Hong Kong Higher Diploma in Engineering and Australian Bachelor of Technology in Engineering : Similarities and Differences.

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Abstract : Higher Diploma courses in Engineering in Hong Kong are for the training of senior technicians, while Bachelor of Technology courses in Engineering in Australia are for educating engineering technologists. Senior technicians and engineering technologists are performing similar kinds of work in the engineering profession but they are differently qualified in the two countries/regions and this article discusses the similarities and differences between them. Hong Kong graduates may be disadvantaged by virtue of the title of their award.

Introduction

In Australia, the academic qualifications held by the engineering workforce range from Associate Diplomas, Advanced Diplomas (CQU 1996) and Associate Degrees in Engineering (USQ 1996) for technicians or engineering associates, to Bachelors of Engineering for professional engineers. Lying between the these two general levels is the Bachelor of Technology in Engineering, a relatively new award, for senior technicians or engineering technologists and possibly school teachers in technical subjects (UB 1996).

In most Australian states, the Associate Diploma level courses are run by Institutes of Technical and Further Education (TAFE) and the disciplines offered include civil, electrical and electronic, and mechanical. Associate Degree courses are offered by universities and students have a choice of disciplines that is more or less the same as those for the Associate Diploma courses.

The Bachelor of Technology courses are offered by many universities throughout Australia but the title of the award varies from university to university. The title, Bachelor of Technology, is used by many universities (GU 1996; NTU 1996; UB 1996; UEC 1996; U of SA 1996; USQ 1996; UW, 1996). However, a university (UWS 1996) confers Bachelor of Technology Management and another university (CQU 1996) awards Bachelor of Engineering Technology respectively for courses of the same level.

Bachelor of Engineering courses for the professional engineer level are offered by universities across Australia and are available in various disciplines like mechatronics, environmental, civil and electrical engineering.

To seek admission to one of the above level courses, a candidate must have completed 12 years of general schooling with passes in English, Mathematics and/or Physics, depending on the specific course and university. Adult students and trade certificate holders are considered on their individual merit.
In Hong Kong, a similar engineering workforce holds academic qualifications of Diplomas, Higher Certificates, Higher Diplomas and Bachelor of Engineering. Diploma holders are mainly trained for the posts of technicians or engineering associates. The academic qualifications for senior technicians or engineering technologists will be Higher Diplomas and Higher Certificates with the latter being considered as marginally qualified for the profession. Bachelor of Engineering graduates are trained to be professional engineers.

**Aims of Courses**

First, let us look at the aims of the two courses. Bachelor of Technology courses in Engineering (QUT 1996) aim at producing graduates with a broadly based appreciation of engineering, giving them the ability to supervise the day-to-day operations of systems and the personnel who control them. The design of Bachelor of Technology reflects the fact that graduates will pursue a career as a professional technologist, implementing complex technology and they have duties and responsibilities that are equivalent with professional people in other areas such as science, business, arts etc. But it differs from a Bachelor of Engineering in that the latter provides students with the knowledge and skills that are necessary to innovate new technology and to commence practice as a professional engineer. Higher Diploma courses in Engineering (CityUHK 1995; HKTC 1996) were established to meet the need of senior technicians or technologists in Hong Kong and are vocational based with special emphasis on industrial participation by employers and practising professionals. They are also designed to provide balanced programmes of study that combine vocational skills with suitable academic studies. The graduates of the courses are made attractive to potential employers and are also well prepared for furthering their academic advancement.

**Entry Requirements and Articulation**

Higher Diploma in Engineering courses in Hong Kong are currently offered by the two technical colleges administered by the Vocational Training Council of Hong Kong and the two formerly polytechnic universities. The duration of the courses vary from institution to institution and hence the entry requirements differ from one to another. The Hong Kong Technical Colleges (Tsing Yi and Chai Wan) offer three-year full-time Higher Diploma courses in Engineering to secondary school leavers who have completed 11 years of general schooling with passes in English (syllabus B), Mathematics and Physics or Engineering Science and two other subjects in their Hong Kong Certificate of Education Examination (HKCEE) (HKTC 1996). The City University of Hong Kong offers three-year full-time Higher Diploma in Building Services Engineering course to HKCEE holders with passes in a physical science subject and Mathematics where the total minimum score in the five passes in HKCEE is eleven (CityUHK 1995). Diploma in Engineering holders will be given two years of advanced standing and will be able to finish the course after two years of part-time study. The Hong Kong Polytechnic University runs two-year full-time Higher Diploma courses in Engineering for candidates with 13 years of general schooling, who pass in Pure Mathematics or Applied Mathematics or Physics at the Hong Kong Advanced Level Examination (HKALE) and pass six subjects at the HKCEE, including English (syllabus B) and Chinese Language of a language other than English (HKPU 1995). Diploma in Engineering holders may also be considered for admission.

On the other hand, to seek admission to the three-year full-time Bachelor of Technology courses in Engineering in Australian universities, candidates are required to have 12 years of
general schooling with passes in English, Mathematics and/or Physics or Chemistry. The admission requirement varies from university to university. Associate Diploma holders will usually be given one and a half years of advanced standing by most universities in Australia when they seek admission to Bachelor of Technology courses in the same engineering discipline. However, the University of Southern Queensland gives two years of advanced standing to their Associate Degree in Engineering holders when they apply for admission to the Bachelor of Technology course in the same discipline. This university also accepts Diploma in Engineering holders from Hong Kong technical institutes to the final year of their three-year full-time Bachelor of Technology in the same discipline. Students are required to study one year full-time on campus or two years part-time by distance education. The first lot of such students are expected to graduate in July 1996. On the other hand, people wishing to switch their career from professional engineering technologists to professional engineers have to study full-time for another two years. This is because the Bachelor of Engineering programme incorporates studies that demand a higher level of mathematical ability than the Bachelor of Technology.

**Academic Status**

Australian Government recognises the degree of Bachelor of Technology in Engineering as a legitimate degree like Bachelor of Business, Bachelor of Science and Bachelor of Arts. The Government of United Kingdom also recognises (NARIC 1991) the said degree as a British Bachelor (ordinary) degree. On the other hand, the British Government recognises (NARIC 1991) the Higher Diploma in Engineering of Hong Kong as their own Business and Technology Education Council (BTEC) Higher National Diploma (HND) in Engineering. While the Australian Government recognises (DEET 1991) the British BTEC HNDs as equivalent to the Diplomas conferred by an Australian Institute of TAFE after three years of full-time study.

The Australian government treats (DEET 1991) Hong Kong Higher Diplomas as equivalent to their own Associate Diplomas. This may be due to the number of years spent in obtaining the qualification. In Australia, 12 years of general schooling is required before entry into the two-year full-time Associate Diploma in Engineering courses; a total of 14 years is therefore required to qualify for an Associate Diploma in Engineering. In Hong Kong, it takes 14 years to obtain a Higher Diploma in Engineering. There is no document mentioning the academic status of the Higher Diploma in Engineering awarded by the Hong Kong Polytechnic University so people may be misled into assuming that it is equivalent to Associate Diploma awarded by an Australian Institute of TAFE. Actually, it may be equivalent to a Diploma conferred by an institute in Australia.

**Professional Recognition**

The Bachelor of Technology in Engineering satisfies the academic requirement for affiliate membership of the Institution of Engineers, Australia (IEAust) while the Higher Diploma in Engineering fulfils the academic requirement for Associate Membership of the Hong Kong Institution of Engineers (HKIE). As the two professional engineering institutions have reciprocal arrangement of recognition for their corporate membership, I believe the Institution of Engineers, Australia will recognise the Higher Diploma in Engineering from Hong Kong as satisfying the academic requirement for its affiliate membership and the

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1 The entry requirements to these courses include 13 years of general schooling with passes in five subjects in the General Certificate of Education, of which one must be at advanced level. The pass at advanced level must be either Mathematics or Physics. Both of the subjects have to be studied up to advanced level.
Bachelor of Technology in Engineering will meet the academic requirement for associate membership of the HKIE.

**Employment Opportunity**

Whether it is in private or in public sector, in Hong Kong or in Australia, holders of Higher Diploma awards are deterred from applying for posts that require a degree as the minimum qualification for appointment. Bachelor of Technology graduates are able to apply for such positions. However, it must be clearly understood that the technologist is not a professional engineer and should not apply for positions requiring a Bachelor of Engineering degree.

**Further Study**

In Australia, or possibly everywhere in the world, the Bachelor of Technology in Engineering is considered as a legitimate and adequate qualification for admission to postgraduate courses like Master of Information Technology, Master of Business Administration, etc. On the other hand, Higher Diploma in Engineering is not usually considered as a qualification for admission to postgraduate study. Only limited universities will give holders of Higher Diploma in Engineering admission into some of their postgraduate courses but this rarely happens in Hong Kong.

As for the opportunity for upgrading to professional engineer status, the chance for both qualifications holders are good. Higher Diploma holders will usually qualify for the award of Bachelor of Engineering after studying two more years full-time in the same discipline. It takes two years of full-time study to upgrade Bachelor of Technology holders to Bachelor of Engineering in the same discipline.

In order to make the course, Bachelor of Technology in Engineering, more attractive the University of Southern Queensland is undergoing course review for its Bachelor of Technology programmes and it is anticipated that the review will result in upgrading the academic standard of its Bachelor of Technology courses to permit holders of the award to complete Bachelor of Engineering in the same discipline in 18 months.

**Conclusion**

This paper is not intended to disparage the status of the Higher Diploma in Engineering conferred by higher educational institutions in Hong Kong compared with the Bachelor of Technology. It merely describes the characteristics as well as the similarities and differences of the two different awards, and notes that Hong Kong graduates may be disadvantaged by virtue of the title of the award.

We believe the contribution by engineering technologists or senior technicians to the engineering workforce is vital and they should receive the respect they deserve. In Australia, this is reflected by the award of a degree. It appears to us that senior technicians in Hong Kong are rewarded with a lower status than they deserve, we therefore suggest the higher educational sector in Hong Kong to consider upgrading its Higher Diploma in Engineering courses to a degree level.
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