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A decade of training biotech engineers

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In the parlance of academic disciplines 'biotechnology' was not a new term, but it was adopted with enthusiasm and expectations in India about a little more than a quarter of a century back. A new government department was created to promote education and research, as developments in engineering the genetic elements were speeding up in research universities worldwide. Further, as commercial ventures were being spun off following leads in innovations and discoveries in the laboratories, the need for engineers to drive the commercialization was envisaged at the turn of the century.

The political leadership in the country wanted to push the bandwagon of next generation technologies, and exhorted that IT and BT would pave the way for prosperity and take the economy to leadership position in the new millennium. This was the impetus for many academic institutions to venture into offering biotechnology programs, particularly in the engineering faculty.

Rapid developments in the field of biology, particularly in the last seventy years, have made the study of biology very exciting as well as challenging. This was already felt by the science degree programs in the 1980s. However, when studies in biology in the engineering colleges were initiated, there was very little guidance as to what skills the students ought to be trained in. The problem has remained unresolved in the past decade. The main reason why this has been the case is that most programs started without defining what skills are required to be imparted, to begin with. Moreover, at the market place, the different career avenues open to the graduates had very different requirements of the fundamental skills, and to train in all these different areas within the time available would be very unlikely. For example, jobs requiring molecular characterization require strong foundations in chemistry and its various sub-disciplines. In jobs where new varieties and strains are to be developed and maintained, strong foundation in biology is a primary requirement. For process development, felicity in statistics is a prerequisite.

Analysis of large volumes of data require abilities in employing computational skills and managing datasets. Thus, although there are many different jobs available, the skills required in one is not necessarily very helpful for the other job. For the learners and more particularly for the trainers it is necessary to choose some area over the others so that depth may be achieved. However, the current scenario in most universities is to go for breadth at the cost of depth. The reason for such a strategy is that although there are many jobs, the demand in each of them is in small numbers, and thus only generalists are trained. This method of training and employing is obviously unsatisfactory--both for the aspiring employees and the employers, because the expectations of both are only partially met, requiring further training in skills needed for competent execution.

It is here that a well functioning professional society can make a telling impact - assessing the skill requirement in different categories of the biotech industry, and project the trend of their growth, so that the academic institutions can be guided to generate the required skill set. It is unfortunate that the academic regulatory bodies confine their task to verifying infrastructural requirement, but have nothing meaningful to offer in respect to the need for developing requisite manpower. Thus, we have the conundrum that, while the biotech industry has grown rapidly in the past decade, its manpower needs are still poorly defined and not met in a way to maintain the growth rate achieved so far.