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Patents: a Missing Link in Industry-Academia Co-operation

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This paper analyses the various benefits of acquainting students with the concept of intellectual property and its protection, and suggests sowing the seed of patent education at college level itself so that students, as well as society, can reap the fruit at a later date.

INTRODUCTION

Education has been defined by Swami Vivekananda, the Great Saint of India, as *the manifestation of perfection already in man*. Curricula are usually determined by the requirements of a society and of mankind as a whole. Designing a curriculum requires judicious judgement of the different related subjects to be incorporated to generate the necessary knowledge and skills. In the rapidly changing scenario of technology, curriculum has to be reviewed from time to time to ensure that it continues to suit a society's needs. A detailed review of the evolution of curricula in various Indian Institutes of Technology (IITs) carried out by N.C. Mathur presents a very gloomy picture of this [1]. As Brailes expressed it, *current engineering education does not include some of the essentials for intelligent, humane and practical decision making* [2]. Standing on the doorstep of the twenty-first century, such factors as rapid leaps in the technological knowledge-base, wider modernisation and the emergence of a scenario of globalisation have to be kept in mind when designing curricula.

THE STATE OF INDUSTRY-ACADEMIA CO-OPERATION

Knowledge has been identified as an invaluable property with enormous socio-economic significance. Educational institutions play a major role in preserving existing knowledge, generating new knowledge bases and communicating available knowledge to students, who are future professionals or industrialists.

It is recognised that the development of society depends on industrialisation. Although there has been a wide range of industrialisation throughout the world, it cannot perhaps be denied that industry usually operates on their own in parallel to academic institutions. The subject of industry-academia co-operation has been discussed in various forums, but the fact remains that there is a gap between academia and industry, a result of which is that society cannot take full advantage of the knowledge generated in either sector. This obviously defeats the very purpose of knowledge generation and education. Proper co-ordination among industries and educational institutions is envisaged as the probable solution to this problem.

An analysis of the present scenario of engineering education depicts a situation in which industry and academic institutions appear to lack proper co-ordination among themselves. As observed by Beeckmans:

> *...engineering teachers in general [barring, of course, some notable exceptions].... prefer to teach what they know and what interests them rather than what is more appropriate for their students' future careers* [3].

An obvious consequence of this is that the knowledge generated/available in educational institutions may not be able to create wealth. Moreover, there is every possibility that the independent work carried out in industry and educational institutions may, in the absence of any proper co-ordination, generate knowledge that is already available elsewhere, resulting in enormous loss of man-hour, money and intellectual input to a society. It is therefore necessary to adopt a system of

sharing new information/knowledge-base generated so that the same may be available for further development through the pages of history of mankind's success.

A basic analysis in this regard reveals that *data* forms the base of *information*, which in turn builds up *knowledge*. Although knowledge is considered to be the cornerstone for wisdom, the present concept is to use it for the creation of wealth. For all *practical* purposes, however, knowledge should be *usable*.

There seems to be a distinct difference of perception between industry and academic institutions in the context of using the knowledge-base. While knowledge, generated with the available or even new information, is used for career development in academic institutions, industry always strives to use the same for financial benefit. Since the objectives of R&D work carried out in educational institutions and industry are different, there is every possibility that such work continues in parallel. Although the research output emanating from academic institutions is published in journals of the respective trade or profession, new knowledge generated by industry may not be given wide publicity for the purpose of maintaining secrecy. Hence it is likely to create a situation where a researcher will waste time finding a solution to a problem that has already been solved, thus resulting in duplication of research. In terms of the development of the human race, this will obviously emerge as a negative point, as human society may be deprived of the benefits of intellectual property, howsoever generated, during the course of development work carried out in industry or educational institutions. It is therefore necessary to link generated intellectual property to facilitate more fruitful research for the overall benefit of society. The base of intellectual property is therefore envisaged as the link to bridge the gap in the context of industry-academia co-operation for the overall benefit of society.

PATENTS

Generated knowledge forms the intellectual property of the individual contributing intellectually towards its development. The main problem of this property is that it is intangible in nature and becomes public property as soon as it emerges from the mind of the inventor, so that there is every possibility of infringement of one's intellectual property, which may be used by others for commercial benefit. This problem is solved to a great extent by protecting one's *intellectual property* (IP) by various means. Patents, the most important form of IP protection, are the legal protection of rights granted by governments to the inventor for a specific period of time, during which the inventor enjoys exclusive rights to the invention. The most important point to be noted here is that the patentee excludes others only from commercialising the patented information, which can, however, be freely used for the purpose of R&D and education. Moreover, after the expiry of the term of the patent, the invention is freely usable. Thus it has got enormous significance for generation of new knowledge.

Patents are in fact the unique storehouse of technological information, covering the widest range of technologies irrespective of the level of sophistication. It is the first, and sometimes the only, publication available with respect to a specific invention. It has been estimated that about 75% of patent documents are never published in any other form. It is therefore obvious that ignorance about patent documents in a particular field will leave a researcher unaware of a lot of developments in that particular field.

A good patent culture is of immense help to researchers not only in finding ready solutions for many of their problems and avoiding duplication of research, but also in selecting a good research project, which will be beneficial to industry. On the other hand, it enables industry not only to identify expertise in a particular field, but also to keep abreast of the latest developments, which in turn facilitates technology transfer. Thus both industry and educational institutions mutually benefit by sharing knowledge protected by patents, resulting in the overall development of society. Patents may thus emerge as the vital link in the realm of industry-academia co-operation.

A patent document basically provides bibliographic details, invention details and claims. The invention details include prior art, its limitations and the new invention with its advantages, thus presenting the patent document as a unique source of up-to-date information on the status of any technology in a particular field. Since it is a techno-legal document, drafting or understanding a patent document requires experience and skill, for which good training is envisaged as a very essential step for a vibrant society. As suggested by OECD, the *inventiveness coefficient* of a country is defined as the number of domestic patent applications per 10,000 population. Thus patent literacy seems to be the *sine qua non* for establishing the inventiveness of any country.

It is therefore worthwhile inculcating a patent culture by incorporating a subject on *IP rights* in the education of students in order to make them patent-literate and to enable budding engineers or professionals not only to study more and more patent texts to their benefit during the period of study, but also to sustain this habit later to collect and generate more workable knowledge-base for the overall benefit of society.

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BIOGRAPHIES

Shri Chakrabarti graduated in Leather Technology in 1984 from the University of Calcutta, securing first class position, and joined the tanning industry in Calcutta. He took his MTech in Footwear Science and Engineering in 1990 from the Anna University, Madras, and worked for the sports goods industry for more than three years. He also secured two diplomas, one in Marketing Management and the other in Business Administration. He also studied German to the level of *Mittelstuffe*-1 in the Max Mueller Bhavan, Madras.

Shri Chakrabarti, a life member of the Indian Leather Technologists' Association, joined the Central Leather Research Institute in Madras as a scientist in 1993 and has been looking after matters relating to intellectual property rights.

Sayeed Sadulla is Deputy-Director and Science Secretary of the Central Leather Research Institute (CLRI), Head of the International Science and Technology Affairs Group, CLRI, and Honorary Professor in the Department of Leather Technology, Anna University, Chennai, India. He has more than 25 years research, teaching and training experience, with research activities including the development of processes aimed at pollution control and cost reduction. Dr Sadulla has published or presented more than 60 papers on leather science and technology, leather education and training, has edited a book on the leather industry, and was awarded the 1988 *All India Small Scale Tanners & Exporters Association Award* for service to the industry.

Thirumalachari Ramasami, born in 1948 at Srivilliputtur, Tamil Nadu, is a Leather Technologist by training and a practising inorganic chemist working at the Central Leather Research Institute (CLRI). He obtained Bachelor and Master's degrees in Leather Technology from the University of Madras through AC College of Technology, Madras, and carried out his doctoral research at the University of Leeds, UK as a Government of India research scholar. He worked for six years in the United States; initially at the Ames Energy research laboratory, Iowa, and later at Wayne State University, Detroit. He was also a visiting fellow in Newcastle Upon Tyne, UK during 1983-94. He joined the CLRI in 1984 as a senior scientist.

He has made several important contributions to the understanding of chemical reactivities of transition metal ions, in general and chromium in particular, and his work has led to notable additions of knowledge in the area of electron transfer reactions on the one hand and commercially successful technologies for a novel range of tanning materials on the other. One of his recent achievements is a landmark in cleaner and near zero waste chrome tanning technologies. This technology has gained commercial exploitation in India.

Dr Ramasami has a broad range of scientific interests and represents a combination of strengths in chemistry, with the capability to develop technologies from first principles. His interests range from chemical dynamics to environmental chemistry, including global change programme. He is a member of several professional scientific and academic bodies in India and abroad, and is an Honorary Professor of Leather Technology at the Anna University, Madras.

He is a recipient of several awards, including the Shanti Swarup Bhatnagar Prize for Chemical Sciences for the year 1993, special award of honour from the Indian Leather Technologists Association 1990 and Coleman Research Prize 1976. He is an elected fellow of the Indian Academy of Sciences, Bangalore, Tamil Nadu Academy of Sciences and Indian Leather Technologists Association. He is co-author of over 100 publications in refereed journals and more than 50 technical reports.

Proceedings of the 1st Asia-Pacific Forum on Engineering and Technology Education

edited by Zenon J. Pudlowski

The *1st Asia Pacific Forum on Engineering and Technology Education*, held at Monash University, Clayton, Melbourne, Australia between 6 and 9 July 1997, heralded a promising new phase in the development and delivery of engineering and technology education in the Asia-Pacific region. Close to 100 participants from 23 countries from Asia, Europe, Africa and the Americas attended the Forum. Over 80 paper presentations were made, 78 of which are included in this volume of Proceedings.

As an activity of the recently established Asia-Pacific Higher Education Network, Engineering Education subnetwork (APHEN-EE), a primary purpose of the Forum was to bring together academics and individuals concerned with engineering and technology education in the region for discussion and the exchange of information, and the formulation of an action-oriented agenda for the network. The papers included in the Proceedings superbly indicate the fertility and dynamism of prevailing discourse from which the way forward will be determined.

Papers were presented in one of six so-called Asia-Pacific Forum sessions covering the diverse and significant issues of *International Collaboration, New Methods in Engineering Education, Information Transfer and Multimedia, Learning Styles in Engineering Education, Industry/Academia Collaboration* and *Issues Concerning the APHEN-EE*. The proceedings should prove to be a valuable resource for some time to come for those involved with engineering and technology education.

To purchase a copy of the Proceedings, a cheque for $A100 (+ $A10 for postage within Australia, and $A20 for overseas postage) should be made payable to Monash University - UICEE, and sent to: Administrative Officer, UICEE, Faculty of Engineering, Monash University, Clayton, Victoria 3168, Australia. Tel: +61 3 990-54977 Fax: +61 3 990-51547