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Developing a robust Self Evaluation Framework for Active Learning: The First Stage of an ERASMUS+ Project (QAEMarketPlace4HEI)

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INTRODUCTION

In modern Higher Education, quality assurance is an important consideration. Across the world there are a range of institutional, national and global processes that institutions work with in order to ensure the quality of learning and teaching at the university level. In many cases, the focus is on assurance and compliance rather than the more forward looking element of quality enhancement.

This paper explores the initial phase of an EU funded ERASMUS+ project to explore the enhancement element of the quality process. The initial focus of the work is on the partners' mutual interest in active learning, in particular the application of the CDIO (Conceive Design Implement Operate) framework in the field of engineering education. The eight European universities are Reykjavik University, Iceland; Turku University of Applied Sciences, Finland; Aarhus University, Denmark; Helsinki Metropolia University of Applied Sciences, Finland; Umeå University, Sweden; Telecom Bretagne, France; Aston University, United Kingdom; Queens University Belfast, United Kingdom.

1 BACKGROUND

1.1 Quality Assurance

Quality assurance in Higher Education is fundamental in ensuring quality and consistency in university learning and teaching across the world. The subject is written about extensively and the scope of the literature is such that all aspects are addressed to some degree. Examples relevant to this work are the quality assurance of Higher Education in Europe [1] and that more specifically for engineering education [2]. The subject is considered sufficiently important that SEFI supports an active Working Group in the area [3].

Quality assurance is most often focused on compliance with a particular set of standards. Examples would be the UK Quality Code [4], EUR-ACE [5] and ABET [6]. In each case there are similarities, but also differences often driven by national or regional priorities. In many quality assurance standards, enhancement is referred to and evaluated yet the proactive development of enhancement opportunities very much rests with the institution itself.

Enhancement is the engine for innovation and, as such, requires particular attention. Reports such as those produced in the UK and the US in recent years that advocate developments in engineering education [7, 8] are key drivers. The learning and teaching community has responded with, for example, advances in e-learning [9], active learning [10] and particular to engineering, the introduction of the CDIO methodology [11].

1.2 CDIO

The CDIO approach originated in the late 1990's [12] and has been driven by the need to provide a more practically based university education for engineers that better represents the world of work. Importantly, the graduates produced more effectively meet the requirements of industry at the conclusion of their course of study.

The CDIO community is growing year on year and the successful Annual International Conference presents a helpful repository of ideas, experiences and

measures of impact that can be used by others in developing their own learning opportunities. A key feature of the CDIO framework is the 12 Standards that are used as the basis of the evaluation process for CDIO programmes [13].

1.3 Project Idea

In exploring a more proactive approach to quality enhancement, the development of the project idea has stemmed from the partner institutions experiences implementing and sustaining the CDIO approach to learning and teaching. The process employed within the CDIO community, whereby self evaluation against the CDIO standards is part of the quality assurance process, has resulted in the development of the QAEMP (Quality Assurance and Enhancement Marketplace) Project.

The background to the project is given in a paper presented at the 2015 Annual International CDIO Conference [14]. The project builds on work previously conducted across several Nordic universities [15].

2 PROJECT APPROACH

The starting point for the project is the generation of baseline data that can be used as the catalyst for enhancement opportunities. This data is best captured through a self evaluation process conducted with respect to the chosen educational element being considered i.e. a module, year of study or complete programme.

The development of a new self evaluation framework that feeds into a ‘Marketplace’ has been undertaken. The Marketplace is where participating institutions can be paired up and then engage in peer evaluation and sharing opportunities concerning each institutions approach to and implementation of active learning.

All of the partner institutions are engaged in the application of CDIO within their engineering programmes and this has provided a common starting point for the partnership to form and the project to be developed. Although the initial focus will be CDIO, the longer term aim is that the approach could be of value beyond CDIO and within other disciplines. The focus of this paper is the process by which the self evaluation framework is being developed and the form of the draft framework.

In today’s Higher Education environment, the need to comply with Quality Assurance standards is an ever present feature of programme development and review. When engaging in a project that spans several countries, the wealth of applicable standards and guidelines is significant. In working towards the development of a robust Self Evaluation Framework for this project, the project team decided to take a wide view of the available resources to ensure a full consideration of different requirements and practices.

The approach to developing the framework considered:
a) institutional standards and processes from the partner institutions
b) national standards and processes e.g. QAA in the UK
c) documents relating to regional / global accreditation schemes e.g. ABET
d) requirements / guidelines relating to particular learning and teaching frameworks e.g. CDIO.

The resulting self evaluation framework is going to be implemented within the project partner institutions to start with in order to support the initial ‘Marketplace’ pairing process. Following this initial work, changes to the self evaluation framework will be

considered before a final version is made available as part of the project outputs. Particular consideration has been paid to the extent of the framework, as a key objective of the project is to ensure that the approach to quality assurance and enhancement has impact but is not overly demanding in terms of time or paperwork. In other words the process needs to be focused on action and the value added to staff, students and the programmes being considered.

3 SELF EVALUATION

In exploring the subject of self evaluation as part of a quality assurance process, documentation from all of the project partner countries was considered (and more). The aim was to do two things:

a) identify the criteria self evaluation approaches consider
b) identify the measurement approaches adopted in self evaluation.

With this work having initiated within the CDIO community, the obvious starting point was to consider the CDIO Standards and from there focus on engineering education more widely and the design, teaching and evaluation of engineering education. The more strategic elements of programmes and quality assurance systems were not considered in this initial phase of the project.

The criteria identified from the initial document study were:

1) A holistic view of learning is taken
2) Appropriate learning outcomes are identified (developed from required competences)
3) An integrated curriculum has been developed
4) A sound subject foundation is created
5) Active learning approaches are used
6) Appropriate workspaces (and equipment) are available
7) Personal and interpersonal skills development is embedded
8) Faculty development takes place (knowledge and teaching)
9) Appropriate assessment is employed (type, level and amount)
10) Programme evaluation to promote continuous improvement is undertaken.

These initial 10 criteria all originated, if slightly modified, from the CDIO Standards. Looking beyond CDIO, additional areas for self evaluation were identified (in no particular order). These were:

11) The profession is introduced to students
12) Links to employability are made throughout
13) Projects are executed in teams (collaboration)
14) Support for learning is provided
15) Technology is used to promote a blended approach to learning
16) Feedback is timely, appropriate and formative
17) Research is used in teaching
18) Student participation in programme review and development
19) Wider stakeholder input to programme development e.g. Industry Advisory Board and Benchmark Statements
20) Student retention and progression is monitored
21) Work placements are promoted
22) Problem solving opportunities (links to the research process)

23) Design projects are integrated throughout the programme
24) Equality, diversity and equal opportunity considerations
25) Consideration for international students
26) Professional attributes and topical considerations e.g. sustainability, ethical behaviour, global awareness etc
27) Evidence of educational scholarship by faculty
28) Effectiveness of communication with students.

This initial list of 28 criteria was grouped under 10 theme headings to help provide a clear focus for the next stage of the Self Evaluation Framework development (Table 1)

Table 1. Initial criteria classification

Theme	**Criteria (numbers refer to the earlier annotation)**
Philosophy	1
Programme Foundation	2,3,4,11,23
Learning and Teaching	5,6,15
Skills Development	7,13,22,26
Assessment and Feedback	9,16
Faculty Development	8,27
Student Focus	14,20,24,25,28
Employment	12,21
Research	17
Evaluation	10,18,19

From this initial list the self evaluation criteria were analysed and discussed within the project team and refined based on the team consensus. This resulted in a self evaluation framework based around 28 criteria (some different from those identified above following the analysis and discussion) which were grouped under the10 themes as identified in Table 2.

Table 2. Final criteria classification

Theme	**Number of Criteria**
Programme Philosophy	1
Programme Foundation	4
Learning and Teaching	5
Assessment and Feedback	2
Skills Development	4
Employment	2
Research	1
Student Focus	4
Faculty Development	2
Evaluation	3

The changes made and the rationale behind them are as follows.
11 and 25 were removed as it was felt that in each case the criterion concerned was covered by another criterion (in the case of 11 – 12, 21 and 26 had the criterion covered; in the case of 25 – 24 covered this area).
Two additional criteria were added, one to cover account being taken of different student learning styles and a second to cover the availability of teaching resources.

With a finalised set of 28 criteria a Self Evaluation Handbook was produced and is available through the project website [16].

4 CURRENT STATUS

Having settled on a set of criteria, before the Self Evaluation can be deployed, a measurement rubric needed to be developed for each criterion. The chosen approach was to use the maturity model rubric similar to the CDIO evaluation.

The measurement approach is based on a general maturity model approach comprising six levels. For each criterion, the general expressions detailed in Table 3 have been adapted to suit the criterion concerned.

Table 3. Generic measurement rubric

Level	**Description**
5	Continuous improvement and development is evident
4	Evidence of implementation and measurement of effectiveness are available
3	Implementation is underway
2	A plan to implement change has been produced
1	There is an awareness of the need to implement change
0	No intention to change

An example is given in Table 4 where the measurement rubric for the criterion 'Wider stakeholder input to programme development' is detailed.

Table 4. Example measurement rubric

Level	Description
5	The programme team continuously improves and develops the process for involving a wide range of stakeholders in programme review and development
4	The programme team has evidence of the implementation and impact of the process of involving a wide range of stakeholders in programme review and development
3	The programme team is implementing a process that ensures a wide stakeholder involvement in programme review and development
2	The programme team has a plan to involve a wide range of stakeholders in the process of programme review and development
1	The programme team is aware of the need for a wide stakeholder involvement in programme review and development
0	There is no stakeholder involvement in programme review and development

The way in which the levels are considered by the evaluator is as follows. For example, if the evaluator perceives the programme can fully comply with the Level 2 description and has aspects of Level 3 in progress, the stated level in the self evaluation should be Level 2, the level at which full compliance can be demonstrated.

The measurement rubrics have been brought together in the Self Evaluation Handbook referred to earlier. The Handbook will be developed further to include examples of evidence / indicators for the different levels for each of the criteria. In this way the Handbook will become more complete and the self evaluation process will gain a greater degree of consistency as it is used.

5 CONCLUSIONS AND NEXT STEPS

The Self Evaluation Framework will be used during the course of the next 6 months in each of the project partner institutions to evaluate a chosen programme. The completed evaluations will then be submitted to the QAEMP Marketplace and the institutions will be paired to allow for meaningful enhancement exchange opportunities to be identified.

Each of the partners will also be asked to feedback their thoughts on the experience of completing the Self Evaluation process. This evaluation of the Self Evaluation will allow the project team to further develop the Self Evaluation Framework before wider dissemination and use takes place. The partners will be asked to feed back on the following:

Evaluation for each criterion
Is the rationale understandable?
Is the rubric understandable, and in accordance with the general maturity model?
What indicators did you use to argue for the level your programme/institution is on?

Evaluation of the framework

Are all criteria relevant?
Are some of the criteria overlapping?
Are there missing criteria?
Is the ordering of the criteria appropriate or would a different grouping be more logical for you?

The form and operation of the Marketplace, along with the development of the Self Evaluation Framework, will be the subject of future papers. Although initially focused on the use of active learning in engineering education, the ultimate goal is to produce a process that can be used across disciplines. The team believe that there may well be value in encouraging pairings across disciplines as it presents an opportunity for even more sharing and innovation in learning and teaching, innovation that would not typically take place without a driver like the QAEMP project.

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