Preparation and Challenges of Initial Accreditation Approval

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Abstract

For a new, young and growing engineering program, preparing for an initial accreditation visit is a daunting challenge. Accreditation being an affirmation of the quality of work to a set of educational standards entails natural pressure for intense planning, sound document organizing, and continuous faculty training. Such planning, organizing, and training can be accomplished by centralizing and simplifying procedures and unobstructed communication. The recommendation and guidance to document everything and demonstrate clear evidence of compliance with the standards are essential factors to success. Writing a practice self-study report early will ensure that the final document will be thoroughly prepared. Finally, a full run of a Mock Site Visit and interviewing session is effective in helping the faculty and staff members feel prepared for the primary visit and assess the readiness for an initial accreditation approval.

Introduction

Accreditation of undergraduate engineering programs, by an authenticated agency, such as the ABET (originally Accreditation Board of Engineering and Technology), the North Central Association of Colleges and Schools (NCA) or The Higher Learning Commission (HLC), is accepted as an affirmation of quality. ABET programs requesting initial evaluation must have graduates prior to the academic year during which the first accreditation visit will take place while renewal of an accredited status is attained through periodic reviews[1]. In case of the accreditation renewal for a previously accredited program, the process bids motivation for a consistent effort towards continuous improvement. For new programs, the initial accreditation process presents guidance as well as challenges that may be used to strive for establishing sound, measurable, and achievable objectives and building a solid academic curriculum track that prepares employable engineers for society.

The process of initial accreditation is demanding, since planning for the initial visit, preparing and organizing all relevant documentation, and training of new program staff and faculty has to concurrently happen with all of the other required founding steps inherent to a new academic program. In addition, preparing and instructing new courses and lab activities, learning and participating in student recruitment and advising and program marketing are few of the continuous program activities. Besides the daily activities, there may be other responsibilities that entail the day to day activities of the faculty such as participating in hiring committees, constructing of new lab facilities and obtaining funding.

Furthermore, establishing a cooperatively functioning group in a new academic program has its own tests. The initial approval, however, is achievable when approached with the mindset that through thorough preparation and accurate process information can overcome many challenges of the initial accreditation process including the first approval.

Framework

At Milwaukee School of Engineering (MSOE), a brand new undergraduate BioMolecular Engineering (BioE) degree program was launched in the fall quarter of 2009. The BioE program has currently 114 total students with a 50% female population. The request for evaluation (RFE) was submitted in January 2013 to participate in the initial accreditation process during the 2013-14 evaluation cycle. The program produced its first graduates in May 2013 and the first ABET team visit for the BioE program occurred in fall 2013.

Preparation

Preparing for initial accreditation is similar to building your very first house. There needs to be a sound foundation as well as the details on construction. Since there are a lot of unknowns during the initial accreditation, a well-defined vision for the entire preparation process and a knowledgeable "ready to deliver" team is a requirement. Every step needs to be developed, planned and communicated to all prep-team members in a timely fashion. Delegation of responsibilities and accountability of each team member towards their obligation should be clear right from the beginning. What a good neighborhood and safe location is to a new house is what context and relevant functional infrastructure is to an initial accreditation process preparation. When a plan is prepared for initial accreditation, there is a significantly higher chance of success if it maps to the type of the program and the program's constituencies such as relevant small and large industries, businesses, government institutions, alumni and Industrial Advisory Committee (IAC) members.

Correct Instruction Document for Planning is a Blueprint

The planning starts with an implementable and reasonable strategy. That is incorporating the correct and most current instruction document for the project and concludes with a realistic timeline to deliver the project. For ABET engineering accreditation for example, a current copy of the "Criteria for Accrediting Engineering" of Engineering Accreditation Commission (EAC) and a copy of "Accreditation Policy and Procedure Manual (APPM)", should be at hand which is available on ABET's website 24/7[2].

The instruction manuals on accreditation criteria and policy and procedures are to be considered as the blueprint for the project and should be read and understood thoroughly. All criteria and constraints, terms used within them, and their effects and intension need to be understood by the team leader and as best as possible by the rest of the team members. No assumptions should be made on the understanding of terminology or intent of criteria described in the instruction manuals. Every term used to describe these criteria and constraints should be discussed with all team members whether they are new or seasoned members of the initial or renewal accreditation preparation process.

Timely team training is a crucial preparation step for initial accreditation. If the team or part of the team has no experience with a real cycle of the accreditation process, first, an elaborate team

training is needed with a follow-up evaluation of the abilities that the training was meant to instill. Proper and timely training can be instrumental in acquiring the desired results in such projects.

Review and evaluation of institutional, departmental and program related documents, such as meeting minutes, safety trainings, course improvement or assessment forms, preparation records, policies, procedures and by-laws, discussions and/or incorporated changes into those policies and procedures, and other such evidential documents should also be reviewed. Record checks on dates of the important events, such as Industrial Advisory Committee (IAC) meetings, program or any other planning meetings (academic advising etc.) can also be helpful for developing focus for organizational activities and for the preparation of a practice and eventually a final self-study report for ABET or an equivalent report for another accreditation agency.

Challenges and Solutions

Many challenges, with varying degrees of complications, can present themselves while preparing for, during, and after the initial accreditation visit. Ten challenges are listed below. Although the challenges are listed, many of the listed challenges and hence their solutions are interconnected. This paper will discuss the solutions and case studies for three of the listed challenges. The rest of the listed challenges will be discussed in upcoming papers.

1. The process of initial accreditation can be perceived as trivial (by a new or trained team).
    a. Faculty not interested in training
    b. Faculty not responding to training
    c. Lack of familiarity of new and inexperienced faculty with the accreditation process.
2. Simplifying the adaptation of important procedures such as assessment.
3. Centralizing procedures in a timely manner.
4. Communication skills under stress.
5. Teaching and learning the importance of evidence based compliance by collecting appropriate student work.
6. Practicing evidence based compliance by designing relevant work for students to attain outcomes.
7. Writing a practice self-study report.
8. Mock visit as a beneficial step with financial constraint.
    a. Faculty interviews
    b. Student interviews
    c. Prep of the resource room for the accreditation agency
    d. Extent of the faculty, staff and administration involvement
    e. Evaluation of the extent of readiness
9. Preparing for the visit along with the ongoing daily responsibilities.
    a. Resource room
    b. Responding to questions for the accreditation agency
10. Not losing the big picture.
    a. Unexpected issues

Challenge 1

The process of initial accreditation can be perceived as trivial (by a new or trained team).

Despite that academic accreditation of college level academic programs is accepted as a measure of quality, the facts that it is voluntary in the United States and other countries who want to gain ABET accreditation, that it is carried out by the non-governmental and non-profit organizations, and that each of these organizations have a different set of standards, policies, methodologies, timelines, instructional materials and stringencies with which the accreditation process is approached, have presented the potential of perception that the process of accreditation is subjective, and that the accreditation is attained by chance if an "easy" visiting team is assigned. The case studies[3] showing the data on dominance of subjective judgments of evaluators in the decision of accreditation status of a program and the cases like Edison College scandal[4] followed by full, but controversial accreditation further fuel accreditation as subjective or even unfair. Such perception of the process can trigger dejection and imprudence towards the importance of accreditation process marking it as an activity not worth of one's hard work or too trivial for attention. Under such circumstances, the person appointed in charge of the preparation for an initial or renewal accreditation process certainly faces several tough issues including faculty not interested in accreditation training and/or not responding to action items during or after such training. Under such circumstances, faculty may attend required activities if implemented by the department with none or very poor outcomes.

Solution 1

Building a foundation of understanding and participating in the process must start early. Consistent education via program meetings, workshops, seminars and webinars should be encouraged, made available and facilitated with funding and strategic time release from other responsibilities. Both leaders and the team members must be encouraged to get involved in trainings to understand the accreditation criteria and to comprehend how the criteria for an initial or renewable accreditation are applicable to the academic program, not if the criteria are applicable. The subject of faculty not interested in training can be tackled in a few different ways:

1. Laying out a streamlined plan of the entire preparation process such that faculty can see their role in the plan.
2. The role of faculty in preparation plan needs to be communicated effectively to each member of the team in terms of departmental, institutional and program level contributions.
3. In addition, how participation in the accreditation preparation will subsequently help with the professional development of faculty should be highlighted.

The faculty members not responding to their part of deliverables either during or after proper training should be assigned smaller and in some cases less important contributions. Productive and more interested members of the team should be delegated important contributions of the preparations and deliverables. Strategic time release equivalent to the significance of contributions is always an attractive incentive. Administration support is mandatory for all middle management leadership roles. Department chairs or deans should be involved to

empower the program chairs to implement trainings and preparations for important events such as initial or renewal accreditation.

Case Study 1

A concerted effort towards building a foundation of understanding and preparing for the process of initial accreditation started with the launch of BioMolecular Engineering Program at MSOE in fall 2009, four years ahead of the potential scheduled visit in fall 2013. The accreditation for all engineering programs at MSOE is pursued via ABET. Each program is assigned a program director that is responsible for program level activities including assessment and preparation for the accreditation process. The program director for the BioMolecular Engineering Program at MSOE was facilitated with 30 hours of working load per week dedicated for the program work. This was a departmental and institutional support to the program to get ready for the initial accreditation. The faculty showing interest in accreditation preparation activities were facilitated to attend events including ABET Symposia and IDEAL workshops[5]. The program director of the BioE program pursued the training and acquired volunteer program evaluator (PEV) position with the ABET. All faculty members of the program irrespective of their interest in assessment and/or initial accreditation preparation were allocated the responsibility of collecting student outcome attainment data from their own course(s) via course improvement or student outcome assessment activities. This activity was laid out according to the flow chart plan shown in **Figure 1**. The plan shown in **Figure 1** was very successful. Practicing the division of labor each faculty was assigned a small part of the whole assessment process. Each faculty collected student outcome attainment data from their own course(s), the assessment data was put into an Excel spreadsheet, titled "Student Outcome Assessment Form", that was available 24/7 on the institutional network. The entire assessment activity was collected and consolidated as the faculty members submitted their data on these sheets.

Using **Figure 1** as a plan, many other important activities were completed with faculty participation. Activities included, but were not limited to regular weekly program meetings, constructing and mapping sets of Performance Indicators (PIs) with each student outcome, reviewing course and lab materials and participating in soft and hard recruitment activities. Following the plan, the program director prepared and submitted four internal BioE program audit reports (one each year), one mock self-study report in 2012 and one real Self-Study report in 2013. All real ABET deadlines were met regardless of mock or real submissions or activities. The faculty that perceived the preparation for the initial accreditation as a trivial matter and showed no to little interest in accreditation preparation were allocated jobs that still contributed to the overall process of preparation, but did not damage the quality of any preparation step. This strategy worked quite well. The faculty members less interested in the initial accreditation process participated, but not actively, while the faculty who were really interested in the process became the core team for the preparation of the assessment and initial accreditation process.

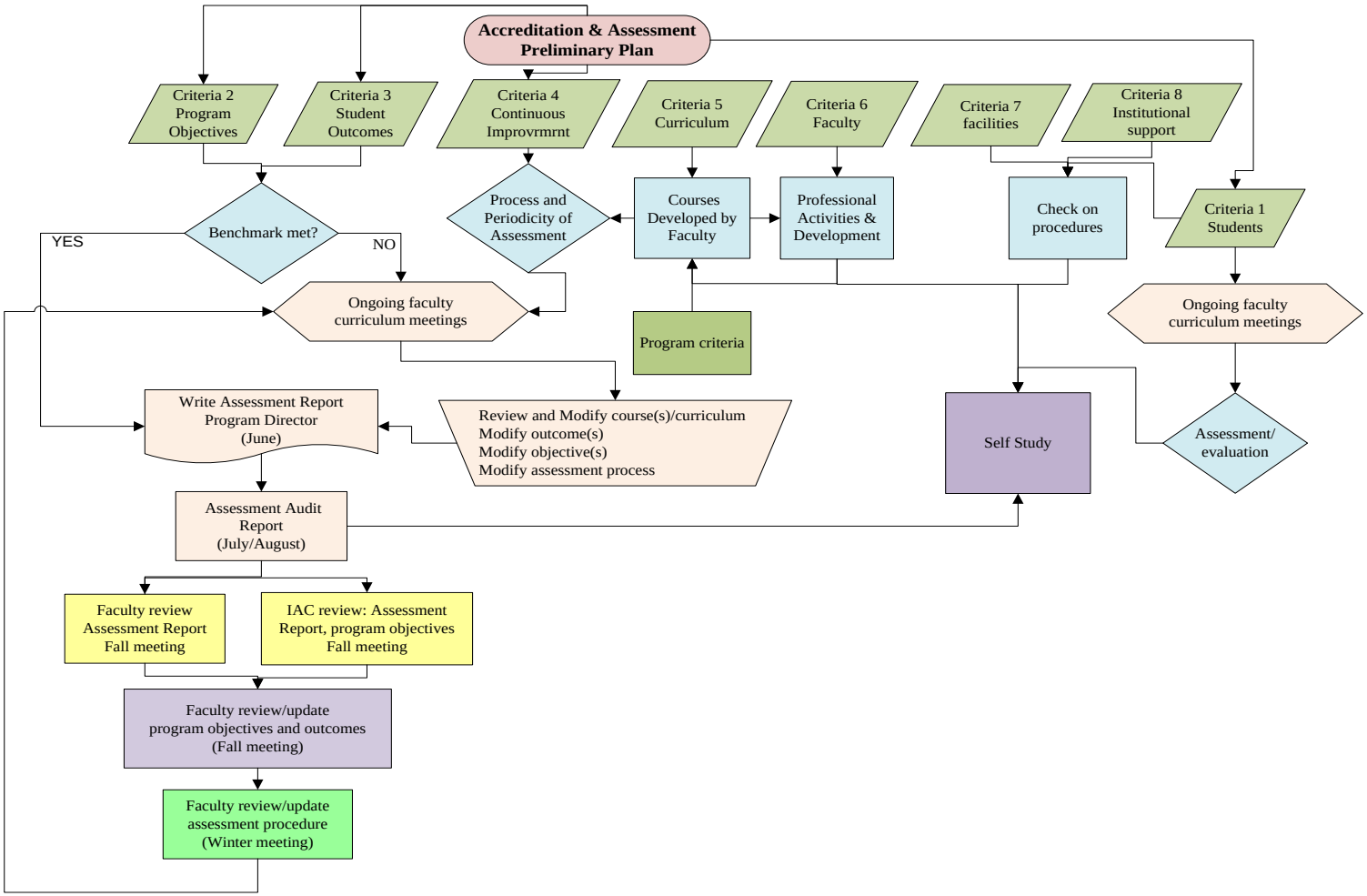


Figure 1. Preliminary Accreditation and Assessment Plan. The flow chart was used to aid in designating and completing the necessary tasks for a successful accreditation visit.

Challenge 2

Simplifying the adaptation of important procedures such as assessment.

Assessment is a multi-step and multilayered process that presents an initial two-fold challenge:

1. Multilayer processes and procedures are lost in translation and communication very easily. Every effort is needed from all team members to communicate frequently and clearly.
2. Simplifying and streamlining such a process so that team members are inclined to adapt it as a second nature.

In addition, many steps related to the initial accreditation preparation such as collecting student work, constructing rubrics and embedded questions, consistently collecting reliable data and requesting overtime investment in which usually the faculty are not compensated are part of this process. It is natural and expected during the preparation of an initial accreditation that an automatic resistance adapting to a tedious and unpaid activity will render the faculty thinking that this is "not good use of my time". This is a challenge that all assessment leaders will have to face and tackle during preparation for initial accreditation.

Solution 2

In his recent book Mckeown writes, "Effective leaders are insightful people and they almost always recognize problems and the need to adapt (step 1). The real difficulty is in understanding what changes must be made, that is, which adaptations are necessary to deal with the challenge at hand (step 2). Once the necessary adaptation is determined with a high degree of confidence, action naturally follows (step 3). However, inaction almost always occurs because the leader does not really understand what needs to be done - step 2."[6]. The above paragraph in essence defines the challenge of an assessment procedure and accreditation preparation, very suitably. We propose that there are tools (for such situations) that when designed and used correctly can simplify and also help determine what adaptations fit to the needs. Proper documentations, clear division of labor and timeline of deliverables are crucial tools for simplifying the adaptation to the procedure.

Case Study 2

At MSOE, the BioMolecular Engineering Program streamlined and simplified the adaptation of both the assessment process and the initial accreditation preparation procedures. To evaluate all of the assessment and initial accreditation preparations, a full-fledged mock accreditation was conducted one full year in advance of the real initial accreditation which included the preparation and submission of the program's Self-Study as well as the preparation of the course folders including student work, student outcome data folders for each student outcome, and the ABET resource room. A full mock run of the ABET initial accreditation evaluation was also conducted in fall 2012. This mock process comprised of a scheduled ABET Program evaluator (PEV) visit (Sunday through Tuesday) including lab and facilities tours; meeting the institutional Vice President, the Registrar, CFO, and other executives; Monday lunch; interviews with the program faculty,

staff and students and a concluding exit statement meeting with the program director, department chair and the vice president of academics.

Preparation activities for this initial mock accreditation were launched three years in advance. The course improvement form shown in **Figure 2** and student outcome assessment form shown in **Figure 3** were constructed, discussed and disseminated among the faculty during academic year (AY) 2009 to facilitate the course level and program level assessment activities and to nurture a culture for collecting, computing, submitting and reporting data. A year after that assessment periodicity was implemented using division of labor among the faculty. A snapshot document of the periodicity is shown in **Figure 4**. All forms and documents were accessible to faculty 24/7 on the institutional network drive. Smaller parts of the assessment procedures were also separately summed up into flow chart diagrams (example shown in **Figure 5**) to facilitate the identification and adaptation of closing the loop for every step of the assessment procedure. All forms have been and are currently in use in the BioMolecular Engineering program successfully. Both the course improvement form and student outcome assessment forms turned out to be very successful tools (i.e. efficient and time management) which allowed for the collection of data from 32 separate assessment activities in 10 different courses. The consolidated data and original hard copy forms were filed, placed in the ABET resource room, and reviewed during the mock and real initial ABET accreditation visits in fall 2012 and fall 2013, respectively.

MSOE BioE Course Improvement Form Date:

Course Number/Title: | Section #:

Quarter/Year Taught: | Instructor Name:

Catalog Description:

Prerequisites:

Course Outcomes:

Are the overall course learning outcomes still appropriate? Can all the course learning outcomes be accomplished in the time available for the course? Should we add additional course learning outcomes?

Are we spending the right amount of time on each outcome? Do some of them need more time and can others do with less?

Are we using the right textbook for this course? Do we need changes to the lab manual or textbook?

Deviation from published catalog description and/or course outcomes (if any):

Other Course modifications (e.g., topic sequence, schedule, etc.) made since the last time you taught the course:

Proposed actions for course improvement:

Positive and/or negative reflections on course (including relevant student feedback, if any):

Check boxes that apply:

☐ Program Director notification needed

☐ Course Coordinator notification needed

Entries below are for course coordinator and/or program director only.

Action(s) taken by course coordinator:

Action(s) taken by program director:

Name and signature of the faculty completing the form:

Figure 2. Course Improvement Form. The course improvement form is used to collect quarterly data on improvement of the program's courses. The initial layout of this form was in place at MSOE. The form was customized for the BioE program.

EB-XXXX "Course Title" "Term" 20xx

Section(s):

Course Instructor(s):

Course Coordinator:

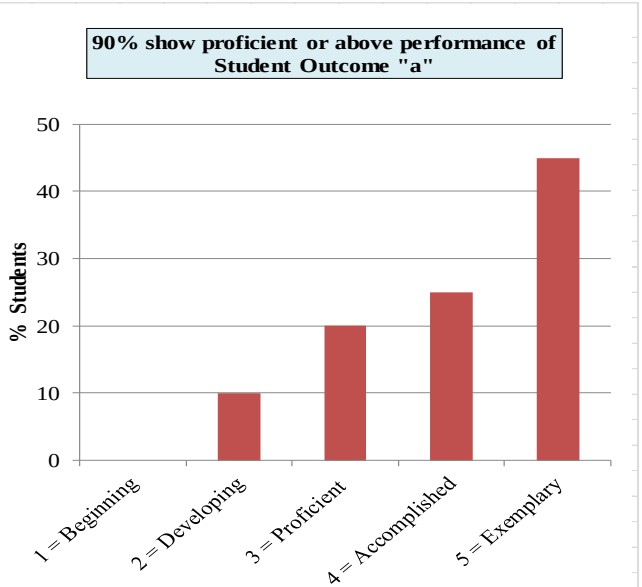
Course Assessors(s):

Assessment of Student Outcome "a"

an ability to apply knowledge of mathematics, science, and engineering.

Assessment Tools: Three Oral Lab Ex Qtns were constructed

Q1 Explain the significance of the components in plant tissue culture medium.
Q2 What is the seeding density for a T-25, T-75?
Q3 What is the maximum number of cells at full confluency in a T-25? T-75?



Scale Used		Range		% students
1 = Beginning	0	-	1.99	0
2 = Developing	2.00	-	2.99	10
3 = Proficient	3.00	-	2.79	20
4 = Accomplished	3.80	-	4.79	25
5 = Exemplary	4.80	-	5	45

Student code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ability to communicate by making diagrams	5	4	4	2	5	5	4	4	2	5	5	3	3	3	5	4	4	5	5	5
ability to do calculations	5	4	4	2	5	5	4	4	2	5	5	3	3	3	5	4	4	5	5	5
reason to lead to conclusions	5	4	4	2	5	5	5	2	2	5	5	5	3	3	5	5	5	5	5	5
Individual performance average on a scale of 1-5	5.0	4.0	4.0	2.0	5.0	5.0	4.3	3.3	2.0	5.0	5.0	3.7	3.0	3.0	5.0	4.3	4.3	5.0	5.0	5.0

Performance average of cohort on a scale of 1-5 4.2

Figure 3. Student Outcome Assessment Form. The form is used to simplify and centralize the adaptation of assessment. Instructors fill the form for the program's targeted courses to collect data on all student outcomes of the program.

	Direct Measure			Indirect Measure
	Assessment Targeted Course(s)	**Senior Capstone**	**ILO Assessment**	**Senior Exit Survey**
(a) an ability to apply knowledge of mathematics, science, and engineering	EB-3430 S EB-3530 S	EB-4930 S		✓
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	EB-3530 S EB-4520 S	EB-4930 S	CH-200 PH-2010	✓
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	EB-4510 F EB-4300 W	EB-4930 S		✓
(d) an ability to function on multidisciplinary teams	EB-3100 W	EB-4920 W		✓
(e) an ability to identify, formulate, and solve engineering problems	EB-4510 F	EB-4930 S		✓
(f) an understanding of professional and ethical responsibility	EB-3100 W EB-3530 S	EB-4930 S	HU-432	✓
(g) an ability to communicate effectively	EB-4100 W EB-2410 S	EB-4930 S	EN-132 EN-241	✓
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	EB-4100 W	EB-4920	EN-132 HU-100	✓
(i) a recognition of the need for, and an ability to engage in life-long learning	EB-4100 W	EB-4930 S		✓
(j) a knowledge of contemporary issues	EB-3430 S EB-4300 W		EN-132 HU-100	✓
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	EB-3530 S EB-4300 W	EB-4930		✓
(l) display a thorough foundation in the basic sciences and sufficient knowledge in the concepts and skills required to design, analyze and control physical, chemical and biological products and processes in the field of biomolecular engineering	EB-4510 F EB-4300 W	EB-4930 S		✓

F = fall term, W = winter term, S = spring term, Institutional Learning Outcome Assessment (ILO) began in 2011-12.

Figure 4. Periodicity of the assessment activity and division of labor. This table shows which courses are targeted courses for assessment and which methods are used for an assessment measurement.

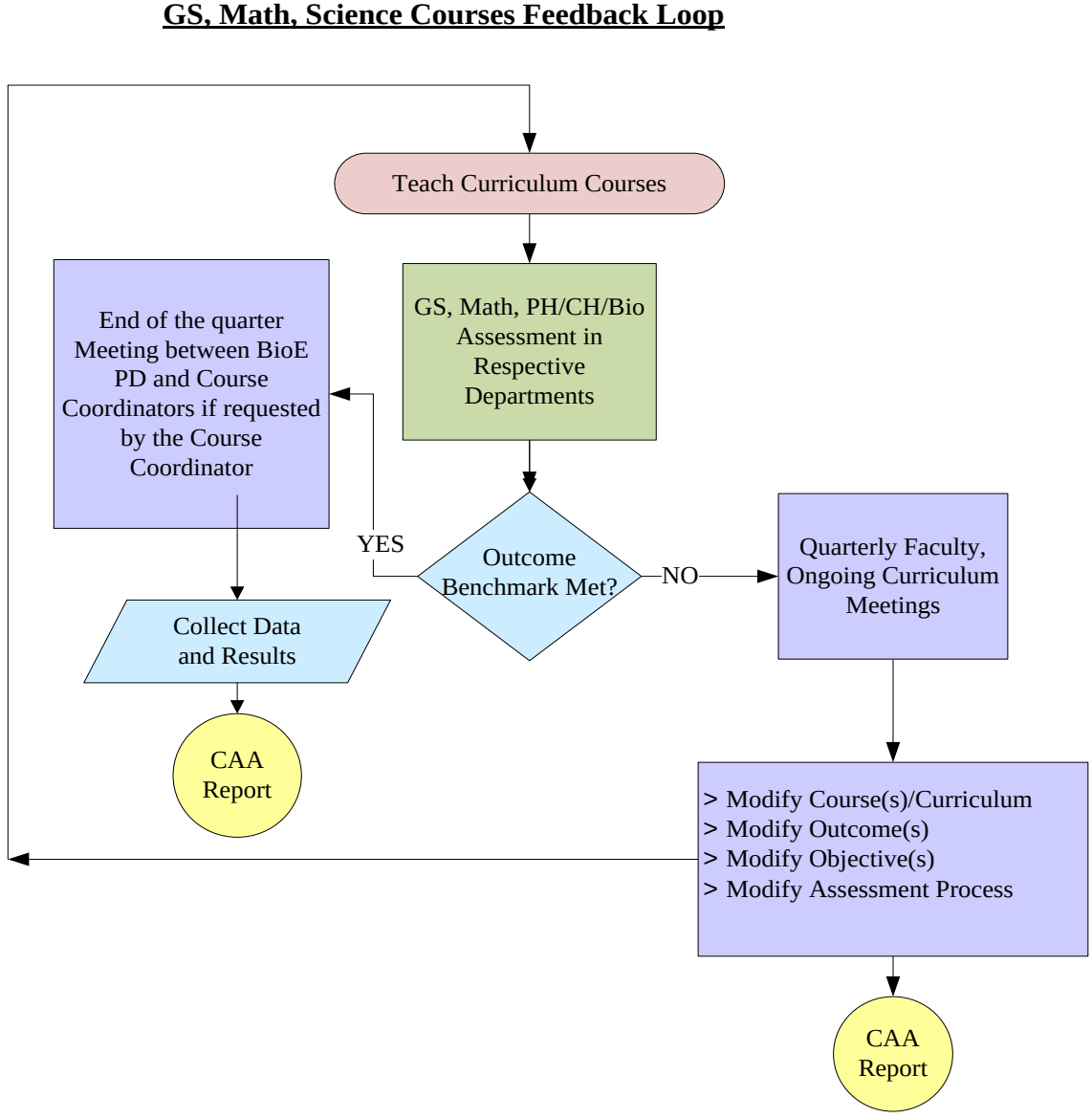


Figure 5. An example of closing the loop for every step of the assessment for initial accreditation preparation. Flow chart depicts how the entire assessment process feeds back to improving the program's math, science and general studies courses.

Challenge 3

Centralizing procedures in a timely manner.

The first and by comparison a relatively dangerous part of this challenge is the potential of using accreditation or assessment as a disciplinary action, coercion or control. Centralizing procedures and the learning process takes time. During the learning period, errors will occur that may or may not be damaging for the program. The second part of this challenge is to find and select appropriate leadership.

Solution 3

All procedures that need to be unified first should be delegated. The delegation of any project and procedure has to be threat free, but should have mandatory deliverables, incentives and deadlines. The general objective of leadership is to lead the team to a common goal. For the initial or renewal accreditation process, the centralizing of procedures is appended with the leadership style. To lead amidst such a challenge requires adaptation to the team, highlighting the strengths and weaknesses of every team member and keeping in mind the context of accreditation and the program. For centralizing procedures, the program must look for and appoint a person who is ready to take a little less credit when success is met and a little more blame when things go sour as well as possess a balance between drive for the common goals and compassion for the team. In addition, tolerance with inexperience and confidence on experienced team members will accelerate the centralizing procedures.

Case Study 3

The physics and chemistry department at MSOE, in the past, was a support only department for the institution. The department consisted of physicists, chemists, and biologists. A molecular biologist/biochemist was brought in to lead the diverse team of faculty. With the launch of the BioMolecular Engineering Program, two chemical engineers, one bioinformaticist, one bioengineer, one protein engineer, one biologist and one lab technician were hired. Seven newly hired and three already existing members were led by one program director. Important activities such as new course development, academic advising and assessment were employed to achieve centralization.

New Course Development

New course development activity was allocated to the faculty members according to their skill sets and area of specialization. The faculty had full control over the course content and the material that was to be used for the course. To centralize the course preparation activity that caters to the overall academic track of the BioE program, a set of student outcomes was discussed and approved by the program faculty. The courses of the program were mapped to one or more student outcomes. This process was completed during program meetings where the program faculty could voice their opinion and vote for such a process. Once the student outcomes for the program were in place, the centralizing process was implemented. Each faculty who prepared a new course for the program was required to submit a document showing course topics that map to one or more student outcomes. Alternatively, the faculty could submit a document showing that course outcomes were

laid out and they in turn map to the agreed upon student outcomes of the program. Course preparation is a paid activity and payments are subjected to the submission of all required deliverables of a new course. The methodology was very successful. There are 28 brand new courses of the program in place. All courses have clear course outcomes and their relationship to the academic program track is defined. Moreover, all courses have an elaborate syllabus and their position in the assessment plan is stated, which means every faculty member in the program knows which course is used to assess each student outcome of the program. This centralization step has helped organize the program level assessment.

Academic Advising

All program faculty members are involved in the academic advising activity. Each faculty member has a certain number of advisees. Each advisor meets all of his/her advisees at least once a quarter. Two simple steps are taken to centralize this procedure. First step is implemented as a step of advising policy. All freshman and sophomore BioE students are required to submit mid-term reports to their academic advisors on all registered courses during a quarter. This step enables academic advisors to collect documentation on academic progress of freshman and sophomores. The same information is collected from junior and senior advisees verbally during advisor-advisee meetings.

The second step is the academic advisors quarterly meeting(s). All academic advisors meet once a quarter and report on their advisee's academic status, retention and any other related issues. The academic advisors meeting furnishes consolidated data on all students of the program. The program director collects this data, reports it to the industrial advisory committee and plans appropriate actions with the faculty, as needed.

Assessment

The assessment process was centralized by constructing and providing common course improvement forms and student outcome forms shown in **Figures 2 and 3**. All BioE faculty members are required to fill the course improvement forms for their own course(s) including the department chair and the program director. All faculty members participating in the assessment of the student outcomes in the targeted program courses are required to fill out the student outcome assessment form. Both forms are required to be submitted to the department administrative assistant every quarter, two weeks after the final exams. The administrative assistant files the submitted forms electronically while the course instructors file these forms in hard copy. The data from these forms are consolidated and reported to the institutional committee by the program director, annually.

Conclusion

This paper has considered three of the many challenges, their solutions, and the case study results seen at the BioMolecular Engineering Program at MSOE during the initial accreditation preparation. The purposes of this and the upcoming papers is to raise awareness of some of the main challenges faced by all new academic programs and highlight solutions that have been tried and thought through for such challenges. Preparation for initial accreditation is not a trivial matter because it is a multilayer and

teamwork process. The preparation takes time because team training, procedure centralizing and procedure simplifying are all time demanding matters. Leadership plays an important role in both the delegation of the project and gearing the team towards success.

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