

Developing engineering education programs with cross-sparring The increase of attractiveness

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INTRODUCTION

This paper describes how the quality of engineering education can be improved in practice by using the process starting from self-evaluation followed by cross-sparring with critical but supportive colleagues. However, the real objective is to raise the attractiveness of the education arising from the development activities invented and inspired during the process. The method is created in an ERASMUS+ project involving eight universities around Europe.

In Higher Education today, institutions are constantly trying to balance the time spent and resources allocated to the areas of Quality Assurance (QA) and Quality Enhancement (QE). Often the quality assurance element dominates, as this is what is most closely linked to the measures identified by institutions to ensure a high level and consistency in tertiary learning provision. Quality enhancement is often identified in

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bespoke projects or left to the enthusiasm and energy of programme managers and individual teachers.

The purpose of the project is not to give any label or accreditation to the programmes, but to support the programmes in their own continuous development towards more attractive solutions and applications.

1 METHODOLOGICAL BACKGROUND - COLLABORATIVE METHODOLOGY

The objective of the collaborative methodology developed and practiced in this project is to enhance the quality of a higher educational institute's operations. The quality evaluation process is based on the networking collaboration between institutes. The experience and expertise they have developed are used to identify the best practices in education. The main objective of this project is to develop, refine and maintain a new, innovative methodology for the continuous quality assurance processes of the participating institutions.

This innovative Quality Assurance process includes the following objectives:

- One or many sessions for self-evaluation, based on the CDIO framework with 28 rubrics addressed.
- A session of cross-evaluation between a pair of institutes, with the evaluation process conducted between similar or different Degree Programmes.
- Only a few of the 28 rubrics will be selected to be discussed in the cross-sparring session.
- Potential development objects will be identified in the evaluation process.
- Teams of experts will be formed to help identify the targets in detail.
- Expert teams and workshops contribute to the implementation of the development action.
- The collaboration will strengthen the networking impact and provoke effective dissemination of the best practices.

2 IMPLEMENTATION

2.1 Self-evaluation

In the very beginning of the project all the most appreciated engineering education accreditation and evaluation formats were studied, for example CDIO [1] and EUR-ACE [2]. Based on the different questionnaires of self-evaluations, a new set of questions focusing on enablers of excellent education was established. Questions concerning finance and management were omitted. The result was a questionnaire of 28 questions. The definitions of the rubric and a scale of evaluation were defined [3].

Each of the participating universities chose one programme as a pilot in which to execute the self-evaluation.

Essential for the success of the outcomes was that the self-evaluation was done honestly without trying to look better than the reality. As the faculty members know their own activities and background of the practises used, there might be a blind spot especially when the documentation and other evidence of the matters are missing. On the other hand during the self-evaluation such lack of evidence becomes clear and correcting efforts can be made. Furthermore, as that process does not aim at accreditation those involved with the programmes can decide what evidence and documentation is really needed and serves the purpose of development.

2.2 Paring in the market-place

The self-evaluation reports were collected together in an “online market-place” that was created. The purpose of the market place is for each of the piloting programmes to find the best match of a pair to enable the most beneficial benchmarking and learning from each other.

The pairs might be chosen on the basis of maximum difference between the strengths and weaknesses or according to the subject area. Furthermore, some other criteria might be used if the programmes so wish. On the other hand, the instructions and templates could be further improved in terms of simplicity and usability.

In some cases the participating programmes represented different fields of engineering, and thus could not compare the content of the education. That was experienced as an important element in order to keep the desired focus precisely on the quality system during the visits [3].) In some pairs the programmes were from the same field and in those cases different advantages were recorded additionally, many improvement ideas to the content were found [4]. Whether or not this drove the focus from the quality assurance to the content can be debated.

2.3 Cross-sparring

After defining the pairs, the piloting programmes carefully analyse what are the priorities of the cross-sparring, then during a two day site visit, around 4 to 8 questions can be studied in depth additionally to reach the common understanding of the programmes in question.

As in this ERASMUS+ project there were 8 participating programmes, 4 pairs were formed. Each of the participants made a site visit to the pairing partner, totalling 8 visits. According to the experiences of the visits all the participants found the cross-sparring successful and worth doing. Many examples of good practices were discussed and gave inspiration to both programmes in each pair [3, 4].

2.4 Enhancement

In general, the use of an extended self-evaluation improved the understanding of the strengths and weaknesses of the study programmes involved. All of the institutions found that the time spent on the self-evaluation resulted in a good payoff. Most of them have already decided that they will do the self-evaluation again, although the project as such no longer includes that action. It is worth analysing how these development focus areas have developed - and what level they have reached.

3 PILOTING THE PROCESS

From each of the participating universities one programme was chosen to be a pilot for testing the process, making altogether 4 pairs for cross-sparring. The pairs were set according to the self-evaluation results, trying to find the best combination of strengths and weaknesses from the programmes' self-evaluation results. Metropolia University of Applied Sciences (Metropolia) selected one major study theme from the programme of Information and Communication Technology (ICT) as the pilot to go through the whole process and gather information and feedback.

This Metropolia ICT Programme is a large programme with an intake of around 300 students per year, with eight different majors also known as specialization options. The major is chosen by students after the first year (60 ECTS) of common ICT studies. There were radical curriculum changes in the Metropolia ICT Programme in autumn 2014. At that time the above mentioned model with eight majors was introduced. At the same time the Health Informatics Programme started in 2008 was integrated as one of the majors in the ICT Programme. The curriculum content of Health Informatics was updated and the name was changed to Health Technology. As the major in Health Technology was seen to be in a rapid development phase, it was chosen for this cross-sparring project.

The cross-sparring process started with self-evaluation in May 2015. Five faculty members first studied the evaluation questions alone and then gathered together to come up with a joint understanding about the status of each question. The consensus discussion took about 6 hours including the decisions made on the most important development issues. At that time the curriculum of Health Technology was already planned, but the first implementation was only to be started in August 2015. Therefore, completing the self-evaluation was quite challenging and it was done based on the plan of the new curriculum and experiences from the former curriculum. It would have been easier and maybe more beneficial to do the self-evaluation after having had results from the actual implementation. But on the other hand, it was quite a fruitful discussion with the faculty members involved to compress the ideas deriving from experiences and planning into distinct ideas, before the actual implementation of the new curriculum. The self-evaluation framework used was extensive and beneficial, maximum benefits would be gained if this kind of self-evaluation was done annually.

After the self-evaluation, Aarhus University School of Engineering's Healthcare Technology Engineering Programme was selected as the cross-sparring partner for Metropolia. These two programmes had many similarities. The Healthcare Technology Engineering Programme was created at the same time as the original Health Informatics Programme in 2008, the contents and background were quite similar and the annual intakes of students were at the same level. There were many discussions during the project concerning whether the programmes selected for cross-sparring should be from the same area and quite similar, or should they be very different. There are pros and cons for both view points, but at least in this case Metropolia Health Technology Major Program benefitted from the solution chosen.

The actual cross-sparring was implemented in two 2-day sessions. The first took place in Helsinki in November 2015 and the second in December 2015 in Aarhus. Before the sessions the visiting university selected six criteria from the self-evaluation framework for cross-sparring. These items formed the basis not only for the 2-day sessions, but also for other discussions and visits, for example to the labs which were found to be

very interesting and fruitful. Additional added value came from interviewing students and observing them on their project works.

The most important result of this cross-sparring was, in fact, that it strengthened the ideas and solutions implemented at Metropolia, e.g. project based learning, feedback system, retention monitoring, technology in learning and working life cooperation. One practical example that can be applied in practice was related to alumni operations. Metropolia Health Technology gathers plenty of data from the students, but less from the alumni. Aarhus systematically gathers data from alumni, having a system where they regularly send a questionnaire to all former students one and again five years after graduation. The questionnaire measures the job status, applicability of the skills acquired at the university to the job, and satisfaction with the programme. Such a model was also well suited to Metropolia Health Technology alumni operations. Practical results were, for example, improving alumni operations by immediately creating a LinkedIn community for graduated students. The community has been actively used since its implementation for communication, feedback and information sharing purposes.

It can be concluded that participation to the self-evaluation and cross-sparring was very valuable for Metropolia. Hopefully this kind of international cross-sparring continues in the future.

4 CONCLUSIONS

The idea of cross-sparring is seen as a productive way to initiate study-programme development. Also the pairing of the partners has a great significance. In the cases presented here there were positive combinations of strengths and development areas present. In the optimal case, the cross-sparring should not be just a “one hit” but lead to an ongoing cooperation. Discussion on how the pairs should be matched continues - in the future it might be beneficial to give the participating institutes an opportunity to describe their preferences based not only on the evaluation criteria, but also on the match of discipline. More experience is needed to create a working market place to fulfil the needs of different programmes.

This type of activity can be recommended to any programmes interested in developing their operations and making their education more attractive. However, it is important to invest enough effort in the process from the very beginning. Furthermore, sharing of information and involving students in the process would further increase the attractiveness.

5 DISCUSSION

The purpose of quality improvement is to use the resources in the most effective way to advance the attractiveness of engineering education. Attractiveness means for example creating an enjoyable time of study, good learning outcomes to enhance the employability for the students, identifying the best place to work with the right type of facilities for the staff and possibilities for continuous development. How well does the process created in the ERASMUS+ project serve this purpose? According to the experience gained here the answer is: “This process is truly worth the effort and thus it would be a great shame if no further possibilities to share it and continuously develop it were forthcoming”.

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