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AN ANALYSIS OF DEMAND AND PERFORMANCE OF POLYTECHNIC PASS-OUTS: A CASE STUDY OF INDUSTRIAL ESTATE JAMRUD ROAD PESHAWAR

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ABSTRACT

In Pakistan, Six to ten percent of matriculate students seek admission in technical institutions while the required number for a country to be on the track of progress is seventy percent. In Khyber Pakhtunkhwa, on the average 4220 Polytechnic Pass-outs entered into the labour market annually during the last five years (2007-11). There is a general concern that the performance of polytechnic graduates in industry is not satisfactory. This study was carried out to evaluate the demand and performance of polytechnic graduates in Industrial Estate Hayatabad, Peshawar. The study reveals that polytechnic graduates do not match the employers' expectation and their performance is not much better than other technicians working at same level. It is therefore, suggested to include one year practical industrial training in curriculum for Diploma of Associate Engineer (DAE), arrange industrial exhibitions every year, improve standard of technical education through effective management and link it to industry.

Key Words: Technical Education, Demand and Performance of Polytechnic Pass- outs, Industrial Estate Hayatabad.

INTRODUCTION

Improvement in economic development and standard of living is not possible without having strong sustainable technical education system. More importantly, today the sovereignty and survival of a nation depends on how much a nation is advanced in scientific and technical knowledge.

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Keeping in view, the above factors, the Government of Pakistan has tried best to its level, to provide a sound technological base and established two Polytechnic Institutes one each in Karachi and Rawalpindi in 1955 to equip industry with trained technical manpower. A network of Polytechnic Institutes was set up in three provinces-Punjab, Sindh and Khyber Pakhtunkhwa, under the control of Directorate of Technical Education and one Polytechnic Institute in Baluchistan under the Directorate of General Education.

In Khyber Pakhtunkhwa, the first Polytechnic Institute was established at Peshawar in 1962. Later on, the numbers of institutes were expanded to other cities of the province. At present, the Government of Khyber Pakhtunkhwa has established nine colleges of technology and fifteen polytechnic institutes. In addition to this, several Polytechnic Institutes have also been established in private sector.

Polytechnic graduates provide very vital and critical relation among management, engineers and the work force. Major responsibilities for the execution of the plans, achieving production targets and maintenance of plants lie on these polytechnic graduates. They play supervisory role and motivate those working with them for enhancing productivity through their training, experience and qualities of leadership.

At Government College of Technology (GCT)/ Polytechnics level, there is no mechanism for the collection of data and other information relating to labour force required to industries. There is also no link between industries and those responsible for manpower training. The development of the industry critically hinges on the performance of technical manpower i.e polytechnic pass-outs. Thus there is a need of systematic analysis of the numbers of polytechnic pass-outs, their professional capabilities, their overall performance and output needed by the respective employers. Without adopting this approach, allowing polytechnic to continue functioning and expansion in their numbers seems futile. Most likely, it will result in the wastage of investment apart from triggering off unemployment and social tensions among polytechnic graduates.

In Khyber Pakhtunkhwa, on the average 4220 Polytechnic Pass-Outs entered the labour market annually during the period 2007-11 (Board of Technical Education, 2011). The purpose of this study is to provide deep insight about the demand and performance of polytechnic pass-outs in subject industrial area.

REVIEW OF LITERATURE

Review of literature is essential for the accomplishment of any research study. Most of the literature reviewed was available in the form of reports. These reports were either prepared by foreign and local consultants hired for the purpose or Government officials that work/worked in technical education.

Bonokoski (1998), suggested that linkage between industry and institutions was essential in order to make them more responsive to industry requirements. Technical Education programs are not fully addressing the needs of industry or the student seeking education for employment.

Rostron (1998), viewed that link between industry-polytechnic institutions management through Institute Management Committee (IMC) would ensure greater direct involvement of industry in designing and updating curriculum.

Norton (1999), stated that financing and cost recoveries are the key drivers in linking Technical Education and Vocational Training (TEVT) with industry. Linkages with industry are the most effective means of improving the quality of polytechnic graduates. Khan. (1999), stated that in nineteen sixties, the polytechnic pass-outs standard was very encouraging both in public and private sectors, but in last three decades, the standard of polytechnic graduates fell down due to many factors like weaknesses in organizational set-up, lack of qualified staff, outdated curriculum, poor evaluation of students before promoting to next classes, outdated equipment, No linkage between industry and institutions and general deterioration in students. In order to overcome the declining standard, he suggested several remedial measures e.g replacement of equipment, qualified staff, revision of curriculum, linkage between industry and institutions, development of teaching and learning resources, etc.

Sharafatullah (2003) has suggested that improved standard of teaching and competencies of teachers would help to reduce drop-out rate, increase employability of pass-outs, enhanced industrial output and cohesive industrial environment. Waqar (2000) claimed that polytechnic pass-outs were more or less better than other technicians working at the same level.

The literature discussed shows that no study so far examined the demand for polytechnic pass-outs in Khyber Pakhtunkhwa. Similarly, the evaluation of performance of polytechnic pass-outs is still questioned. The present study is being carried out to answer these questions.

DATA AND METHODOLOGY

The objective of this study is to evaluate the demand and performance of polytechnic pass outs employed in industry. The statements of objectives cover different qualities -productivity, theoretical knowledge, master-hand skill, safety consciousness, use resources economically, leadership qualities, efficiency etc., possessed by polytechnic graduates working in industry. All these qualities were incorporated in the questionnaire, developed for eliciting responses from the industry managers. The questionnaire for eliciting responses from the employers is a good approach because it gives qualitative information, which can be quantified also. For quantification, a rating scale has been developed in line with each question and answers of the respondents were obtained on those rating scales. For evaluation, the overall performance of polytechnic pass outs has been put in the questionnaire, asking employers to rate the Diploma of Associate Engineer

(DAE) employees' qualities by indicating their choices on the rating scale given in the questionnaire. For computation purpose, a numerical value has been given to each of the indicators of the rating scale.

A questionnaire was handed over to all working industrial units and was recollected personally to avoid delay in responses, to involve maximum number of enterprises, to approach enterprises personally to make them informed of the purpose, to use somewhat observational method in conducting the study and to help respondents in completing the questionnaire.

After collecting questionnaire from the respondents, quantification of the responses was carried out. Present and future demand for polytechnic pass-outs and other technicians has been compared. Technology-wise bifurcation was made. Different qualities possessed by polytechnic pass-outs were compared with those working in industry at same level. At the end of the study, summary and possible factors responsible for changing demand and low efficiency of polytechnic pass-outs and hence recommendations for the improvement of quality of technical education have been suggested. The study is confined to the Industrial Estate Hayatabad (IEH), Jamrud Road, Peshawar, as, it is the biggest industrial estate in Peshawar. It is well equipped with all infrastructure facilities including roads, electricity, telephone, banks, water supply network, street lighting etc. From the very nature and objectives of the study, efforts have been made to survey all industrial units in the said location.

RESULTS AND DISCUSSIONS

This Section covers a brief information regarding visits of the industrial estate pertaining to the survey. Efforts have been made to evaluate all the qualities, possessed by an ideal polytechnic pass-out, through the questionnaire received from the respondents duly filled in.

Questionnaires in 97 out of 125 units were distributed. 28 were either found closed or shown closed. 42 respondents returned the questionnaire. 45 units did not return the questionnaire. The number of units that refused to cooperate as they did not let the researcher in, and that filled in the questionnaire properly were 10 and 19 respectively.

The questionnaire contained about 18 parts. The first statement was about ISO-9000 certification – A certificate of standard process of manufacturing of product/services. Competition in international market requires ISO-9000 certification. And provision of highly trained staff to work in industry is pre requisite for ISO 9000 certification. The number of ISO-9000 certified enterprises, reported in the survey were 14 while the staff training position in these units as per their report is given in Table I.

Table-I. Staff Training Position in ISO-9000 Certified Units.

Sr. No.	Training Position	Numbers
01	Trained within the Enterprise	10
02	Trained key staff abroad	00
03	Trained in Polytechnics	00
04	Trained within Pakistan	03
05	Engaged trained consultant	01
06	Any others	00

Source: Field survey

Current and Next Five Year Demand:

The current and next five years demand of respondent units for DAE pass-outs and technicians is given in Table II and is further elaborated in Figure I and II respectively.

Table-II. Current and Next five years projected demand of DAE Pass-outs and Technicians.

S. No.	Technologies	Current		Five Years Projection	
		Polytechnic Pass-outs	Technicians	Polytechnic Pass-outs	Technicians
01	Electrical	16	32	08	18
02	Mechanical	8	89	22	57
03	Chemical	06	18	04	23
04	Bio Chemical	03	03	00	00
05	Secretarial	03	06	03	31
06	Civil	01	13	10	15
07	Auto & Diesel	01	03	00	00
08	Printing & Graphic Arts	00	06	04	03
09	Architecture	00	01	00	00
10	Foundry & Pattern Making	00	04	00	22
11	Wood Working	00	34	00	05
12	Welding & Sheet Metal	00	20	01	56
13	Marbles	00	17	00	08
14	Glass & Ceramics	00	15	00	30
15	Refrigeration	00	01	00	00
16	Power	00	00	00	10
17	Boiler Engineering	00	03	00	00
	Total	38	265	52	278

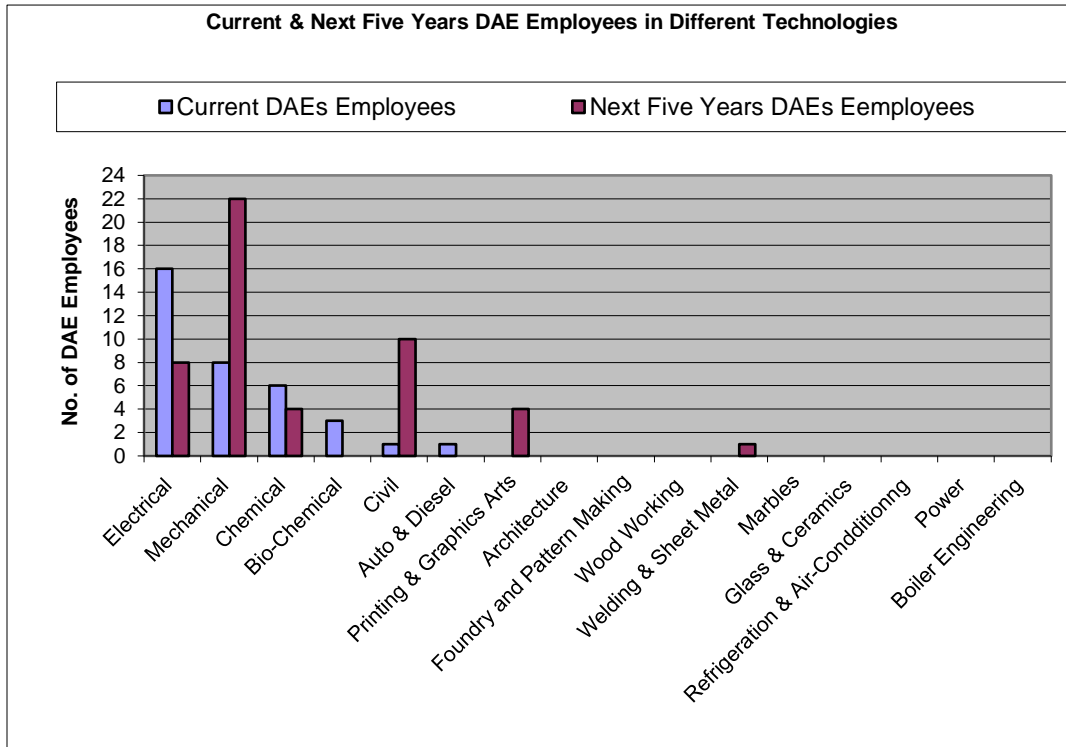
Source: Field survey

Polytechnic Pass-Outs (DAEs)

The number of DAE pass-outs with different technology backgrounds, currently working in responded industrial units in the area is shown in figure I. Forecast number of polytechnic pass-outs, as projected by industrialists for the next five years are also depicted in figure I. Projection for the next five years has been made to observe the future employability of polytechnic graduates in industry. The decrease in employment of DAE pass-outs with electrical and chemical backgrounds will be 16 to 08 and 06 to 04 respectively in the next five years while the number with Bio-

chemical and Auto-Diesel technology backgrounds will fall from 3 to 0 and from 1 to 0 successively. The number of employees in the secretarial technology in the next five years will remain unchanged and have not been shown in the graph both for DAE and technicians.

Figure-I. Technology-wise current and projected number of DAEs.



Source: Field survey

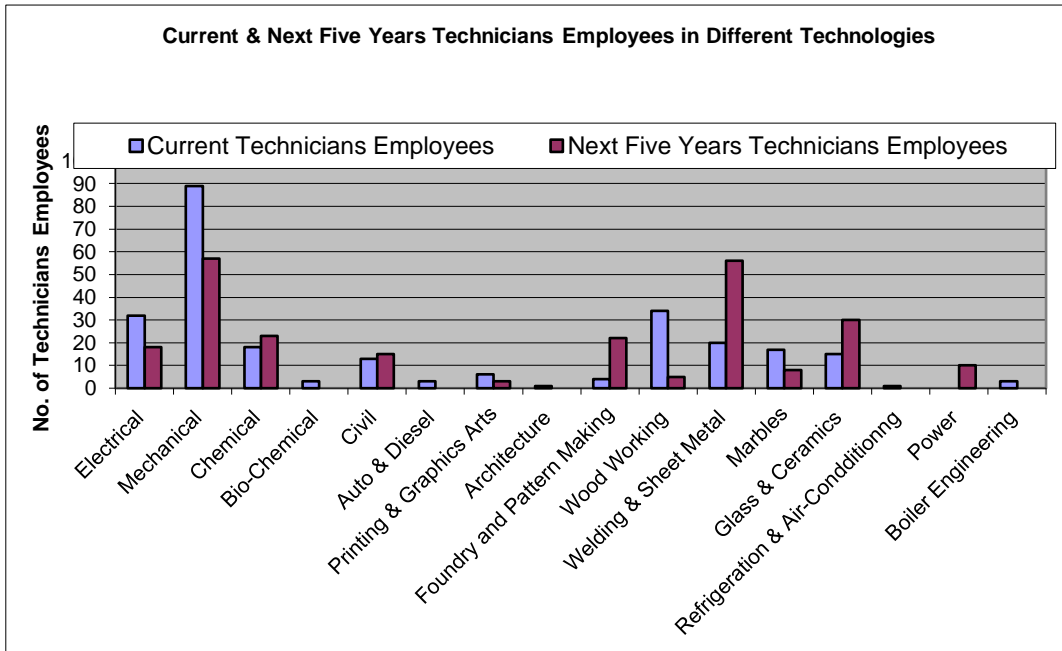
The chances of employment for polytechnic graduates with technology backgrounds of Civil, Printing & Graphics Arts, Mechanical and Welding & Sheet Metal will be more in the next five years. Technology-wise increase is 10-fold, 4fold, 3fold, and 1fold respectively. On the average, the number of polytechnic pass-outs that will work in the respondent industrial units in next five years will increase from the present 38 employees to 52. Polytechnic pass-outs with Architecture, Foundry & Pattern making, Wood working, Marbles, Glass & Ceramics, Refrigeration & Air Conditioning, Power and Boiler Engineering are neither currently working in the industry nor there will be any demand of such polytechnic pass-outs in the replied units for the next five years. The irregular variation in demand for DAEs in industries could be due to lack of coordination between technical education and industry.

TECHNICIANS

The study results show that at present there are 265 technicians and in the next five years this number will rise to 278. This shows 5 percent increase in the employment of technicians in the next five years. Table II shows that the demand for technicians in Electrical, Mechanical, Bio-Chemical,

Auto & Diesel, Printing & Graphic Arts, Architecture, Woodworking, Marbles, Refrigeration & Air-conditioning and Boiler-Engineering technologies are decreasing where as the demand for Chemical, Secretarial, Civil, Foundry and Pattern making, Welding and Sheet making, Glass and Ceramics and Power technologies are increasing in the coming five years. The increase/decrease in number of technicians’ vis-à-vis technology backgrounds is shown in figure II.

Figure-II. Technology-wise Current and Forecast Number of Technicians.



Source: Field survey

PERFORMANCE EVALUATION OF POLYTECHNIC GRADUATES IN THE SUBJECT AREA

The comments of 19 enterprises, which had polytechnic pass-outs, regarding the qualities of polytechnic pass-outs are interpreted one by one. For quantification, the questionnaire has rating scales 5, 4, 3, 2 and 1. The answers of the respondents were obtained in these rating scales. For computation, each of the performance of the rating scale was given a numerical value as:

- Strongly Agree/outstanding = 5
- Agree/very good = 4
- Indifferent/good = 3
- Disagree/satisfactory = 2
- Strongly Disagree/poor = 1

And an average rating was calculated as:

Average rating = Total Value/Number of respondents

Where total value is equal to the sum of product of rating scales and the corresponding number of respondents. Let us assume that if the number of respondents against the rating scales mentioned above are 5, 3, 7, 2 and 2 respectively, total value will be the sum of rating scales times the respective number of respondents. i.e.

$$\begin{aligned} \text{Total value} &= 5.5+4.3+3.7+2.2+1.2 \\ &= 64 \end{aligned}$$

Dividing this value by total number of respondents gives average rating. In this case, the average rating is 3, which shows that the overall performance is good.

After calculating average rating for each serial-wise performance in each table i.e. from table III to table VI, two graphs were drawn for making the analysis simple and more understandable. Figure-III covers the data of table III while Figure IV covers the data of tables IV to VI. The number in columns 3, 4, 5, 6 and 7 in the respective tables indicates the number of respondents (out of a total of 19 units) that encircled the best rate for the respective performance. Serial-wise comments on each performance in the light of the responses received are given after figure III.

Table III contains questions about qualities like productivity, theoretical knowledge, mastered hand-on skills, safety consciousness, use of available resources, possession of leadership qualities, efficiency, discipline, commitment, tendencies about improvement of quality of product and multi-skills approach of polytechnic graduates working in the enterprises.

Table-III. Number of Enterprises, which encircled the best rating scale.

Sr. No.	Performance of Polytechnic Pass-outs	Strongly Disagree 1	Disagree 2	Indifferent 3	Agree 4	Strongly Agree 5
01	Polytechnic graduates, one year after being employed are more productive than other persons employed at the same level.	2	2	7	3	5
02	Polytechnic graduates have a strong knowledge of the theoretical aspects of work.	2	2	6	5	4
03	After one year of induction. Polytechnic graduates have mastered hand-on-skills.	1	5	7	2	4
04	Polytechnic graduates are safety conscious (lesser number of accidents)	1	3	4	4	7
05	Polytechnic graduates use resources economically.	1	4	6	5	3
06	Polytechnic graduates have leadership qualities (morale boosting etc)	2	2	6	6	3
07	Polytechnic graduates work more efficiently.	1	3	7	3	5
08	Polytechnics graduates are more disciplined.	0	5	4	8	2
09	Polytechnic graduates are committed	0	4	5	5	4

	to their work.					
10	Polytechnic graduates contribute in improving the quality of product.	0	5	3	6	5
11	Polytechnic graduates apply multi skill approach.	1	4	4	7	3

Table IV concerns whether there is a need of change in curriculum or not. It also require suggestions from the enterprises whether the DAE students be offered sandwich courses (50% learning in polytechnic and 50% attachment with industry) and 12 weeks practical training over there for improving the quality of polytechnic graduates or other wise.

Table-IV. Number of enterprises responded to improve the quality of future graduates.

Sr. No.	Performance of Polytechnic Pass-outs	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
		1	2	3	4	5
12	No change is necessary	6	1	1	1	2
13	Sandwich courses (50% learning in Polytechnic and 50% attachment with the industry)	0	1	2	4	9
14	12-Week practical training with industry.	0	5	1	1	8
15	Any other proposal					

Through the following table V, it has been attempted to get information from industrialists in the cited area about selecting techniques, tools/machines and materials efficiently being used by the DAE pass-outs. It further shows how the polytechnic graduates design tools, jigs and fixtures, identify and rectify the faults, plan, organize and supervise their work effectively and maintain standard of quality and speed.

Table-V. Number of enterprises responded about undertaking given activities with little or no supervision.

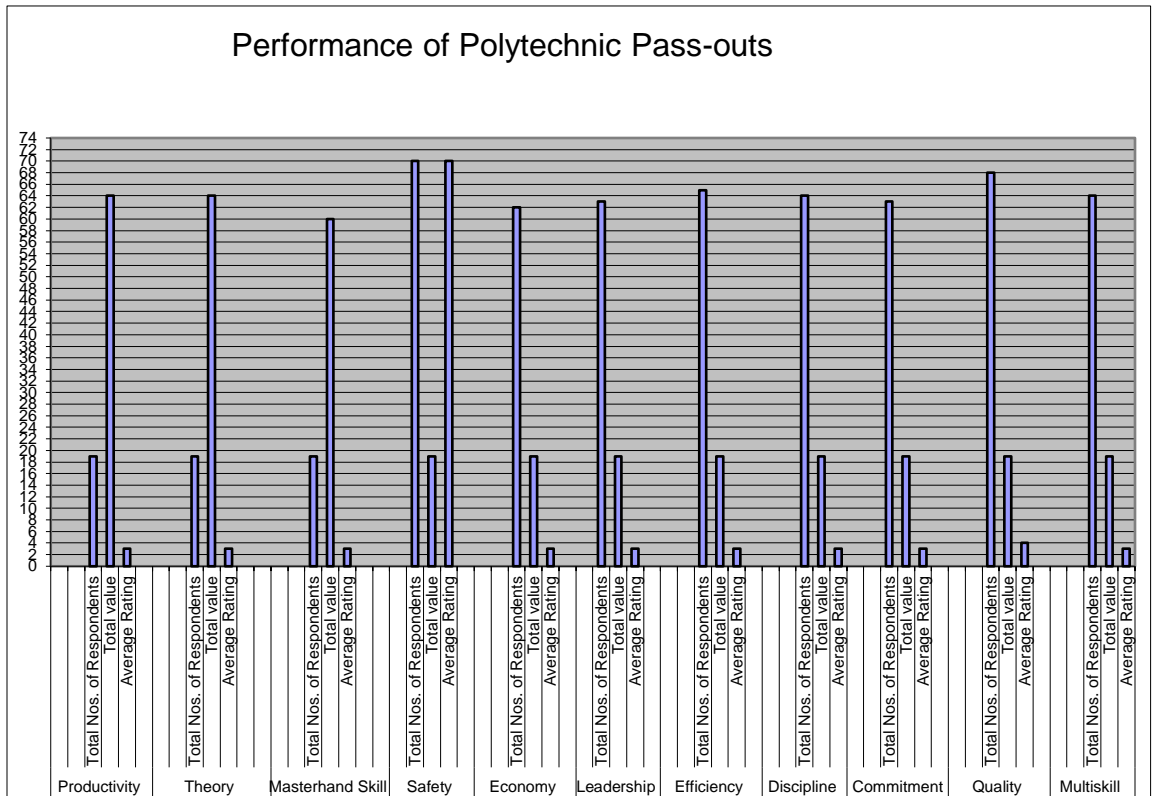
Sr. No.	Performance of Polytechnic Pass-outs	Strongly Disagree	Disagree	Indifferent	Agree	Strongly Agree
		1	2	3	4	5
16	Select technique, tools/machines and materials efficiently.	1	3	6	6	3
17	Design tools, jigs and fixtures.	1	4	9	3	2
18	Identify and rectify the faults quickly.	1	3	6	5	4
19	Plan, organize and supervise their work effectively.	0	4	6	8	1
20	Maintain standards of quality and speed.	1	2	8	5	3

Information regarding behaviour, performance, discipline, dedication and attendance has been collected in the form of table VI. The rating scales 1,2,3,4 & 5 have been replaced by poor, satisfactory, good, very good and outstanding respectively.

Table-VI. Number of enterprises responded about the behavior, performance etc. of DAEs Pass-outs.

		Poor	Satisfactory	Good	Very Good	Outstanding
21	Behavior	0	6	9	4	0
22	Performance	1	8	3	7	0
23	Discipline	2	8	4	4	1
24	Dedication	2	8	4	4	1
25	Attendance	2	4	5	6	1

Figure III Total values, numbers of respondents and average rating of performance



Source: Field survey

Different qualities- productivity, theoretical knowledge, master hand skill etc. of DAEs, working in industries has been shown in figure III. The height of the bars for the corresponding qualities (from left to right) show number of respondents, total value and average rating scales determined for each quality given in table III. Each quality given in figure III is briefly explained as under.

Productivity refers to the amount of production in relation to the factors of production employed. Enhancing efficiency of the employees through quality education and training, adaptation of latest technology and efficient management can increase productivity. Analyzing this quality of DAEs, it

was found that the polytechnic pass outs were good regarding productivity. This has been shown in figure III by average rating scale 3.

Theoretical knowledge enables DAEs graduates to predict things that they have not yet seen. Without having theoretical background there would be only a shapeless mass of observations. Polytechnic pass-outs are supposed to have strong theoretical knowledge. The enterprises were of the opinion that the polytechnic pass-outs had no strong theoretical knowledge.

After one-year induction in industry, polytechnic graduates are supposed to have master hand skill in their respective fields. The study reveals that polytechnic graduates after having one-year experience in industry have no outstanding master hand skill. This has been depicted in the figure by average rating scale 3.

Once basic physical needs of employees are satisfied, their attention turns to the need to protect themselves from industrial accidents. The prevention of accidents reduces operating and production costs of industry. Polytechnic graduates are supposed to be safety conscious because in academic life much emphasis is laid on how to avoid accidents in industry. The average rating scale 4 confirms that polytechnic pass-outs are more safety conscious than other persons working at the same level.

Profit maximization requires that resources should be used economically. It is expected that DAEs will possess the quality to exploit resources economically. The average rating scale 3 in figure III shows that the employees with DAE qualification are not more capable to use resources economically than other workers of the same level.

Leadership is an elusive quality that inspires others to perform. It is a quality of influencing others to accept his directions freely and willingly. In other words, a leader gets other people to follow him.

Leadership in a group depends on what the group objective is. A good leader possesses both job-centred and employee-centred qualities in his leadership style. He provides a balance approach, giving emphasis to maintaining morale, and at the same time getting an adequate work performance. The employers choose the average rating scale 3 as reflected in figure III, thereby indicating that polytechnic graduates possessing good leadership qualities.

Efficiency occurs when the value of a product produced from given resources is maximized. Efficiency is also achieved if the value of output produced for a given cost is maximized. The present competitive age requires that polytechnic graduates must be efficient. From the average rating scale 3 in figure III, it is evident that DAEs working in industry are not more efficient than the employees of the same level.

Discipline involves any action that attempts to generate compliance with rules and regulations. It is a condition that exists in industry where employees act according to recognized codes of behaviour set forth by the industry. Without discipline, effective learning and productivity will not take place.

For discipline, the data of figure III advocate that discipline-wise the polytechnic pass-outs are not much better than other workers of the same level.

Commitment refers to a state of mind to accept a developmental change. In other words, it is the desired responses of an employee to actual job situation and problems. Regarding commitment of DAEs pass outs working in industry towards their jobs, the respondents average rating scale is 3, which shows that polytechnic pass-outs are not more committed to their work.

Quality means conformity of specification/fitness for use/customer satisfaction/ conformance to requirements/delighting the customer. Quality product is the need of the competitive economy. The study reveals that polytechnic graduates play an important role in improving the quality of products. The same has been shown in figure III by average rating scale 4.

Competitive economy lets consumers free to choose commodities among the range of choices. This freedom of consumers will compel industries to produce goods and services as required by them. The product differentiation can be made by adopting new technology and employing well-trained personnel, most likely passed outs from polytechnic institutions. Concerning this question, the average rating is 3, showing that polytechnic graduates do not possess sufficient multi skill approach.

To summarize the reasons, that the performance of polytechnic graduates employed in industry is not excellent could be attributed to: that college of technologies and polytechnic institutes has no liaison with industry and they run their academic activities unilaterally. A wide gap exists between the expected quality of work required to industry and that offered by polytechnic graduates.

Further, lack of performing practical, non observance of discipline rules, unfriendly library environment, untrained teachers, conflict between teaching communities, no attention towards characters building, poor theory and practical examination system etc. are also some of the main factors that affect the quality of polytechnic graduates.

CONCLUSION AND RECOMMENDATIONS

Sustained industrial and economic development is not possible by mere capital investment unless it is reinforced with well-trained scientific and technical manpower. There is an intensive need to evaluate the Technology-wise both quantitative and qualitative demand of DAE graduates and other technicians working in industry on regular basis, so that college of technologies and polytechnic institutes can tailor their training programmes best suited to industrial environment. Industry and technical education need to form a joint study group for exploring possibilities of two-way linkage and to look at all aspects of cooperation through Directorate of Technical Education and Chamber of Commerce and Industry. Attention is also required to revitalize and restructure Institute Management Committees – already established in GCT and in most of the GPIs. Due to no outstanding performance of DAE graduates in industry, technical education must review the academic activities of teachers and students, training programmes and structure of the organization. These timely changes will make technical education demand driven and boost income opportunities

for DAE Pass-outs. The ultimate result will be quality enhancement of industrial products and a sound base for competition in international market.

In the light of the preceding analysis, the following recommendations are made:

- Academic activities in the institutes need greater attention to train the students as required by the industry.
- Teachers' teaching skill enhancement through regular training programmes is necessary for the quality technical education.
- Since polytechnic pass-outs have no sound footing in practical, therefore, it is suggested that all teachers should submit their monthly progress reports on practical to their respective head of institutions. Further, they need to utilize full credit hours.
- The present scenario demands a comprehensive programme to make bound industrialists to impart one year training in industry to polytechnic pass-outs on mutual benefit basis, in order to meet industrial skilled labour requirements.
- In order to make industrialists aware of importance of technical education and to share information with them, arranging seminars on quarterly basis are needed.
- For strengthening institute industry linkages, industrial exhibition must be arranged once in a year in each polytechnic institute.
- There is a need that each institute must conduct tracer studies by each year and be communicated to Directorate of Technical Education. This will be of help in assisting institute-industry linkages and updating curriculum.

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