study the overall technical and vocational education system of the country but a little effort has been made to focus on the vocational training related to construction industry of Pakistan. This research tries to fill the void by studying the construction vocational training system being run in the province of Punjab and to identify the factors that affect the effectiveness of the courses being taught at the institutions.

1.3 OBJECTIVES

Following are the objectives of this research:

(a) To study the structure, curriculum and courses of the construction vocational training system at the technical training institutes of Punjab.

(b) To identify the factors affecting the effectiveness of the construction vocational courses.

(c) To propose recommendations for the improvement of these courses.

1.4 SCOPE

The scope of this research was limited to study of construction related courses being taught at the technical training institutes at vocational level only. The technical courses, Diploma of Associate Engineering (DAE) related to construction industry having long duration are not part of this study. Moreover this study was carried out at the technical training institutes in Punjab province only. A field survey of more than 100 individuals was done in order to obtain the factors that

affect the courses. An effort has been made to study the current structure and identify problems related to construction vocational courses.

1.5 ORGANIZATION OF THE THESIS

The thesis contains five chapters. Chapter 1 deals with introduction, which gives a brief on construction vocational courses along with significance of the research, its objectives and scope. Chapter 2 is of literature review, in which history and current structure of Technical and Vocational Education and Training (TVET) of Pakistan has been discussed with a special focus on the courses related to construction industry of Pakistan. Chapter 3 deals with methodology which explains the methodology adopted to carry out this research. This chapter discusses the procedure of data collection and analysis. Chapter 4 of this thesis is data analysis and result. It describes the procedure adopted for the analysis of data obtained from the questionnaire and their subsequent result. Chapter 5 is conclusion and recommendation. It concludes and proposes the recommendations based on the findings of this research from the analysis of the data.

Survey questionnaire is also available in the appendices. The software used for the analysis of the data is Statistical Package for the Social Sciences (SPSS Ver 18.0)

1.6 SUMMARY

This chapter includes brief introduction regarding the topic. Significance of the research has been given and objectives of research are listed. Scope of the thesis is also mentioned and organization of the thesis is explained.

Chapter 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter deals with the literature review of the construction vocational training courses being run in the country. History of Technical and Vocational Education and Training (TVET) system in Pakistan has been studied and current scenario of the technical and vocational education system has also been discussed. Vocational training courses related to construction industry are discussed in detail and the organizations involved in the structuring and development of these courses are also mentioned.

2.2 SKILLS DEVELOPMENT

Skill development deals with the capacity building and effectiveness of human capital which in turn increases productivity and improves the economy of a country. The most important result of the effective skills development program is that it not only provides greater employment opportunities by enhancing the workers abilities but it also enhances the progress of work, which in turn helps in the betterment of the economy of a country. It specifically improves the skills levels of the workforce and enhances the levels of productivity. Wagner (2005) points out that vocational training system would have a major positive impact on national competitiveness. Growth theories focus on the increasing returns on the human capital. Human capital is a key input to both the, use of ideas and the production of ideas, (Roomer, 1993). It has been observed that human resources quality determines the competitiveness of a society in every aspects of life and due to which a greater effort is seen for the development of the vocational and technical courses for the socio-economic prosperity of a country. Grubb (1985) stated that vocational education can be used effectively to combat dropouts. More specifically,

it is believed to be an effective answer to reduce unemployment and migration to urban centers (Lillis and Hogan, 1983). It has been seen that the economies in the world which have flourished over the years have invested heavily in their vocational education and thus skills development of their youth. The investment on the education sector is less than 2 % of Gross Domestic Product (GDP), in the case of Pakistan, which is by all means, is far less than reference level provided by UMI, which is 4.9 %. It is imperative for the society like Pakistan that it must create suitable environment and conditions for the creativity and in order to proceed further in the knowledge-based industries.

2.3 HISTORICAL PERSPECTIVE OF VOCATIONAL TRAINING IN PAKISTAN

At the time of independence of Pakistan, the system of technical and vocational training, it inherited was from British ruled India of the 18th century. Development of education in Pakistan in later years, 1947 and onwards was influenced by the system built in the Pre Pakistan era (Ali, 1990). The inputs to the education system in Pakistan are based on government policies and subsequent economic development plans and these policies are framed by the ruling governments keeping in view their political manifestos. Unfortunately, these policies kept on changing due to rapid change in the socio-political scenario of the country due to changing of governments. The political events happened at different stages of time resulted in the making of various educational policies and initiatives in order to prepare the youth to keep abreast with the needs of time and ensure their personal enrichment (Government of Pakistan, 1986). Technical and Vocational education and training was identified as a separate stream in 1950s (APACC, 2004). The establishment of Pak Swedish Institute of Technology in addition to the establishment of two polytechnics in Karachi and Rawalpindi marked the beginning of the Vocational and Technical training in Pakistan. Now with the passage of time various technical training institutes, polytechnics, vocational and private training centers have opened up in the country. However the training being imparted in these institutions do not corresponds to the demand of this

technological era. The development of the technical and vocational training was studied in this research in consideration with the policies and events since the independence of Pakistan in 1947. According to Ali (1998) different stages of development of education system in Pakistan are:

1. Stage 1: Policy Formation Phase (1947- 1958)
2. Stage 2: Development Phase (1959-1970)
3. Stage 3: Experimentation Phase (1971-1977)
4. Stage 4: Expansion Phase (1978-1988)
5. Stage 5: Quality Improvement Phase (1989- 2003)

2.3.1 Policy Formation Phase

At the time of emergence of Pakistan, the vocational and technical system of education was not standardized. Various efforts have been made to bring the system into streamline and according to needs of the country since the initial period. A technical education council was also formed to review the area of vocational and technical education and give suggestions. The council of technical education recommended for the creation of separate Directorate of Technical Education in each province to work under the Ministry of Education of the Province (Govt. of Pakistan, 1959). The council suggested the establishment of three polytechnics in the coming five years as it termed polytechnics as the best way to train the manpower in different trades of industries. These efforts of the council resulted in the formulation of Educational Development Plan (1951-1957) and First Five Year Plan (1955-1960). It nevertheless proved a useful guideline to the relevant needs of various level and phases of education (Zaki, 1968). Due to the council efforts and recommendations one polytechnic started at Karachi in 1953 and the other one was opened up at Rawalpindi in 1958. These institutions started taking students and provided training in the fields of automotive technology, civil technology, electrical technology and mechanical technology. Subsequently, Swedish Pakistan Institute of Technology was also set up at Karachi and Gujrat which lay emphases on producing technicians with more emphases on practical training.

2.3.2 Development Phase

This phase started with martial law in the country. Leaders of East and West Pakistan developed differences after the General Elections of 1970 which ultimately resulted in the separation of East wing of Pakistan, now Bangladesh. Despite the disorder in the last quarter of this stage, the government with the control on administration succeeded in the implementation of its policies and regulations up to a certain level. A commission on National Education was set up in 1958, in which the commission recognized education as an investment in national growth and as an economic asset (Govt. of Pakistan, 1960). The commission played an important role in the development of education system and identified needs in the technical and vocational education setup. The commission prepared a report regarding the improvement of the education system and many institutional framework for teaching, learning and different processes in addition to vocational and technical training arrangements currently in Pakistan owe their origin to the suggestions which were presented in the commission report. On the recommendations of the commission development of the polytechnics under the second and third five year plans on education policies is as under.

Table 2.1 Development of Polytechnic Institutes during Second and Third Five-Years Plans

Item	Second Five Year Plan	Third Five Year Plan	Increase %
Allocation (Rs. Millions)	61.7	258.7	330.0
Expenditure (Rs. Millions)	78.0	97.0	26.0
No. of Institutes	9 (1F)*	14 (1F)*	66.6
Annual Intake	2100	3500	60.0
Enrolment	5120	7700	50.4
Output	2100	2500	20.0

*Women Polytechnic

Source: 1. Memon Abdul Aziz, Review of Education Policies and Corresponding Five Year Plans (1947-1986)
2 Sixth Five Year Plan, Planning Commission

2.3.3 Experimentation Phase

This phase of educational development embarked with the restoration of parliamentary form of government in the country. The fourth five year plan 1970-75 was prepared keeping in view the requirements of the education system. The government gave the Education Policy 1972-80, in which education reforms were proposed which were required to be achieved by 1980. The policy also planned various changes which were in contrast from the existing practices on the education sector. The salient features of the policy included that a boy who leaves school after 8th grade should be a better craftsman and after matriculation, he should a better worker and technician. It also proposed that unification of general and technical education will be provided. Large scale up gradation and development of curricula was also done in order to achieve the objectives of the policy. To achieve its goals courses like wood work, metal work, applied electricity, agriculture etc were brought in 6th to 8th classes (Govt. of Pakistan, 1974). The actual expenditure on technical and vocational education during 1972-77 was 222.7 Million Rupees (Govt. of Pakistan, 1978). The measures taken for the improvement of education sector laid the foundation of new scenario in the technical and vocational education system.

2.3.4 Expansion Phase

This phase of educational development encompasses two five year plans, i.e. fifth five year plan (1978-83) and sixth five year plan (1983-88). A National Education Conference was held in October, 1977 whose main objective was to ascertain the measures for the improvement of quality education. In response of the conference, Ministry of Education after consulting with the various stakeholders announced the National Education Policy in October, 1978. Salient features of this policy included that technical and vocational education be made product oriented. In case of technical and vocational education the policy recommended the following (Govt. of Pakistan, 1978). “It was decided to make the curriculum of the technical/vocational institutes market oriented”. “A system will be introduced for the standardization, testing and certification of technical/vocational skill”. “A teacher training college will be established of technical/vocational institutes”. In

the fifth five year plan (1978-83) a total amount of 766.8 Million was allocated to technical/vocational education. At the end of sixth five year plan (1984-89), there was a 40 % increase in the estimated intake of students due to implementation of the policies of the government. During this phase apart from augmenting the physical facilities and infrastructure advancement a number of initiatives like training courses, workshops, staff development, learning processes and management improvement were also taken.

2.3.5 Quality Improvement Phase

During this phase, National Education Policy (1992) was announced which stated that number of technical and vocational training institutes shall be increased and these facilities shall be provided at tehsil level in accordance with the requirement of the area. It also stated that private sector will be encouraged and given opportunities to set up private vocational and technical institutes. It stated that curricula of the courses shall be revised in view of changing market requirements. The National Education Policy of 1998-2010 was declared on 21st Feb, 1998 on the directives of Prime Minister of Pakistan. Table 2.2 shows the allocation and the expenditure on vocational/technical education during different five year plans on education policy.

Table 2.2 Statement of 1st to 9th Plans Allocation and Expenditure on Technical Education in Pakistan

	Allocation	%	Expenditure	%	Total Education	
					Allocation	Expenditure
1st Plan (1955-60)	-	-	-	-	304.93	197.96
2nd Plan (1960-65)	-	-	-	-	490.00	448.79
3rd Plan (1965-70)	-	-	-	-	1086.00	580.61

	Allocation	%	Expenditure	%	Total Education	
					Allocation	Expenditure
Non Plan Period (1970-78)	-	-	-	-	2998.14	3402.65
5th Plan (1978-83)	-	-	-	-	10698.00	5643.50
6th Plan (1983-88)	1315	6.983537	857.95	5.16651	1830	16606.020
7th Plan (1988-93)	2000	8.816484	943.17	4.66293	22684.8	20232.97
8th Plan (1993-98)	2447	3.544748	2373.32	6.18584	69031.70	38367.49
9th Plan (1998-2003)	5000	4.166667	-	-	133,500	-

Source: National Education Policy 1998-2010

2.4 TECHNICAL EDUCATION AND VOCATIONAL TRAINING SYSTEM (TEVT) IN PAKISTAN

TEVT education in Pakistan is divided in the following subparts: pre vocational education, vocational training and technical education. Pre Vocational education is the one which a worker obtains from school while studying. It does not have any part in the growth of any vocational skill. Vocational education deals with development of skilled and semi-skilled workers. Technical education is given through post- secondary courses which give emphases to theoretical knowledge with practical training. It has been observed that numbers of vocational training institutes are insufficient as compare to the needs of construction tradesmen in Pakistan. TVET system in Pakistan suffers from resource constraints, low participation and pass- out rates and distorted linkage with the construction industry (APACC, 2004). Since the emergence of Pakistan various efforts have been done for the betterment of general education sector in the country, however in the technical and vocational education sector (TVE), limited efforts have been

made. Mahmood and Javed (2007) pointed out that number of accreditation bodies of general education increased from 5 in 1970s to 34 in 2005-6, however Boards of Technical Training, the accrediting bodies of technical and vocational education are only 3, one in each province.

2.4.1 Structure of Vocational Training System in Pakistan

The strength of technical and vocational education training system of a country is a vital measure for the preparation of its trained workforce necessary for its socio-economic progress. Grubb (1985) stated that vocational education can be used effectively to combat dropouts. The present structure of vocational education programs in Pakistan is a intricate one and involve many agencies and levels. Government Vocational Institutes are controlled by the respective provincial education department, and on the other hand technical training centres and apprenticeship training centers come under the control of provincial labor departments. Training in different skills is given through various institutions i.e. polytechnics, vocational training centre's, apprenticeship schemes etc in the formal sector and 'Ustad-Shagird' system in the informal sector. The administrative control of these institutions comes under different departments and division i.e. Federal Division of Manpower and Labor, Provincial education/labour and manpower training departments, small industries, private ownership etc. Table 2.3 shows the capacity along with summary of existing Vocational and Technical Institutes.

Table 2.3 Vocational and Technical Training Institutions in Pakistan (2004)

Province	Type of Institute	No. of Centre	Capacity
TEVTA Punjab	Technical and Vocational	402	83,000
Punjab Training Council	Vocational	60	15,000
DMT* Sindh	Vocational	33	3,740
TE and MT NWFP	Technical and Vocational	35	3,300
DMT Baluchistan	Vocational	12	1,730

Skill development		Contractual basis	25,000
Federal	Ministry of Labour	2	1,500
Federal	Ministry of Education	2	1,400
Private Sector and Apprentice			70,000
Total		546	204,670

Source: ADB (2005)

* Directorate of Manpower and Training of Labour

Despite the growth in the technical and vocational education sector since 1970s, it was noted that system remained deficient in order to cope up with the needs of the industry. NAVTTC (National Vocational and Technical Training Commission) came into existence in 2006 and after its creation, it was expected that consolidation of divided TVET system will occur. Currently following ministries and departments are involved in the management and running of the TVET system in the country:

- NAVTTC, The Ministry of Education
- Ministry of Science and Technology
- Ministry of Social Welfare
- Ministry of Labour, Manpower and Overseas Pakistanis
- Ministry of Industries
- Ministry of Agriculture and Livestock
- Other sector Ministries
- Provincial TEVTAs and Departments

Figure 2.1 shows the different agencies and departments involve in the management of TEVT system in the country.

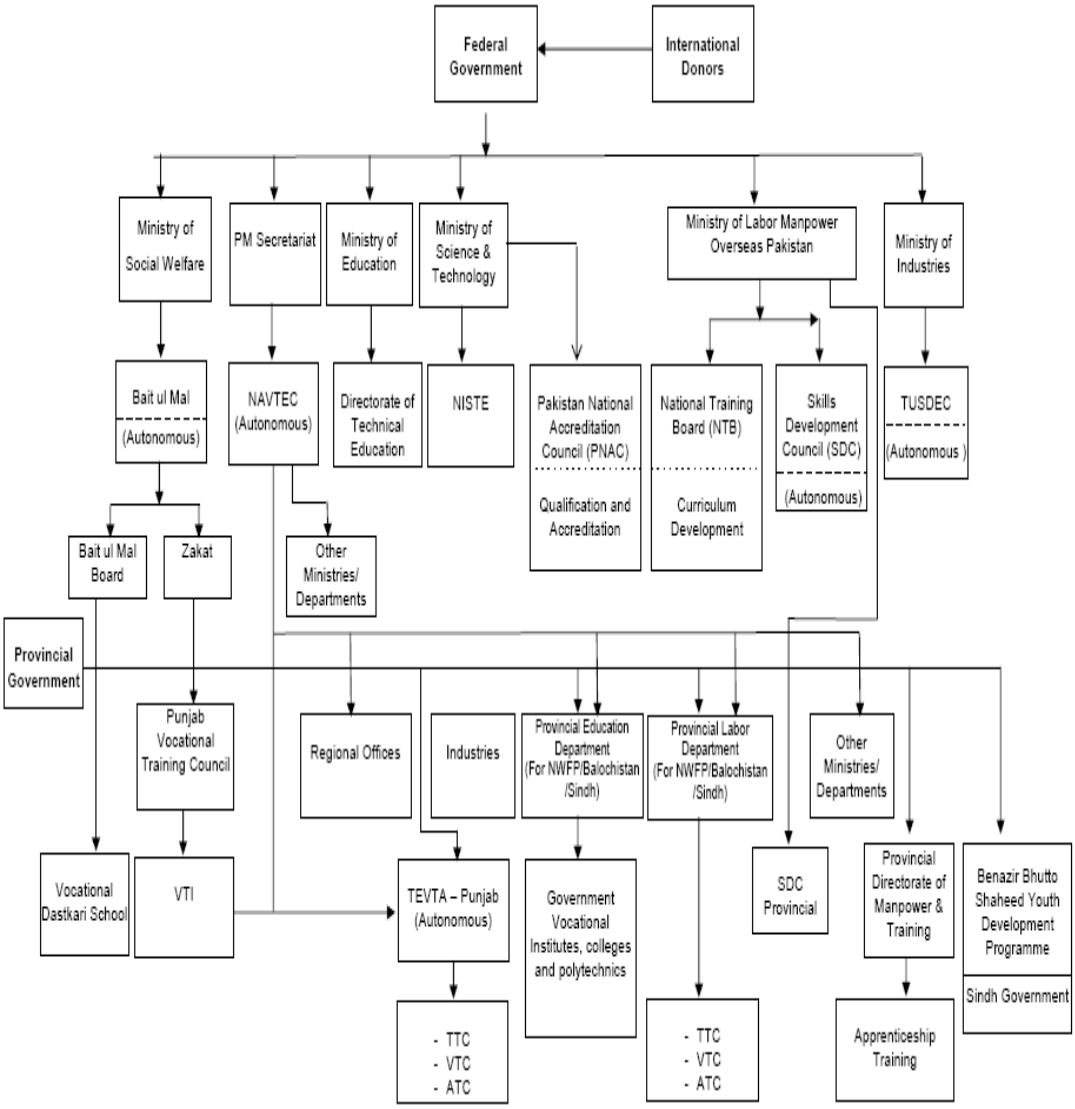


Fig 2.1: Management of TVET System

Coordination of TVET system is improved after the emergence of Technical Education and Vocational Training Authority (TEVTA) in the four provinces and the establishment of National Vocational and Technical Training Commission (NAVTTC) at the Federal level. The duties of NAVTTC include facilitation, regulation and giving policy direction for skill development in Pakistan. Under the National Vocational and Technical Training Act, 2011 NAVTTC is responsible for setting up national occupational skills standards, development of curriculum, national qualification framework, labor market analysis, training of trainers, public private partnership and setting of standards for TVET providers (NAVTTC Website). TEVTAs work at the province level. They are implementing agencies. Their function is to give training and provide administrative facilities along with

requisite infrastructure. They are also given the authority to make curricula, skill standards and certification of courses.

2.4.2 Certification and Accreditation Process

The certification and accreditation of the technical and vocational courses in the provinces of Punjab, Sindh and Khyber Pakhtoonkhwa is done by their respective Board of Technical Education (BTE) and in the case of Baluchistan Province Directorate of Technical Education (DTE) is responsible for certification and accreditation. In addition to this Trade Testing Boards (TTB) are working at the provincial level through which National Testing Bureau (NTB) certifies the vocational education. These Boards also have the responsibility to certify the skilled worker in the informal sector in line with the procedures of International Labor Organization (ILO).

2.4.3 The Post-18th Amendment Scenario

Until the eighteenth amendment, BTEs made part of the Ministries of Education (MoE) whereas the administration of NTB was done by the Ministry of Labor and Manpower (MoL&M). Therefore, certification and accreditation of the technical education was primarily the responsibility of the MoE whereas the MoL&M accredited and certified the vocational education. After devolution of the MoL&M to the provinces in the eighteenth amendment, the Ministry of Education, Trainings and Standards (MOET&S) has been assigned the complete responsibility of all matters which are related to both technical and vocational education. After the eighteenth amendment, NTB and NAVTTC have both been placed under the administration and supervision of the MOET&S. The post-18th amendment accreditation and certification system of TVET in Pakistan is shown in Figure 2.2.

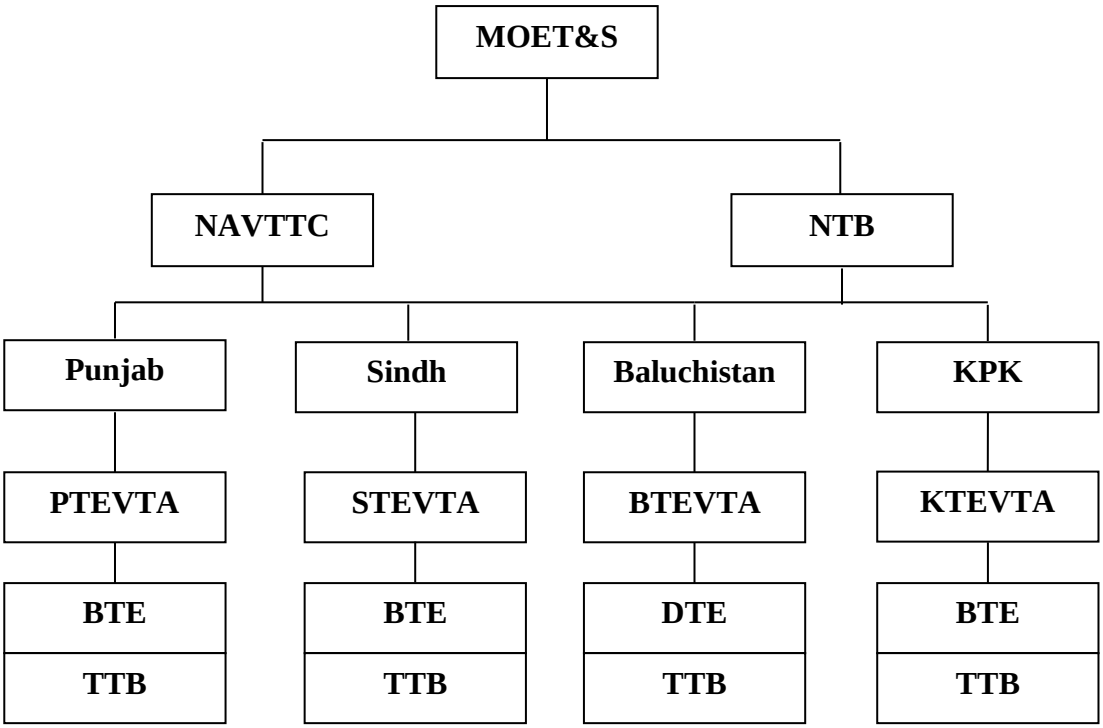


Figure 2.2: Post-18th Amendment Accreditation & Certification System in Pakistan

2.5 TECHNICAL EDUCATION AND VOCATIONAL TRAINING IN PUNJAB

Punjab TEVTA came into existence in 1999 with the result of an Ordinance. Various government departments involved in imparting the technical and vocational education came under the umbrella of TEVTA Punjab. Polytechnics, commercial training institutes and colleges, training centers of Punjab Small Industries Corporation (PSIC), Apprenticeship Training Institutes, and other similar institutes were given under the authority of TEVTA. The Board of Technical Education is also put under TEVTAs control. The main objectives of TEVTA were, to advance and provide market driven vocational training and education, to form a active technical and vocational education system which ensures socio-economic progress, to assess the manpower training needs, make relationship with others sectors of economy, regulate and develop examination system, develop staff development plans etc.

2.5.1 Courses Related to Construction Industry in Technical Training Institutes of Punjab

The technical and vocational training institutes offer the vocational courses related to construction industry of Pakistan into the following streams.

1. Diploma G II (2 years duration)
2. Diploma G III (1 year duration)
3. Certificate level course (3-12 months duration)

2.5.1.1 List of Courses in Diploma G II (2 years duration)

The following is the list of courses in Diploma G II:

- Carpenter (24 Months)
- Civil Draftsman (24 Months)
- Building Electrician (24 Months)
- Fitter General (24 Months)
- Plumber (24 Months)
- Welder (24 Months)

2.5.1.2 List of Courses in Diploma GIII (1 year duration)

The following is the list of courses in Diploma G III:

- Electrical (12 Months)
- Carpenter (12 Months)
- Draftsman Civil (12 Months)
- Electrician (12 Months)
- Fitter General (12 Months)
- Painter (12 Months)
- Welder (12 Months)
- Wood Work (12 Months)

2.5.1.3 List of Courses at Certificate Level (3-12 Months)

The following is the list of courses at Certificate level:

- Carpenter (6 Months)
- Plumber (6-12 Months)

- Wood Work (6 Months)
- Auto Cad (3-6 Months)
- Mason/Bricks Layer (6 Months)
- Bulldozer Operator (6 Months)
- Civil Surveyor (6 Months)
- Paint Polish (6 Months)
- Sheet Metal (6 Months)
- Civil Surveyor (6 Months)
- Electrical Wiring Technician (6 Month)

2.6 CURRICULUM OF THE COURSES

Some of the courses curriculum is presented here which are being taught at the institutions.

2.6.1 Curriculum of Wood Work Course

Salient features of the course are as follows

Entry Level: Middle

Total Duration of Course: 1Year (2 semesters)

Training Methodology: Practical 80%, Theory 20%

1ST SEMESTER

Sr. No	Subjects/ Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Hand Tools Theory	46	16	62
2.	Timber Theory	20	-	20
3.	Hard Ware	28	-	28
4.	Design and Drawing	20	64	84
5.	Preparation of joints / Jobs	-	520	520
6.	Mathematics & Cost Calculation	20	-	20

Sr. No	Subjects/ Main Topics	Theory Hours	Practical Hours	Total Hours
7.	Functional English	20	20	40
8.	Work Ethics	-	20	20
	Total	**154**	**640**	**794**

2ND SEMESTER

Sr. No	Subjects / Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Finishing and Polishing	56	20	76
2.	Mathematics and Cost Calculation	26	-	26
3.	Wood Working Machines	48	-	48
4.	Design and Drawing	8	80	88
5.	Preparation of different Jobs / Projects	-	500	500
6.	Functional English	20	-	20
7.	Work Ethics	20	-	20
	Total	**178**	**600**	**778**

2.6.2 Curriculum of Mason Course

Salient features of the course are as follows

Entry Level: Primary but preferably middle pass

Total Duration of Course: 6 Months

Training Methodology: Practical 90%, Theory 10%

SCHEME OF STUDIES

Sr. No.	Subjects	Theory Hrs.	Practical Hrs.	Total Hrs.
1.	Basic Mathematics	09	20	29
2.	Drawing Reading and Layout	08	16	24
3.	Masonry Work	12	142	154

Sr. No.	Subjects	Theory Hrs.	Practical Hrs.	Total Hrs.
4.	Surface Rendering	01	37	38
5.	Flooring	02	48	50
6.	Roof and Stair Case	04	60	64
7.	Waste Water Disposal Works	01	28	29
8.	Estimation	03	09	12
Total: -		**40**	**360**	**400**

2.6.3 Curriculum of Quantity Surveyor Course

Salient features of the course are as follows

Entry Level: Matriculation

Total Duration of Course: 1 Year (2 semesters)

Training Methodology: Practical 70%, Theory 30%

1ST SEMESTER

Sr. No.	Subjects	Theory Hours	Practical Hours	Total Hours
1.	Fundamentals of Civil Technology – I	113	31	144
2.	Engineering Drawing	48	296	344
3.	Estimation – I	59	193	252
4.	Work Ethics	-	20	20
5.	Functional English	20	20	40
Total		**240**	**560**	**800**

2ND SEMESTER

Sr. No.	Subjects	Theory Hours	Practical Hours	Total Hours
1.	Fundamentals of Civil Technology – II	106	56	162
2.	Estimating – II	42	235	277
3.	Computer Application	148	153	301
4.	Work Ethics	-	20	20
5.	Functional English	20	20	40
Total		**316**	**484**	**800**

2.7 SUMMARY

In this chapter, historical perspective of vocational training in Pakistan has been discussed and different phases of educational development are outlined. TEVT sector in Pakistan is also studied and structure of vocational training system is elaborated. Current structure of TEVT education is also presented. Vocational training programs related to construction industry are also mentioned. The next chapter describes the methodology adopted for this research.

Chapter 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Research is a continuous struggle for truth. This chapter gives the methodology adopted to obtain the objectives of the research as mentioned in Chapter 1. Survey method has been chosen as the research strategy. The chapter also gives insight to the survey design process. The preparation of questionnaire, data collection through field survey and analysis of data by the statistical software is also presented.

3.2 RESEARCH METHODOLOGY

Survey method was adopted to find the factors that are affecting the vocational training system related to construction industry in technical training institutes of Pakistan. Questionnaire is more prudent way as it requires less time and is less expensive way also. In addition, it permits data collection from a much larger population. It is a suitable way for the collection of standardized and quantifiable information. According to Van Dalen (1973), it is easy to fill out, keeps respondents on the subject, is relatively objective and fairly easy to be tabulated and analyzed. Three different ways are considered appropriate for the conduct of research in construction management. These are: quantitative methods, qualitative methods and combination of both quantitative and qualitative commonly known as ‘mixed mode approaches’. Quantitative method uses the deductive approach and is related to data collection and its analysis by the statistical procedure, while Qualitative method use inductive approach and is related to obtaining results from interviews and observations rather than use of

statistical procedures. Therefore, Quantitative method was adopted in this research to obtain the objectives of this study. Figure 3.1 shows the methodology adopted.

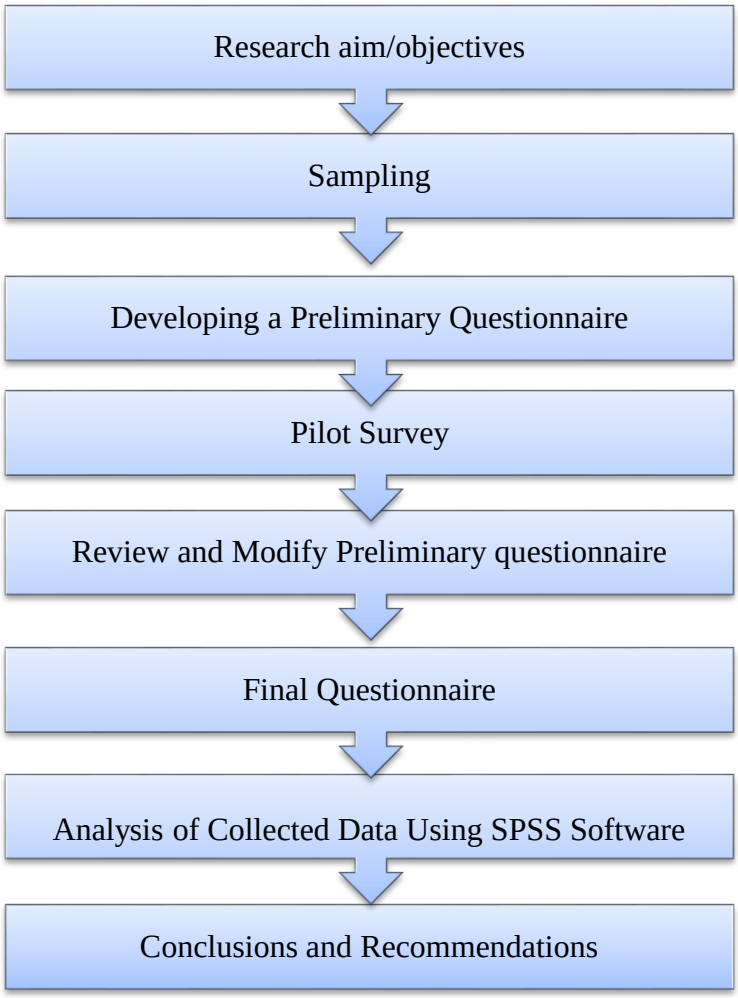


Figure 3.1: Research Methodology Flow Chart

To carry out the study, a questionnaire was prepared indicating the factors affecting the vocational training system related to construction industry based on the literature review. In order to rationalize, improve and refine the questionnaire, pilot study was also performed. Having done the pilot study, full scale survey was carried out in the technical training institutes of Punjab to get their feedback on the 52 factors grouped in 7 categories. Finally, reliability analysis was done on the collected data and relative importance index was calculated for each factor to find their ranking.

3.3 SURVEY DESIGN PROCESS

Survey is defined as "data collected from number of cases/projects through systematic measurement and then analyzed to yield the results" (Marsh, 1982). Trochim (2006) and Bryman (2004) argued that in applied social research, surveys are mostly carried out by questionnaire and interview surveys. Bryman (2004) referred surveys as cross-sectional studies and explained that the data collected from the surveys are generally quantitative in nature and can be used to correlate two or more variables. Trochim (2006) suggests that several issues should be kept in mind when a survey is chosen as a research strategy: a) population, b) sampling and c) question issues. The survey design selected for this research is shown in the Figure 3.2 (adopted from Shuwei, 2009).

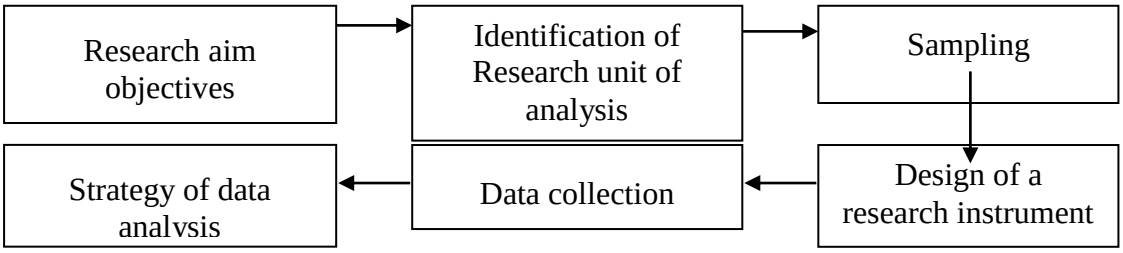


Figure 3.2: Survey Design Chart

3.3.1 Sampling

The total population of students undertaking the vocational courses related to construction industry was difficult to ascertain as there are a number of construction vocational courses being run in different technical institutes of Punjab and data regarding number of students undertaking these courses was not available. With regard to this non-probabilistic sampling approach was used. The sample size was found from the following formula used by Shah and Abdul Hadi (1993).

$$[n' = S^2/V^2] \text{ ---------- (3.1)}$$

In this formula,

n' = the sample size for infinite population

V = the standard error whose value for the confidence level of 95 per cent is 0.05

S^2 = the population elements standard error variance. The formula for S^2 is as follows (Shah and Abdul-Hadi 1993):

$$S^2 = P(1-P) \text{ ---------- (3.2)}$$

S^2 is maximum at the value of P = 0.5. The sample size according to (Shah and Abdul-Hadi 1993,) is calculated as:

$$n' = S^2/V^2 = (0.5)^2/(0.05)^2 = 100 \text{ ---------- (3.3)}$$

Data was collected from 100 students/teachers.

3.4 DEVELOPMENT OF QUESTIONNAIRE

The questionnaire was formed in a way so that it is easy to interpret and not difficult to mark. Since it was meant for the students and the teachers/principal of the technical training institutes of Punjab, so it was made in English language and also explained in Urdu personally on locations as the students undertaking the vocational courses related to construction industry were most primary, middle pass and in some cases illiterate also. A covering letter was attached with the questionnaire mentioning the purpose of the questionnaire.

The questionnaire was adopted from Dai et al. (2009). A pilot study was also performed to gauge the effectiveness and usefulness of the questionnaire and based on that study, the same was slightly modified. The factors affecting the vocational education system were derived after the thorough review of past literature and results of pilot study. In total 65 factors were identified which were grouped in 8 categories. In order to achieve this, 5 point Likert Scale was used. The points 1, 2, 3, 4 and 5 gives strongly agree, agree, undecided, disagree and strongly disagree. Based on the responses of the respondents a analysis was thus made to find the ranking of factors and their reliability analysis.

3.5 SELECTION OF AREAS

As the study was aimed to be conducted in technical training institutes of Punjab and the Punjab is divided into three zones i.e North, Centre and South. So following training institutes from these zones were approached personally and through mail in order to get the questionnaire filled up. Figure 3.3 shows the location map where questionnaires were given personally and through mail.

(a) Govt. Technical Training Institute, Gujrat.

(b) Govt. Technical Training Institute, Gulberg, Lahore.

(c) Govt. Technical Training Institute, Khanewal Road, Multan.

(d) Govt. Technical Training Centre (M), (ABAD), Kahuta.

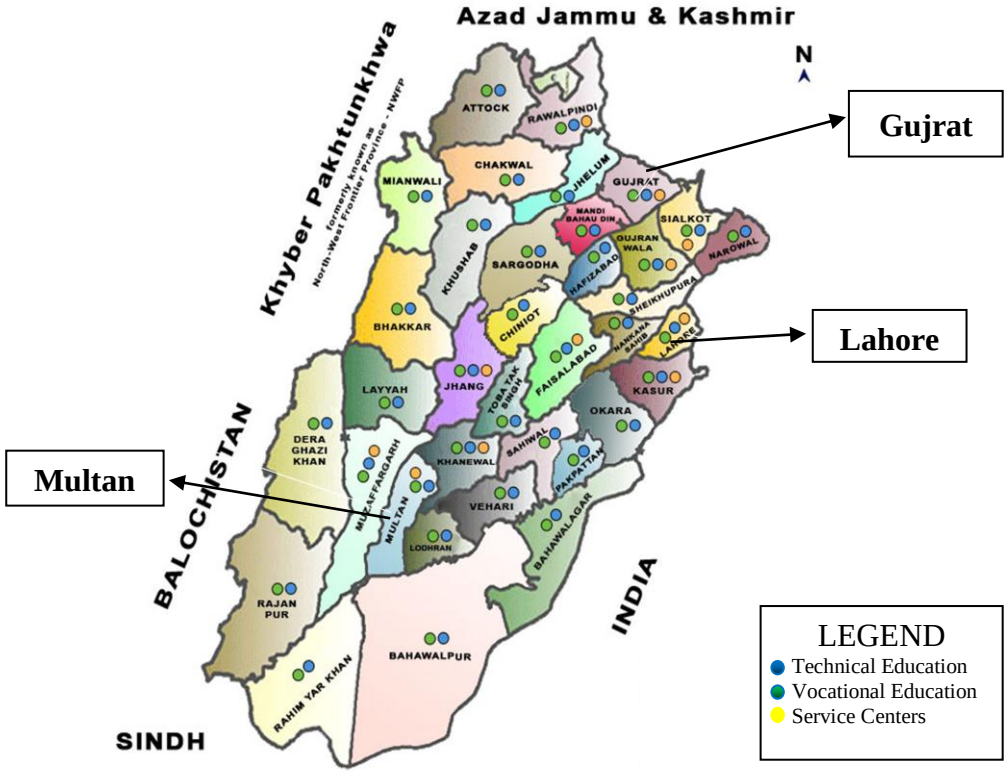


Figure 3.3 Survey Location Map

3.6 TECHNIQUES OF DATA ANALYSIS

Statistical Package for Social Sciences (SPSS v18) was used as the main software for the analysis of data. As it is mentioned earlier that questionnaire was

filled up by going to the intended respondents individually and through mail delivery system. When all the required questionnaires were filled up and data obtained then MS Office was used as a medium to compile the data. MS Excel was used as the main tool for the entry of data from the questionnaires and arrange so that to make it useful for its subsequent analysis.

The Relative Importance Index (RII) is a tool which is applied in various studies in order to obtain ranking of factors in terms of priority.

Chan and Kumaraswamy (2010) in their study used the following formula to calculate RII:

$$RII = {}^{\Sigma w}/_{A} * N \quad \text{.....(3.4)}$$

where :

w = Weight as assigned by each respondent in a range from 1 to 5, where 1 implies "Strongly Agree" and 5 implies "Strongly Disagree";

A = Highest weight (5);

N = Total number of respondents

The above mentioned formula was used to rank the factors affecting vocational training system related to construction industry in technical training institutes of Pakistan. Overall ranking of categories of causes was also determined. In addition to it, reliability of the data was checked by the use of Cronbach's Alpha coefficient method. The Rank Agreement Factor (RAF) and Percentage Agreement (PA) was also obtained to check the agreement and disagreement between the students of different institutes surveyed,

3.7 SUMMARY

This chapter gives the methodology adopted to obtain the results of the study. Survey instrument was used to carry out the research. Factors affecting the courses were found by the review of past literature and pilot study of the

questionnaire. Sample size was selected through convenience sampling. It also gives the formula used for finding the Relative Importance Index RII.

Chapter 4

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

This chapter provides analysis and results of the data collected from the filled questionnaires. The software used for the analysis and results is SPSS 18 (Statistical Package for Social Sciences). In this study data was collected from the students and teachers at the various technical training institutes of the Punjab which gave their perception about the factors affecting vocational training system related to construction industry. These factors were summarized in eight categories. After obtaining the data, various statistical tests have been done e.g. Reliability Analysis, calculation of Relative Importance Index (RII) of factors, Rank Agreement Factor (RAF) and Percentage Agreement (PA) between the parties involved. Ten most important factors have also been given.

4.2 ALLOCATION OF VARIABLES

In order to perform reliability analysis on SPSS 18, factors in each category were given code relative to the category so that analysis is done in the software easily and for the recognition of factors by the software easily. Following sections give insight to the coding procedure.

4.2.1 Factors Related to Physical Facilities

Factors related to Physical Facilities are given codes as mentioned in Table 4.1

Table 4.1: Physical Facilities Related Factors

Sr. No.	Cause	Code
1	Are there enough classrooms to impart training	PF1
2	Laboratories are fully used	PF2
3	Laboratories have enough equipment to impart training	PF3
4	Laboratories have the requisite equipment to impart the training	PF4
5	Sufficient computer facilities are available	PF5
6	Proper teaching aids are used to give lecture	PF6
7	Sufficient infrastructure is available for the training	PF7

4.2.2 Factors Related to Academic Facilities

Factors related to Academic Facilities are given codes as mentioned in Table 4.2.

Table 4.2: Academic Facilities Related Factors

Sr. No.	Cause	Code
1.	Latest books are available for the training	AF1
2.	Teachers are academically competent	AF2
3.	Teachers have practical experience / knowledge for the course	AF3
4.	Teachers are abreast with modern teaching methodologies	AF4
5.	Regular academic site visits are arranged for the training course	AF5

4.2.3 Factors Related to Curriculum Development

Factors related to curriculum development are given codes as mentioned in Table 4.3.

Table 4.3: Curriculum Development Related Factors

Sr. No.	Cause	Code
1.	Current curriculum of vocational training meet the industrial requirements	CR1
2.	Does the curriculum uses latest industrial literature	CR2
3.	Present curriculum is practical oriented	CR3
4.	Does the curriculum induces the critical thinking among the students	CR4
5.	Practical and theory studies are separately taught	CR5
6.	Instructional medium using English as a language is helpful	CR6
7.	Instructional medium using Urdu as a language is helpful	CR7
8.	Does the curriculum content achieve the required objectives of the course	CR8
9.	Revision of the curriculum is done periodically	CR9
10.	New techniques / knowledge is added in the curriculum	CR10
11.	Curriculum of the course has not been changed since many years	CR11
12.	Current curriculum of the course is abreast with modern day techniques and procedures	CR12

4.2.4 Factors Related to Relevance of Courses

Factors related to relevance of courses are given codes as mentioned in Table 4.4.

Table 4.4: Relevance of the Courses Related Factors

Sr. No.	Cause	Code
1.	Do the course contents meet the requirement of job market	RC1
2.	Contents of the course are sufficient to achieve the objective of the course	RC2
3.	Do you feel confident after getting the training regarding job employment	RC3
4.	New techniques / tools are taught which are prevailing in practical field	RC4
5.	Sufficient training is covered in the curriculum for efficient learning of the course	RC5

4.2.5 Factors Related to Staff Development

Factors related to staff development are given codes as mentioned in Table 4.5.

Table 4.5: Staff Development Related Factors

Sr. No.	Cause	Code
1.	Regular training / workshops are carried out for the staff	SD1
2.	In-service training is necessary for successful teaching	SD2
3.	The training quality given to teachers is good	SD3
4.	Training helps to increase knowledge of teachers	SD4
5.	New techniques / knowledge of the course are necessary for the effective teaching	SD5
6.	Teachers help in character building of the students	SD6
7.	No training is done for teachers	SD7
8.	Quality of teachers imparting the training is satisfactory	SD8

4.2.6 Factors Related to Assessment/Evaluation

Factors related to assessment/evaluation are given codes as mentioned in Table 4.6.

Table 4.6: Assessment/Evaluation Related Factors

Sr. No.	Cause	Code
1.	Practical work of students is given appropriate weight-age in the final examination	AS1
2.	The system of examination fulfills the objectives of the course	AS2
3.	Present system of examination is more based on Theory part	AS3
4.	Present system of examination is more based on Practical part	AS4
5.	Annual examination system is helpful in vocational courses	AS5
6.	Semester system of examination is helpful in vocational course	AS6
7.	Time period of overall training is satisfactory	AS7

4.2.7 Factors Related to Graduate Employment

Factors related to graduate employment are given codes as mentioned in Table 4.7.

Table 4.7: Graduates Employment Related Factors

Sr. No.	Cause	Code
1.	Does the institution help in getting the job in the market	GE1
2.	The contents of the courses are sufficient in imparting full training with respect to practical field	GE2
3.	There is a huge difference between practical field and the training imparted in the institutions	GE3

Sr. No.	Cause	Code
4.	Does the training help in learning new techniques of the field	GE4
5.	Do the graduates feel confident after getting the training	GE5
6.	Practical training helps more in job field	GE6
7.	Theory training helps more in the job field	GE7
8.	Does the training help in solving problems in the field	GE8
9.	Does the training help in acquiring jobs outside Pakistan	GE9

4.2.8 General Factors

General factors are given codes as mentioned in Table 4.8.

Table 4.8: General Factors

Sr. No.	Cause	Code
1.	The downfall of construction industry in due to Scarcity of vocational training institution	GN1
2.	The downfall of construction industry in due to Non utilization of manpower	GN2
3.	The downfall of construction industry in due to Untrained manpower	GN3
4.	The downfall of construction industry in due to Improper training of the manpower	GN4
5.	The downfall of construction industry in due to Courses being taught in vocational training are not abreast with practical field	GN5
6.	The downfall of construction industry in due to Government disinterest in promoting vocational training	GN6
7.	Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff	GN7
8.	Employer advisory council should be set up by institutes for better coordination with industrial needs	GN8

Sr. No.	Cause	Code
9.	The graduates of the vocational institute are considered by society as Outstanding expert	GN9
10.	The graduates of the vocational institute are considered by society as Ordinary	GN10
11.	The graduates of the vocational institute are considered by society as Lower Status	GN11
12.	Construction industry development in Pakistan is depended upon quality of vocational training	GN12

4.3 RELIABILITY ANALYSIS

Repeating any measurement that produces the same result is considered a Reliable measurement (Gaur & Gaur, 2009). Leech et al. (2005) argued that the Reliability test is done to check whether each item in the scale is free from error of measurement.

Many methods are used for testing the reliability of a questionnaire. Test-retest method is normally employed for obtaining the results regarding reliability. This method involves comparing of results by doing twice measurement on an object. If results are similar, then the measurement is considered as reliable. But practically this method of obtaining reliability is quite difficult. In SPSS software, normally reliability of a data is found by Cohen's Kappa Coefficient for categorical data and Cronbach's Alpha for continuous data (Likert –Scale type items). Among them, Cronbach's Alpha is most popular method (Hinton et al. 2004 and Leech et al. 2005). Table 4.9 shows the guideline for assessing the reliability of any data according to Cronbach's Alpha method.

Table 4.9: Guidelines for Assessing Reliability Analysis

a.	0.9 & above	Excellent reliability	**b.**	0.7 to 0.9	High reliability
c.	0.5 to 0.7	Moderate reliability	**d.**	0.5 and below	Low reliability

As the data was collected on a Likert Scale (1, 2, 3, 4, 5), so reliability of the data was checked using Cronbach's Alpha method. The summary of the reliability check using SPSS 18 between different categories of factors is represented in Table 4.10, whereas full results are presented in the appendices.

Table 4.10: Cronbach's Alpha Values For Different Categories

Sr. No.	Categories of Factors	Students	Teachers
1.	Physical Facilities	0.728	0.897
2.	Academic Facilities	0.822	0.976
3.	Curriculum Development	0.932	0.929
4.	Relevance of the Courses	0.854	0.830
5.	Staff Development	0.809	0.811
6.	Assessment / Evaluation	0.877	0.901
7.	Graduates Employment	0.873	0.883
8.	General	0.831	0.824
	Over All	**0.832**	**0.838**

4.4 DESCRIPTIVE ANALYSIS

Questionnaires were given to the students and teachers of the technical training institutes by visiting then personally and some questionnaires were delivered through mail. In all 120 questionnaires were distributed and out of those 100 valid responses were collected.

4.4.1 Type of Respondents

Since the study was aimed at the technical training institutes of Punjab, so the respondents were the students studying there and the teachers imparting the

training. This helped in finding the view of each regarding the factors affecting the courses related to construction industry being taught at the institutions.

4.4.2 Ranking of the Factors Affecting the Courses

Respondents were required to give their responses to the 65 factors summarized into 8 categories. Likert Scale 1-5 was used where 5 represented Strongly Disagree and 1 represented Strongly Agree. The factors were taken from the extensive review of literature and from the pilot testing of the questionnaire. Quite a number of researchers have used Relative Importance Factor (RII) method to obtain the relative importance of different factors. Similarly the same method was adopted to find the relative importance of different factors given in the questionnaire on a five-point scale to find the factors affecting the vocational training system related to construction industry from each stakeholder (students and teachers). The formula for the Relative Importance Index (RII) is

$$RII = {}^{\Sigma w}/_{A} * N \quad \text{..... (4.1)}$$

Where w = weight assigned by each respondent in the range from 1 -5

A = the highest weight (5)

N = total number of respondents

These ranking helped in comparing the relative importance of factors as given the two groups of respondents. The RII and corresponding ranking of the two groups (students and teachers) for (i) each factor affecting the training system and (ii) each category of factors found out through field survey of 100 students/teachers are given in the tables of the coming sections. Overall RII values and their ranking were also found out by computing weighted average of the values of RII for the two groups (students and teachers).

Table 4.11 shows the RII and ranking of factors of Physical Facilities for the two groups with the overall RII and ranking as given below:

Table 4.11: RII and Ranking of Factors for Physical Facilities

Cause	Students		Teachers		Overall	
Physical Facilities	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Are there enough classrooms to impart training	0.500	42	0.380	50	0.44	53
Laboratories are fully used	0.560	38	0.420	45	0.49	46
Laboratories have enough equipment to impart training	0.590	37	0.420	45	0.505	43
Laboratories have the requisite equipment to impart the training	0.510	41	0.380	50	0.45	51
Sufficient computer facilities are available	0.490	45	0.690	35	0.583	43
Proper teaching aids are used to give lecture	0.550	39	0.380	50	0.47	50
Sufficient infrastructure is available for the training	0.500	43	0.390	47	0.45	51

Table 4.12 shows the RII and ranking of factors of Academic Facilities for the two groups along with the overall RII and ranking as given below:

Table 4.12: RII and Ranking of factors For Academic Facilities

Cause	Students		Teachers		Overall	
Academic Facilities	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Latest books are available for the training	0.818	3	0.824	3	0.821	3
Teachers are academically competent	0.710	35	0.750	35	0.722	38
Teachers have practical experience / knowledge for the course	0.800	11	0.760	30	0.788	15
Teachers are abreast with modern teaching methodologies	0.770	28	0.750	35	0.764	22
Regular academic site visits are arranged for the training course	0.818	3	0.821	4	0.81	4

Table 4.13 shows the RII and ranking of factors of Curriculum Development for the two groups along with the overall RII and ranking as given below:

Table 4.13: RII and Ranking of Factors for Curriculum Development

Cause	Students		Teachers		Overall	
Curriculum Development	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Current curriculum of vocational training meet the industrial requirements	0.790	19	0.780	21	0.785	16
Does the curriculum uses latest industrial literature	0790	19	0.801	12	0.807	11

Cause	Students		Teachers		Overall	
Curriculum Development	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Present curriculum is practical oriented	0.780	23	0.760	25	0.774	21
Does the curriculum induces the critical thinking among the students	0.815	5	0.819	5	0.812	5
Practical and theory studies are separately taught	0.780	23	0.770	14	0.775	17
Instructional medium using English as a language is helpful	0.770	25	0.760	25	0.767	19
Instructional medium using Urdu as a language is helpful	0.41	47	0.43	41	0.42	55
Does the curriculum content achieve the required objectives of the course	0.400	49	0.390	49	0.397	52
Revision of the curriculum is done periodically	0.780	23	0.560	38	0.670	38
New techniques / knowledge is added in the curriculum	0.820	2	0.840	2	0.826	2
Curriculum of the course has not been changed since many years	0.760	31	0.730	38	0.751	30
Current curriculum of the course is abreast with modern day techniques and procedures	0.869	1	0.841	1	0.855	1

Table 4.14 shows the RII and ranking of factors of Relevance of Courses for the two groups along with the overall RII and ranking as given below:

Table 4.14: RII and Ranking of Factors for Relevance of the Courses

Cause	**Students**		**Teachers**		**Overall**	
Relevance of The Courses	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Do the course contents meet the requirement of job market	0.780	23	0.790	18	0.783	17
Contents of the course are sufficient to achieve the objective of the course	0.808	7	0.802	8	0.805	7
Do you feel confident after getting the training regarding job employment	0.780	23	0.690	45	0.745	33
New techniques / tools are taught which are prevailing in practical field	0.760	31	0.770	14	0.763	21
Sufficient training is covered in the curriculum for efficient learning of the course	0.620	36	0.570	37	0.59	54

Table 4.15 shows the RII and ranking of factors of Relevance of Courses for the two groups along with the overall RII and ranking as given below:

Table 4.15: RII and Ranking of Factors of Staff Development

Cause	**Students**		**Teachers**		**Overall**	
Staff Development	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Regular training / workshops are carried out for the staff	0.813	6	0.812	6	0.811	6

Cause	Students		Teachers		Overall	
Staff Development	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
In-service training is necessary for successful teaching	0.540	42	0.590	57	0.565	56
The training quality given to teachers is good	0.720	34	0.710	39	0.715	36
Training helps to increase knowledge of teachers	0.56	40	0.59	34	0.574	48
New techniques / knowledge of the course are necessary for the effective teaching	0.610	35	0.480	42	0.545	49
Teachers help in character building of the students	0.460	46	0.430	49	0.451	59
No training is done for teachers	0.500	43	0.780	21	0.584	40
Quality of teachers imparting the training is satisfactory	0.810	8	0.780	21	0.79	16

Table 4.16 shows the RII and ranking of factors of Assessment/Evaluation for the two groups along with the overall RII and ranking as given below:

Table 4.16: RII and Ranking of Factor of Assessment/Evaluation

Cause	Students		Teachers		Overall	
Assessment / Evaluation	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Practical work of students is given appropriate weight-age in the final examination	0.350	53	0.380	50	0.359	58
The system of examination fulfills the objectives of the course	0.390	50	0.430	49	0.402	52
Present system of examination is more based on Theory part	0.76	31	0.77	14	0.763	22
Present system of examination is more based on Practical part	0.350	53	0.380	50	0.359	58
Annual examination system is helpful in vocational courses	0.78	23	0.69	46	0.73	25
Semester system of examination is helpful in vocational course	0.350	53	0.380	50	0.359	58
Time period of overall training is satisfactory	0.380	52	0.380	50	0.380	48

Table 4.17 shows the RII and ranking of factors of Graduates Employment of the two groups along with the overall RII and ranking as given below:

Table 4.17: RII and Ranking of Factors of Graduates Employment

Cause	Students		Teachers		Overall	
Graduates Employment	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Does the institution help in getting the job in the market	0.430	45	0.510	38	0.47	46
The contents of the courses are sufficient in imparting full training with respect to practical field	0.790	14	0.830	7	0.802	7
There is a huge difference between practical field and the training imparted in the institutions	0.670	34	0.510	38	0.59	41
Does the training help in learning new techniques of the field	0.805	9	0.79	15	0.800	9
Do the graduates feel confident after getting the training	0.790	14	0.30	63	0.545	46
Practical training helps more in job field	0.290	64	0.350	61	0.320	62
Theory training helps more in the job field	0.770	25	0.570	29	0.670	38
Does the training help in solving problems in the field	0.790	14	0.730	7	0.76	22
Does the training help in acquiring jobs outside Pakistan	0.690	29	0.610	22	0.650	39

Table 4.18 shows the RII and ranking of General factors of the two groups along with the overall RII and ranking as given below:

Table 4.18: RII and Ranking of Factors of General

Cause	Students		Teachers		Overall	
General	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
The downfall of construction industry in due to Scarcity of vocational training institution	0.300	60	0.320	59	0.306	61
The downfall of construction industry in due to Non utilization of manpower	0.000	65	0.320	59	0.096	65
The downfall of construction industry in due to Untrained manpower	0.410	47	0.430	41	0.416	55
The downfall of construction industry in due to Improper training of the manpower	0.320	59	0.320	59	0.320	63
The downfall of construction industry in due to Courses being taught in vocational training are not abreast with practical field	0.340	57	0.350	57	0.343	61
The downfall of construction industry in due to Government disinterest in promoting vocational training	0.410	47	0.390	47	0.404	58
Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff	0.801	10	0.771	14	0.786	10

Cause	Students		Teachers		Overall	
General	**RII**	**Rank**	**RII**	**Rank**	**RII**	**Rank**
Employer advisory council should be set up by institutes for better coordination with industrial needs	0.340	58	0.320	59	0.334	62
The graduates of the vocational institute are considered by society as Outstanding expert	0.3	60	0.32	59	0.306	64
The graduates of the vocational institute are considered by society as Ordinary	0.35	56	0.32	59	0.334	62
The graduates of the vocational institute are considered by society as Lower Status	0.30	60	0.35	58	0.315	63
Construction industry development in Pakistan is depended upon quality of vocational training	0.53	40	0.62	39	0.557	50

Relative Importance Index and ranking were also calculated for each category by taking the sum of RII of factors and diving by the number of factors in the category. Table 4.19 shows the Relative Importance Index (RII) and ranking of each category as given below:

Table 4.19: RII and Ranking of Each Category

Category	Students		Teachers	
	RII	Rank	RII	Rank
Physical Facilities	0.529	6	0.453	6
Academic Facilities	0.750	2	0.754	2
Curriculum Development	0.752	1	0.759	1
Relevance of the Courses	0.740	3	0.746	3
Staff Development	0.735	4	0.740	4
Assessment / Evaluation	0.431	7	0.459	5
Graduates Employment	0.734	5	0.451	7
General	0.325	8	0.365	8

4.4.3 Rank Agreement Factors (RAF) & Percentage Agreement (PA)

Rank Agreement Factors were then found by using formula and methodology used by Okpala and Aniekwu (1988) to find the agreement in ranking between the group (students and teachers) surveyed. The RAF can range from 0, which shows perfect agreement and it goes up to a higher value showing increasing disagreement. Percentage Agreement and Disagreement have also been computed through the formulae. Formulae for calculating the above are as follows:

Absolute Difference (Di) = | Ri1 - Ri2 |……..…….. (4.2)

Where Ri1 = Ranking of First Group; Ri2 = Ranking of Second Group

Maximum Absolute Difference (Dmax) = | Ri1-Rj2| ……...…….. (4.3)

Where Ri1 = Ranking ; Rj2 = Ranking with absolute maximum difference

j = N – i + 1

Rank Agreement Factor (RAF) = ∑D/N …… (4.4)

Where D = Absolute difference; N = Number of Categories

Percentage Disagreement (PD) = RAF / RAFmax or (Di/N) / Dmax/N……(4.5)
Percentage Agreement (PA) = 100% - PD…..……..... (4.6)

The above formulae were employed to find the percentage of agreement between the group (students and teachers) surveyed regarding ranking of factors affecting the vocational training system related to construction industry.

Table 4.20 shows the calculations and the results for Percentage Agreement between Students and Teachers:

Table 4.20: Percentage Agreement and Disagreement between Students and Teachers

FACTOR NO	FACTOR	RII		ABS	FOR MAX ABS DIFF		ABS
		STUDENTS (Ri1)	TEACHERS (Ri2)		Rj1	Rj2	
1	PF	6	6	0	6	3	3
2	AF	2	2	0	2	7	5
3	CR	1	1	0	1	8	7
4	RC	3	3	0	3	6	3
5	SD	4	4	0	4	5	1
6	AS	7	5	2	7	2	5
7	GE	5	7	2	5	4	1
8	GN	8	8	0	8	1	7
			Di=	**4**		**Dmax=**	**32**

Using equation 4.4, the RAF and RAF max are calculated as follows:

Rank Agreement Factor (RAF) = 4 / 8 = 0.5
Rank Agreement Factor Maximum (RAF max) = 32 / 8= 4.0
Percentage Disagreement = 4.0 /3 2.0 = 12.5 %
Percentage Agreement = 100.0 – 12.5 = 87.5 %

Using the above mentioned procedure, the Percentage Disagreement (PD) and Percentage Agreement (PA) between other stakeholders were also calculated.

The Percentage Agreement (PA) and Percentage Disagreement (PD) for the three stakeholders are shown in Table 4.21 given below:

Table 4.21: Percentage Agreement (PA) and Percentage Disagreement (PD) between all Stakeholders

STAKEHOLDER	DISAGREEMENT	AGREEMENT
STUDENTS AND TEACHERS	12.5 %	87.5%

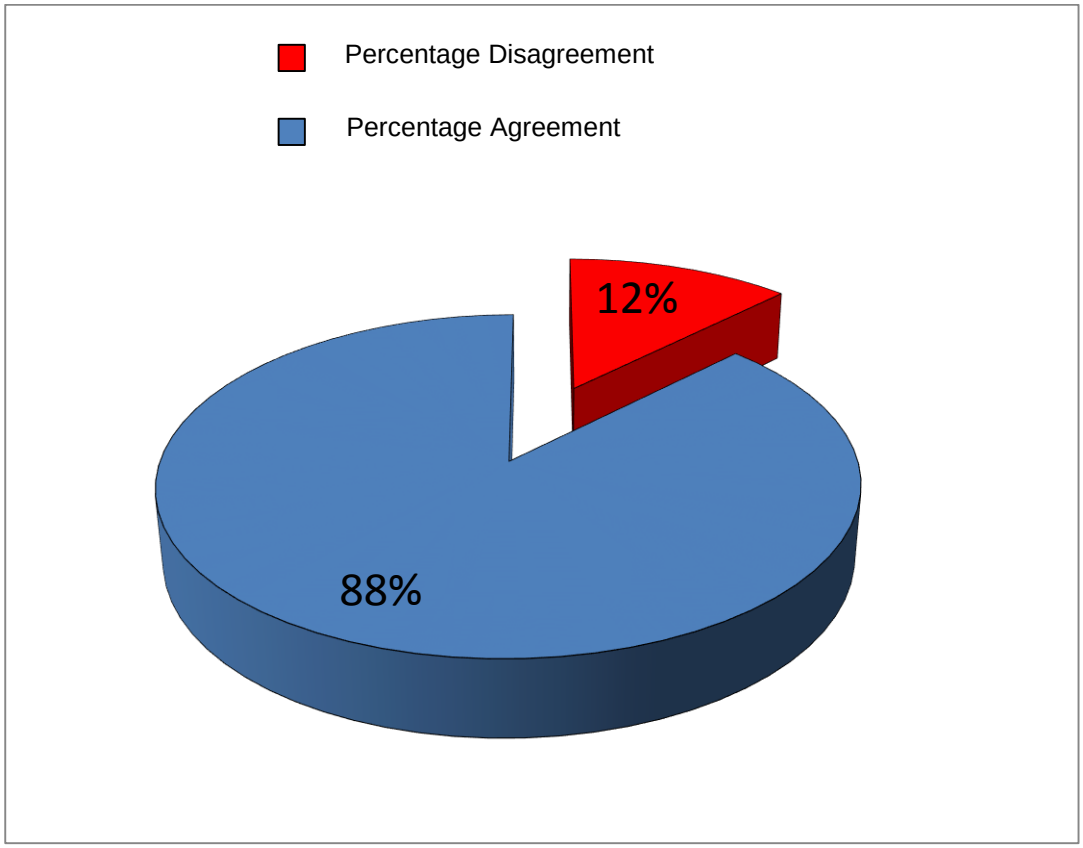


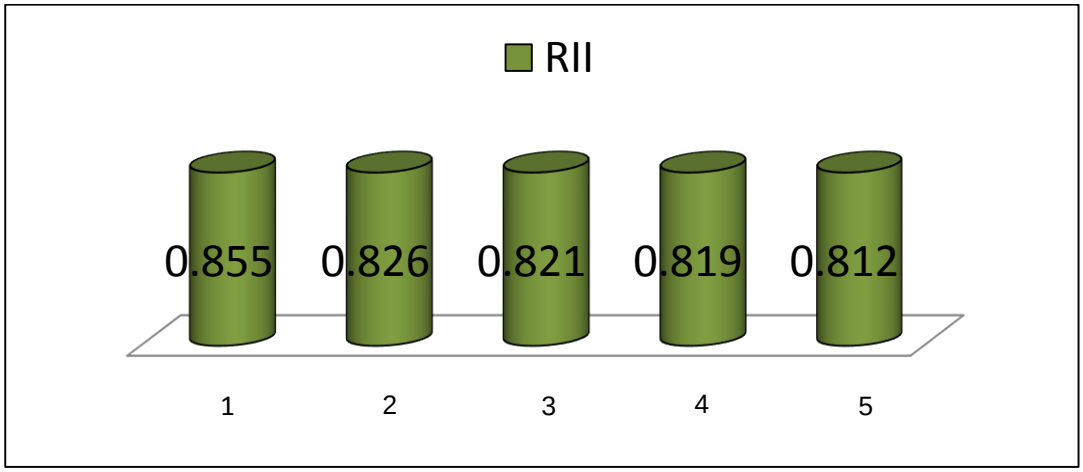
Figure 4.1: Percentage Agreement/Disagreement Chart

4.5 TOP TEN FACTORS

Moreover, among the categories overall top ten factors having the maximum RII were also found out in order to get factors which are affecting the vocational courses the most. The top ten factors are given in Table 4.22 below:

Table 4.22: Top Ten Factors

Factors	Rank
1.Current curriculum of the course is abreast with modern day techniques and procedures	1
2. New techniques / knowledge is added in the curriculum	2
3. Latest books are available for the training	3
4. Regular academic site visits are arranged for the training course	4
5. Does the curriculum induces the critical thinking among the students	5
6. Regular training / workshops are carried out for the staff	6
7. The contents of the courses achieve course objectives	7
8. Proper teaching aids are used to give lecture	8
9. Does the training help in learning new techniques of the field	9
10. Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff	10



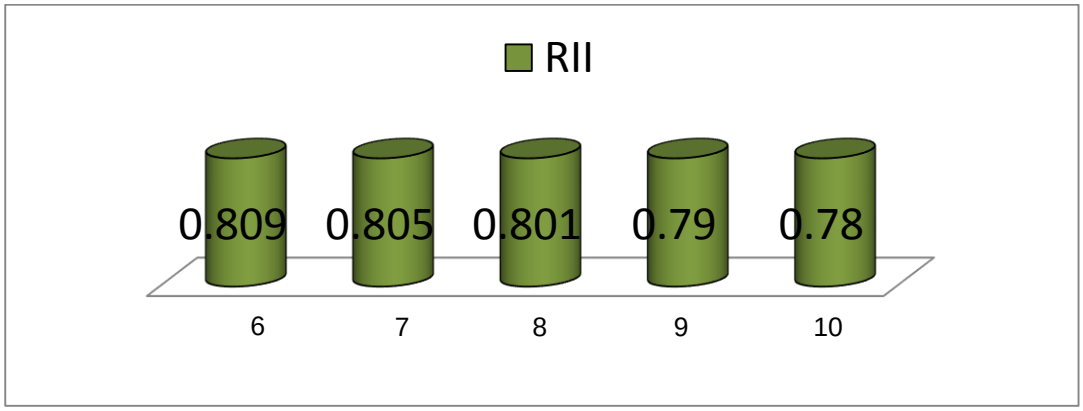


Figure 4.2: Top Ten Factors

4.6 SUMMARY

This chapter provides the analysis of the data collected with the help of SPSS 18 software and MS excel. Different test have been made on the data i.e. Reliability test, Ranking factors, Rank agreement factor and Percentage agreement. Overall ranking of factors have also been given among the different categories based on their RII. Similarly, in the next chapter recommendations and conclusions have been made with respect to the results.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS AND RECOMMENDATIONS

5.1.1 Conclusions

The first objective of the study was to study the structure, courses and the curriculum of vocational training system related to construction industry in technical training institutes of Punjab.

The first objective was achieved through thorough review of literature and current structure of the vocational training as represented in Table 2.2 of Chapter 2 of this study, which shows that vocational training is controlled in each of the province through their respective Technical Education and Vocational Training Authorities (TEVTA's) under which Board of Technical Education (BTE) and Trade Testing Board (TTB) comes. At Federal Level Ministry of Education, Trainings and Standards (MOET&S) has the control. Similarly courses related to construction industry have also been mentioned and their curriculum has also been given in Chapter 2.

The second objective was to find the factors affecting the effectiveness of these courses.

The analysis of data in Chapter 4 revealed that among students and teachers, the categories of factors that are affecting the effectiveness of construction vocational training courses in technical training institutes are almost same, which are given as below in Table 5.1:

Table 5.1 RII and ranking of Each Category

Category	Students	Teachers
	Rank	Rank
Physical Facilities	6	6
Academic Facilities	2	2
Curriculum Development	1	1

Relevance of the Courses	3	3
Staff Development	4	4
Assessment / Evaluation	7	5
Graduates Employment	5	7
General	8	8

Similarly top ten factors were also found out which are as follows

Factors	**Rank**
1.Current curriculum of the course is abreast with modern day techniques and procedures	1
2. New techniques / knowledge is added in the curriculum	2
3. Latest books are available for the training	3
4. Regular academic site visits are arranged for the training course	4
5. Does the curriculum induces the critical thinking among the students	5
6. Regular training / workshops are carried out for the staff	6
7. The contents of the courses achieve course objectives	7
8. Proper teaching aids are used to give lecture	8
9. Does the training help in learning new techniques of the field	9
10. Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff	10

The last objective of the study was to propose recommendations for the improvement of these courses, which are given in the subsequent section.

5.1.2 Recommendations

Some recommendations based on the above finding of the study are given below. This will help in improving the effectiveness of the vocational training system related to construction industry being run in the technical training institutes. It will also enhance the capabilities and abilities of the students undertaking theses courses which will prove to an asset for the construction industry after getting the training from these institutes.

1. Since it was found from the study that the factor "Current curriculum of the course is abreast with modern day techniques and procedures" came on rank 1 which means that both the students and teachers strongly disagree with the point. The above finding of the research supports a report of Sindh Board of Technical Education (1974). This shows that no proper efforts have been made by the government till yet in order to get the curriculum of the courses in line with the modern methods and techniques. It is recommended that proper council should be made which should review the curriculum periodically and suitable changes shall be made in order to make it at par with the changing requirement.

2. The factor "New techniques / knowledge is added in the curriculum" ranked at No. 2 among students and teachers which shows that both disagrees with this point and there is a need to add new techniques and knowledge in curricula in line with the industrial requirement so that students are familiar with the new methods and techniques of the course.

3. The factor "Latest books are available for the training" came at rank 3 among students and teachers. This shows that both the stakeholder disagrees with the factor. It was found that latest books are not available for the training. The above finding supports Ali (1985) and Shah (2004). It is recommended that latest books be prepared and made available to the students so that they acquire latest knowledge of the field.

4. The factor "Regular academic site visits are arranged for the training course" ranked 4^{th} between teachers and students. It is recommended that regular site visits

be carried out by the institutions in order to get the students familiarize with the industry and their new trends.

5. The factor "Does the curriculum induces the critical thinking among the students " is ranked at No. 5, which support the findings of Ali (1985) ,who stated present curricula does not motivate ,challenge and encourage critical thinking among students. It is seen that engineering managers look for certain personality traits for recruitment such as creativity, judgment, analytical ability etc. This situation suggests that there is a need to include creativity and critical thinking in the curricula to expose the students to the activities which promote creativity.

6. The factor "Regular training / workshops are carried out for the staff" came at 6th rank among students and teachers. This shows that no regular and proper training is organized by the government for the teachers/staff of vocational training institutions. The above finding augments the research findings of Adiviso (2003) and Ali (1986). It is recommended that regular training workshops be arranged for the teachers and new/modern trends be taught to them so that they can inculcate those to their students in order to make them better craftsmen.

7. "The contents of the courses achieve course objectives" is ranked at 7th which shows that both students and teachers disagree with this point. It shows that staff development program have not received any attention in past which resulted in ineffectiveness of curriculum, low quality of pass outs and ineffective teaching quality in institutes (Ali,1986).

8. The factor "Proper teaching aids are used to give lecture "is ranked at No. 8. It is suggested that teaching aids be given to the institutions for the efficient teaching and learning.

9. The 9th ranked factor among students and teachers is "Does the training help in learning new techniques of the field" which shows both disagrees with the statement. It is recommended that there should be added in the objectives and curricula of the courses new trends and procedures at par with the industrial standards so that students are familiar with the prevailing knowledge and standards.

10. The factor “Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff” is ranked at number 10th, which shows that among students and teachers there is a agreement that no coordination is carried out with industry in order to reinforce learning. It was recommended in the National Education Policy (1998-2010) that experts from the concerned industry shall be invited to give lectures and industrial advisory council shall be set up (Govt. of Pakistan 1998). The above findings presents that no action has yet been taken in this regard, this call for urgent attention.

11. It is also recommended that revision of the courses be carried out at regular intervals, so as to make them efficient and in line with market requirements. While going through the curriculum of wood work course, it was found that no new books are available in the institutes and new technologies are not added in its curriculum. The tools and machines were obsolete and preparation of joints/jobs was also not in line with new trends, since various new joints have come in market but the syllabi included old wood joints. Similarly final exam of the course includes preparation of a job/some sample by the students, which is a simple design and includes no new trends/variations. Therefore, it is suggested that revision of the curriculum be carried out of all courses so that students feel confident after training.

5.2 FUTURE RESEARCH

The scope of this research was to find the factors affecting the effectiveness of vocational courses related to construction industry, however further study could be carried out in following which would prove beneficial to local construction industry.

1. Study of Diploma in Associate Engineering (DAE) level courses related to construction industry.

2. Performance of individuals undertaking these courses in the industry.

REFERENCES

Ali, M. M (1990). Development of Technical Education in Pakistan. A Critical Study of Objectives and Achievements. Department of Education. University of Karachi pp. 275.

Ali, M. M (1998). Milestones, Progress of Technical Education in Pakistan 1947-1997. Sindh Board of Technical Education Karachi. Pp 4-5, 18-25, 36-44, 70-74-90-94,101-130, 175-196.

Amjad, R. (2005). Sills and Competitiveness: Can Pakistan Break Out of the Low-Level Skills Trap? The Pakistan Development Review 44:4.

Asian Development Bank (2004). "Improving TEVT Strategies for Asia," http://www.adb.org/Documents/Books/Tech_Educ_Voc_Training/.

APACC (2004). "Conference on Establishment of a Regional Body for Accreditation and Certification of Technical and Vocational Education and Training (TVET) institutions". Seoul, Korea.

Booth A. L., and Snower D. J. (eds.) (1996). *Acquiring Skills: Market Failures , their Symptoms and Policy Responses*. Cambridge: Cambridge University Press.

Bryman, A. (2004). "*Social Research Methods."* Oxford, Oxford University Press, London, UK.

Chan, D.W.M. and Kumaraswamy, M.M. (1997). "A Comparative Study of Causes of Time Overruns in Hong Kong Construction Projects." *Int. J. Proj. Manage.*, 15(1), 55-63.

Dai, J., Goodrum, P. M., and Maloney, W. F. (2009). "Construction Craft Workers' Perceptions of the Factors Affecting their Productivity." *Journal of Construction Engineering and Management*, ASCE, 135(3), 217-226.

Fisk, E. R. (1997). "*Construction Project Administration."* (5th edition), Prentice Hall, New Jersey.

Gaur, A. S., and Gaur, S. S. (2009). "*Statistical Methods for Practice Research: A guide to data analysis using SPSS*." Sage Publications, New Delhi, India.

Grubb, W.N. (1985) "The Convergence of Educational System and the Role of Vocationalism". *Comparative Education Review* 29 (4): 526-548.

Govt. of Pakistan (1978). National Education Policy and Implementation Program, Ministry of Education, Islamabad pp 38-41.

Govt. of Pakistan (1986). *Quality of Input and Output of Technical Education*, Planning Commission Lahore pp 54.

Govt. of Pakistan (1959). Report of Commission on National Education, 1959. Manager Govt. of Pakistan Press, Karachi pp15-16.

Govt. of Pakistan (1974). Report of Survey of Technical Manpower of Polytechnic Curriculum. Manpower Division. Sindh Board of Technical Education, Karachi pp 6-7.

Govt. of Pakistan (1960). Report of Commission on National Education. Manager Govt. of Pakistan Press, Karachi, pp 15-16.

Govt. of Pakistan, (1978). National Education Policy and Implementation Program, Ministry of Education, Islamabad pp 38-41.

Govt. of Pakistan (1979). National Education Policy and Implementation Program. Ministry of Education, Islamabad pp38.

Haq, K. (2002). Human Development in South Asia -2002. *Agricultural and Rural Development*. Mehbub ul Haq Human Development Centre, Islamabad.

Hinton, P. R., Brownlow, C., McMurray, I., and Cozens, B. (2004). "*SPSS Explained*." Routledge, New York, USA.

Iftikhar, H.S. (1996). *An Evolution of Technology Education in Pakistan (Master Thesis)*, University of Punjab, Lahore p 177.

Javeid, Z. (2009). "Impact of Training on Earnings: Evidence from Pakistani Industries." *Asian Social Science*, 5(11), 76-85.

Kish, L. (1995). *"Survey Sampling."* (65th edition), John Wiley and Sons Inc., New York.

Lillis, K. and Hogan, D. (1983). *Dilemmas of Diversification: Problems Associated with Vocational Education in Developing Countries*. Comparative Education. l): 89-107.

Leech, N. L., Barrett, K. C., and Morgan, G. A. (2005). *"SPSS for Intermediate Statistics: Use and Interpretation."* Lawrence Erlbaum Associates Publishers.

Marsh, C. (1982). "*The Survey Method, The Contribution of Surveys to Sociological Explanation*." Allen and Unwin.

Okpala, D.C., and Aniekwu, A.N. (1988). "Causes of High Costs of Construction in Nigeria." *J. Const. Eng. Manage*., 114(2).

Shahid. P. (1985). *Implementation of National Education Policies*, Academy of Education Planning and Management, Islamabad pp 15-30, 36-37.

Shuwei, W. (2009). *"The Impact of Collaborative Working on Construction Project Performance,"* University of Northumbria, Newcastle.

Shah, A. and Abdul-Hadi, N. (1993). The Effect of Contractor Size on Mark-up Size Decision in Saudi Arabia. *Construction Management and Economics*, 11, 421–429.

Trochim, W. M. K. (2006). "*The Research Methods Knowledge Base."* 2nd Ed. http://www.socialresearchmethods.net/.

Van Delen (1973). "*Research Methods for Business Students*." Harlow FT Prentice Hall.

Wagner, K (2005). "*Productivity and Skills in Industry and Services- A British – German Comparison*". The Pakistan Development Review.

Zaki (1968). 'Educational \ Development in Pakistan" West Pakistan Publishing Company Ltd, Islamabad pp 10.

APPENDIX: I **Questionnaire Covering Letter**

To:

_____

Subject: **RESEARCH QUESTIONNAIRE**

Respected Sir,

Department of Construction Engineering and Management at School of Civil and Environmental Engineering (NUST) Islamabad is conducting a Research Survey on ***Study of Vocational training System Related to Construction Industry In Technical Training Institutes Of Pakistan***.

We are interested to find out the factors which are affecting the vocational courses related to construction industry in technical training institutes of Punjab.. We are conducting confidential surveys. To help with task, we would like you to complete the attached questionnaire – confidentiality is assured. The questionnaire is relatively simple to complete and it ask about the importance of various factors.

It is important for you to be completely honest about your feelings. All responses will be treated in strict confidence. This will assist us in analysis and interpretation of results.

Thank you for your assistance and cooperation in advance.

Yours sincerely,

Muhammad Arslan
Post Graduate Student – Construction Engineering & Management

Dr. Hamza Farooq Gabriel (PhD)
Associate Professor
Department of Construction Engineering & Management
National Institute of Transportation
School of Civil & Environmental Engineering
Sector H-12, NUST, Islamabad

APPENDIX: II **STUDY OF VOCATIONAL TRAINING SYSTEM RELATED TO CONSTRUCTION INDUSTRY IN TECHNICAL TRAINING INSTITUTES OF PUNJAB.**

Questionnaire for Teachers / Students

PERSONAL INFORMATION

- Name: _____
- Designation: _____
- Name and Address of the Organization / Institution: _____

Please give your responses to the following items and mark the columns you consider as the most appropriate after reading it carefully.

1. SA = Strongly Agree 2. A = Agree, 3. UD = Un Decided, 4. DA = Dis Agree, 5. SD = Strongly Disagree

No.	Specifications	1	2	3	4	5
	Physical Facilities					
1.	There are enough classrooms to impart training					
2.	Laboratories are fully used					
3.	Laboratories have enough equipment to impart training					
4.	Laboratories have the requisite equipment to impart the training					
5.	Sufficient computer facilities are available					
6.	Proper teaching aids are used to give lecture					
7.	Sufficient infrastructure is available for the training					

No.	Specifications	1	2	3	4	5
	Academic Facilities					
1.	Latest books are available for the training					
2.	Teachers are academically competent					
3.	Teachers have practical experience / knowledge for the course					
4.	Teachers are abreast with modern teaching methodologies					
5.	Regular academic site visits are arranged for the training course					
	Curriculum					
1.	Current curriculum of vocational training meet the industrial requirements					
2.	Does the curriculum uses latest industrial literature					
3.	Present curriculum is practical oriented					
4.	Does the curriculum induces the critical thinking among the students					
5.	Practical and theory studies are separately taught.					
6.	Instructional medium using English as a language is helpful					
7.	Instructional medium using Urdu as a language is helpful					
8.	Does the curriculum content achieve the required objectives of the course					
9.	Revision of the curriculum is done periodically					
10.	New techniques / knowledge is added in the curriculum					
11.	Curriculum of the course has not been changed since many years					

No.	Specifications	1	2	3	4	5
12.	Current curriculum of the course is abreast with modern day techniques and procedures					
	Relevance of the Courses					
1.	Do the course contents meet the requirement of job market					
2.	Contents of the course are sufficient to achieve the objective of the course					
3.	Do you feel confident after getting the training regarding job employment					
4.	New techniques / tools are taught which are prevailing in practical field					
5.	Sufficient training is covered in the curriculum for efficient learning of the course					
	Staff Development					
1.	Regular training / workshops are carried out for the staff					
2.	In-service training is necessary for successful teaching					
3.	The training quality given to teachers is good					
4.	Training helps to increase knowledge of teachers					
5.	New techniques / knowledge of the course are necessary for the effective teaching					
6.	Teachers help in character building of the students					
7.	No training is done for teachers					
8.	Quality of teachers imparting the training is satisfactory					
	Assessment / Evaluation					
1.	Practical work of students is given appropriate weight-age in the final examination					

No.	Specifications	1	2	3	4	5
2.	The system of examination fulfills the objectives of the course					
3.	Present system of examination is more based on:-					
	a. Theory part					
	b. Practical part					
4.	Annual examination system is helpful in vocational courses					
5.	Semester system of examination is helpful in vocational course					
6.	Time period of overall training is satisfactory					
	Graduates Employment					
1.	Does the institution help in getting the job in the market					
2.	The contents of the courses are sufficient in imparting full training with respect to practical field					
3.	There is a huge difference between practical field and the training imparted in the institutions					
4.	Does the training help in learning new techniques of the field					
5.	Do the graduates feel confident after getting the training					
6.	Practical training helps more in job field					
7.	Theory training helps more in the job field					
8.	Does the training help in solving problems in the field					
9.	Does the training help in acquiring jobs outside Pakistan					
	General					
1.	The downfall of construction industry in due to:-					

No.	Specifications	1	2	3	4	5
	a. Scarcity of vocational training institution					
	b. Non utilization of manpower					
	c. Untrained manpower					
	d. Improper training of the manpower					
	e. Courses being taught in vocational training are not abreast with practical field					
	f. Government disinterest in promoting vocational training					
2	Industrial coordination is carried out to reinforce learning e.g. site visits exchange of staff					
3.	Employer advisory council should be set up by institutes for better coordination with industrial needs					
4.	The graduates of the vocational institute are considered by society as:-					
	a. Outstanding expert					
	b. Ordinary					
	c. Lower status					
5.	Construction industry development in Pakistan is depended upon quality of vocational training					

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.822	.818	5

APPENDIX: III RELIABILITY ANALYSIS IN SPSS VER.18.0

FOR STUDENTS

1. Physical Facilities Factors

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.728	.700	7

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.728	.700	7

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.686	2.429	2.957	1.529	1.218	.176	7
Item Variances	1.740	1.152	2.511	1.359	2.180	.217	7

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

2. Academic Facilities Factors

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.054	2.286	3.429	1.143	1.500	.209	5
Item Variances	2.253	2.075	2.498	.823	1.204	.150	5

3. Curriculum Development Factors

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.932	.927	12

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.781	1.986	4.086	2.100	2.058	.329	12
Item Variances	1.235	1.058	2.349	1.291	1.275	.050	12

4. Relevance Of the Courses Factors

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.854	.879	5

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.709	3.086	3.914	.829	1.269	.124	5
Item Variances	1.100	1.907	1.616	.709	1.781	.087	5

5. Staff Development Factors

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.809	.831	8

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.820	1.943	4.129	2.186	2.125	.577	8
Item Variances	2.820	.809	2.433	.624	1.771	.089	8

6. Assessment/ Evaluation Factors

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.877	.868	7

a. Listwise deletion based on all variables in the procedure.

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.157	1.757	4.029	2.271	2.293	.689	7
Item Variances	1.067	.898	1.146	.248	1.277	.010	7

7. Graduate Employment Factors

Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.873	.880	9

	Mean	**Minimum**	**Maximum**	**Range**	**Maximum / Minimum**	**Variance**	**N of Items**
Item Means	3.733	1.900	3.986	1.086	2.098	.474	9
Item Variances	1.017	.896	1.135	1.239	1.266	.204	9

8. General Factors

Case Processing Summary

		N	%
Cases	Valid	70	100
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.831	.861	12

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	1.755	1.514	2.671	1.157	1.764	.121	12
Item Variances	.692	.330	1.992	1.661	6.028	.323	12