

Table 1. Data on number of papers indexed in the *Web of Science*

Year	World	India	China	Israel
1998	958,640	17,712	19,924	12,102
1999	973,138	18,698	24,447	12,028
2000	956,412	17,501	30,501	12,271

smaller country in terms of both population and geographic area, contributes about 12,000 papers every year, about two-thirds of India's output (Table 1). China is forging ahead, while India is stagnating. If there were a bias against developing countries, the number of Chinese papers indexed in *SCI* would not have increased by more than 50% in two years.

The quality issue cannot be addressed by blaming the use of impact factors for evaluating journals or blaming ISI's monopoly. It requires a far more honest self-appraisal.

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Four-year undergraduate programme in science

There is always something happening in the education scenario in our country. Committees played around with the 11 + 1 formula and now we seem to have settled down for 10 + 2 years of education at the school level.

Undergraduate (UG) engineering education (BE/B Tech) was initially for a duration of five years. It was made into a four-year programme about 20 years ago. Similar restructuring has not taken place with science education. Chakraborty¹ has suggested a four-year UG programme in science. I fully endorse this.

As a matter of fact, an INSA–UGC Committee made this recommendation about two years ago. But nothing has happened so far. The reason, I suspect, is the dilemma, 'Who will bell the cat?' Of course, the UGC should.

As is well known, students (pushed by parents) rush into an engineering UG programme because a job is (assumed to be) guaranteed at the end of four years. It was particularly the case during the IT boom. It did not matter where and what engineering subject the student studied; the industry in India and elsewhere lapped up all of them. That explains the mushrooming of engineering colleges in

the country and the trainloads (and plane loads) of students (and parents) landing in Bangalore to write the CET-2002.

There has been a dramatic decline in the number of students registering in basic science (three-year degree) courses, across the country. This is presumably because the graduates do not normally get any meaningful job at the end of three years. They have to pursue a (two years) Master's programme in the same subject or go for value addition through B Ed, MBA, MCA, etc. At the end of the Master's programme, they still do not find ready employment. They have to go for a Ph D programme to get a job in the industry or academia.

What needs to be done is to evolve a four-year integrated UG programme in science. In the first two years the students can learn mathematics, physics, chemistry and biology, and they can specialize in the subject of their choice in the third and fourth years. At the end of four years, they would be as employable as their engineering counterparts – be it for a software job or for a hardware job; be it for information technology, biotechnology or bioinformatics! They can also pursue higher studies like MBA, MCA, IAS, etc.

The change in the UG programme would increase the throughput of students in each college and save valuable resources. Many of the science colleges can combine engineering and science streams, as the IITs have done. The United States of America has been following the four-year UG programme for many years. On the lighter side, it will cost the Government of India less money to train prospective graduate students for America and other parts of the world.

Such a change in the UG programme should be accompanied by infrastructural improvement – in the laboratories, in particular. Each college should be given autonomy, whether it likes it or not. Each university department should have a four-year UG programme associated with it.

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