

The management of engineering education analogous to the industry

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ABSTRACT: This paper parallels the working of the engineering institution with that of an industry. The working model of an engineering institution is shown where successful engineering graduates are produced to supply to a market that demands the services of students. Here, students are the product, while teachers are the producers or makers of the product (students). The students already have a value when they enter the institution. Value adding is achieved by the teachers during the course leading up to graduation. The observations made by the author during the past 15 years of teaching are presented in this paper, which stresses the fact that the optimal utilisation of the student potential always helps the institution in producing the best engineering graduates.

INTRODUCTION

Various types of students are admitted for study at engineering institutions. Incoming students will have different degrees of Intelligence Quotient (IQ) and varying degrees of Emotional Quotient (EQ).

It up to the institution to sort them out properly and utilise their full potentials. An optimal utilisation of the student potential always helps the institution in producing the best engineering graduates.

EMOTIONAL INTELLIGENCE

For survival in today's world it is not enough if the outcoming graduates have a very high IQ; they must also have a good EQ. Emotional quotient is an array of personal, emotional and social competencies and skills that influence a person's ability to succeed in coping with the demands and pressures inherent in an environment.

EQ deals with social skills, such as influence, communication skills, conflict management, leadership, cooperation and teamwork capabilities. EQ also deals with interpersonal skills like adaptability, flexibility and an increased ability to handle relationships [1].

Emotional intelligence gives a competitive edge. The most valued and productive professionals, managers and administrators are those with traits of emotional intelligence.

Change

Spencer Johnson, in his book *Who Moved My Cheese?*, states that change will happen and that people cannot alter that [2].

However, a person can take on one of several options, including:

- Anticipate change.
- Monitor change.
- Adapt to change quickly.
- Change.
- Enjoy change.
- Be ready to change again and enjoy it again.

Developing emotional intelligence in students can help them to understand that they cannot change everything around them. However, attitudes can be changed. In reality, engineering employers look for a person with motivation and leadership skills, who is creative, a good team member, risk taking and who has problem solving skills, design skills, international competitiveness, management and administrative skills, flexibility and commitment to the organisation [3].

PROCESS MODEL OF STUDENTS AS PRODUCTS

Figure 1 indicates how the students are processed and sorted out as soon as they enter the technical institution. They are trained rigorously in theory and practical classes. Continuous evaluation is carried out by giving them class tests and assignments. They are also trained in developing their personality like inter-personal and intra-personal skills.

PREVENTIVE COSTS

The best survival technique for self-financing engineering institutions is to take care of the preventive costs of the institution. Preventive costs include the salaries paid to the teaching and non-teaching staff of the institution, as well as the costs invested in the quality planning of the institution.

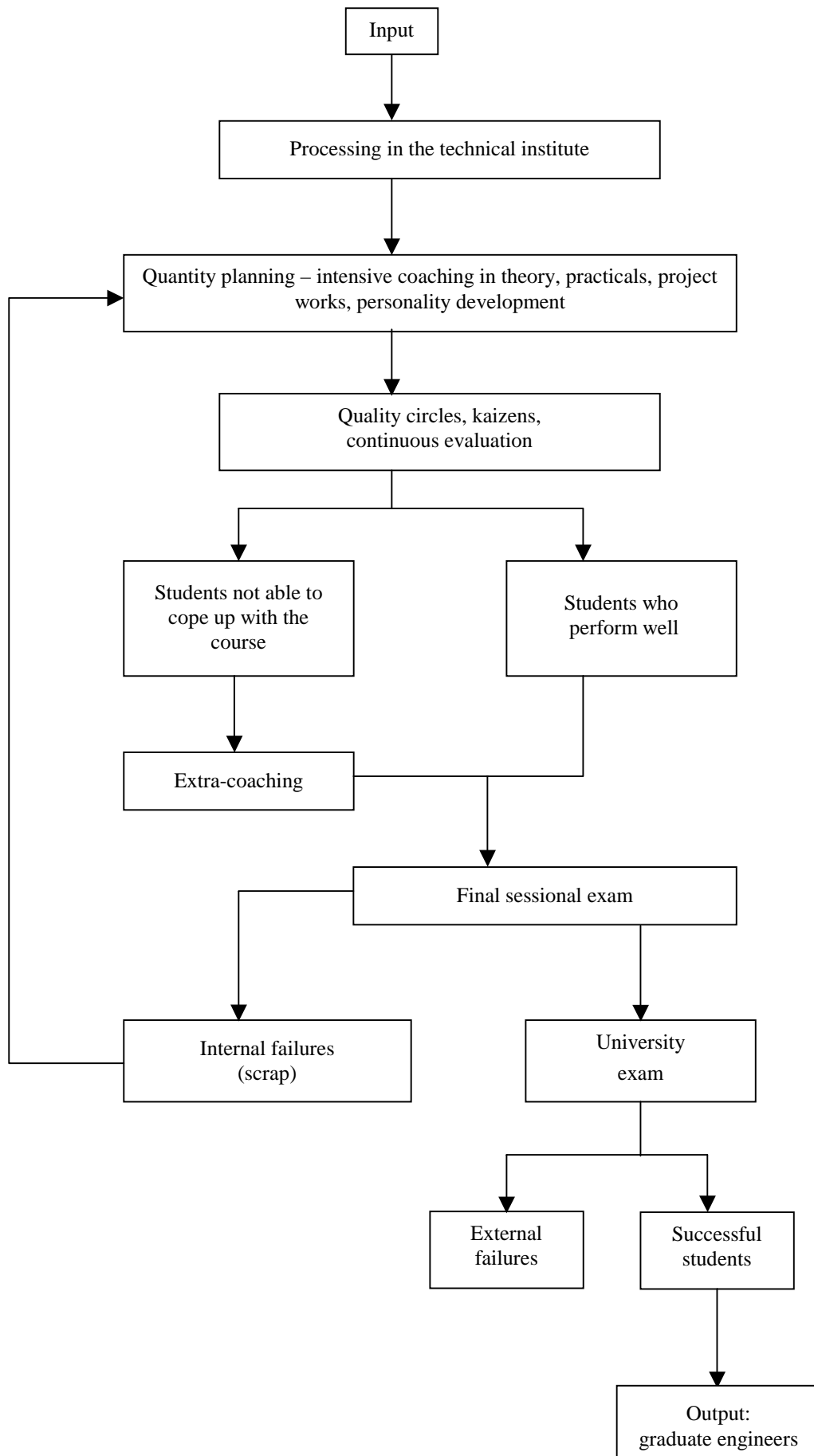


Figure 1: Model illustrating the intake, processing and output of engineering students.

The following are the quality planning costs:

- Control of the technical institution in order to maintain its smooth running.
- Quality circles at each department.
- Establishment of kaizens for continuous improvement.
- The training of teaching staff.
- Project work for students.
- Guest lectures, industrial visits and industry-institute interaction.

APPRAISAL COSTS

There are various factors that need to be considered regarding appraisal costs, such as:

- Maintenance and calibration of laboratory equipment.
- Maintenance of computer labs.
- Information technology facilities.
- Conducting tests and examinations.
- Evaluation of practicals.
- Library maintenance.
- Rent for the college buildings.
- Maintenance of college buildings.
- Electricity and water bills.
- Furniture expenses.
- Fuel and maintenance for college buses and other vehicles.
- Quality audits.

INTERNAL FAILURE COSTS

Internal failure costs cover many areas and include the following:

- Students who join the college and leave the college during a reshuffle.
- Students who fail in an internal examination and who are not qualified to participate in an external examination (scrap).
- Re-examination and evaluation.
- Students who do not obtain the degree during the stipulated period (scrap).
- Student strikes, student tomfoolery and staff on strike (downtime).

EXTERNAL FAILURE COSTS

External failure costs include the following:

- Complaints that arise due to the unsatisfactory performance of the institution.
- An employer who is not satisfied by the quality of the graduate engineers produced by a certain institution (downgrading).

COST REDUCTION

Cost reduction is best achieved by:

- Minimising the fixed cost.
- Maximising the advantage of the fixed cost.
- Maximising the use of the staff present in the institution.
- Conducting energy audits.

Of course, variable costs like salaries to the teaching and non-teaching staff cannot be reduced. The more efficient and well trained the teachers are, the more beneficial it is for the students. The ultimate aim towards all these is to assure the quality and reliability of students who graduate from an institution [4].

CONCLUSIONS

We can all follow as much as possible from what is mentioned above. However, it is only possible to make a continuous approach towards perfection, but it is literally not possible to be 100% perfect. Thus, it is analysed in this paper that by the optimal utilisation of the student potential and the human resources, as well as by optimising the quality costs, it would be possible to supply the best product from an engineering institution in order to satisfy the industry demands.

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