Role of Accreditation in Quality Enhancement of Technical and Engineering Education

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Abstract

Several researchers have noticed the role of technical and engineering education in economic progress. For quality of technical and engineering education, accreditation and quality enhancement are two important processes. This study was conducted because accreditation is a recent phenomenon and not well-researched in the context of technical and engineering education in Pakistan. This study explores the relationship between Accreditation and Quality Enhancement of technical and engineering education in Pakistan. It will be helpful for the policymakers in identifying the problems and suggesting changes in Accreditation process. The quantitative data was collected through survey and qualitative data was collected through in-depth interviews. In first phase response of ninety heads of program was received and then ten selected heads of programs were interviewed. The findings of all phases were integrated during the interpretation phase. It was concluded that in Pakistan there is a positive correlation between accreditation process and quality enhancement.

Key Words: Accreditation, Engineering Education, Quality Enhancement, Technical Education.

Introduction

Today's society is technologically based society and quality of lifestyle depends upon the quality of technical and engineering education. According to Mykerezi (2003), numbers of researchers have noticed the role of technical and engineering education in the economic progress. For quality of technical training and engineering education, accreditation and quality enhancement are two important processes. In Pakistan, for quality enhancement, accreditation of technical training and engineering education institutes is a burning issue.

In current situations, the quality of technical training and engineering education is not only challenging but also of very importance. Engineering education and technical training have become indispensable part of this globalization, as graduates of engineering education and technical training from a country can take jobs in another country or multinational companies (Chowdhury et al, 2013).

As per Patil and Pudlowaski (2005), now assessment and accreditation process of engineering education have become dynamic and mandatory in the quality assurance of engineering and technical education because of increasing trends of internationalization / globalization of engineering and technical education, expansion in number of disciplines and enrolment of students in engineering and technical education, enhancement of e-learning facilities and emergence of multicultural working environment. Nowadays, accreditation is used as a tool or catalyst for quality enhancement if implemented properly. According to Theobald et al (2017), accreditation is a third-party peer review process and is the main component of quality assurance system. Accreditation is a way of assessing the state of the institute or program in relation to where it ought to be. (Obedara & Alaka, 2013)

In Pakistan accreditation of engineering and technical education institutions is a burning issue for quality assurance and quality enhancement. Accreditation is one of the cross cutting aims of the Higher Education Commission (HEC) Medium Term Development Framework (MTDF).

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Statement of the Problem

Quality enhancement is among the most crucial problems facing education. (Hayward, 2006) This problem has been a matter of concern in education specifically in engineering education and technical training. (Natarajan, 2000)

According to Council of Higher Education Accreditation (2003), accreditation assures academic quality. In Reform Framework presented by HEC (2005) Quality enhancement was recognized as one of the core cutting strategic aims through Quality assessment and Accreditation. There are nine autonomous professional councils/ bodies and four councils/ bodies have been established under HEC. Among these three bodies/ councils are dealing with engineering and technical education.

So far empirical evidence produced to prove the role of Accreditation process in Quality Enhancement in the field of engineering education and technical training is rare. In Pakistan, Up to now about two hundred institutes and five hundred programs have been accredited through accreditation bodies in last fifteen years. The purpose of this study was to analyze the role of accreditation in the quality enhancement of engineering education and technical training.

Significance of the Study

This study was about the process and product of accreditation in engineering education and technical training for the enhancement of its quality. The reason for undertaking research in this field is multidimensional.

The enhancement of quality in engineering education and technical training is one of the areas of ongoing debate. Moreover, formal accreditation process at program and institutional level is a new phenomenon. Yet, it is not well researched and documented with reference to technical and engineering education in Pakistan.

Moreover, most of the current researches on accreditation focus its relationship with Quality Assurance systems, discusses either in the developed or developing countries. Research; which addresses Accreditation process in relationship with quality enhancement in technical and engineering education was rare. Some research discussed Accreditation in relationship with quality enhancement in either engineering or technical education (Chowdhury, 2013; Natarajan, 2000; Venkataram & Giridharam, 2007) but no such study was conducted for accreditation of engineering or technical education system in Pakistan. That is why this study is significant in its nature and there is need to analyze the role of accreditation in quality enhancement of technical and engineering education in Pakistan. This study will beneficial as;

i. The study will be useful for the policymakers working for accreditation organization to understand the problems related to accreditation process and suggest suitable adjustments in Accreditation Standards / Manuals for quality enhancement of engineering education and technical training in Pakistan.

ii. The study will be useful for the planners in identifying the weak or problem creating areas and suggest changes in the Accreditation Manuals.

iii. For researchers it will provides a baseline to explore further dimensions related to quality enhancement through accreditation.

Objectives

This study intended to achieve the following objectives:

1. Investigate the gaps available in Accreditation Manuals in Pakistan.
2. Explore the effectiveness of Accreditation Manuals provided by Accreditation Councils/ Bodies related to quality enhancement.

Research Questions

1. To what extent the existing Accreditation Manuals provided by Accreditation Councils/ Bodies in Pakistan are properly used in technical and engineering education?

2. Which are the problems in Accreditation for technical training and engineering education in Pakistan?

3. Which betterments in the quality of training or education have been observed after accreditation in technical and engineering education?

4. What types of changes in the existing Accreditation Manuals are required for quality enhancement of technical and engineering education in Pakistan?

Literature Review

Quality Assurance

According to Plato, "Goodness is not the same as being, but even beyond being surpassing it in dignity and power" and according to Aristotle, "Any kind of excellence renders that of what it is the excellence good and make it perform its function well".

Doherty (2012) is of the view that definition of quality by the Plato is utopian according to which "quality" is closer to its "ideal". According to Aristotle's definition, quality is fitness to purpose. There are two points of view regarding quality. The first one is metaphysical: quality is unmeasurable; whereas other one is realistic: quality is measurable. Aristotle is regarded as the father of modern quality system.

Garvin (2008) highlighted eight dimensions / ways that people use to judge the quality of a product. Some of these dimensions are comparatively subjective, while others are comparatively objective.

Doherty (2012) argued that improvement in Quality normally starts with inspection, which is a form of quality control. This identifies weakness, non-compliance in system. Quality assurance is a proactive approach which pursuits to diagnose problems and address them immediately, or prevents them before happening.

Doherty (2012) is of the view that Quality assurance is intended to assure accountability and improvement in system. Accountability is usually linked with stakeholders outside of system, such as accreditation agencies, governmental bodies and the public, while improvement focuses on internal process.

According to Nicholson (2011), there are dual purposes of quality assurance, to (i) ensure accountability and (ii) promote enhancement. Accountability is achieved by the process of accreditation, assessment and audit. Although audit, assessment and accreditation represent three distinct concepts and processes, they may coincide, merge or mingle.

Williams (2016) discussed different relationships between quality assurance and quality enhancement. He discussed Danø and Stensaker (2007) according to them quality assurance and quality enhancement are integral parts of the same cyclic process and each part informing the next. Dill (2000) is of the view that quality enhancement is the next, perhaps more profound stage in a process that began with quality assurance. In itself, quality assurance is not enough. He discussed that in literature it had been argued that quality assurance had to lead towards quality enhancement. Elassy (2015) is of the view that both quality assurance and quality enhancement are part of a spectrum, where enhancement dependent upon quality assurance.

According to University of Aberdeen (2015), it is progressively agreed that it is important to promote enhancement of quality, not just to ensuring maintaining the quality. This shifts the emphasis from quality assurance to quality enhancement. As per Hina and Ajmal (2016) quality enhancement not only improves but also regulates the advancement of existing system with respect to predefined standards.

Quality Assurance System in Pakistan

In Pakistan, prior to before HEC no formal system, at national level, for quality assurance and monitoring of educational programs was in practice (Isani & Virk, 2003).

At that time, it was realized that there was a need to streamline the prevailing process of Self Accreditation at individual institutional level with its self developed criteria and process, with the globally recognized best practices for enforcing the internal practices of quality assurance. In this regard, numbers of steps were undertaken at national level. "These involved sensitizing the academia and other stakeholders, development of quality criteria, standards, processes, guidelines, effective monitoring & evaluation system and capacity building of the practitioners" (HEC Report 2006)

The Government of Pakistan authorized HEC to "set up national or regional evaluation councils or authorize any existing council or similar body to carry out accreditation of institutions including their departments, faculties and disciplines by giving them appropriate ratings. The Commission shall help build capacity of existing councils or bodies in order to enhance the reliability of the evaluation carried out by them." (HEC Ordinance 2002).

On the basis of the mandate discussed above, in 2005 at HEC, the Quality Assurance Agency was established. Quality Assurance Agency has setup four Accreditation Councils for Agriculture, Business, Computing and Teachers Education. (HEC, 2015)

HEC developed a "Medium Term Development Framework" (MTDF). That framework was an action plan for the duration of five years; identifying key issues for higher education and offering a long-lasting vision and a feasible strategy to overcome these issues.

That strategic framework was developed having four core aims, along with three cross cutting aims. The core aims mentioned in framework were:

i.   Development of faculty
ii.   Improvement in Access & Learning
iii.   Excellence in Research
iv.   Relevance to National Priorities

Cross cutting, supporting Aims of framework were:

i.   Development in Leadership, Governance & Management
ii.   Quality Enhancement: Quality Assessment & Accreditation and
iii.   Development of Physical & Technological Infrastructure (HEC, 2008)

Accreditation

Different authors define the term accreditation in different ways. Basically accreditation means that the institute as a whole and / or one or more specific program attains certain predetermined standards or criteria and awards a quality label (Obedara & Alaka, 2013, Martin & Stella 2007, Sanyal & Martin 2007, Harvey 2004 & CHEA 2002). Accreditation assures quality control, in form of attainment of minimum standards, in education, enhancement of quality and facilitating student mobility (Sanyal & Martin 2007). According to Theobald et al, (2017) accreditation is a "third party peer review process" and is the core component of quality assurance system.

Accreditation is a way to ensure that organizations are meeting particular standards. Adelman (1992) defined accreditation as "a process of quality control and assurance whereby, as a result of inspection or assessment, an institution or its programs are recognized as meeting minimum acceptable standards". APA (2008) discussed Accreditation both as status and as process.

As per CHEA (2009), accreditation is a procedure of external quality review developed and practice by higher education to scrutinize college, university, and educational programs for quality assurance and quality enhancement.

According to Dano and Stensaker (2007), critical issue related to accreditation is that how it is implemented as a procedure, what kind of accreditation processes are designed, and in which ways it links with educational institutions attempting to improve their quality framework.

Accreditation of Engineering and Technical Education

According to Patil and Pudlowski (2005), the quality assurance and accreditation procedure in Engineering & Technical Education started voluntarily with the help of Accreditation Board of Engineering and Technology (ABET) in the USA and after that in many other countries. From 1932 to October 2012, ABET accredited around three thousand two hundred seventy eight programs, distributed over more than six hundred seventy universities and colleges in twenty three countries. Since 1997, ABET has been recognized by the Council for Higher Education Accreditation   (CHEA).

In Pakistan, Pakistan Engineering Council (PEC) is responsible for accreditation of Engineering Education institutions, Pakistan Council of Architects and Town Planners (PCATP) is responsible for accreditation of

Architecture and Town planning education institutions and National Vocational & Technical Training Commission (NAVTTC) is authorized to accredit Technical Education & vocational training institutions.

Research Design

This study was conducted with mixed method approach. Study was conducted in two phases. First quantitative data was collected and analyzed and then the qualitative data was collected and analyzed. In this study phase-I and phase-II are sequentially connected. Phase-II was conducted to enrich the findings, increase the depth & breath as well as seeking in-depth input from respondents.

In first phase, questionnaire was developed and survey was conducted at program levels. This was followed by second phase focusing on the detailed qualitative in-depth interviews, to collect comprehensive views of the selected heads of institutes and programs on the bases of survey conducted in first phase of study.

Data collected through interviews and survey was analyzed; the findings of all phases were integrated during the interpretation phase.

Population

Delimited population (actual numbers) for this research study was:

Table 1. Delimited Population (Actual Numbers)

Sampling Matrix						
Accreditation bodies	PEC		PCATP		NAVTTC	
	Program	Sample Size	Program	Sample Size	Program	Sample Size
Islamabad	18	35	2	2	0	0
Punjab	37	81	8	8	8	11
KPK	16	37	2	2	5	9
Sind	15	61	7	7	5	11
Baluchistan	2	7	1	1	0	0
AJK	1	4	0	0	1	2
Total	89	225	20	20	19	33

Sources: PEC (2016),PCATP (2016) and NAVTTC (2016)

First Phase Population

For second phase of research, study population was Chairpersons/ Head of Department of 278 Programs in 128 Universities/ Colleges/ institutions

Second Phase Population

Six Engineering Institute (one from each geographical state, i.e. Islamabad, Punjab, KPK, Sindh, Baluchistan and AJK), two Architecture institutes and two technical institutes.

First Phase Sample

For this study first phase sampling matrix is given below;

Table 2. Phase-I Sampling Framework

Sampling Matrix			
Accreditation bodies	PEC	PCATP	NAVTTC
	Sample Size	Sample Size	Sample Size
Islamabad	12	1	0
Punjab	29	3	4
KPK	13	1	3

Sindh	21	4	4
Baluchistan	4	1	0
AJK	3	0	2
Total	82	10	13

Second Phase Sample

For the second phase of the study, a sample of six Engineering Universities/ Colleges, two Architecture Universities/ Colleges and two Technology colleges were selected from first phase for in-depth interview to increase depth and breadth and enrich information. Purposive sampling was used for this phase. Main focus was the persons who are directly involved in accreditation as well as quality assurance/ enhancement process in renowned national Engineering, Architecture HEIs and Technical Colleges/ Institutes.

For second phase of study, the following were focused as per importance and requirement of sample:

1. Academic and Accreditation section of Quality Assurance Directorate of NUST.
2. Directorates of QECs of UET Lahore and Punjab University

Another group of Executive Body/ Committee members of Accreditation bodies serving in educational institutions were selected as respondents. Remaining respondents were selected on the basis of data collected during second phase of study, on the basis of requirements of the study

Research Instruments

First Phase

For first phase of study, questionnaire was developed. Parameters of the questionnaire were including following;

- Role of Accreditation Manuals and guidelines,
- Shortfalls in Accreditation Manuals and guidelines.
- Missing/ unnecessary Standards
- Problems in accreditation procedure
- Role of accreditation team in visits
- Selection of accreditation team
- Quality Enhancement in the fields of Accreditation criterion
- Objectives
- Learning outcomes
- Curriculum and Learning Process
- Student
- Faculty and Supporting Staff
- Facilities and Infrastructure
- Finical recourse and institutional support
- Suggestions for improvement.

For this phase, a questionnaire was developed as a data collection instrument This questionnaire requires six personal information, including name (optional), designation, qualification, organization, age and experience and one information regarding version of accreditation manual used by the respondent. Questionnaire consists of thirty one restricted response items on five point Likert scale and eight open-ended response items.
For Face Validity, questionnaire was sent to eight relevant stakeholders from relevant field and academia.

Few suggestions were received for modifying questionnaire, which were addressed and modified version of questionnaire was developed. This modified version of questionnaire was sent for pilot testing for testing reliability of developed tool for this phase of the study.

Pilot Testing

For checking validity of the tool Pilot Testing was conducted. Program other than delimited population was selected for Pilot Testing, such as;

- Mechanical, Chemical Departments of Engineering Universities / Colleges
- Engineering and Technical Universities / Colleges accredited after August 2015
  For Pilot Testing questionnaire was sent to twenty six Engineering and Technical Universities / Colleges.

As instrument, developed for first phase, contain multiple answer categories items, on five point Likert Scale. For this instrument, Cronbach alpha is suitable to measure the reliability of this tool. The value of Cronbach alpha for pilot testing data is 0.947. As the value of Cronbach alpha greater than 0.90, which showed that reliability was strong. So pilot testing was highly reliable and we could perform research on the basis of our collected data.

As, need for the addition of column of Department was observed during pilot testing. After Pilot Testing one column of Department was included in the information section of Questionnaire. After that, survey was conducted at program levels and questionnaire was sent to 105 Head of Program.

Second Phase

In second phase, the focus was on detailed qualitative open-ended face to face interviews to collect in detailed and comprehensive views of the selected heads of programs. Interview Protocol was prepared to record evidence including following;

- Quality of educational services with reference to accreditation criteria
- Quality of Learning processes
- Use of resources
- Quality enhancement after accreditation

Second Phase Interview protocol was prepared and for Face and content validity this tool was sent to five relevant stakeholders from relevant fields and academia.

Interview protocol contains a note for interviewee, objectives of the interview and seven major questions. Questions were related to title of the accreditation manual, process and criteria. Moreover, suggestions regarding improvement of accreditation manual and process were requested. Final question relates to the improvements in the quality of education observed by interviewee because of accreditation process.

During Phase-II of the study, In-depth Interviews were conducted in all geographical areas and for all categories, according to Phase-II sample. These interviews were conducted with ten selected respondents.

During Phase-II of the study, in these In-depth Interviews mainly seven questions were asked from interviewees, but in some cases few sub questions were also asked for getting in-depth information or for clarification.

Data Collection, Analysis and Presentation

For first phase of the study Data collection technique was Survey and tool for the collection of data was Questionnaire. Descriptive data analysis techniques were used to analysis the data collated through questionnaire.

For second phase data collection technique was in-depth Interview and tools for data collection was Interview protocols. For the collected data during third phase Thematic; coding and clustering techniques were used to analyse data.

During the study, the data collected through document analysis, survey and interviews were transcribed by the researchers themselves. It helped in further analysis in qualitative studies. Descriptive statistical data analysis techniques were applied on quantitative data collected through survey. Whereas, for interviews, thematic; coding and clustering were developed according to the nature of the data and research questions and after that it was thematically analyzed and discussed. For the purpose of data analysis of the questionnaire, percentage was used.

Analysis and Interpretation of Data

For the achievement of objectives of the study, data was collected through questionnaires in Phase –I of the study, and finally from in-depth Interview in phase-II of the study.

First Phase Data Analysis

This section deals with analysis and interpretation of the collected data through questionnaires, which were personally delivered and collected by the researcher.

The data were tabulated in the light of the responses. It was analyzed and interpreted accordingly. For the purpose of the data analysis,

Mean of each item was also calculated. Moreover, correlations between accreditation manual, visit, process and quality improvement because of accreditation are measured through person correlation coefficient. But before all these processes reliability of the data is checked through Cronbach's Alpha.

Reliability Analysis

Table 3. Reliability of Data (For Analysis)

Case Processing Summary		N	%
Cases	Valid	90	100.0
	Excluded	0	.0
	Total	90	100.0

List wise deletion based on all variables in the procedure.

Reliability Statistics	
Cronbach's Alpha	N of Items
.936	31

Since our instrument contains multiple answer categories items. And suitable measure to test the reliability of such tool is Cronbach alpha (Cronbach, 1951). The values of cronbach alpha for our analysis data is 0.936. So according to this rule of thumb, data for analysis is highly reliable and we can perform the further analysis on the basis of our collected data.

Analysis of Data from Questionnaire

Table 4. Restricted Response Statements

Item. No.	Statement related to;	Total (N=90)
1	Helpfulness of Accreditation Manual	4.34
2	Provision of guidelines in Accreditation Manual	4.19
3	Coverage of steps involved in process	4.13
4	User friendly	3.92
5	Elaboration of all	3.81
6	No shortfall in Accreditation Manual	3.46
8	Suitability of timing for accreditation visit	4.09
9	Communication of dates of accreditation visit	4.17
10	Communication of names of accreditation team	3.83
11	Formation of accreditation team	3.94
12	Selection of accreditation team	3.99

13	Role of members of accreditation team as a guide.	3.58
14	Role of members of accreditation team as an auditor.	3.88
15	Coverage of all Criteria by team.	4.03
16	No communication gap between Team and Management.	3.73
19	Procedure was not complex.	3.96
21	Accreditation process coverage	4.20
22	No problem faced during process.	3.80
24	Fulfillment of all requirements in Accreditation process	4.03
26	Role in improving quality of education	4.29
27	Improvement in quality of Program Educational Objectives with the help of accreditation	4.01
28	Improvement in quality of Learning Outcomes with the help of accreditation	3.96
29	Improvement in quality of Curriculum with the help of accreditation	3.81
30	Improvement in quality of Teaching Learning Process with the help of accreditation	3.89
31	Improvement in quality of Students with the help of accreditation	3.72
32	Improvement in quality of Faculty and Support Staff with the help of accreditation	3.79
33	Improvement in quality of Physical Infrastructure with the help of accreditation	4.16
34	Improvement in quality of Students Supports Services with the help of accreditation	3.86
35	Improvement in allocation and utilization of financial resources with the help of accreditation	3.73
36	Continuous Quality Improvement with the help of accreditation	4.20

In the first phase of study, there were thirty one restricted response items in questionnaire. These items relate to Accreditation Manual, Visit, Process and Quality improvements in the result of accreditation.

- Items no. one to six relates to Accreditation Manual,
- Items no. eight to seventeen relates to Accreditation visit,
- Items no. nineteen, twenty one, twenty two and twenty four relates to Accreditation process, and
- Items no. twenty six to thirty six relates to Quality Improvement

Correlation coefficients were calculated between accreditation procedure inputs (Manual, Visit and Process) and Quality Improvement, as output, as shown in the table given below;

Table 5. Correlations between Accreditation process inputs and Quality Improvement.

		Manual	**Visit**	**Process**	**Quality Improvement**
Manual	Pearson Correlation	1	.558**	.617**	.393**
	Sig. (2-tailed)		.000	.000	.000
	N	90	90	90	90
Visit	Pearson Correlation	.558**	1	.773**	.626**
	Sig. (2-tailed)	.000		.000	.000
	N	90	90	90	90
Process	Pearson Correlation	.617**	.773**	1	.557**
	Sig. (2-tailed)	.000	.000		.000
	N	90	90	90	90
Quality Improvement	Pearson Correlation	.393**	.626**	.557**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	90	90	90	90

**. Correlation is significant at the 0.01 level (2-tailed).*

The results show that there are positive correlations between Accreditation Process, Visit, Manual and Quality Improvement because of accreditation. Moreover, correlation between Accreditation Process, Visit, Manual and Quality Improvement is significant at the 0.01 level (2-tailed).

This means that minimum value of correlation coefficient is 0.393 which is between Quality improvement and Accreditation Manual and maximum value of correlation coefficient is 0.773 which is between Accreditation Visit and Accreditation Process

Open Ended Response

Along with thirty-one restricted response items tools also had eight open response items for gathering additional or detailed information or clarification of response, if desired by the respondent. Analysis of data gathered by these open-response items are given below:

Shortfalls or limitations in the Accreditation Manuals

In the response of this item nine out of ninety respondents pointed out any shortfalls or limitations in the Accreditation Manuals.

Shortfalls or limitations in the Accreditation Manuals pointed out by the respondents were:

- Detailed marking of individual component (of Criterion / performance area) with proper elaboration is missing in the Accreditation.
- Examples are missing in Accreditation Manual.
- One respondent is of the view that accreditation manual has vague statements.

Problem Faced During Visit of Accreditation Team

In the response of this item eleven respondents pointed out any problem faced by them during visit of the Accreditation Team.

Problems highlighted by the respondents, which they had faced during the visit of the Accreditation Team were:

- Wrong selection of the team members. Team member has his own understanding of OBE system.
- Authoritative behavior of visitation team members.
- Experts generally do not have formal training on quality audit process.

Complexity of Procedure

In the response of this item, seven respondents are of the view that procedure adopted by the Accreditation body was complex for them.

Complexities observed by the respondents in the procedure adopted by the Accreditation body were implementation of CQI, calculation of Student to Teacher ratio and parallel running of both the conventional and OBE creates complexity and it is complex because of non-availability of centralized software for preparing OBE record.

Problem Faced During Whole Procedure

In the response of this item, of the questionnaire twelve respondents pointed out any problem faced by them in the whole accreditation procedure.

Problems pointed out by the respondents, which they had faced in the whole accreditation procedure were attitude of the team members, communication gap between host institution and the team, time consuming procedure, complex scoring criteria and unnecessarily objections were pointed out by the team members.

Fulfillment of Accreditation Requirements

In the response of this item of the questionnaire, five respondents gave any statement regarding missing or unnecessary area (Criteria) in the accreditation procedure for the quality of technical and engineering education. Missing or unnecessary area (Criteria) in the accreditation procedure for the quality of technical & engineering education, pointed out by the respondents were:

- Proper qualification of team member is missing.

- Lack of financial resources and Industry academics linkage.
- Less time for Student and Faculty interaction

Suggestion for the Improvement of Accreditation Manual

Forty-one suggestions were received from respondents.
Suggestions for the improvement of Accreditation Manual were:

- Need for addition of examples in form of
    - Inclusion of case studies
    - Direct part of manual text
    - Annexure or
    - Supplement/ Support data
- Salient components of accreditation process should be summarized in a separate chapter.
- Rubrics of Evaluation should be shared with HEI's.
- OBE based manual must contain Q&A frequently asked Questions (FAQs) portion.
- Subjective marking should be removed.
- PEC should provide proper template for SAR (Self Assessment Report) along with the manual.
- Too much paperwork should not be involved.
- Manual should be periodically circulated and communicated to institutes/ universities/ TEVTAs

Suggestion for the Improvement of Accreditation Process

Forty-nine suggestions were received from respondents
Suggestions for the improvement of Accreditation Process were:

- Timely notification of date of visit and name of members of accreditation team.
- Need for well-defined evaluation criteria and uniform evaluation policy.
- Team members must be aware the ground realities of that location.
- Extensive and continuous trainings is required for the Accreditation team and the faculty members.
- Inclusion of best practices along with case studies for CQI process can help enhance the process.
- Team especially senior (aged) individual come with preset mind. They need to be trained".

Improvements in the Quality of Education Because of Accreditation Process

In reply to this item, fifty-one respondents commented. According to respondents' improvements were observed in infrastructure, lab development, faculty, financial avocation, Assessment mechanism, course file work, implementation of CQI process, on campus student facilities, Teaching Learning Resources / materials and in Complaint Management system.

In Phase-II ten selected respondents stated that they observed quality enhancement in following areas, as given in following table.

Table 6. Improvement in Different Quality Areas

Criteria / Performance Area	Sub Area	Frequency
Program Educational Objectives (PEOs)		2
Program Learning Outcomes (PLOs)		2
Curriculum	Curriculum Review Curriculum Development (OBE) Now Student Centered system	8
Learning Process	Delivery of lessons Teaching Practices	7

	Learning Environment	
	preparation of Teaching Learning Resources / materials	
	Practical demonstration	
	Class Size	2
	Learning Assessment	2
	Teacher	1
	Teaching Load	1
	Punctuality	1
	Implementation of aptitude lest criteria.	
Students	Results	4
	Discipline	
Faculty and Support Staff		9
	General	7
Facilities and Infrastructure	Lab	9
	Class Room	2
	Library	2
	General	
Institutional Support and Financial Resources	For conferences & Seminars	4
	For research	
CQI	General	2
	Web Site	
Students Support Services	Complaint Management system	3
Industry Linkages		1

Conclusions

On the basis of discussions, analysis and findings, as already discussed in this report it is concluded that;

In Pakistan there is a positive correlation between Accreditation and Quality enhancement. Improvement in the quality indicator because of accreditation is higher in engineering education as compare to architecture/ town planning and technical education. Improvement in the quality indicator because of accreditation is lower in technical education as compare to architecture/ town planning and engineering education. Satisfaction level of Accreditation Manuals of PEC, PCATP and NAVTTC is lower as compare to accreditation process and visit. Satisfaction level of Accreditation Manuals of PEC, PCATP and NAVTTC is lower as compare to accreditation process and visit. PEC and NAVTTC accreditation standards are matched with international standards. In PCATP criterion of accreditation component of CQI is missing.

From the findings of survey, and in-depth interview it was concluded that missing areas in the accreditation process are;

- Institute Accreditation in the case of engineering and architecture/ town planning education
- Discipline specific standards
- CQI Handbook
- Implementation Guidebook
- Standardized Infrastructure lists.
- Document Checklist
- SAR Templates
- More Training sessions
- Manual Revision, for architecture/ town planning

Implications

- It is recommended that Accreditation of Professional Engineering / Architecture and Town Planning institutions should be started.
- Specific discipline / technology related criteria for accreditation should be developed.
- Institutions accreditation process for the newly established and already established institutions should be different.
- Standardized list of physical facilities, including building, machinery and equipment should be developed.

Recommendations

For the Improvement of Manuals

- Detailed marking of each individual component and sub components should be included
- Practical examples for required files or evidences should be included in manual directly or as annexure or as a case study.
- There should be Self Assessment Report templates in Accreditation Manual
- Accreditation process should be further elaborated in manual with flow charts.
- It is recommended that checklist for the required documents should be a part of Accreditation Manual.
- There should be frequently asked Questions portion in Manual.

For the Improvement of Process

- There should selection of assessment team strictly on merit, in accordance with the guidelines given in accreditation manuals.
- No office bears or members of executive committee should be member of accreditation team.
- Individuals from academic audit, quality assurance, or field/ industrial practitioner should be selected on a priority basis for the selection of team members.
- As at the time of assessment visit availability of industrial representatives and Alumni is a difficult task. There should a provision of discussing with the through video/ voice conference.
- For OBE system more training are required for faculty.
- There is also requirement of special training for implementation of CQI.
- There should be a separate Hand book for CQI implementation.
- Teaching learning activities should not suffer during or for preparation of visit.
- In Accreditation Criteria there should be more focus on Student feedback, interaction with faculty, Industrial academic linkages and proper financial recourse allocation.
- For monitoring of quality of education, there should be provision mandatory random surprise visits.

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