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Dear Christine

Re: Mapping Professional Accreditation in the Context of Higher Education Regulatory and Standards Frameworks

Writing on behalf of the Australian Council of Engineering Deans (ACED), I appreciate your invitation to provide input to your project on professional accreditation.

ACED has formally been in operation for more than 20 years, with the stated mission "*To support and promote engineering education and research in the higher education sector*". ACED does this in the national interest, which for education is about assuring the public that our engineering graduates will conduct their work in the public interest with due regard for human safety and the environment. As an incorporated association, ACED's membership comprises all the Australian public universities providing accredited or provisionally accredited engineering degree programs at the Professional Engineer level. The principal accreditation agency is the national engineer membership organisation, Engineers Australia (EA).

Program Accreditation by Engineers Australia

Accreditation is a process through which an accreditation status is conferred on a program for a finite future period. Each ACED member has typically about ten distinct accredited programs, mostly 4-year Bachelor of Engineering (Honours) degrees that qualify graduates to commence supervised practice as Professional Engineers. An increasing number of members are now offering Master of Engineering degrees ("entry to practice" programs) for this purpose.

Several ACED members also seek accreditation of chemical engineering programs from the Institution of Chemical Engineers (IChemE). Software engineering programs are also accredited by the Australian Computer Society (ACS). In most instances, the IChemE and ACS accreditations are undertaken alongside the EA accreditation process. Two ACED members have separate accreditation of some programs from the European Network for Accreditation of Engineering Education (ENAEE).

In addition, several ACED members provide 3-year Bachelor of Engineering Technology degrees, and 2-year Associate Degrees that may qualify their graduates to start practice as Engineering Technologists and Engineering Associates (senior technicians) respectively. Accreditation from EA is sought for most of these programs.

Over the past 20 years, the standards and processes used by EA for accreditation have been developed through the collaborative efforts of members of the profession and employers, ACED (including Associate Deans for Teaching and Learning) and members of the Australasian Association for Engineering Education (AAEE). For example, the major revision of the EA Stage 1 Competency Standards (the generic graduate attributes) undertaken in 2011 was a collaborative and consultative effort of the three organisations, partly supported through one theme of an ALTC Grant to ACED.

International Dimensions

Through the international agreements of which EA is a member, notably the Educational Accords of the International Engineering Alliance (IEA), graduates from programs accredited by EA are granted equivalent standing in the jurisdictions of the other Accord signatories, enhancing their mobility, and

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confidence of increasingly globalised employers. Program equivalence is established and reviewed by a rigorous peer-based process, referenced to outcomes-based Graduate Attribute Exemplars and accreditation process requirements. The Washington Accord (EA was a foundation member in 1989) now provides mutual recognition of the graduates at the Professional Engineer level in 17 countries.

As noted earlier, two ACED members also have accreditation from the ENAEE, whose membership is restricted to European accreditation agencies, four of which are also in the IEA.

Benefits

Although all of this accreditation is voluntary it is evident that ACED members are strongly committed to engineering program accreditation. Altogether, the EA accreditations cover about 11,000 graduates per year. Accreditation provides external peer validation and benchmarking of ACED members' degrees program design and implementation, and bestows direct benefits to graduates in terms of membership of the professional body (EA) and mobility (through the international agreements). These outcomes, together with the activities of the Australasian Association for Engineering Education (AAEE) contribute to the good standing in which the Australian engineering education system is held internationally.

Non-accredited Engineering Programs

ACED members provide postgraduate coursework and research degrees in engineering that are not accredited by EA or other agencies. The entry to these awards is normally restricted to "qualified professional engineers", i.e. holders of an accredited degree at the Professional Engineer level. ACED has periodically discussed how it could, at reasonable cost, provide some level of accreditation of advanced coursework qualifications. ACED and its members recognise that this would contribute to satisfying some elements of the requirements of the Higher Education Standard Framework at the disciplinary level.

Responses to your questions follow

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1. What is the practical impact of professional accreditation on institutions?

The benefits of program accreditation, as outlined above, are well recognised by ACED members. The current processes operated by EA and other accreditation bodies are a cost-effective way of assuring and benchmarking threshold entry level program outcomes for a complex profession. ACED and its members do not consider accreditation to be "a burden", financial or administrative.

Accreditation provides a regular (five-year) external "health check" that supplements internal university review processes. The documentation requirements largely draw on existing material, such as program schedules and course guides, and its compilation also provides opportunities for internal reflection on the extent to which the target curriculum is being delivered. Whenever possible, accreditation panels evaluate all the providers' eligible programs. This may require quite large review teams, but is efficient in terms of time and cost.

ACED members supply about two-thirds of the accreditation panel members; the other panel members are from industry, ensuring that due attention is paid to employability outcomes. Invariably the academic members of panels find that participation enables them to sharpen reflection on their own institution's programs. The professional accreditation requirements are well aligned with those of other regulatory systems in the Higher Education sector; so that it would be more accurate to say that being discipline-specific, the EA requirements complement the sector-wide requirements.

A positive and "clean" outcome for accreditation is not guaranteed, especially for new programs for which Provisional Accreditation may be granted, pending completion of the program by one or more cohorts of graduates. The outcomes of accreditation may include reporting requirements on significant deficiencies, and always include commendations on good practice, and recommendations on improvement. The latter form part of the engineering faculty's continuous improvement cycle.

ACED members who have experience of other accreditation systems consider the EA system to be sound, increasingly outcomes focussed, and do not stultify innovation. As such, EA accreditation is fit for purpose, and is an example of good practice. Furthermore, ACED is able, formally, to contribute to EA's accreditation process improvements.

2. Are there advantages and/or disadvantages to professional accreditation processes as they are currently managed? What are they?

The current EA accreditation processes have evolved over the past thirty years, with input from ACED members as outlined above. The requirements and evaluation processes have been reasonably stable for the past decade.

EA is flexible regarding the form of the self-review submission, and the provision of assessment materials, providing all criteria are addressed. Increasingly, accreditation panel members are invited to log into providers' learning management systems, so that they can experience some aspects of what it is like to be a student. Our members have to arrange meetings for each of the main branches of engineering with program leaders, academics, employers, graduates and students.

The EA Accreditation Board Chair and National Manager Accreditation attend and report to the biannual meetings of the full ACED Council. These EA officers also host an annual consultative committee meeting with the ACED President and Executive Officer, and AAEE President. These meetings enable discussion of issues arising from the previous cycle of accreditations, and upcoming accreditation changes. Significant issues that have been satisfactorily dealt with over recent years have been increases to the fees charged by EA for accreditation (currently providers pay an annual fee that accounts for about half of the costs of the five-year accreditation reviews; supplementary reviews for considering new programs may be subject to a fee), and the guidelines for accreditation of "entry-to practice masters" degrees.

3. Are there trends emerging in professional accreditation that you are aware of and are the bodies you are associated with adopting them? What new approaches are emerging?

After the 1995-6 national review led by EA, ACED and the Academy of Technological Sciences and Engineering (ATSE), the engineering profession committed to outcomes-based education. Over the two decades since, both engineering education providers and engineering accreditation agencies have developed deeper understanding of this methodology. All engineering accreditation systems now emphasise outcomes-based program and course specifications, and observation and evaluation of their achievement by students.

ACED members have responded to this approach, and have developed sound mapping of programs and courses to the EA requirements (16 engineering-generic outcome elements in knowledge and basic skills, engineering applications ability, and professional and personal attributes) to institutional outcomes. Accreditation panels are placing emphasis on inspecting capstone research projects (as the best assessed indicator of the individuals' ability to integrate knowledge and skills and plan towards a significant project outcome), and on students' reflective journals, particularly of work placements in industry.

The EA accreditation system has also been reasonably adaptive to mixed-mode pathways, but has yet to deal formally with programs containing several MOOCs, that may appear in future. The EA approach is to put the onus on the educational provider to proffer the evidence of the required assessed learning outcomes.

4. Does accreditation make innovation in course design more difficult, or does it encourage innovation?

In general EA encourages innovation in curriculum design, delivery and assessment providing changes improve the learning outcomes. The EA guidelines on the distribution of course content between mathematics and science, engineering fundamentals and specialisations, engineering analysis and design, and the contexts of engineering practice are not rigidly constraining. The output-based criteria allow universities to be innovative in achieving the requirements.

EA requires graduates to gain "exposure to engineering practice", and suggests a range of ways in which this can be included in the program. In the past, all ACED members included a (zero credit) program requirement of at least 12 weeks employment (placement) in an engineering setting; and a minority of programs included one or more longer period of co-op education. As engineering industries have changed, the provision of placements has become more difficult. At the same time,

the higher education sector has recognised the value of 'work integrated learning' for program credit. ACED is working vigorously and collaboratively with EA to determine how exposure to practice can be retained and improved in the changed industrial and education environments.

Over the years, ACED members have created new programs in emerging areas (such as biomedical engineering, environmental engineering, mechatronics and software engineering), and variants (such as nanomaterials, sustainable energy, bioinformatics, etc.) of the major engineering branches. EA accreditation has been able to cover these innovations, especially after they have been discussed with the Accreditation Centre in the early stages of their development, for which Provisional Accreditation may be granted.

5. **How do international professional recognition requirements impact on course design in your discipline? Do these requirements mesh easily with internal academic quality assurance, the HESF and TEQSA process? What, if any, are the problems?**

As noted earlier, Australia is in the leading global engineering accreditation movement, the IEA. Through the Washington, Sydney and Dublin Accords, our graduates fully recognised as having undertaken education equivalent to that in the jurisdictions of the other signatories. EA has influenced the graduate attribute standards developed by the Accords, and the program standards operated by EA are entirely consistent with them. EA's full signatory status in the Washington Accord was confirmed for a further six years in 2016, after observation by an international review team of accreditation processes at two ACED members' institutions in August 2015.

Where ACED members provide engineering degree programs in overseas jurisdictions, these programs must satisfy local educational requirements, and where applicable, local professional accreditation requirements. Educational requirements may require inclusion of cultural courses. Normally the "home" programs have sufficient flexibility (such as provision for general studies or electives) for these requirements to be accommodated easily. Members' experience is that the accreditation requirements of some overseas jurisdictions have a greater input focus than that now used by EA criteria to meet, and may have much higher accreditation fees.

6. **What could be done to streamline the various regulatory, quality assurance and professional accreditation processes to reduce the burden on institutions?**

As noted earlier, ACED members do not regard the professional accreditation of engineering programs that they choose to have as particularly burdensome; rather it is the major external part of the quality assurance systems that covers the discipline itself. These professional accreditation requirements thus add value to the internal processes operated more at the level of the institution.

ACED would be pleased to provide further information, or participate in any discussions that would assist your project.

Yours sincerely

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