

## Engaging Faculty in Continuous Improvement: The Context of an ABET Accreditation Process

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# **Engaging Faculty in Continuous Improvement: the Context of an ABET Accreditation Process**

## **Abstract**

Lessons learned. In this paper we present the lessons learned while implementing three strategies to promote faculty engagement in continuous improvement. These strategies were devised within the continuous improvement process that was established in the School of Engineering at Universidad Icesi. In this paper we will refer to full-time faculty members from two academic departments which serve three undergraduate programs, all of which were accredited by ABET (Accreditation Board for Engineering and Technology) in 2017. At the beginning of the 2018 academic year, faculty members were asked about their perceptions of the devised strategies; their perceptions are presented as a new ABET assessment cycle is beginning.

The contribution of this paper is twofold. First, it discusses the strategies designed by the School of Engineering at Universidad Icesi to effectively engage faculty members in the implementation of a sustainable and continuous improvement process. Second, it presents early results obtained from the implementation of these strategies, including the perceptions of faculty members about these changes.

## **Background and supporting literature**

This paper presents a work in progress related to the consolidation of a continuous improvement process at the School of Engineering at Universidad Icesi. As presented in [1], the continuous improvement process of an academic program can be explained as a PDCA (Plan–Do–Check–Act) cycle. Similarly, the process of improving faculty teaching competences can be explained by following a PDCA cycle. The outcome-based program accreditation ABET led to the consolidation of this improvement process in the School of Engineering and at the departmental level. Two academic departments participated in this consolidation effort, the Information and Telecommunication Technologies Department (ICT) and the Industrial Engineering Department (IND), which consists of 13 and 12 full-time faculty members, respectively.

The faculty member reflection is as important as the students' reflection that extends over time after the courses have ended [2]. This reflection process is critical to course assessment and improvement in the quality of engineering education. Collaborative reflection has also been found to be useful for improving teaching practices [3], and as such this paper presents an initial step towards that direction. Currently, most reflection efforts at the School of Engineering are done by individual faculty members in isolation, yet moving towards collaborative reflection is a direction we intend to move toward.

The Accreditation Board for Engineering and Technology (ABET) states in criterion 5 for accrediting engineering programs that faculty must ensure that the program devotes adequate attention and time to each curriculum component, which is consistent with the outcomes and objectives of the program and the institution [4]. Evidence of student work must be presented during the visit, and a binder for each course containing all evidence collected could be arranged

in a display room for the program evaluators to review during their visit. The faculty portfolio described later in this work serves as part of that evidence.

### Continuous improvement process development and implementation

At the departmental level, a continuous improvement process based on the strategies listed below has been proposed in order to engage faculty in continuous improvement. The proposal is based on the premise that after reflecting, a faculty member will improve her or his course and teaching practices. These strategies constitute part of the faculty continuous improvement process shown in Figure 1.

Strategy #1 – Faculty Portfolio

Strategy #2 – Peer discussion and learning

Strategy #3 – Improvement plan consolidation

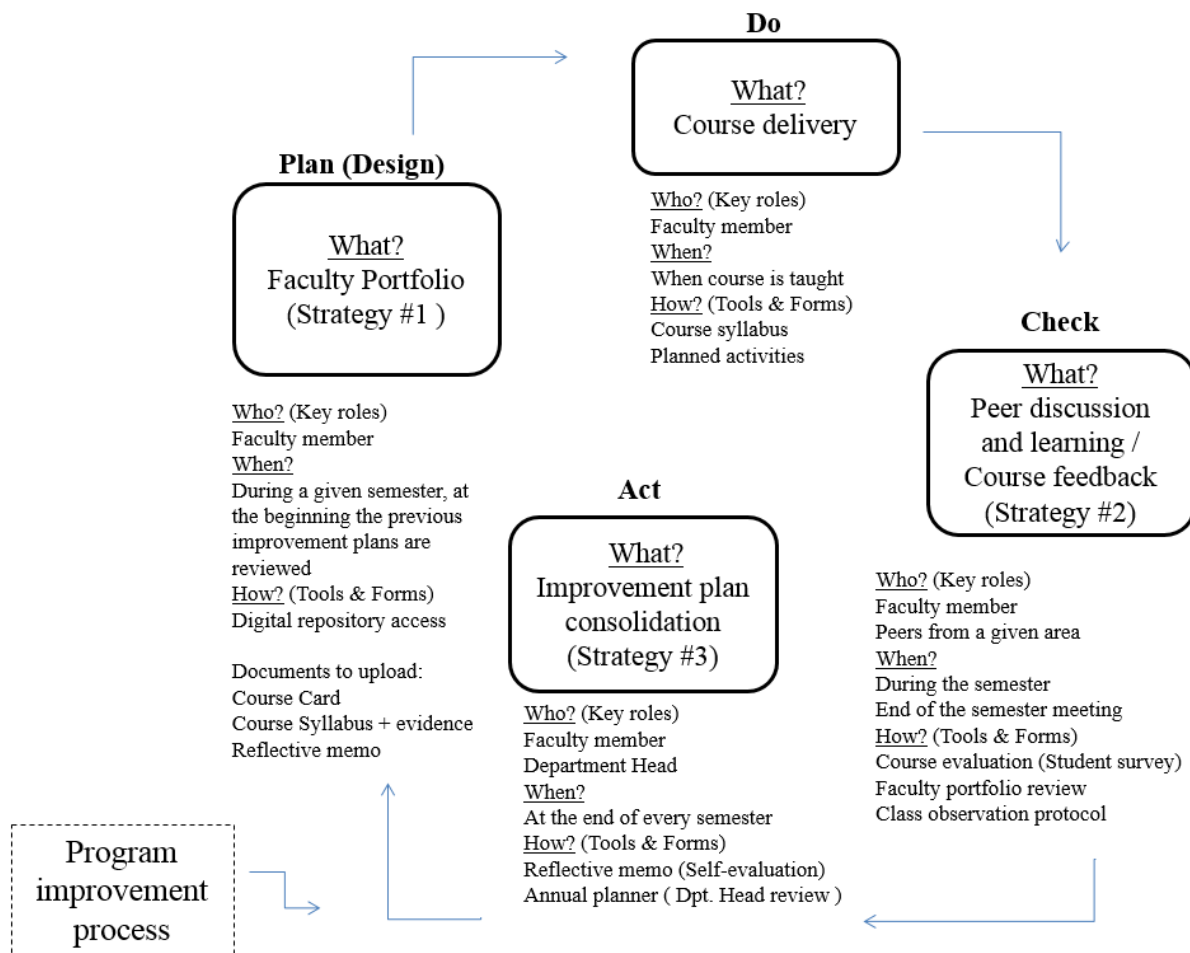


Figure 1. Faculty continuous improvement process

These strategies were formulated during the 2015-2017 ABET accreditation process. To date, the three strategies have not been fully implemented, however a path for improvement has been

devised. The strategies are discussed in chronological order of implementation, which is to say that the first strategy was the initial one implemented while the third is still a work in progress.

### *Strategy #1 (Portfolio) - Development and implementation*

The first strategy was to move away from course evaluations to what we call "faculty portfolios". A faculty portfolio is a set of artefacts that support the teaching process utilized by a faculty member, including course syllabi, evaluations, and a self-evaluation known as the reflective memo, among other documents. While course evaluations have traditionally played a role in establishing faculty classroom performance, in this paper we explain how in this new context faculty members have the opportunity not only to consider course evaluations with their portfolio evaluation, but also to reflect on and construct improvement plans based on their own portfolio evaluation results. The portfolio is developed by each faculty member during the semester and is housed in a digital repository managed by a centralized office (the Quality Assurance Office at the School of Engineering). The portfolio was found to have positive impact on faculty engagement since each faculty member has the opportunity to explain how her or his class was planned and delivered. This is a win-win situation since through this process each faculty member collects and analyses the evidence required (curriculum evidence by program, criterion 5) for any international accreditation project such as ABET.

To better understand this strategy, the evolution of the portfolio will be explained below.

#### *Initial stage – before 2015*

An instrument (a form to be filled out) called the *faculty self-evaluation* was used to record faculty members' evaluations of the achievement of the objectives proposed in the course syllabus, as well as the effectiveness of the strategies and materials used in achieving them. In addition, the results of course evaluations completed by the students were given to the professor after the completion of the course, sometimes the following semester. The course evaluation is an anonymous, mandatory survey answered by students regarding various aspects of the course, such as instructor performance; the quality of the evaluations, including their alignment with the objectives of the course; and the effectiveness of teaching and learning strategies proposed by the instructor. With this information, the faculty member proposed improvement actions related to her or his course where necessary and may eventually make suggestions regarding the chain of pre-requisites. The instrument worked quite well at the course level, however, it did not have a wider impact or significance at the curricular level due to the fact that the results were not shared with other faculty members of the same curricular block or area. Neither were improvement actions shared, thus in this aspect, faculty efforts were autonomous and isolated.

Beginning in 2011, we implemented curricular reform based on the CDIO Syllabus 2.0 [5] [6], which takes the evolution and consolidation of knowledge and skills along the curriculum building blocks into account. At that point, we used the CDIO Syllabus 2.0 (linked to Standard 3) as a resource for curriculum benchmarking. We did not use the complete CDIO framework, which includes twelve Standards focused on program improvement. As a result, the curricular content of the courses of a given block or area began to exhibit increased cohesion, and each area did make a clear compromise in the development of competences. In order to demonstrate this, it

became necessary to implement measurement instruments and develop evaluation rubrics. Through these measures, it was then possible to establish the achievement of the learning objectives quantitatively. The instrument subsequently evolved into a reflective memorandum in which the faculty member made an objective reflection of the achievement of the learning objectives and of the teaching strategies employed, which could then be used to justify the levels of performance achieved by the students. The reflective memorandum was not mandatory, and faculty response were low.

#### *ABET accreditation 2015-2017*

When the School of Engineering began the ABET accreditation process for three of its programs in 2015, the reflective memorandum evolved into a faculty portfolio, an instrument that could now be used not only for course improvement and curricular alignment, but also as objective and verifiable evidence of the professor's work. It can additionally be used by each faculty member as a reflection about her or his teaching competences. The various programs followed a similar process in terms of documentation, and the academic department most closely related to the program implemented the strategies explained within this paper. This was done in order to take the documentation (in this case course evidence) a step further, using it as the basis for faculty reflection (both individual and collective).

The faculty portfolio includes:

- a) Course card: Course cards are meso-curricular documents that allows the program to connect the macro-curriculum (curricular matrix) with the micro-curriculum (course syllabi). The course card is the mechanism we have developed in order to maintain consistency between course goals (alignment between course and student outcomes) and terminal learning objectives, as well as teaching and learning strategies that will be used to create course syllabi [7].
- b) The syllabus of the proposed course is adjusted after a collaborative review carried out by the faculty members within the curricular area. The course planner makes up part of the syllabus and includes, for each session: the objectives for the session, the activities to be carried out before and during the class, the material that will be used, and the activities that must be carried out by the student after the session.
- c) Evaluation activities as they are executed. Faculty members must include in their portfolio copies of the evaluations applied during the course along with the corresponding rubrics, and three exemplars of graded evaluations, one each that corresponds to the best, the average and the lowest levels of performance.

The reflective memorandum, which must be developed throughout the semester. All the information is stored in a digital repository managed by the Continuous Improvement and Accreditation Office (MECA for its acronym in Spanish: *Oficina de Mejoramiento Continuo y Acreditación*).

The digital repository includes reflective memoranda information since the year 2014. Beginning in 2016, in preparation for the ABET visit in the fall of that same year, it became

mandatory that all faculty members upload their portfolios to the repository, and has remained mandatory to the present.

*Strategy #2 (Peer discussion and learning) – Development and implementation*

The second strategy was to promote peer discussion among faculty members from similar domains or areas. The portfolios are presented and discussed among peers during an end of the semester meeting. This discussion enriches the portfolio since ideas for course improvement can be shared and common plans can be devised. The peer discussions could potentially lead to faculty learning communities that motivate faculty members to share their experiences and to promote cooperative learning among them.

The reflective memoranda within the portfolios were subsequently used as curricular management tools because now each faculty member was giving a report and justification of the results obtained before her or his colleagues in a meeting that involved all faculty members for the courses of a given block or area. In this way, we were able to analyze the results in context and propose improvement options for one, several or all of the courses of a given block or area.

After reviewing the faculty portfolios, a team of professors identifies and presents good practices that allow for the achievement of results equal to or superior to those proposed individually.

During the first and second semesters of 2017 (the beginning of the first accreditation cycle after the ABET visit), faculty members met on a regular basis as the Assessment and Evaluation Committee to review and discuss improvement plans. Peer discussion and learning was encouraged.

*Strategy #3 (Improvement plan consolidation) – Development and implementation*

The third strategy was to consider the results of the various aspects of the portfolio evaluation (self-evaluation, peer discussion and evaluation) as part of the evaluation of the teaching dimension, which is one component of the faculty member's annual review at the department level. Other dimensions also considered in the annual review include research and service.

Various inputs provide a better picture of faculty performance within the classroom, which subsequently provides information that could be used for faculty evaluation. The inputs are:

- a) Course evaluations
- b) Faculty Portfolio review (including self-evaluation, peer evaluation and class observation)
- c) Department Head review (annual planner)

Currently, rubrics to review faculty portfolios are being developed and tested.

Each Department Head reviews faculty members on annual basis (annual planner) and, together with the faculty member, establishes an improvement plan and actions for each year. As of 2018, the inclusion of improvement actions and plans not only at the course level but also at the faculty

member level are considered. These improvement plans will include specific goals associated with the improvement of specific competences (teaching and professional).

As part of the reflective memorandum (self-evaluation), each faculty member is invited to identify weaknesses and opportunities for improvement, which are included in a self-managed improvement plan. The Department Head uses this input to identify and consolidate training opportunities, workshops, communication or seminars; to establish spaces for cooperation and the presentation of improvement plans; and to assess the faculty member's level of commitment to and compliance with her or his proposed improvement plan.

Current planning at the departmental level is considering the use of the CDIO twelve standards framework [8]. This framework takes the enhancement of both faculty teaching and professional competences into account (standards 9 and 10). The use of this framework and the related rubrics provides an initial picture of the current state of faculty improvement programs, as well as a path to move forward. Faculty members (IND) were asked to apply the CDIO self-assessment rubric (on a 0 to 5 scale); for both standards 9 and 10, 45% of respondents perceived that level 3 best described the current state of faculty development programs.

### **Lessons learned**

Among the three strategies, it is clear that strategy #1 is fully implemented and that strategies #2 and #3 are partially developed. The consolidation of the continuous improvement process at the school level will continue during the current ABET assessment cycle (2017-2022).

#### **Strategy #1**

During the 2015-2017 accreditation cycle for the three engineering programs that were presented for accreditation by the EAC (Engineering Accreditation Commission), the portfolios were presented as supporting evidence for criterion 5 and contributed to successfully fulfilling this criterion.

Over the course of three years, it has been demonstrated that what started as mandatory (the portfolio) can be used as a continuous improvement tool to engage and empower faculty members on the design, development and follow up of her or his own improvement plans, which can be based on their reflections.

Support from the Continuous Improvement and Accreditation Office is crucial for the implementation of this strategy. This office is in charge of keeping the digital repository up to date and of assisting faculty members in the periodic update of portfolios.

#### **Strategy #2**

The faculty portfolio review is a tedious task. Promoting discussion among faculty members can lead to better utilization of the information gathered in the portfolios. Peer discussion and learning motivate faculty members to improve their own teaching, and also help identify common improvement actions and goals. Faculty members from each department meet periodically (the Assessment and Evaluation Committee) to discuss and review improvement plans.

In addition to the course evaluation that is usually delivered at the end of the semester, a diagnostic tool is currently being implemented. This diagnostic tool (a short survey completed by the students) can be applied before the midpoint of the semester and could provide important feedback so that the faculty member can adjust delivery of instruction instead of having to wait until the end of the semester to find out that something might not be working in her or his class. Results of the survey are discussed with the faculty member the week following its application in order to establish an improvement plan which can be implemented immediately. This diagnostic tool is not mandatory; faculty members can request it if they perceive the need. To date, more than 10 faculty members have used the diagnostic tool.

The idea of classroom observation was not well received among faculty members so classroom observations were not performed. A different approach is currently being tested, this approach would consist of a classroom visit by a peer, and the peer being a faculty member who has already reviewed the material (faculty portfolio) associated with the course being visited. The peer would then provide feedback to the faculty member based on the visit. There are plans to implement this system for the first semester of 2018.

### Strategy #3

Moving from course evaluations to the evaluation that additionally considers the faculty portfolio review and the evaluation performed by the Department Head based on the inputs described in this paper seems to be a fair way to evaluate faculty performance in the classroom, despite the fact that this evaluation will demand time and effort from the Department Head.

### **Faculty perceptions**

During the first quarter of 2018 all full time faculty members from the ITC and IND academic departments were invited to participate in a focus group in order to discuss their perceptions on the described strategies. Three different dates were scheduled for the focus groups. Participation was not mandatory, and faculty members were free to decide which date to attend. Half of the total group of faculty members (both departments) participated in the focus group. The final report about faculty perceptions (focus groups) is still being processed, but preliminary findings include the following: Faculty members recognize the importance of the portfolio in an accreditation process such as ABET. They see that the portfolio has two parts, the collected evidence and the reflective memorandum. For them, the reflective memorandum is the most important component of the portfolio and they would like to use it as a reflection tool, however the current document format does not invite such reflection. The current form requests too many details about the course and does not provide a space where the faculty member can write in her or his own words. Faculty members would like to share their findings with their peers after finishing a course, and would like the opportunity to also hear about the experiences of others, and further to be able to reflect on and learn from it.

The final report will be discussed by the school administrators, and each Department Head will define a plan to adjust the faculty continuous improvement process based on the results.



## Future work

Future work will focus on supporting collaborative reflection (strategy #2) efforts in each academic department and also in the development of a rubric for faculty portfolio review (strategy #3) as well as the development of professional development programs aligned with standards 9 and 10 of the CDIO framework.

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