

Caribbean Engineering Accreditation in a Regional Context

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ABSTRACT

The University of the West Indies (UWI) was until recently the only degree-granting institution in engineering in the Commonwealth Caribbean. UWI currently uses the British Institutions for accreditation of its engineering degrees. Other institutions have emerged in the region, which offer degrees in engineering, and are seeking internationally recognized accreditation. Countries without accreditation systems are encouraged to establish them. Developing countries do not have the industrial maturity or reputation of industrially developed ones so it is more incumbent on them to put in place systems on par with best international practice. This can be achieved by using existing accreditation bodies with international experience and recognition, while introducing an indigenous system with a structure that would guarantee international recognition. This is the model proposed by the Council of Caribbean Engineering Organizations (CCEO)¹, through the establishment of a Caribbean Engineering Accreditation Council (CEAC).

INTRODUCTION

The acute quality awareness in industry, as evidenced by the ISO series of quality standards and stakeholders' demands for accountability, have been manifested in many other areas, such as education. Stakeholders demand assurances that academic training equip graduates with an initial knowledge base that is relevant and of high quality, particularly at the professional level. In order to provide these assurances several mechanisms and systems are developed by governments, professional associations and the teaching institutions themselves. This paper looks in general at the different approaches to accreditation of professional engineering degrees and diplomas in different parts of the world and suggests a strategy for establishment of an indigenous Caribbean engineering accreditation system with a structure and procedures that would be internationally accepted.

The Caribbean Community is moving towards a Single Market and Economy (CSME) [1] and in doing so it is negotiating with other trading blocs about the terms under which they will treat with one another. Additionally the Free Trade Area of the Americas (FTAA) is scheduled to come on stream in 2006. Liberalization of international trade, particularly under the General Agreement on Trade in Services (GATS), is already influencing the hiring practices of

¹ The Council of Caribbean Engineering Organizations (CCEO) is an umbrella body of the national professional engineering associations of the English-speaking Caribbean, namely Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Trinidad and Tobago.

multinational companies and together with increased globalization of trade, is leading to greater international mobility of professionals, particularly in engineering. This has also been facilitated by, among other things, the use of common technology internationally, as demonstrated, for example, by industry-standard software packages for analysis, design and drafting [2] that allow the easy exchange of digital information, and the performance of certain functions at a distance.

An internationally recognized accreditation system would facilitate the rapidly increasing global trade in engineering services in a more equitable manner. This is particularly important for less industrialized and developing countries, which already suffer from constraints and deficiencies that handicap their ability to compete in international trade. This is in the economic and educational interests of these countries, as it would obviate the need for each country (or group of countries) to devise a completely new system, since many developing countries do not have indigenous accreditation systems, or have systems that are not very well developed or internationally recognized. Until an acceptable local system is in place such countries have to adopt the most suitable of the internationally recognized professional accreditation systems to run in parallel with local ones where they exist.

QUALITY IN HIGHER EDUCATION

The industrially advanced countries have devised systems of quality assurance for tertiary level education of one form or another. The systems tend to be more developed for the professional qualifications, particularly in engineering. This is more likely due to the influence of the professional societies, industrial organizations and regulatory agencies, having regard to the issues of public safety and liability.

In some countries the Government, usually by legislation and/or regulations administered through a commission or a Ministry, is responsible for quality assurance or accreditation [3]. The accreditation boards and committees usually comprise education administrators, relevant industrial representatives and members from professional societies and often include laypersons in the public interest. This is fairly common in Europe. In other countries the responsibility for quality assurance in tertiary level engineering education is undertaken by the professional societies themselves [3]. This is the norm in the Anglo-American countries such as Britain, Canada, and the United States to name a few. In Britain there is the Higher Education Quality Council, which deals with tertiary education in general. However accreditation of engineering degrees has been effectively delegated to the Engineering Council, a confederation of professional institutions of engineers and related disciplines. In Canada the accreditation of engineering degrees is the responsibility of the Canadian Council of Professional Engineers (CCPE), an umbrella body for the associations of professional engineers in the provinces and territories. In the United States there are regional accreditation bodies, which link to the federal government, consistent with the strong tradition of devolution of authority to local and state control. However the accreditation Board for Engineering and Technology (ABET) is a national, overriding institution, derived principally from the profession and subscribed to by the engineering community nationally.

In some industrialized countries in Europe the quality assurance systems in professional engineering schools are surprisingly not very well developed in terms of their independence,

consistency and national scope. Germany is illustrative of this situation [4]. However the reputation of German industry and engineers has ensured international respect and recognition. This is not likely to diminish in the near future but in recent times the need for a more defined, independent and consistent national or regional system has been enunciated by the concerns of government, industry, the profession and the educational institutions themselves. This is in part driven by internal demands for better accountability as well as external forces of the European Union and the wider international community. This demand for accountability is a worldwide trend and has implications for international trade, particularly in services.

Engineering Accreditation in Developing Countries

Developing countries do not have the industrial maturity and reputation of countries such as Germany for example, so it is even more incumbent on them to develop systems of accreditation that are internationally recognized and also relevant to local conditions.

Del Castillo contends that a certain amount of homogeneity exists in engineering education in Latin America, arising from the colonial tradition and the more recent influence of the North American system [5]. In the countries that were more recent colonies (e.g. in the British Empire) the homogeneity of engineering education is even stronger, in congruence with the system in the former mother country.

The English-speaking territories in the Caribbean were British colonies for the most part, most of which gained independence in the 1960s and 70s, but remained within an international grouping of former colonies that, together with Britain, form the Commonwealth. Throughout the British Empire the system of education was essentially the same, high school students doing the same university matriculation examinations, which originated from either Cambridge University or the University of London. In general the universities in the Empire were established along the lines of the British model. The more developed and larger countries of the Commonwealth developed their own tertiary level accreditation systems. Many less developed and smaller states continue to use the traditional British style external examiner system and opt for international accreditation, often from the British Institutions. A good case in point is the Faculty of Engineering of The University of the West Indies (UWI).

THE UNIVERSITY OF THE WEST INDIES

The University of the West Indies (UWI)² serves fifteen English-speaking countries/territories in the Caribbean, former British colonies. The University started in 1948 as the University College of the West Indies, initially as a college of the University of London. There are campuses in three countries (Jamaica, Trinidad and Tobago and Barbados) and University Centres in the other territories. The University consists of Faculties, Schools, Institutes and Centres in the areas of the Arts, Agriculture, Education, Engineering, Humanities, Law, Medicine, Natural Sciences, Social Sciences. Currently (in 2003) there are over 20,000 full-time students and an even larger

² The Contributing Territories of The University of the West Indies (UWI) are: Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Trinidad and Tobago.

number doing part-time, distance and extra-mural studies. There are well over 1,200 engineering students who are pursuing Bachelor's, Master's and doctoral degrees.

External Quality Assurance at UWI

From its inception The University of the West Indies (UWI) adopted the British university quality system, whereby all examinations and a representative sample of scripts, are scrutinized by external examiners, of the rank of full professor, from outside the university. In the 1980s the UWI Faculty of Engineering initiated the additional quality assurance mechanism of external accreditation. In the absence of a regional system the British Institutions were invited, being the only internationally recognized bodies, which, at that time, accredited degrees overseas.

Internal Quality Assurance at UWI

In addition to the traditional periodic reviews of programmes and curricula, professional Departments have developed quality manuals. Within the last five years The University of the West Indies has established a formal Quality Assurance Unit (QAU) whose mandate includes assisting Departments with quality management systems, organizing quality assurance reviews, auditing specific ancillary functions and supporting the professional Faculties and Departments with preparation for accreditation visits [6].

When a programme or department is selected for review a Quality Assurance Review Team is appointed, usually of about six persons, at least two or three of whom are from outside the University, and include a senior academic from outside the region and a senior professional from within the region but external to UWI. The review consists of a self-assessment report, which must be done by the Department under review long before the team visits to inspect Departmental and ancillary facilities, meet with the stakeholders and verify the contents of the self-assessment report. The Review Team writes its report, which is distributed accordingly and there is evaluation of any follow-up action recommended. The review process and procedures are very similar to an accreditation exercise.

A CARIBBEAN ENGINEERING ACCREDITATION SYSTEM

Britain, Canada and the United States are the most significant countries for the Caribbean in terms of trade, migration, language and culture, as well as political and administrative structure. Since independence from Britain, trade, migration and other patterns of life in the Commonwealth Caribbean, including tertiary education, have shown a major shift to North America and their systems.

The systems of accreditation in Britain, Canada and the United States are very well structured, mature and independent of the engineering schools. They also have international experience. Although they may differ in administrative form there is a great amount of commonality in the procedures, expectations and level of outputs. These three countries together with Australia, Ireland, Hong Kong, New Zealand and South Africa have an agreement for mutual recognition of accredited degrees, referred to as the Washington Accord [7]. The Commonwealth Caribbean is the only major English-speaking region that is not a member, due in part to the non-existence

of indigenous accreditation of similar stature to signatories to the Washington Accord. The Canadians assisted Jamaica to update their engineering institutional systems including accreditation and also helped establish a Caribbean engineering accreditation system.

The Commonwealth Caribbean is relatively small (about 6 million people) with four institutions that have Schools of Engineering. The University of the West Indies is the oldest and largest and has an excellent reputation. It has set the pace in both internal and external quality assurance systems including international accreditation, which, as mentioned previously, is done by the British Institutions (of Engineers) for the programmes of the Faculty of Engineering. The other (more recent) Schools of Engineering in the region have opted for North American accreditation systems.

The (American) Accreditation Board for Engineering and Technology (ABET) has several attributes that recommend it, more than any other body, as the basis for a Caribbean engineering accreditation system. ABET has seventy (70) years experience and currently accredits well over 2,000 engineering and technology programmes and over 50 in engineering-related disciplines, more in number and variability than any other accreditation body [8]. The most significant features of the ABET accreditation system are the simplicity and flexibility of Engineering Criteria 2000 (EC 2000), which gives general guidelines for attaining quality of an engineering degree programme, the most important of which is the emphasis on outcomes in the context of performance competencies graduates must possess.

ABET, and more recently the Canadian Engineering Accreditation Board (CEAB), conduct evaluations of overseas degrees for “substantial equivalency”, using the same criteria as for their domestic programmes. ABET started evaluations of foreign degrees in the 1980s and increased the activity substantially in the 1990s. ABET has been working closely with various engineering organizations and educators in several parts of the world covering the five continents. Of special significance to the Caribbean is the 1995 Memorandum of Understanding between ABET and the UNESCO Regional Office for Latin America and the Caribbean to assist in the establishment of national and regional accreditation systems.

The British system is well developed and is used by several institutions in several countries, particularly in the Commonwealth [9,10]. However the new British system is still very prescriptive and therefore not very amenable to variable situations, particularly outside Britain. There is the added complication of a Matching Section, which is supposed to be a top-up year of professional-cum-academic preparation added onto the traditional 3-year degree, in order to qualify for accreditation at the corporate level of the Engineering Council, as a Chartered Engineer. The more direct route is the 4-year M.Eng degree, an undergraduate degree despite the nomenclature. The system is still under intense debate, particularly the structure and format of the Matching Section, which is yet to be satisfactorily resolved, but which is the resort of a large number of 3-year degree graduates who aspire to chartered status but could not do the 4-year programme because of the input restrictions on entry qualifications. In fact this is the plight of several thousand graduates in Britain at the moment [].

The notion of an undergraduate degree being called M.Eng is going to add unnecessary confusion in the minds of the West Indian public and industry. In addition an industrial Matching

Section would be a practical impossibility in the current industrial scenario in the Caribbean, and for the foreseeable future, particularly outside of Trinidad and Tobago. The Matching Section can be done at university but it is not a simple case of doing a Master's degree in engineering or an MBA (according to SARTOR [9]).

Another very serious disadvantage of the British prescriptive constraints is their system of awarding the class of degree to graduating students, which is inconsistent with the semester system, which obtains at The University of the West Indies. In British universities engineering students still pass or fail a year, as it were (as was the case in UWI prior to 1990) as opposed to passing individual subjects as in a semester system. Students in Britain who repeat the final year are not eligible for honours. When this principle is transformed into a directive to UWI to disallow honours to students who fail a Level 3 subject this clearly demonstrates a misunderstanding of the semester system. Another directive (to UWI) arising out of this British principle is to disallow honours to students who spread Level 3 over two years, despite taking only eight semesters to complete their degree. This is against modern thinking of access to tertiary education, which must facilitate part-time students who may have to work their way through university.

When we adopted the semester system we incorporated a number of features of the North American system, which were most compatible with our circumstances. The class of degree is based on a GPA of the first mark attained by the student in all subjects, which is a fair measure of overall performance and does not disproportionately penalize the student for one failure.

The British Institutions have served us well for the past 20 years or so. In that period several Caribbean nationals have gained invaluable experience in international accreditation. However there are several reasons for establishing an accreditation system for the Commonwealth Caribbean. Of utmost importance is the trend by the international community regarding non-recognition of external accreditation and the move towards the establishment of indigenous systems consistent with the needs and educational structure of a particular country or region, a principle enunciated by the Washington Accord. Interestingly, however, the Medical Schools in the region may be the first, of necessity, to formulate a Caribbean accreditation system, due to the decision by the General Medical Council of Britain to discontinue overseas accreditation.

In fact one of the overall objectives under GATS, as laid out in Protocol 2, Article 35 e, is to "...establish common standards and measures for accreditation or where necessary for the mutual recognition of diplomas, certificates and other evidence of qualifications...(and) to determine equivalency or accord accreditation to diplomas, certificates and other evidence of qualifications secured by nationals...(and) the coordination of legislative and administrative requirements of Member States ..." [11].

The University Council of Jamaica (UCJ) has overall responsibility for accreditation in that country, and has vested the responsibility for accrediting engineering qualifications with the professional engineering organizations, as is the common practice internationally. No other country in CARICOM has the legal equivalent of the UCJ. In Trinidad & Tobago the National Institute of Higher Education, Research, Science and Technology (NIHERST) has a long-standing Committee for the Recognition of Degrees (CoRD), and recently the Government

established an Interim Accreditation Committee. There is an institution in St. Kitts and Nevis with limited functions and The Bahamas, Barbados, Belize and Guyana have taken proposals to cabinet for the establishment of their national accreditation bodies. A manual outlining the Caribbean engineering accreditation system was tabled at the CARICOM workshop on accreditation in May 2001 [12].

Currently the Council for Human and Social Development (COHSOD) of the CARICOM Secretariat is working to create a single regional Accreditation Board that will oversee the accreditation of all certifiable regional qualifications [13], including those of the engineering bodies. The Caribbean Engineering Accreditation Council will work under the oversight of this regional Accreditation Board. The engineers have been proactive in ensuring that their views regarding the requirements of accreditation within the profession are fully represented, and that standards of recognition and equivalence across the region are established.

Model legislation [14], according to internationally accepted standards, has been forwarded by CCEO to its various constituent members, and in 1999 this model legislation was endorsed throughout the region, but registration laws have not yet been widely enacted. Legislation exists in Barbados, Belize, Jamaica, St Lucia and Trinidad & Tobago, and is under revision, where necessary, to comply with the essential features of the model. Several other states (most notably the Bahamas, Grenada and Guyana) have bills in various stages of the legislative process. It is a policy imperative that this process should be advanced.

Ironically the exigency of the situation with the Medical Schools, which no longer have access to British accreditation, may be the catalyst to accelerate the implementation of Caribbean accreditation systems. In policy terms, the governments of the region should support the move by enacting the necessary legislation and pressing ahead with the establishment of regional indigenous accreditation systems.

A Caribbean Engineering Accreditation Council (CEAC) has been established by the Council of Caribbean Engineering Organizations (CCEO) to work in parallel with the external accreditation bodies. The structure and procedures of the CEAC are consistent with the accreditation systems of the countries of the Washington Accord. In order to ensure international acceptance (and membership of the Washington Accord) the CEAC has stipulated that CEAC visiting accreditation team Chairs shall be designated by either ABET, the Canadian Engineering Accreditation Board (CEAB) or the UK Engineering Council, and the Chairs shall choose team members from Canada, UK, US and the Caribbean, as they see fit [11].

TO ADD MORE DETAILS ABOUT THE CEAC

Provided there are suitable international oversight capabilities, which can ensure that the professional registration standards are equivalent, there should be no problems in agreeing to mutual recognition and reciprocity. The Washington Accord provides some oversight in that signatories should accept one another's accredited academic qualifications. With respect to professional practice the Engineers Mobility Forum [15] should provide useful guidelines.

CONCLUSIONS

- Stakeholders/social partners are demanding greater accountability from tertiary educational institutions, particularly for professional qualifications, in terms of relevance and standards.
- The state is ultimately responsible for quality assurance in education, which is more effectively done for the professions through professional associations or institutions driven by them.
- It is incumbent on all countries, but particularly the developing countries, to put in place accreditation systems that are relevant to local conditions and that are also internationally recognized.
- The University of the West Indies has set the pace in the Caribbean with an excellent internal quality assurance system and international accreditation of its engineering degrees.
- Accreditation by an external, international body should obtain while creating a Caribbean system that would gain international recognition by bodies such as the Washington Accord.
- The North American model of accreditation is more relevant to the Caribbean than other international systems.

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