Articulation for the Engineering Work Force in Australia: An Engineers Australia Perspective

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Abstract: *The National Articulation Committee of Engineers Australia was set up in 2001 to assist Engineering Associates and Engineering Technologists with at least five years experience to achieve Stage 1 Competency for the categories of Engineering Technologist and Professional Engineer by means other than through completion of benchmark qualifications. Access to an articulation process since 2001 has assisted some 100 Members of Engineers Australia to articulate to a different category, the majority becoming Professional Engineers. More are in the pipeline. The paper describes the historical development of articulation and details the processes in place.*

Introduction

In the context of Engineers Australia, articulation refers to the process of linking together the three knowledge base or enabling competencies required to commence practice as Engineering Associate, Engineering Technologist and Professional Engineer. The foundation competencies are known as Stage 1 Competencies and can be viewed on the web (Engineers Australia, 2008).

The benchmark qualifications that satisfy Stage 1 Competency are:

- for a Professional Engineer: an accredited four-year Australian Bachelor of Engineering degree,
- for an Engineering Technologist: an accredited three-year Australian Bachelor of Engineering Technology degree, and
- for an Engineering Associate (Officer): a recognised two-year Australian (AQF6) Advanced Diploma or Associate Degree.

Articulation is not concerned with the demonstration of Stage 2, or practice-based competencies gained in the workplace.

Historical Background

The National Articulation Committee of Engineers Australia was set up primarily to assist experienced Engineering Associates and Engineering Technologists to achieve Stage 1 Competency for Engineering Technologist and Professional Engineer respectively by means other than through completion of the above benchmark qualifications. The Committee was approved by Council in 2001 and its first term of reference was to:

Receive inquiries from candidates who wish to articulate to a different membership category of Engineers Australia and advise each candidate on a suitable pathway or pathways to accomplish such articulation, taking into account the candidate's existing qualifications and experience and current circumstances.

Prior to developing its own articulation strategies the Committee sought to benefit from experience in Australia and overseas. The Convenor of the Articulation Committee found no articulation programs of the kind envisaged by Engineers Australia in Canada, the USA, the UK, South Africa, or Germany. Other members of the Committee eliminated France and New Zealand, leading the Committee to conclude that it was probably breaking new ground. Experience with Deakin University's articulation programs during the previous few years (based on Lloyd, 1979) proved informative, but those programs preceded the competency framework.

In its early deliberations the Articulation Committee examined the Stage 1 Competencies in detail. It concluded that an Engineering Technologist with an appropriate period of responsible experience in the work place could gain many of the competencies of a Professional Engineer, and that an experienced Engineering Associate could likewise gain many of the competencies of an Engineering Technologist and a Professional Engineer. The exceptions to this line of reasoning were the Knowledge Base Competencies, PE1 and ET1. It was considered unlikely that candidates for articulation would be able to achieve such competencies by means other than through formal study.

The newly-formed Articulation Committee therefore agreed that for articulation candidates with acceptable experience the Committee could approve Stage 1 Competency by assisting candidates to demonstrate the Knowledge Base Competencies PE1 and ET1 through directed studies. The avenue for demonstration of PE1 was to be completion of approved graduate programs and for ET1 the Committee was to work with educational establishments to develop appropriate programs equivalent to Bachelors of Engineering Technology.

A pilot program was set up in 2001 to trial the proposed articulation process for achieving Stage 1 Competence for Professional Engineer. Six candidates were selected, and on the basis of acceptable self-assessment of competencies needed for Professional Engineer each was given a study program. Eventually five of the six articulation candidates achieved their goals, and in the process much valuable experience was gained by the Committee.

Articulation Guidelines

The initial articulation guidelines for articulation, formulated in 2001 during the pilot program, have been expanded and refined with the experience gained over the years. They are available on Engineers Australia's web site and now represent a robust and settled set of guidelines that experienced Engineering Associates and Engineering Technologists can approach with confidence. (Engineers Australia, 2008)

The following are extracts from the current guidelines. They apply for articulation candidates who have been carrying out the responsibilities of their current occupational category for at least five years.

Individual Articulation Programs

The Committee will assist an individual candidate to identify or devise a personal program of academic study if no suitable accredited program is available. Such a program will recognise and build on existing qualifications and experience to achieve Stage 1 competency in the target category as quickly and directly as possible. Completion of such an agreed program will confer eligibility to articulate, but may or may not result in a further academic qualification.

For articulation from Engineering Technologist to Professional Engineer

The framework for a personal program of academic study for articulation purposes is a study-based engineering Masters degree program presented by a University offering undergraduate programs accredited by Engineers Australia.

Management or Project Management programs are not recognised as suitable frameworks for articulation purposes since they do not contribute sufficiently to the breadth of foundation knowledge in science, mathematics and engineering required to achieve Stage 1 competency. For similar reasons graduate programs by research only and graduate degrees in Systems Engineering are also not recognised for articulation purposes.

Many engineering masters programs offer a wide choice of study units. Within the masters program framework a specific program is developed and agreed for each candidate. Completion of this agreed personal program satisfies Stage 1 Competency for Professional Engineer.

Applicants who have a clear understanding of their career objectives may submit study units from more than one University to satisfy the requirements. Such "mix and match" programs must be fully justified. The submission must demonstrate that the program is equivalent to study-based masters program. It must also include a self-assessment statement which shows that the candidate

understands the additional competencies required for progression and must describe how the proposed program will enable them to achieve such competencies.

For articulation from Engineering Associate to Engineering Technologist

The framework for a personal program of academic study for articulation purposes is a Bachelor of Technology (BTech) program accredited by Engineers Australia.

Most such programs give credit for Engineering Associate qualifications already held. Candidates wishing to claim Recognition of Prior Learning (RPL) beyond that allowed by a specific institution's regulations are dealt with on a case-by-case basis as described in the following section.

Recognition of prior learning

Applicants for articulation who consider that they already have achieved the intended learning outcomes of an academic unit contained in their individual articulation program may apply to the Committee for RPL. Prior learning may have been acquired formally or informally, through previous study, workplace learning, or work experience. Application may be made for up to 50% of an individual articulation program.

Subjects submitted for RPL must not have been completed for the award of a qualification already held and should not be core technical subjects.

The preferred avenue to obtain RPL for candidates whose target category is Professional Engineer is the Master of Engineering Practice offered by the University of Southern Queensland. This program has been developed specifically for articulation purposes and is accredited by Engineers Australia. Candidates may obtain credit for up to 50% of the program through the submission of Portfolios. The Portfolios are written in a format that may be used later as Career Episode Reports for Stage 2 assessment by Engineers Australia.(Dowling 2006)

Candidates other than those embarking on the Master of Engineering Practice who wish to take advantage of RPL must obtain approval from the Committee at the time that their personal program is negotiated.

Applicants must present tangible evidence that they have satisfactorily attained the learning outcomes specified for the subject or unit for which RPL is sought. The learning outcomes are normally declared in University or TAFE subject/unit outline documents.

Operational Details

Applications for articulation come from many quarters. In practice most come from individual members, but referrals are also received from Engineers Australia's Division Offices, Stage 1 and Stage 2 Competency Assessors, Member Services, and Engineering Education Australia.

Correspondence between an applicant for articulation and the Committee is normally by email through the Articulation Manager who has been appointed for one day per week to manage the day-to-day application of the guidelines. The usual process is for an applicant to provide the Manager with a CV including details of all post-secondary academic studies and all work experience since qualifying in their present category. If considered necessary, referees' advice is sought on the level of responsibilities assumed by the applicant to ensure that the competencies other than the Knowledge Base Competencies PE1 and ET1 have been demonstrated.

Following an exchange of emails, during which various alternatives are discussed, an agreed individual program of study is negotiated including any RPL arrangements. In some circumstances, particularly migrants with 4-year Bachelor Degrees not recognised for Professional Engineer, the program of study will not be a complete post-graduate qualification but an appropriate group of courses in an accredited undergraduate program or a stream in a graduate program. The Manager's decisions are consistent with precedents set and approved by the Articulation Committee over the last seven years.

Once the program of study and RPL arrangements have been approved, the Manager notifies the applicant and enters an outline on the Engineers Australia data-base. Details of the agreement are copied to any Division or Assessor that has been involved in the initial referral.

When a certified copy of the results from the agreed program of study has been received, and any RPL submissions have been approved, the applicant is notified that Stage 1 Competency for the appropriate category has been achieved. A copy of the notification is sent to the applicant's local Division and a notation is entered on Engineers Australia's data-base.

Following receipt of the notification that Stage 1 Competency has been achieved, the candidate applies for and receives transfer of membership.

After successfully transferring membership to the target category, a candidate may wish to apply for Chartered Status in that category and/or registration on the appropriate section of Engineering Registers. This may not be possible until some time after the articulation process during which Stage 2 Competency in the new category would need to be demonstrated.

From time to time the Manager receives requests for assistance from members who have previously been assessed for migration purposes by the Overseas Qualifications Unit. Under such circumstances the case is discussed with the Unit and, based on those discussions and any other information supplied by the articulation candidate, the Manager arrives at a recommendation for the Articulation Committee.

The Committee's remit does not include consideration of applications to join Engineers Australia. However, many potential members in the categories of Engineering Technologist and Engineering Associate wish to understand the possibilities for articulation before joining, and it is part of the manager's role to give advice. Further, many organizations, both government and private, need information on the potential for advancement of their current and prospective employees.

Overseas Members are only given assistance in articulation if their purpose is related to migration to Australia.

Quite a few Articulation Candidates consider they have already achieved the full range of Stage 1 Competencies for their target category by a combination of experience in the workplace and programs of learning. Those candidates may apply for a Stage 1 Assessment independent of the articulation process as detailed on the web (Engineers Australia 2008). The Stage 1 Assessors are members of the Articulation Committee but report independently to the Director, Education and Assessment. If a candidate's application is unsuccessful they may continue with the articulation process.

The National Articulation Committee

The National Articulation Committee currently comprises seven members - the Manager Articulation who chairs Committee meetings, two Professional Engineers, a representative each of Engineering Associates and Engineering Technologists, a current Stage 1 Assessor, and a senior Academic. The Director Education and Assessment is an ex-officio member. Members are drawn from the ACT, NSW, Queensland, Tasmania and South Australia. Although there are no formal college representatives, the Committee comprises members of the Civil, Electrical, Mechanical and Structural Colleges. Three members formed the original Articulation Committee, bringing a strong sense of continuity. There is one female member.

The Committee meets annually to review the previous year's operation, to consider any alterations to the Guidelines, and to give directions to the Manager for the further development of articulation activities. The Manager may refer consideration of individual articulation programs to members of the Committee between meetings, and the full Committee is available for resolution of contentious issues.

Regular observers at meetings of the Committee include the Associate Director Registration, who gives advice on matters related to areas of practice, the Associate Director Accreditation, who keeps the committee informed of any developments in program accreditation that may affect articulation, and the Manager Stage 2 Assessment. Other observers are invited when the need arises, such as in 2008 a representative from the National Engineering Team Task Force attended the annual meeting.

Achievements

By May 2008 the Manager Articulation had created files for just over 300 Members of Engineers Australia who had made inquiries concerning articulation and over 150 files for Non-Members who had expressed an interest in their articulation possibilities were they to join.

Of the Members seeking to articulate, examination of Engineers Australia's data base showed that one had achieved FIEAust, 68 MIEAust, and five GradIEAust. It was estimated that around ten Associate Members had become Technologist Members

From the Non-Members who had made inquiries, 36 had become members of Engineers Australia, 11 achieving MIEAust and one GradIEAust.

Regrettably, 54 members, including two who achieved MIEAust, were no longer members of Engineers Australia. Clearly many of those whose membership had lapsed had been disappointed to discover that their articulation ambitions were unable to be satisfied without undertaking further study.

One of the most pleasing aspects of the articulation program is the enthusiasm with which many of the articulation candidates have approached their studies. A common comment from successful candidates has been that their studies have been most useful to their career and they feel that they are better engineers as a result.

Government and private organizations from all States in Australia regularly approach the Manager Articulation for advice on how their Officers and Technologists may progress to another category. All have been impressed that Engineers Australia has a well defined policy for such pathways.

Perhaps the greatest achievement of the Articulation Committee in its seven years of existence has been to work with the University of Southern Queensland to develop an accredited Master of Engineering Practice designed specifically for articulation from Engineering Technologist to Professional Engineer (Dowling 2006). More than 30 students have enrolled in 2008, and on past experience approximately half will be referrals from the Articulation Committee. Under discussion is a proposal to develop a similar articulation program for progression from Engineering Associate to Engineering Technologist.

Current Activities

The Articulation Committee continues to pursue its objective of providing a pathway from Engineering Associate to Engineering Technologist that does not require completion of a Bachelor of Technology. Ideally the pathway would be equivalent to the Master of Engineering Practice that serves articulation from Engineering Technologist to Professional Engineer so well. The main difficulty lies in the wide variety of backgrounds presented by graduates with Advanced Diplomas, and the situation has been exacerbated by the introduction of skills-based Training Packages.

As an alternative to Advanced Diplomas, various universities are introducing two year Associate Degrees, some of which have been submitted for accreditation. The Committee sees potential in such programs for articulation purposes and is taking a keen interest in their development.

The Year 2008 has been designated by Engineers Australia as the Year of the Engineering Team. One of its eight objectives is to facilitate articulation. The Articulation Committee considers that more of the Task Force's efforts should be directed towards achieving better recognition in the work place for the roles of Engineering Technologists and Engineering Associates, particularly by regulatory authorities. A number of Technologists and Associates seeking to articulate, many of them migrants, would have been happy to continue in their roles if they had received the recognition in Australia that some overseas countries afford. The above view has been conveyed to the Task Force.

The Articulation Committee has been concerned from its inception that some area of practice are not appropriately covered by graduate engineering programs in Australia. As an example, articulation candidates wishing to practise as Professional Engineers specialising in Building Services are generally offered electrical or mechanical programs unless they undertake a Building Services program overseas, such as at the University of Bath in the UK. The Committee encourages universities to develop graduate programs to fill these gaps.

Another area not adequately covered at the level required for Stage 1 Competence as a Professional Engineer is Fire Safety Engineering. The Associate Director Registration has been working with the Committee for some years to develop a proposal to satisfy this need. The current proposal is that articulation candidates with appropriate backgrounds (generally Building Surveyors with graduate qualifications in Fire Safety Engineering) will complete eight courses to fill gaps in their foundation knowledge. Three courses are in mathematics and mathematical modelling, two courses are in engineering design and projects, and the remaining three courses are in foundation engineering principles covering Solid Mechanics, Fluid Mechanics and Thermodynamics. Although designed specifically to provide Stage 1 competency for Fire Safety Engineers, the program may be of use to the Articulation Committee for candidates from other backgrounds, eg Architects.

The Articulation Committee keeps abreast of developments in Australia and overseas that are relevant to articulation. To the best of the Committee's knowledge there is no comparable program in existence elsewhere.

Conclusions

Since its inception in 2001 an Articulation Committee has operated within the Education and Assessment Division of Engineers Australia to facilitate the progression of Engineering Associates to Engineering Technologists and Engineering Technologists to Professional Engineers. The Committee also assists Affiliates to become members in an occupational category.

The articulation guidelines developed over the years have been tried and tested thoroughly and are now applied routinely. Such is the body of experience gained during this period that few individual cases now need referring to the full Committee. With less time taken up with individual cases the business of the Committee has broadened to include wider issues related to articulation, some of which have been outlined above.

The greatest misconception that still exists in individual applicants for articulation is that Stage 2 Competency should be sufficient for articulation purposes. Many candidates believe that performing a similar job to other engineers in an organization should suffice for progression. What needs to be understood is that Stage 2 Competency includes Stage 1 and cannot be demonstrated in isolation.

References

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