

## **ABET Accreditation: Best Practices for A Systematic Coordinated Multi-Program Approach**

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## **Abstract:**

The School has four engineering programs that are currently preparing for reaccreditation. Three of the four programs are to be reviewed under the engineering accreditation commission (EAC) and one program under the applied and natural science accreditation commission (ANSAC). All four programs were successfully accredited in the 2013 ABET accreditation visit.

Near the mid-term of the current accreditation period, the School made a strategic decision to begin collaborative efforts across programs in preparation for the fall 2019 visit. Although accreditation is program specific, it was reasoned that a school-wide multi-coordinated effort could leverage resources, facilitate documentation, standardize templates and assessment software, address similar challenges and shortcomings in a coordinated and holistic manner, and facilitate the sharing of ideas and best practices. The momentum of the effort has been remarkable. The outcome of the school-wide collaboration for accreditation, is that each program is now better prepared for the documentation of the final self-study report and the fall 2019 ABET visit.

This paper will document a multi-pronged approach used to support this strategic direction of coordination at the school and program level. The paper discusses the planning and coordination process, document standardizations, the draft self-study report process and the mock site visits, along with accrued benefits and recommendations. The paper will be useful for other engineering schools preparing for future accreditation visits, as best practices and lessons learned from the multi-program coordinated approach will be presented. [234 words]

## **Introduction:**

Our school is a small Historically Black College and University (HBCU) which offers engineering programs in civil engineering, electrical engineering, industrial engineering and transportation systems. We serve a very diverse student population of about 1,300 undergraduate students in the School of Engineering (SOE) along with 135 graduate students pursuing master's and doctoral programs. The engineering programs are supported by 35 full time faculty and about 30 adjunct instructors. All four engineering programs are currently preparing for ABET reaccreditation in Fall 2019. Three programs are to be reviewed under the Engineering Accreditation Commission (EAC); Civil, Electrical and Industrial Engineering [1] and one program under the Applied and Natural Science Accreditation Commission (ANSAC); Transportation Systems [2].

Preparing for accreditation review is at times a daunting undertaking which requires planning, coordination, implementation, monitoring, feedback and evaluation. All programs preparing for accreditation not only need an assessment process, an evaluation process and a continuous improvement loop, but also a self-study documentation process. Several of the literature reviewed, outlined varying content ranging from understanding the basics, getting it right the first time, to a systematic approach to prepare for accreditation [3], [4], [5], all at the individual program level. This paper, however, will present strategies used in a multi-program approach for

accreditation which includes documentation of the final self-study report, transition plan for the new ABET Outcomes and preparations for the ABET on-campus visit. Some of these strategies included reviewing ABET Criteria, reviewing previous ABET due process report, compiling a draft self-study report; reviewing new outcomes and determining what's new, missing or the same, and preparing for a mock site visit.

## **Getting Started**

Each program at the School, independent of the others, had already established a program assessment process and were actively collecting assessment data for the six-year cycle. On closer examination, the School Leadership decided that a coordinated multi-program approach would have greater value added and accrued benefits. In fall 2016, midway through the six-year accreditation period, the School began collaborative efforts across the four programs in preparation. All programs had a successful visit in the previous cycle, however, with the ABET definitions and student outcomes undergoing significant changes, it was determined that a coordinated effort could leverage resources, streamline administration, reduce duplications and maximize efficiencies. In addition, programs could benefit from standardizing documentation and processes, standardizing templates, and sharing best practices.

## **Multi-Program Planning & Coordination**

With a small to medium sized faculty complement across all programs, coupled with increasing enrollment, it was envisioned that dedicated personnel could be identified to support the assessment and accreditation efforts. Programs were tasked to identify 1-2 dedicated accreditation or assessment coordinators who would then interface with program faculty, coordinate efforts at the program level and report back from the school level meetings. Faculty were chosen based on recommendation from the Chairs and/or self-selection following a call. The faculty ranged in rank from Assistant Professor to Professor. The school-level accreditation committee consisted of the program faculty coordinator(s) plus the department chairs, the school-wide assessment coordinator and the Associate Dean for undergraduate studies. Two internal evaluators also brought additional expertise from their tenure as ABET program evaluators. The following sections detail specific planning and coordination activities used to advance programs in the assessment and continuous improvement process.

### *Regular Meetings*

Multi-program coordinating team meetings were initially scheduled weekly, but then extended to fortnightly or monthly, depending on the focus and demands of the assessment process. The meetings were utilized to get each program up and properly functioning in the assessment domain. Programs were at various levels of readiness and so it was important to have regular and consistent meetings with objectives and set deliverables. At times, situations required separate program meetings with coordinators and department faculty when it was necessary for training or to reinforce the assessment process or continuous improvement component. The culminating objective was for each program to submit a draft self-study report by end of summer 2018 and facilitate a mock site visit by spring 2019.

### ABET Training for Program Assessment

It is well established that in preparing for an accreditation review, programs should have faculty participate in ABET training. It is even suggested in the literature that having ABET program evaluators on staff or having faculty participate in ABET workshops is advantageous and of great benefit to developing an effective assessment process [3]. In our case this was even more critical, as programs had experienced a loss of faculty due to varying reasons. Some faculty who had been involved in the previous ABET review were no longer at the school, while others had been promoted to upper-level administrative positions at the university. In essence, programs experienced a “brain drain” and did not fully have the resources, history or continuity from the last review.

Each program was mandated to have faculty participate in the ABET fundamentals of program assessment workshops. At least one faculty coordinator from each program participated in recent trainings for a total of four faculty from the school. Further, the school-wide assessment coordinator participated in the 2018 ABET symposium, helping to provide broader insight into proposed ABET program outcome changes and how to incorporate these at the program level. In all, the program level ABET training facilitated a greater understanding of the assessment and accreditation process and provided insights into the process that subsequently provided support and leverage to other faculty within the individual departments.

### Program Self-Assessment

One of the first initiatives was to have each program complete and submit a self-evaluation for program assessment and continuous improvement (Table 1). This form was adapted from an ABET assessment workshop [6]. The form has five rating scales in the drop-down selection: 0 – not in place; 1 – beginning stage of development; 2 – beginning stage of implementation; 3 – in place and implemented; 4 – implemented and evaluated for effectiveness; 5 – implemented, evaluated and at least one cycle of improvement.

The self-assessment form helped programs analyze and evaluate where they were in the assessment planning landscape. The form looked at stakeholders, program educational objectives, student outcomes, student outcomes aligned with educational practices, assessment processes and evaluation processes. If programs are honest and diligent about completing the evaluation, this goes a far way in helping gauge how well they are doing and what areas of improvement and action are necessary. Each program completed the form which was then used for ongoing review and implementation for continuous improvement. In general, based on self-reporting, programs were lagging on the assessment and evaluation component and having clearly defined program educational objectives. This self-assessment process resulted in programs revising the PEOS, making targeted stakeholder outreach, distinguishing between direct and indirect assessment processes and making sure they were closing the loop for continuous improvement.

### ABET Criteria Review & Due Process Review

A second major initiative required coordinators to review the program’s 2014 ABET *Due Process* feedback and self-study report (SSR). The background section of the current SSR requires programs to include the final statement from ABET from the last visit. However, if programs were cleared and there are no concerns, weaknesses or deficiencies noted in the final

statement, it can result in programs assuming that all is well. So, we required each program to review the actual due process response which would have identified any initial flags or shortcomings. This is the launching pad for the subsequent SSR and required that programs critically review those concerns to make sure resolutions have been sustained or are not likely to reoccur. A review of the recent SSR also allows programs to reacquaint themselves, to make historical connections and to determine where changes, if any, have been effected.

A third initiative, mandated program coordinators to update themselves by becoming familiar with the criteria applicable to the engineering commission related to their discipline, along with the accreditation policy and procedures manual, [7] the self-study report template and the accreditation schedule detailed on the ABET website. Program Faculty were also encouraged to do the same. This was also facilitated in individual department meetings with faculty, where the policy and procedures and the self-study report template would be reviewed.

### **Standardized Documentation & Processes**

In seeking to streamline the assessment and accreditation planning process it was determined that part of the coordinated approach was to ensure the standardization of documentation, processes, and templates to facilitate faculty input. Several of the literature speaks about standardization of documentation and processes [3], [4], [8]. Not only is the process smoother and more efficient but this also facilitates faculty input, as documentation is simplified, information is shared, and faculty receives targeted training. We highlight in this section:

#### *Faculty Input & Documentation*

Again, elsewhere the literature supports the case for standardized documentation [4], [5]. A third initiative required standardized templates especially for faculty input. Templates included sample resumes, formatted templates for two-page resumes as per ABET guidelines, two-page Syllabi templates, Faculty Workload Summary and Faculty Qualifications and Experience. This approach helped programs to better organize, become more streamlined and facilitated faculty input at a greater level. This resulted in less duplications and redundancies, less errors, improved output and more satisfaction with the process based on anecdotal feedback.

#### *School-level SSR Data*

At the school-level, the accreditation coordinating team was responsible for providing the drafts for Criterion 1–Students, Criterion 7–Facilities and Criterion 8–Institutional Support. Most content for these sections is applicable for all programs e.g. student support process, admissions process, transcript evaluation process, student advising system (Starfish), Banner System for student records, library facilities, technology, computer labs and some software. In addition, institutional organizational chart, and other supporting budgets are common information that each program needs. By strategically coordinating this from the school level, redundancies and duplication efforts were eliminated. In a similar manner, course syllabus from supporting programs were requested from one contact to each of those programs. Once school level drafts were finalized for Criteria 1, 7 & 8, program specific data (e.g. department admission policy/process, program transcript evaluation process, graduation statistics, etc.), were then added.

Table 1: Self-Assessment Template for Continuous Improvement [6]

<b>Rating Scale (selected from drop-down box): 0-not in place; 1-beginning stage of development; 2-beginning stage of implementation; 3-in place and implemented; 4-implemented and evaluated for effectiveness; 5-implemented, evaluated and at least one cycle of improvement</b>											
Stakeholder/Constituent Involvement (Those who have a vested interest in the outcome of the program)	RATING	Program Educational Objectives (Graduates performance after completing program)	RATING	Student Outcomes (Desired knowledge, skills, attitudes, behaviors, by the time students complete program)	RATING	Student Outcomes aligned with educational practices	RATING	Assessment Processes	RATING	Evaluation	RATING
Stakeholders are identified	<input type="text"/>	Objectives determined	<input type="text"/>	Outcomes are identified	<input type="text"/>	Desired performance is mapped to curricular practices and/or strategies (e.g., courses/teaching methodology)	<input type="text"/>	Assessment is on-going and systematic at the program level	<input type="text"/>	Assessment data are systematically reviewed	<input type="text"/>
Primary stakeholders are involved in identifying/affirming program educational objectives	<input type="text"/>	Objectives are publicly documented	<input type="text"/>	Number of outcomes are manageable	<input type="text"/>	Practices/strategies are systematically evaluated using outcomes assessment data	<input type="text"/>	Multiple methods are used to measure each outcome	<input type="text"/>	Evaluation of results are done by those who can effect change	<input type="text"/>
Primary stakeholders are involved in periodic evaluation of educational objectives	<input type="text"/>	Number of objectives are manageable	<input type="text"/>	Outcomes are publicly documented	<input type="text"/>	Where necessary, educational practices are modified based on evaluation of assessment data	<input type="text"/>	Both direct and indirect measures of student learning are used to measure outcomes	<input type="text"/>	Evaluation of assessment data is linked to curricular practices/strategies	<input type="text"/>
Sustained partnerships with stakeholders are developed	<input type="text"/>	Objectives are aligned with mission statement	<input type="text"/>	Outcomes are linked to educational objectives	<input type="text"/>			Assessment processes are reviewed for effectiveness and efficiency	<input type="text"/>	Evaluation leads to decision making/action	<input type="text"/>
		Objectives are periodically evaluated for continued relevancy	<input type="text"/>	Outcomes are defined by a manageable number of measurable performance indicators	<input type="text"/>			When needed, assessment methods are modified based on evaluation processes	<input type="text"/>		

### Webpage Accreditation Updates

In order to satisfy ABET Criteria for public information [9], we decided to synchronize and coordinate the program and school webpage updates. An accreditation webpage template was designed to guide the creation of program specific accreditation webpages. Each webpage included the ABET accreditation statement, abet accreditation guidelines, program history, institutional mission, program educational objectives, student outcomes (new), enrollment statistics and degrees awarded. The school main accreditation page was linked to each program accreditation webpage and included similar information in addition to the summary statistics for enrollment and degrees awarded for all programs.

### **Transition Plan to New Outcomes**

A common challenge experienced across programs is how to demonstrate continuous improvement, especially with the new program outcomes being formally approved as recent as Oct 2018. A transition plan (Table 2) from old ABET outcomes to new ABET outcomes was developed at the coordinators' level and shared at the program level to guide the transition process, data collection, assessment, and documentation [10]. Mappings were done between the new outcomes *l-7* and the old outcomes *a-k* based on the matrix provided by ABET [11], [12].

Some of these transition plan strategies included updating the assessment plan, reviewing new outcomes and determining what's new, missing or the same, reviewing current practices, creating new mappings, developing new performance criteria based on the new guidelines for outcomes, getting stakeholder input, establishing timelines and assessing what curriculum changes would be needed [13]. Each program was required to adopt or modify the transition plan and update it with program specific details. They were also required to adopt the new outcomes in Fall 2018 and begin the transition process. Table 2, documents some of the major deliverables involved in the transition plan for the new outcomes. New curriculum mappings and new performance indicators were necessary to accurately measure the new student outcomes. In some cases, curriculum revisions or mappings were needed to respond to the need for complex problems, engineering design and diverse teams.

Table 2: Transition Plan for New Outcomes 1-7 (developed internally)

	Civil Eng. EAC	Elect. Eng. EAC	Ind. Eng. EAC	Transp. (ANSAC)
Deliverable #1 –				
<b>1. Data Collection Plan</b>	●	●	●	●
- Map New outcomes to old outcomes				
- 7-year schedule starting in 2018-2019				
- Data Collection/Assessment 2018-2019				
Deliverable #2 –				
<b>2. Develop New Performance Criteria</b>	●	●	●	●
- New Outcomes				
- Complex Engineering Problems				
- Engineering Design				
- Team Based				
Deliverable #3 –				
<b>3. Curriculum Changes</b>	●	●	●	●
- New Courses				
- Course Changes				
- Curriculum Matrix Updated				
Deliverable #4 –				
<b>4. Stakeholder Input</b>				
- Advisory Board				
- Faculty				
- Students				
<span style="color: orange;">● WIP</span> <span style="color: black;">● Not Started</span> <span style="color: green;">● Completed</span>				

### Draft Self Study Report & Mock Site Visit

The coordinated approach culminated in the preparation of program draft self-study reports (SSR), a year ahead of the fall 2019 visit. During summer 2018, clearly defined deliverables were established with deadlines for completing each criterion of the SSR. There were a total of four major deliverables for the draft SSR (See Figure 1). The draft reports were reviewed by the internal PEVS and ABET school coordinators, and feedback provided to the program coordinators based on ABET Criteria and guidelines [7]. The draft SSR required a complete documentation based on both the new outcomes 1-7, as well as the old outcomes a-k, since the previous five years (2013-2018) of the collection cycle, were based on outcomes a-k. [11] [12].

However, the introduction of the proposed changes to ABET program outcomes posed a unique challenge. Based on the timing of the decisions by ABET, at first it was not clear how these changes would be incorporated and what programs were required to do. Having documented the draft SSR, each program is now cognizant of where they are in the process, what loopholes exist, what needs to be resolved ahead of the ABET visit and steps needed to ensure a successful visit.



<b>CRITERION</b>	<b>DELIVERABLES</b>	<b>DUE DATES</b>
Background	#1	June 15
Criterion 2 - PEOS	#1	June 15
Criterion 3 - Student Outcomes	#2	June 29
Criterion 5 - Curriculum	#2	June 29
Program Criteria	#2	June 29
Criterion 1 - Students	#3	July 13
Criterion 6 - Faculty	#3	July 13
Criterion 8 - Institutional Support	#3	July 13
Criterion 4 - Continuous Improvement	#4	July 27
Criterion 7 - Facilities	#4	July 27
APPENDICES	#4	July 27

Figure 1: Schedule for Draft Self Study Report, Summer 2018

Mock Site Visits:

Another key strategy required mock site visits with external program evaluators to provide an indication of true program readiness and shortcomings. From the beginning of the multi-program coordinated approach, it was understood that the primary objective was to document the draft SSR, as well as prepare for on-campus interim visits by experienced PEVs. As part of this process, scope of work, terms of reference, schedule, budget and invoicing guidelines were provided by the school ABET leadership, to guide discussions with program evaluators. Again, this approach streamlined the process and eliminated redundancies and errors.

All three programs from the Engineering Accreditation Commission had draft self-study reviews as well as, onsite campus visits, while the Transportation program (Applied and Natural Science Accreditation Commission), needed only a review of the draft self-study report. Feedback from evaluators has been encouraging and extremely useful. Some feedback included formatting errors, documentation via electronic or physical binders, mappings between new and old outcomes, transition process for new outcomes, faculty readiness and awareness of the accreditation process, advisory board awareness and familiarity with the process, presentation of assessment results and clarification of the continuous improvement process. A meeting was facilitated with all program coordinators and chairs to review the feedback from all four program evaluators. Many of the suggestions and recommendations are applicable across all programs, irrespective of commissions. Modifications and changes to the final self-study report are in progress, for July 1, 2019 submission.

## Conclusions

The school of engineering at our University, made a strategic decision to modify its approach to the assessment process and self-study preparation. This was primarily motivated by pending changes (at the time), to the ABET requirements for the engineering and applied science accreditation commissions, for programs to transition to new student outcomes. In this paper, we focused on the strategies and resultant best practices that were pursued for an upcoming ABET accreditation visit. This paper was intended to document the process involved, outline the accrued benefits, and share best practices and recommendations for improving assessment and continuous improvement. We were able to adopt a systematic multi-program coordinated effort which enabled us to leverage resources, streamline administration, reduce duplications and maximize efficiencies.

Programs benefited from having faculty team leads at the program level and coordinators at the schoolwide level, who were the primary leaders in the coordinated assessment and accreditation efforts. Programs further benefited from program self-assessment, regular coordinating meetings, clearly defined goals and deliverables, standardized documentation and processes, standardized templates, ABET training, faculty assessment training, transition plan development and the sharing of best practices. Strategies presented in this paper will be useful for other engineering schools preparing for future accreditation visits and who could benefit from collaborative efforts across different programs in the same school or college.

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