Evaluation of Post Graduate Programs of University of Engineering and Technology, Lahore

By

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Abstract

Higher education institutions, especially technical/engineering have a pivotal role in the overall development, particularly in the economic and industrial sectors of the society. The study was designed to sty the UET Lahore. The purpose of the study was to evaluate Post-Graduate Programs of University of Engineering and Technology, Lahore". The objectives of the study were to i) evaluate the performance of MS Programs of UET, Lahore according to the perception of students and teacher ii) identify the short falls of the program. Determine the problems faced by the teachers and the student's and iii) suggest measures on the basis of findings and conclusions, to improve the system. The study was delimited to the Faculty of Electrical Engineering of UET, Lahore. Population of the study consisted 31 teachers and 578 students of Post Graduate programs of Faculty of Electrical Engineering, for the period 2008-2010. Sample of the study was consisted of 100% teachers and 45% students. The major conclusions of the study indicated that that the courses were organized, well delivered and the objectives were clear, the method of final assessment can meet the criteria of labour market demands, the dissertation supervisor was available and supportive, the students need training / information on the resources available in the library and the teachers needed teacher / computer training programs. It was recommended that teachers may be provided opportunity to avail teacher training/computer training programs to enhance their teaching and research skills. The courses may be revised and updated with the consultation of major employers of UET graduates like, WAPDA, WASA, PTCL, Public and Private Industries. The students may pay more attention in developing practical skills according to labour market demands.

Keywords: *Evaluation, Technical Education, Engineering Education, University of Education*

1. Introduction

The importance of higher technical education is acknowledged universally. It may be a means of technical growth of the society in this modern and ever-changing world. The structure of a nation cannot be maintained without its proper education and training. It influences the individual's life in two ways. First, it produces high standard disciplines and refines intellectual development. Secondly, it brings desirable changes in the behavior of an individual and develops his/her habits and manners according to the priorities of the society. If these two aspects are covered effectively by the education, it means that education is leading the nation towards development. After the establishment of Pakistan more emphasis was given to the technical/engineering education in different policies. Budget was also enhanced for strengthening/up-grading of the existing institutions and to establish the new technical institutions. Keeping in view the importance of technical education one of the steps taken in this regard by the Government of Pakistan was the transformation of Maclagan, College of Engineering, which was established in A.D 1921, into the University of Engineering and Technology, Lahore in A.D 1961. (UET, Prospectus, 2010).

The major objective of higher education is to accelerate its contribution as a collective resource in achieving the goals of social change and nation-building. Higher education institutions are therefore

expected to cater the imperatives of total human development and uplift of the quality of life of people in the country. Resources are always limited to meet the unlimited needs and to cope with this critical situation, all over the world. Modern and intelligent nations have devised some techniques and strategies to run the industrial, business or educational programs, which save their resources considerably increasing the efficiency of institutions. And they are satisfying more and more needs of their societies with these saved resources making the programs cost effective. These effective result oriented strategies are named "evaluations."

There is neither dogmatic definition of evaluation, nor any single strategy which could cause miracles happen. The decision for adopting the right type of approach about evaluation of any program, however, depends on the type of program, situation and the intended objectives desired from the program. According to Sarfraz (2001, p.3),

> Evaluation is about judgments, as the word suggests, seeing the value, lack of value, in educational programs. These judgments do not necessarily mean that there is no value. One of the tricks of evaluation is to isolate the negative and positive aspects of value judgments. Develop the aspects that are seen as having some value and work on improving or eliminating those aspects that are judged to be of little value. The objective of evaluation of any program is to make them able, those who provide or administer services, determine what to offer and how well they are offering those services. In addition, evaluation in education can identify program effects, helping staff and others to find out whether their programs have an impact on participants' knowledge or attitudes.

For the improvement of educational objectives, almost all the institutions perform some activities to know the level of their achievements, like the tests and examinations for the assessment of students' knowledge. The technique and standard of corrective actions, on the basis of data collected, makes the evaluation effective and result oriented.

At the time of emergence of Pakistan it had very poor infrastructure, almost, in all sectors of the country. Education was inherited from the colonial rulers, who intentionally devised the education system, of that time, to keep the people of Subcontinent backward, to exploit and to convert them into educated slaves. At the very time of independence it was the need of the hour to give proper consideration to the education of our people. Keeping in view the importance of education, many efforts were made to provide a definite direction to this great cause in Pakistan. Because of this, Quaid-i- Azam laid down a set of objectives to provide a road map to all education endeavors in the country. He said in his message to Pakistan Education Conference at Karachi on 27th Nov.1947 that:
> We know the importance of education and the right type of education cannot be over emphasized. Under foreign rule, for over a century, sufficient attention has not been paid to the education of our people and if we are to make real, speedy and substantial progress we must earnestly tackle this question and bring our national policy and program on the lines suited to the genius of our people, in consonance with our history and culture and having regard to the modern conditions and vast developments that have taken place all over the world.

Importance of Higher Technical/Vocational Education in Pakistan
Education is widely accepted as one of the leading instrument for promoting economic development. But what level of education that contributes most to development whether, primary, secondary, or higher education? Knowledge-based competition within a globalizing economy is prompting a fresh consideration of the role of higher education in economic development and growth. Previously it was often viewed as an expensive and inefficient public service that largely benefited the wealthy and privileged ones of the society but now it is understood to make a necessary contribution, in concert with other factors, to the success of national efforts to boost productivity, competitiveness and economic growth. Viewed from this perspective, higher education ceases to contend with primary and secondary

education for policy attention. Instead, it becomes an essential complement to educational efforts at other levels, as well as to national initiatives to boost innovation and performance across economic sectors. Recent evidence suggests higher education is a determinant and a result of income too, which can produce public and private benefits. Higher education may create greater tax revenue, increase savings and investment, and lead to a more entrepreneurial and civic society. It can also improve a nation's health, contribute to reduce population growth, improve technology, and strengthen governance and decreases level of poverty if not finishes it completely.

Modern civilization is dominated by science and scientific developments. As a result of it, specialization in certain branches and industrialization has become the most important aspect of scientific development. It is because of this reason that technical education has been in demand.

The fast and huge transformations due to globalization and information technology are creating great impacts on the future of nearly every society, community, institution and individual in different parts of the world. To meet the challenges of ever advancing and changing world the promotion of higher technical education is inevitable. Higher education is an important from of investment in human capital development. In fact, it can be regarded as a high level or a specialized form of human capital, contribution of which to economic development is very significant. It is rightly regarded as the "engine of development in the modern world economy".

2. Evaluation

The most important challenge is not just to guarantee the expansion of education, but also to improve its quality and to link education to society's needs and development goals. The main objective of Higher Education institutions in Pakistan is to develop teachers, researchers, administrators and highly skilled manpower. The great relevance and high costs of this objective make it indispensable that higher education institutions conceive to what degree they are fulfilling their responsibilities for this great cause. To make the programs more and more effective and result oriented there is dire need to have the support of timely evaluation practices to make useful interventions, to take corrective actions and right decisions. The discipline and profession of evaluation is growing by leaps and bounds. Societies all around the globe seem to be embracing the values of accountability, professionalism, and evidence-based practice, and are commissioning evaluations of all shapes and sizes.

In addition, evaluation of any program is to make them able, those who provide or administer services, determine what to offer and how well they are offering those services. Evaluation in education can identify program effects, helping staff and others to find out whether their programs have an impact on participants' knowledge or attitudes. St. Leger and Walsworth-Bell (as cited in Reeve, & Peerbhoy, 2007, p. 122) have defined evaluation as, "the critical assessment, in as objective a manner as possible of the degree to which a service or its component parts fulfill stated goals" The focus of this definition is on attaining objective knowledge, and scientifically or quantitatively measuring predetermined and external concepts.

Types of Evaluation
There are many types of evaluations which are equally important depending on the situation and type of program. Some important types of evaluations are effective for educational programs and activities are given as under:

Process Evaluation
Process Evaluations may be described as an assessment of materials and activities while these are in process. Examination of materials is likely to occur while programs are being developed, as a check on

the appropriateness of the approach and procedures that will be used in the program. For example, program staff might systematically review the units in a curriculum to determine whether they adequately address all of the behaviors the program seeks to influence. A program administrator might observe teachers using the program and write a descriptive account of how students respond, and then provide feedback to instructors. Examining the implementation of program activities is an important from of process evaluation.

Outcome Evaluation
Outcome evaluation assesses program achievements and effects. Outcome evaluations study the immediate or direct effects of the program on participants. This type of evaluation is not unlike what happens when a teacher administers a test before and after units to make sure the students have learned the material. The scope of an outcome evaluation can extend beyond knowledge or attitudes, however, to examine the immediate behavioral effects of programs.

Impact Evaluation
Impact Evaluations look beyond the immediate results of policies, instructions, or services to identify longer-term as well as unintended program effects. It may also examine what happens when several programs operate in unison. For example, an impact evaluation might examine whether a program's immediate positive effects on behavior were sustained over time. Regardless of the kind of evaluation, all evaluations use data collected in a systematic manner. These data may be quantitative such as counts of program participants, amounts of counseling or other services received, or incidence of a specific behavior. They also may be qualitative such as descriptions of what transpired at a series of counseling sessions or an expert's best judgment of the age-appropriateness of a skills training curriculum. Successful evaluations often blend quantitative and qualitative data collection, the choice of which to use, should be made with an understanding that there is usually more than one way to answer any given question.

3. Engineering Education in Pakistan

It is a fact that engineering/technical education is the need of the day and, it not only gives more return than general education but also plays a vital role in the socio- economic development of the country. The examples of Japan, China and other developed countries can be viewed in this perspective. Engineering education in Pakistan is not being given due importance in relation to the new technical advances in the world and challenging demands of the labour market. Seema Ansari and S. Fariha Hasnain describe in their study, "Support and Quality of Engineering Education in Pakistan", concluded that the rapid changes in the engineering education worldwide require that, engineering education in Pakistan be paid more attention from government quarters to justify its importance to the nation. Educational institutions alone cannot surmount all the challenges, like sustaining engineering workforce, defining educational outcomes for a new breed of engineers, revamping engineering education and funding the necessary changes. Industry, government, and educational institutions must work together to prepare tomorrow's engineers. Of the 126 universities established in Pakistan since the nation was founded, only 30-35 offer engineering with limited seats. Thus the country has been unable to produce the needed manpower for its development. Furthermore, the meager national investment in engineering education requires more efforts for improvement. (www.pafkiet.edu.pk/LinkClick.aspx?fileticket.)

The University of Engineering and Technology, Lahore is the oldest university of the engineering sector in Pakistan. This university has produced a lot of engineering graduates who are fulfilling technical man power demands in the country and abroad. Brief picture of this university is given on the following pages.

UET, Lahore
Though this institution received its charter as a University in the year 1961, it has a much longer history as a distinguished seat of learning in the engineering sciences. It started its career in 1921 as the

Mughalpura Technical College, deriving its name from the famous suburb of the old city of Lahore, richly dotted with architectural heritage of the great Mughals including the magnificent Shalimar Gardens. Its more familiar name of the pre-University college, was given to it in 1923 when Sir Edwards Maclagan, the then Governor of the Punjab, laid the foundation stone of the building, now called the Main Block, which still retains its majesty in spite of the wear and tear of over eight decades. At that stage the institution offered courses of study in two disciplines, namely Electrical and Mechanical Engineering. These courses, though known for their excellence, did not lead to a University degree.

The year 1932 was a major milestone in the evolution of this institution when it was affiliated with the University of the Punjab for award of a Bachelor's Degree in Engineering. At the dawn of Independence in 1947, it had well-established B.Sc. Degree courses in civil, electrical and mechanical engineering and the quality of its scholastic standards won it a place of prestige throughout the British India. In 1954, it started a Bachelor's Degree course in Mining Engineering, the first-ever of its kind in the country. But its massive expansion and development commenced in 1961 on its transformation into a University. It set for itself a variety of goals, but the first priority was to start teaching of those disciplines which were crucial for national development but were not catered for by any institution in the country. Accordingly, in the sixties, Bachelor's degree courses were started in Chemical Engineering, Petroleum and Gas Engineering Metallurgical Engineering, Architecture and City & Regional Planning. (UET Doc, 2012)

Later on, the University concentrated its energies and resources on developing its postgraduate programmes. By 1970s it had established over a core of Master's Degree Courses in diverse specializations of engineering, architecture, planning and allied disciplines. Ph.D. degree programme was also initiated in a number of disciplines. The process of consolidating and strengthening them continued to be a major concern of the University, with phenomenal increase in students' enrolment in seventies. Consequently the University College of Engineering, Taxila was established in 1975. For three years it functioned at Sahiwal and was shifted to its campus at Taxila in 1978. This College has now been upgraded to University of Engineering and Technology, Taxila.

Establishing traditions of research in the engineering and allied disciplines has been a major goal of the University. With this end in view, the University established a Directorate of Research Extension and Advisory Services which strives for the promotion and organization of research activities. Since the inception of the University, there has been a massive rise in students' enrollment. From a total enrollment of 447 in 1961, the figure has now (in 2012) gone up to about 9804. Over 1900 students are pursuing postgraduate studies. The number of female students enrolled for different disciplines is ever on the increase and is 1364 at present. The number of foreign students coming from countries, like Iran, Jordan, Kuwait, Kenya, Nepal, Suadi Arabia, Iraq, Bangladesh and Sri Lanka is over 250 which gives the University Campus a cosmopolitan character.

Faculties of UET, Lahore
The teaching departments of the University are grouped into the following six faculties:-
- Faculty of Electrical Engineering
- Faculty of Mechanical Engineering
- Faculty of Civil Engineering
- Faculty of Architecture & Planning
- Faculty of Chemical, Mineral & Metallurgical Engineering
- Faculty of Natural Sciences, Humanities and Islamic Studies

23 Teaching Departments are working under the above faculties by offering 19 Under Graduate and 55 Post Graduate Programs.

The Campuses and Affiliated/Constituent Colleges
(i) Campuses
- KSK Campus, Kala Shah Kaku, Lahore
- FSD Campus, Faisal Abad

- RCET ,Gujranwala(constituent college)

(ii) Affiliated Colleges
- Institute of Space Science Technology, Islamabad
- Himat-e-Islam Khwateen Degree College, Lahore
- Garrison Science Degree College for Boys Lahore
- Garrison Science Degree College for Girls, Lahore
- NFC Institute of Engg. and Fertilizer Research, Faisalabad
- Government College of Technology, Lahore
- Government College of Technology, Faisalabad
- Government College of Technology, Bahawalpur
- Government College of Technology, Rasul

Achievements of the UET from 2000-2010

The University of Engineering and Technology, Lahore is a public institution imparting technical education to meet the requirements of technical manpower of public and private industry. A brief summary of the University with its remarkable developments/achievements during the period 2000-2010 is given as under:

i. **Faculty Strength**

In the year 2000 there were 281 faculty members including 81 Ph.Ds. Today the faculty strength has increased to 774, inclusive of 127 Ph.Ds. so as to maintain the requisite student-teacher ratio.
The detail of faculty strength is as under:-

Faculty	Main Campus	KSK Campus	FSD Campus	RCET, GRW	Total
Professor	76	6	4	1	87
Associate Professor	40	1	0	1	42
Assistant Professor	114	1	0	1	116
Lecturer	376	49	52	52	529
Total	606	57	56	55	774 Including 127 Ph.Ds

Faculty on Higher Education Abroad

Presently 172 faculty members are undergoing Ph.D programme in foreign Universities and 37 are pursuing Ph.D. in local universities (Total 209). The detail is as under:-

Scheme	Main Campus	KSK Campus	FSD Campus	RCET, GRW	Total
University's Faculty Development Program (FDP)	84	14	10	07	115
Other Scholarships	79	11	03	01	94
Total	163	25	13	08	209

Student Enrolment and Programs Offered

Student Enrolment and Programs Offered	2000	2010
M.Sc. Programmes offered	30	55
M.Sc. Enrolment	516	1778
Ph.D. Enrolment	Nil	200
Ph.D. Produced	04 before 2000	39 after 2000

External Linkages

The University has developed its linkages to some of the foreign international Universities of high repute to extend the cooperation for research and the exchange of faculty and students. Also the University has

developed its linkages with national and international industries to provide them consultancy services and for getting their cooperation to provide internship facilities to the students of the University.

International Linkages

UET has Linkages with a number of universities worldwide with different types of cooperation agreements as indicated before the name of university in the table given below.

Some of the signatory universities are as follows:

S#	University	Country	Scope
1)	Michigan Technology University	USA	Exchange of Faculty and Students
2)	University of South Carolina	USA	
3)	Queen Mary University of London	UK	
4)	University of Bedfordshire	UK	
5)	University of Manchester Institute of Science and Technology (UMIST)	UK	
6)	University of Manchester (Faculty of Engineering & Physical Sciences)	UK	Research & Development Projects Exchange of Faculty / Students Admissions & Credit Transfer Joint Conferences, Workshops & Seminars
7)	Anhalt University of Applied Sciences in Berburg/ Dessu/Kothen	Germany	
8)	Wuerzburg-Schweinfurt University of Applied Sciences	Germany	
9)	Brandenburg Technology University BTU-Cottbuss	Germany	
10)	Najing University China	China	Exchange of Faculty and Students
11)	Asian Institute of Technology Bangkok	Thailand	
12)	University Kebangsaan Malaysia (UKM)	Malaysia	
13)	The University of Aden, Yemen	Yemen	
14)	University of Regina	Canada	
15)	HONAM University, Gwangju	Korea	

a. International Linkages in Progress
- Florida Atlantic University, USA.
- Purdue University, USA.
- University of North Carolina- Charlotte, USA.
- University of Newcastle- Tyne, U.K.
- King Fahad University of Petroleum & Minerals, Saudi Arabia

b. Existing Linkages with Industry
- Huawei Technologies China
- China Mobile Pakistan (Zong) Limited
- Alternative Energy Development Board
- Lahore Chamber of Commerce & Industry
- All Pakistan Textile Mills Association (APTMA)
- M/s Synthetic Products Enterprises (Pvt.) Ltd.
- M/s Saddaullah Khan & Brothers
- OGDCL Islamabad
- Schlumberger Seaco Inc. (SLB)
- Chartered Institute of Logistics and Transport

From the above information it is obvious that the University has made a considerable improvement, during the last decade for increasing the enrolment of students, developing highly qualified faculty, developing number and type of courses offered, developing its cooperation linkages with international universities and national/international industries.

4. Methodology of the study

This study was descriptive in nature. Therefore, survey method was adopted for data collection. Two questionnaires were prepared for the students and teachers of UET Lahore. The study was delimited to the Faculty of Electrical Engineering of UET, Lahore. Population of the study consisted 31 teachers and 578 students of Post Graduate programs of Faculty of Electrical Engineering, for the period 2008-2010. Sample of the study was consisted of 100% teachers and 45% students.

Data Analysis
The data collected through questionnaires were summarized by calculating mean score and standard deviation scores on each variable of the study.

5. Conclusions and Discussion

The UET Lahore has a crucial role in preparing skilled people for the national development. The University's programmes have credibility with reference to educating the individuals and their induction in the society. The students prefer it in the public universities. Different programmes are being offered by the University and some new innovative measures have taken place in this University for future. It is very much clear that course objectives of the different engineering's programmes were clear and interesting to the students. The courses contained practical applications of theories and laws instead of rote memorization of the students. Similarly learning resources in the library and web's facilities were adequate and appropriate to the students need. The student's feedback on their assessment was useful and helpful for them. The final assessments of the courses were planned according to the objectives of the courses being taught. Time to time improvements in the courses and programmes were made by the University administration to keep the programmes and courses up to the criteria and level of the market. The courses of these programmes are well organized by the university administration by hiring qualified academicians for the purpose. These courses have enough practical work to make the relevant concepts clear and particularly easier and interesting to the students. The teaching and learning environment was conducive and the teaching methods applied encouraged the students for their active participation. Inspite of all these positive aspects of the engineering programmes of UET Lahore, still its courses needs revision regularly in consultation with different largest public/private industries in the country in order to fulfill the future demand of the labour market of the country. There were problems in selecting the faculty from the market. As according to the preference and demand of the students it was not possible for the university to hire very senior faculties. The faculty already working lack proper on job training as there was no mechanism for their training. The mechanism for the internship of the graduate was not formal which need to be considered as essential by the administration. According to faculty the methods of assessment of students in relation to the intended learning outcomes were not so effective which needs changes. Overall the performance of the engineering programmes of UET Lahore was up to the mark. Keeping in view the situation, it was recommended that existing courses may be revised in consultation with different institutions in public and private sector. For this purpose a comprehensive survey may be designed by the University's administration. Efforts may be made by the University's administration for the continuous on job training of the faculty in country and also aboard the country. This training may be scheduled in consultation with the concerned supervisory institutions. A proper mechanism may be formed for the internship of the students by putting them in different institutions available at the easiest and convenient places. This internship may be supervised by the concerned experts in the field. The final assessment of different courses of the students may be made more effective by giving the weight age of students' practical work etc.

Table 1: Opinion of the student about the evaluation of the programme N=200

S.No	Statement	SA	A	UNC	DA	SDA	Mean
1	The course objectives were clear.	100	48	30	20	02	4.07
2	The course was well organized.	110	17	21	32	20	4.30
3	The course contained practical applications of theories and laws than just memorizing the theories	110	12	44	10	24	4.13
4	The course contained enough practical work to make the concepts clear and easier to grasp.	95	08	50	17	30	3.88
5	The teaching and learning methods encourage participation.	108	40	41	10	01	4.03
6	Do you agree that the courses be revised and updated regularly with the consultation of major employers like, WAPDA, WASA, PTCL, OGDC and public/private industry, to fulfill the labour market demands?	71	100	17	10	02	3.25
7	The overall environment in the class is conducive to learning.	100	67	12	10	11	3.98
8	Learning materials (lesson plans, course notes etc) were relevant and useful.	105	30	22	20	23	4.23
9	Recommended reading books were relevant and appropriate.	110	42	37	10	1	4.10
10	The provision of learning resources in the library are adequate and appropriate	30	32	123	10	5	2.10
11	The provision of learning and research resources on the web are adequate and appropriate.	100	25	33	40	2	3.99
12	The course stimulated your interest and thought on the subject.	103	60	31	03	01	4.03
13	Ideas and concepts were presented clearly.	108	30	43	10	09	4.25
14	Feedback on assessment was timely.	110	11	41	20	18	4.10
15	Feedback on assessment was very helpful	95	08	58	30	09	3.75
16	There were some practical activities before the final exam. of the course to check if the objectives of the course have been achieved	100	07	45	28	20	4.15
17	The method of final assessment of the course is the best to judge that the intended objectives of the course have been achieved	95	08	58	30	09	3.95
18	The method of final assessment can meet the criteria of labour market demand	100	07	45	28	20	4.09
19	There is proper mechanism to make timely improvements on the basis of suggestions, provided by the students to remove their remedies	90	51	50	09	0	3.5
20	You were able to select faculty who were qualified to guide and evaluate your work as you began research on your dissertation.	20	37	60	40	43	2.5
21	The supervisor was available when you were working on your dissertation	100	19	12	30	39	3.60
22	The supervisor was supportive during the dissertation process.	108	30	00	32	30	3.95
Table 1: Opinion of the teachers about the evaluation of the programme N=25							
1	Enough facilities for teaching and learning are available in the university	20	02	0	02	01	4.32
2	The teacher need teacher training courses	10	06	07	02	0	2.30
3	The teacher need any computer learning programme for teaching and research purposes	17	00	08	0	0	4.21
4	The centralized labs should be set up to save the resources and to provided better opportunities for practical work	8	00	14	03	0	2.50
5	The internship should be made compulsory for all post-graduates	10	09	04	01	01	2.56

	students to get the degree so that the demand of labour market be fulfilled						
6	Courses curricula are appropriate in relation to the intended learning outcomes.	10	04	04	05	02	2.45
7	Methods of assessment of students in relation to the intended learning outcomes are effective.	7	07	03	03	05	1.90
8	The teachers are providing quality teaching in relation to students, needs and intended learning outcomes.	20	02	03	0	0	4.30
9	The courses are revised and updated regularly with the consultation of major employers like ,WAPDA.WASA,PTCL,OGDC and public/private industry, to fulfill the labour market demands.	02	0	06	15	02	2.10

Scale value for this table is SA (Strongly Agreed) =5, A (Agreed)=4,UNC (Uncertain)=3, DA(Disagreed)=2 and SDA (Strongly Disagreed)=1

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