

## Science teaching in universities on contract basis

The UGC is deliberating the appointment of university teachers on contract basis. The National Institute of Public Administration, the Indian National Science Academy and several universities have organized meetings to discuss the pros and cons of this issue. Many academicians have presented their views in national newspapers.

I personally feel that this is a good option provided it is implemented in totality, with several perks and benefits to the teacher on contract. We all know that good and stringent rules are framed on paper; but, in reality during its implementation, most administrators fail in their duties. As an example, consider the merit-promotion scheme. It was a good scheme for the promotion of the meritorious teachers, but most of the non-meritorious teachers were promoted in that scheme. This scheme, in a way killed the temperament of an academic institution, because there was no additional reward for hard-working teachers.

A second example of non-implementation of the set rules relates to UGC scientists. They were appointed on a five-

year contract with a condition that extension would be given after a proper progress report. Unfortunately, though the output of these scientists was poor, none of them (with exceptions) was terminated. There are many such examples.

In my view, the contract teaching positions should be for higher ones like those of readers and professors, with an attractive salary package and stringent monitoring rules. In fact, the salary should be more than that of the regular positions in that cadre.

In every university there should be a separate central equipment facility, so that the newly appointed teacher can start his research on the very first day of joining duty. He should be given proper infrastructure facilities like an office, laboratory and assistants.

In case the teacher brings a project in that tenure and purchases some equipment from the project funds, he must be allowed to take those equipment to any place where a new contract may take him or to the parent organization from where he has come on this contract.

His teaching quality should be judged from the student's appraisal report. Similarly, his research output, publications, patents and their acceptability, etc. can be judged by industrial houses. This means that the performance of a teacher should come under the domain of consumerism. This arrangement will provide a quality judgement system that will not be influenced by other extraneous forces.

Secondly, the high salary and better research facilities will attract good teachers from other universities and colleges to join this scheme.

Besides regular teachers, experienced doctors, engineers and scientists, who have interest in teaching but who have joined private practice or an industry or a research institute could be appointed to teach for one semester. In this case, teaching quality must be monitored on monthly basis by the student's appraisal report.

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## Cost of research index: What is an *SCI* paper worth?

There has been some attention recently<sup>1,2</sup> on the number of *SCI* papers produced by India and other countries of its league. But, what is an *SCI* paper worth?

Nearly four decades ago, one of the doyens of the history and sociology of science, de Solla Price, argued in an article titled 'Research on research'<sup>3</sup> for an estimate he called the cost of research index, which came to a rough figure of US \$ 20,000 per published paper. This was based on the assumption that 0.7% of the GNP of every country is allocated to pursuing science, which results in papers. de Solla Price estimated that there were roughly 700,000 papers published every year, and a comparable number of scientists, i.e. 700,000, in the global scientific effort. From this, he computed that the cost of R&D that leads to papers was US \$ 20,000 per scientist, which also translated into a figure of US \$ 20,000 per paper. In the same article, de Solla Price indicated that India published about 2% of the world's science and also contributed approximately 2% of the

world's GNP (the indicator used then to measure wealth), in 1964. This meant very neatly that the cost of an Indian paper was the same as the global average computed.

Very recently, Biyani and Joshi<sup>4</sup> argued thus:

'[The] scientific force of nearly three lakh persons published 12,127 [*SCI*] papers in 2000. . . . The central government is spending Rs 13,000 crores on research . . . if the cost of one [*SCI*] paper is calculated, then it would be more than rupees one crore per paper.'

This translates approximately to about US \$ 200,000 a year. Thus, in four decades, the cost of a paper from India has increased by a factor of 10, and this seems reasonable when considering factors like discounting for inflation over four decades, etc. In this age where we try to measure the worth of the applied (sponsored, strategically targetted) research in terms of the external cash flow or extra-budgetary receipts generated, and can do

so, because the monetary terms for doing so are spelled out at the outset, those who do open-ended, blue-sky, curiosity-driven research are at a disadvantage as they produce ideas that become intellectual property in the form of papers or patents, the worth of which cannot be costed easily. de Solla Price<sup>3</sup> and Biyani and Joshi<sup>4</sup> show how this can be done for a paper published. Something similar could be worked out for patents.

1. Prathap, G., *Curr. Sci.*, 1995, **68**, 983-984.
2. Arunachalam, S., *ibid*, 2002, **83**, 107-108.
3. de Solla Price, D. J., in *Journeys of Science* (ed. Arm David, L.), The Twelfth AFOSR Science Seminar, 1967.
4. Biyani, A. and Joshi, M. N., *Curr. Sci.*, 2002, **83**, 1302.

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