

Quality engineering education - present standard of teachers and the standard of input students

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ABSTRACT: Engineering education is at a crossroads, due to advancements in the relevant educational curricula and syllabus on the one hand, and, on the other, the negative impact of information technology on the development of teaching methodology and the content of curricula and syllabus. Another reason for this dichotomy is that the standard of the students who are input to engineering education is entirely different from that planned. Present-day students are influenced by information technology. The same affects the quality of teachers. Educational content, the standard of teachers, the standard of input students, administration and management of the educational system and the degree of influence of information technology are to be critically analysed to facilitate the design of flawless, adaptive, time-sensitive and modern educational systems.

INTRODUCTION

Engineering education has undergone drastic changes in teaching methodology, content, delivery techniques and the method of evaluation in order to bring about an efficient, challenging system that would effectively offer challenging education to meet the educational needs of students and the stake-holder needs to retain them in the market [1-6]. Rarely is there agreement on the deficiencies in our educational system in identifying the good students who are in the system and the deprived few who are outside the system.

The factors (parameters) that influence the quality of engineering education are:

1. Demand of the stakeholders.
2. Administration and management of education.
3. Knowledgeable teachers with upgraded delivery techniques.
4. Standard of input students.
5. Needs of the parents.
6. Needs of the society.
7. Morals, standards and values in life.

The quality of engineering education is governed by the seven factors listed above. The last parameter viz. *Morals, standards and values in life*, is universally accepted in principle; however, the definition varies from region to region, from language to language and by religion.

The sixth parameter viz. *Needs of the society* is affected by the people of the region, the overall industrial growth and the influence of adjoining countries.

The fifth parameter viz. *Needs of the parents*, may vary between parent. Some parents look for an institution with a good academic atmosphere and good name; some look for good employment prospects for their ward; some look for the scope of higher education at the institution; and some look for the likely development of entrepreneurial skills by their ward.

In a few cases, even though their ward is academically poor, the parents would like the ward to study a professional degree to acquire status in the society. So the parent's demand may vary from one to another. Father and mother may have different aspirations for their student child.

The fourth parameter viz. *Standard of input students*: the quality of students admitted to professional courses may vary for a number of reasons.

The first may be down to varied admissions policies, where students are admitted from various regions and countries and from school educational programmes with varied academic ratings.

The second reason may be admission of less-merited students. Due to poor levels of admission, some institutions may admit such less-merited students. In addition, government regulations may make an institution admit students with lesser academic credentials to provide better opportunities for socially oppressed classes; therefore less-merited students may be admitted through political and other considerations.

The third reason why the standard of input students may vary could rest with financial considerations. For example, to *fill up the coffers*, institutions may admit students based on monetary considerations, such as that of collecting excess fees. In some cases, students without basic academic requirements may be admitted for monetary considerations.

In some countries, governmental institutions allegedly may seek to fill their admissions by attracting less-merited students from other countries through professional agencies, thereby introducing a commercial incentive into education. Some institutions, with no limitations on student numbers, may affect large scale admissions through agents who are paid sizeable commissions.

The fourth reason for a variation in standard of input students could be that of inflated academic credentials. To improve their pass percentages, an institution may allow students to pass with higher academic credentials than merited. This may also be to attract industries for placement and training places.

In order to attract the industries for placement and training, every student is awarded higher academic credentials, which they do not deserve.

Government regulations make the institutions to admit students with lesser academic credentials to give opportunity for socially oppressed class. To fill up the coffer, institutions admit students on monetary considerations like collecting money/excess fees, and less merited students are admitted on political and other considerations.

The fifth reason for a variation in standard of input students may be poor admissions management. As indicated above, in stray cases, students without basic academic requirements are admitted for monetary considerations.

With poor institutional management, admissions are made to fill the required numbers. Also, many institutions have no methodology for identifying merited students. Further, students with good potential may be deprived admission due to a paucity of identifying methodologies. Parents may encourage students to gain admission to institutions with poor ratings. Many institutions have lost their methodology for identifying merited students being admitted.

The third parameter viz. *Knowledgeable teachers with upgraded delivery techniques*, has a greater impact on the quality of engineering and technology education. For example, the following aspects of teaching may affect the quality of learned output:

- Teaching qualifications

Some teachers are ill-qualified and have poor subject knowledge. A few teachers may aim at obtaining higher qualifications by unscrupulous means.

- Teaching techniques

Many teachers follow age-old delivery techniques and may be unable to provide the needed content in the available timeframe. There are many teachers who are unaware that they are facilitators and guides for students' learning.

There are also many teachers who are unaware of modern delivery techniques using information technology and may feel *left behind* by this technology. Then, there are many teachers who lack communication skills and do not offer value-based education. There may be many teachers who are ill-equipped to evaluate student performance.

- Teachers' assessments of students

There are some teachers who may cover up deficiencies in their teaching methods by assessing liberally or yielding to external pressure to assess liberally.

- Teachers and monetary considerations

Some teachers may acquire their appointments and promotions based on monetary considerations; and there may be some teachers who will seek financial advantage or payment in kind from students so as to give a good assessment or for guidance.

- Teachers' research interests

Many teachers will have no research background, specialised interests or published work and will have neither current research publications nor current research projects on hand.

All of the factors discussed above can, to a lesser or greater degree, have a substantial impact on the quality of education.

The second parameter viz. *Administration and management of education* plays a vital role in the quality of engineering education. Professional institutions can be governed by either government, private or non-profit organisations. Invariably there may be alleged instances of administration by ill-qualified personnel. Such personnel may be unable to absorb and understand the intricacies required to advance curricula and syllabuses and the impact of information technology on higher education and, in particular, on engineering education.

They may resort to unscrupulous means in admitting students; or in inviting industries to provide placements; and in the evaluation of students. They may seek the help of professional agencies for admission and recruitment. To attract more students for admission, the institution may be tempted to resort to passing all the students using *liberal* evaluations.

The agencies involved in recruiting from industry may be paid liberally in kind. Their motto may be to *run the institutions (except government institutions) and make money year after year*. In some cases, this may lead to an increase in the number of institutions using funds generated through education. Once they are strong economically, they could be in a position to influence any regulatory agency and quality is of the least importance for the institution management.

The first parameter viz. *Demand of the stakeholders* rarely has any impact on the quality of engineering education. As is sometimes the case, stakeholders may complain that engineering students are not up to their expectations. Even though they may be aware of the ills listed above, they may choose to keep silent about it. These sorts of attitude indicate the least interest in the training of the students. The focus may be more on the finished product only. There are few exceptions to this.

The influence and involvement of the seven factors listed above have tremendous impact on the quality of engineering education. In order to determine the quality of the engineering education offered by an institution, the influence of each factor and sub-parameters listed should be quantified to hence arrive at the overall quality. An assessment needs a good mathematical model to incorporate the influences of the above parameters and sub-parameters to determine the level of quality of these institutions. The main factors and sub-parameters are highly subjective and, hence, the final result could be highly approximate.

True quality is somewhat akin to absolute zero in temperature. It can never be achieved but one can aim at achieving true quality in an institution. The methodology may raise eyebrows. The details listed above should be exhibited to all stakeholders. It might be reasonably assumed that there are definite improvements possible making for a better quality of engineering education.

CONCLUSIONS

Any form of regulation or accreditation may not be able to improve the quality of engineering education. On the other hand, the institutions may try to obfuscate to present a better picture and, hence, to acquire better and higher accreditation credentials.

Instead, if these institutions listed the status on the above parameters along with past negative incidences and posted them on the web with provision for public comment, there would be an opportunity for real quality improvements year after year.

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