

Experience of Mapping Professional Body Practice and Collaborative Projects

The Alignment of the Programmatic Review and Accreditation Process in Engineering Education

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PhD Research

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Engineering Education & Quality

- ▶ The fundamental purpose of engineering education is to build a knowledge base and attributes to enable the graduate to continue learning and to proceed to formative development that will develop the competencies required for independent practice
- ▶ Quality of Engineering Education is measured by *Professional Bodies* using two methods:
 - Outcomes evidence based criteria for evaluating education programmes
 - Competency based standards for professional registration

(Source: IEA Graduate Attributes and Professional Competencies document - available from the IEA website <http://www.ieagreements.org>)

Context

- ▶ Quality Assurance in ***engineering education programmes*** principally involves two major processes:
 - Internal Programmatic Review - strategic review of Department and programmes
 - External Accreditation - rigorous review of programmes

(Faculty of ASET Programmatic Review Guidelines document, 2016 - available on the LIT website <http://www.lit.ie>)

- ▶ Both Methods ***differ in their focus and intent*** and the preparation required by the programme teams and management
- ▶ Two processes emphasise ***different aspects of engineering education***

(Professional Body Accreditation in Higher Education Institutions in Ireland - July 2017 - Available on the QQI website <http://www.qqi.ie>)

PhD Research Question

- ▶ Explore if the internal programmatic review process can be enhanced by using the outcomes evidence based methodology of the external accreditation process
- ▶ If this can be achieved then the programmatic review and accreditation quality assurance process will be brought into closer alignment
- ▶ This could then allow for the establishment of a single collaborative quality assurance process for engineering education or facilitate sequential occurrence of the processes within the same timeframe

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Literature Review

The most significant documentation relating to my research question are as follows:

- ▶ IEA, 2013. *Graduate Attributes and Professional Competencies* (Online). Available at <http://www.ieaagreements.org>
- ▶ IEA, 2015. *Best practice in Accreditation of Engineering Programmes: An Exemplar* (Online). Available at <http://www.ieaagreements.org>
- ▶ Kyne, M., 2016. *Faculty of ASET Programmatic Review guidelines* (Online). Available at <http://www.lit.ie>
- ▶ CIOB, 2012. *Accreditation of Programmes*. [Online] Available at: <http://www.ciob.org>
- ▶ QQI, 2017. *Professional Body Accreditation in Higher Education Institutions in Ireland* (Online). Available at <http://www.qqi.ie>
- ▶ Engineers Ireland, 2010. *Procedure for the Accreditation of Engineering Education Programmes*. [Online] Available at: <http://www.engineersireland.ie>
- ▶ Engineers Ireland, 2014. *Accreditation Criteria for Professional Titles*. [Online] Available at: <http://www.engineersireland.ie>

Literature Review (2)

- ▶ Heitmann, G., 2000. Quality Assurance in German Engineering Education against the Background of European Developments. *The International Journal of Engineering Education Volume 16 Issue 2*, pp. 117-126.
- ▶ Quality & Qualifications Ireland (QQI), 2016. *Statutory Quality Assurance Guidelines developed by QQI for Institutions of Technology*. (Online) Available at <http://www.qqi.ie>
- ▶ QAA, the Quality Assurance Agency in Higher Education, October 1998. *Quality Assurance : a new approach*, London: Higher Quality, the bulletin of the QAA No.4.
- ▶ Society of Chartered Surveyors Ireland , 2012. *Partnership Model of Course Accreditation - Republic of Ireland*, Dublin: Society of Chartered Surveyors Ireland.
- ▶ The Royal Institution of Chartered Surveyors (RICS), 2008. *Policy and Guidelines on University Partnerships*. [Online] Available at: <http://www.rics.org>

Research Design

- ▶ ***Consultation phase with Gatekeepers***

Development of a draft position paper *on quality assurance in engineering education*. Within the IoT Sector, consulted with COHSE, COR, QQI and Registrar EI

- ▶ ***Focus Group & Focus Group Pilot***

From the consultation phase create and pilot questions for the interview phase (Delphi Technique Round 1)

- ▶ **Delphi Technique Round 1 - *Semi-Structured Interviews***

- ▶ **Delphi Technique Round 2 - *Structured Questionnaire***

- ▶ **Delphi Technique Round 3 - *Semi-Structured Interviews***

Research Design Process 1 - Complete

Consultation Phase (with the Gatekeepers)

- ▶ The researcher prepared a *Position Paper* on quality assurance in engineering education in consultation with the THEA Council of Heads of School of Engineering
- ▶ The position paper concluded that there is considerable overlap between the programmatic review and accreditation processes and some *realignment/amalgamation of the processes* would achieve the same outcomes
- ▶ This position paper was presented to the IoTI *Council of Registrars* and the *Registrar of Engineers Ireland* who have agreed in principle with the conclusion and recommended further consultation with QQI

Research Design Process 2 - Complete

- ▶ Researcher met with *QQI and the Registrar of Engineers* Ireland to consider if it is possible/practical to *align the objectives* of the programmatic review and Engineers Ireland accreditation processes
- ▶ The outcome of the meeting was that the *Researcher prepared 24 triangulation documents* comparing the QQI Engineering Award Standards, the QQI Professional Award Type Descriptors and the Engineers Ireland Accreditation Criteria. There is over *90% alignment* between these standards
- ▶ Researcher prepared a *Comparative Analysis* of the programmatic review and accreditation processes. This analysis allows the researcher to develop the *first draft of a set of questions* for the focus group. The comparative analysis was presented to the THEA Council of Heads of School of Engineering

Triangulation of Engineering Standards/Criteria - Sample 1 - Strands

NFQ level 7/EI Prof Title Associate Eng/Competence

Engineering Award Standards	Professional Award Type Descriptors	EI Accreditation Criteria Programme Outcomes
Context	Exercising Autonomy & judgement	Level 7 Programme Outcomes
Role	Exercising Responsibility	(b), (c)(ii), (c) (iii), (d),
Learning to Learn	Working with Others	(d)(i), (d)(ii), (d) (iii), (d)
Insight	Learning and Teaching	(iv), (e), (f), (f) (i),(f)(ii),
	Attitudes	(f)(iii), (f)(iv), (g)

Triangulation of Engineering Standards/Criteria - Sample 2 - Substrands

NFQ level 7/EI Prof Title Associated Engineer

Eng. Award Standard	Eng. Award St. Substrand Design & Development	EI Prog. Area Descriptor Design & Development
Knowledge Breadth	Knowledge of essential elements of design	Knowledge of design methods
Knowledge Kind	Characteristics of design and materials used	Detail designs and the performance of materials
Skill - know how and skill range	Design a system, component or process	Carry out designs of systems or processes
Skill - know how and skill selectivity	Design testing and modifications to designs	Performance testing and design refinement

Triangulation of Engineering Standards/Criteria - Sample 3 - Strands

NFQ level 6/EI Prof Title Eng. Tech./Skills

Engineering Award Standards	Professional Award Type Descriptors	EI Accreditation Criteria Programme Outcomes
Know-How & Skill Range	Use cognitive & practical skills to solve problems	Level 6 Programme Outcomes
Know - how & Skill Selectivity	Draw Insightful conclusions	(b)(ii), (b)(iii), (c)(ii),
	Communicate and Influence	(c)(iii), (d)(i), (d)(ii),
		(d)(iii), (e)(ii), (g)(i),
		(g)(ii), (g)(iii), (g)(iv)

Triangulation of Engineering Standards/Criteria - Sample 4 - Strands

NFQ levels 8-9/EI Prof Title Chartered Eng/Knowledge

Engineering Award Standards	Prof. Award Type Descriptors	EI Accred. Criteria Programme O. L8	EI Accred. Criteria Programme O. L9
Breadth	Scope & Coherence	(a), (a)(i), (a)(ii),	(a), (a)(i), (a)(ii),
Kind	Structure	(a)(iii), (a)(iv), (b)(i),	(a)(iii), (a)(iv), (b)(i),
	Issues	(c)(i), (c)(iv), (d)(i),	(c)(i), (c)(iv), (d)(i), (d)(iii)
		(e)(i), (e)(ii), (e)(iii),	(d)(iv), (e)(i), (e)(ii), (e)(iii), (e)(iv)
		(e)(iv), (e)(v), (f)(i)	(e)(v), (f)(i), (f)(iv)

Triangulation of Engineering Standards/Criteria - Sample 5 - Substrands

NFQ level 6/EI Prof Title Engineering Technician

Eng. Award Standard	Eng. Award St. Substrand Business Context	EI Prog. Area Descriptor Social & Busin. Context
Knowledge Breadth	Basic knowledge of management & business	Aware of social and commercial contexts of engineering
Knowledge Kind	Understands the role of technician engineer	Learn how to work within a team
Skill - know how and skill range	Produces appropriate presentations	Analyse and present information
Skill - know how and skill selectivity	Communicate well defined technical matters	Communicate basic technical information

Triangulation of Engineering Standards/Criteria - Sample 6 - Substrands

NFQ level 8-9/EI Prof Title Chartered Engineer

Eng. Award Standard	Eng. Award St. Substrand Engineering Practice	EI Prog. Area Descriptor Engineering Practice
Knowledge Breadth	Knowledge of current engineering practice	Familiar with engineering operational practice
Knowledge Kind	Engineer's role in society and ethical standards	Awareness of codes of practices and ethics
Skill - know how and skill range	Perform a management role in an engineering context	Day-to-day management of complex engineering projects
Skill - know how and skill selectivity	Apply principles to real engineering problems	Control engineering products or processes

Comparative Analysis -Sample

Process Stage	Process Activity	Programmatic	EI Accreditation
Overview	Cyclical Review Period	5-7 years	5 years
Overview	Guidance Documents	QQI, Institute, Faculty	Engineers Ireland
Overview	Mandatory or Voluntary	Mandatory	Voluntary (Quasi Mandatory)
Overview	Evaluates progress	Previous 5 years and plans for next 5 years	Previous 5 years
Overview	Self - Evaluation	All programmes	Engineering Progs.
Overview	Site Visit	Independent expert panel	Independent expert panel
Overall Responsibility	Responsibility for the Process	Institute Reg. for Academic Council	EI Registrar for EI Accred. Board

Research Design Process 3 - Complete

Focus Group and Focus Group Pilot of LIT staff.

- ▶ The Registrar, relevant Heads of Faculty/Department and lecturing staff were invited to participate in the Focus Group. The focus group have fine tuned the questions for the interview phase.

Delphi Technique Round 1 - Semi-Structured Interviews

- ▶ Semi - Structured Interviews were held with a pre-determined multi-level expert group. Finalising the participant list, conducting the interviews, transcribing the interviews and analysing the interview data followed consecutively. The overarching themes of this stage directly influenced the questions generated for round 2 of the Delphi Technique

Research Round 1 : Overarching Themes 1 (Existing Processes)

- ▶ Purpose of the QA processes
- ▶ Mandatory versus Voluntary Engineers Ireland Accreditation process
- ▶ Prospective versus Retrospective focus
- ▶ Synchronising of the Review Cycles
- ▶ Similarities between the two process and the affect on workload
- ▶ Validation and Accreditation Objectives
- ▶ Programmes not accredited by Engineers Ireland
- ▶ Panel Membership

Research Round 1 :Overarching Themes 2 (Revised Processes)

- ▶ Align or Combine?
- ▶ Independence of the quality assurance Outcomes (Validation and Accreditation)
- ▶ Advantages, Disadvantages and Barriers to Aligning/Combining the two Quality Assurance processes
- ▶ Methods of Aligning/Combining the two processes
- ▶ Revised process site visit Agenda
- ▶ Responsibilities of Stakeholders in the Revised Process
- ▶ Communications Management between all the stakeholders and across organisations

Research Design Process 4 - In Progress

Delphi Technique Round 2 - Structured Questionnaire

- ▶ The questionnaire was sent to all interviewees to garner their individual views and suggestions for improvement of the quality assurance processes. The analysis of the completed questionnaires will directly influence the creation of the interview questions for the third round of the Delphi Technique

Delphi Technique Round 3 - Semi-Structured Interviews

- ▶ Semi Structured Interviews will be conducted to confirm and discuss the outputs of the round 2 questionnaires.

Conclusion

- ▶ *Two major cumbersome quality assurance process* for engineering education programmes are in place currently which differ in focus and intent but have considerable overlaps
- ▶ Significant *consultation* has taken place with the *Gatekeepers*
- ▶ Research designed to gain the *insights from experts* on how *improvements to the management /scheduling of the processes* could be achieved whilst retaining the benefits of the outcomes evidence based approach for programme review
- ▶ Research is in *the Data Collection and Analysis stage* using an Adapted Delphi Technique methodology to collect data and the Constructivist Grounded Theory to support the analysis of the data

Thank you

Any Questions?