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The Influence of ABET Accreditation Practices on Faculty Approaches to Teaching*

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This paper investigates the effect of ABET accreditation processes on quality teaching using thematic analysis of descriptions from faculty in open-ended survey questions and logistic regression of quantitative survey questions about their pedagogy. Ordinal logistic regression related faculty perspectives on accreditation terminology and processes to faculty teaching practices. There were 43 qualitative comments about ABET accreditation and 91 quantitative survey results used in this study. Faculty had overwhelmingly negative views regarding accreditation, believing that it adds to their workload, stifles their creativity, and distracts them from other important objectives including teaching. Faculty who express various negative views of either the goals or the practice of accreditation are less likely to engage in certain student-centered teaching practices. More positively, our findings show that faculty who tend to agree with the student-outcomes focus of the ABET criteria engage in richer educational experiences—they give students more writing assignments and allow students to learn collaboratively.

Keywords: engineering; ABET; accreditation; teaching practices

1. Introduction

Engineering programs in the United States are accredited by the Engineering Accreditation Commission of ABET [1]. ABET also accredits engineering programs in other countries upon request [2]. ABET's Criteria for Accrediting Engineering Programs [3] were revised in the 1990s because engineering educators perceived the criteria standards limited innovation in engineering degree programs [4]. This research project explores the effect ABET has on faculty teaching practices, including classroom innovation. Faculty survey responses regarding ABET's focus on student outcomes were found to be related to their approach to teaching. It has been shown that traditional STEM teaching is one of the major reasons that students leave these degree programs [5], so improving teaching quality can keep the students that enrolled in STEM degrees and could attract more diverse students into these degrees.

2. Literature review

ABET accreditation and its fit with definitions of quality. ABET was founded in 1932 as a way to bring together professional organizations for applied science, computing, engineering, and engineering technology programs [6]. ABET's vision states: "ABET is recognized as the worldwide leader in assuring quality and stimulating innovation in applied science, computing, engineering, and engineering technology education" [6]. ABET's mission statement provides additional detail about quality, innovation, development, and advancement of education:

"ABET serves the public globally through the promotion and advancement of education in applied science, computing, engineering, and engineering technology. ABET:

- Accredits educational programs.
- Promotes quality and innovation in education.
- Consults and assists in the development and advancement of education worldwide.
- Communicates and collaborates with its constituents and the public.
- Anticipates and prepares for the changing educational environment and the future needs of its constituents.
- Manages its operations and resources in an effective and fiscally responsible manner." [6]

Noting the priority of *assuring quality* in engineering degree programs as expressed in ABET's vision and mission, we anticipate there will be various faculty responses to the accreditation process, because quality is a subjective term and can have very different meanings to faculty, administrators in higher education, industry, students, and other stakeholders. Earlier work has described variation in how faculty define quality teaching [7–8].

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Much of the research on quality in engineering focuses on creating quality assurance mechanisms or dimensions akin to industrial engineering quality management for factories or product development [9–10], yet some researchers have considered other definitions of quality in higher education. Harvey and Green identified five definitions of quality: exceptionality, perfection and consistency, fitness for purpose, value for money, and transformation [11]. These various definitions are described in detail in Harvey and Green's work, but are summarized in the concept map in Fig. 1.

Accreditation processes might seem to fit with multiple definitions of quality described by Harvey and Green—the expectation that all programs will achieve a common set of student outcomes resonates with the "passing a set of required standards" aspect of the "perfection and consistency" definition. On the other hand, the freedom given to institutions to choose Program Educational Objectives consistent with the institution's mission (Criterion 2) and the flexibility in how the student outcomes (Criterion 3) are demonstrated seem more aligned with "fitness for purpose" definition [3, 7, 11]. ABET's mission statement certainly resonates with the "transformative" aspect of quality described by Harvey and Green. Criterion 3 is student-focused and aims to develop students into engineers, and both the literature and the results of this study show that when faculty discuss accreditation, they are concerned primarily with Criterion 3. Although the "exceptional" definition of quality is persistent in higher education and possibly engineering education in particular, having performance standards like ABET's works against the "exceptional" definition of quality. Focus on the "exceptional" aspect of quality suggests restricting admission to only those exceptional students who promise to increase the quality of graduates and to grant accreditation only to those engineering programs that are exceptional. By basing accreditation on the assessment of outcomes promotes extending access to any students who can meet those outcomes and to accredit any program that is able to achieve those outcomes in its students. Accreditation, therefore, much like a criterion-referenced grading system, allows all programs to succeed—there is only one grade of accreditation [7, 11]. The "perfection and consistency" definition of quality has strong resonance in disciplinary engineering through manufacturing standards such as ISO9000 [12]. Yet, the focus on standardization of processes and striving for zero defects are a mismatch to engineering education in multiple ways. Encouraged by Petroski and others [13], engineering education is seen as a place where students can fail safely and the outcomes focus of accreditation results in a diversity of processes that all seek to achieve the same outcomes.

Rather than these other definitions, Harvey and Green situate the quality that results from accreditation within the "Value for Money" definition of quality, because accreditation is viewed as an outside entity that sets standards of quality [11]. In this sense, accreditation is a process of satisfying an external client. Although ABET is an expression

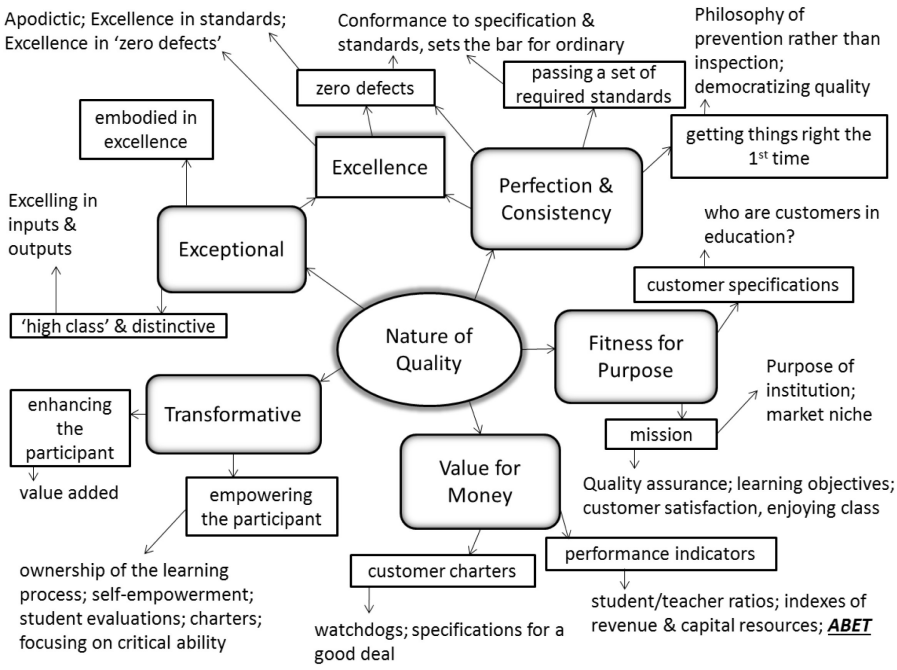

Fig. 1. Author's concept map of Harvey and Green's (1993) Defining Quality in the context of engineering education [11].

of self-government within the engineering community, viewing the accreditation process as satisfying an external client is still appropriate, because accreditation visitors are always external to the program. Thus, while ABET has the mission to "promote quality and innovation in education, consults and assists in the development and advancement of education worldwide, anticipates and prepares for the changing educational environment and the future needs of its constituents," its mechanism for accomplishing this is the accreditation of the programs. The adversarial relationship of faculty with accreditation processes as they are implemented constitutes additional support for viewing accreditation as an external process.

2.1 Research on the impact of the revisions to ABET's criteria for accreditation

Various reports calling for the reform of engineering education [4, 14] and multiple programs promoting that change [15–17] contributed to the reform of ABET's Engineering Accreditation Criteria [18] around the turn of the century. Since then, many studies cite the major revision of the ABET criteria as a motivating factor for change [6, 18–21]. The previous ABET criteria have been described as rigorous but inflexible criteria that acted as a barrier to the reform of engineering education [18]. Even as changes to the criteria for accreditation provided top-down pressure for change [18], the National Science Foundation's investment in multimillion-dollar-per-year engineering education coalitions helped guide that change to broadly reconsider the way U.S. engineering students are educated [17]. Volkwein, Lattuca, Terenzini, Strauss, and Sukhbaatar proposed a study of the impact of the revised criteria, and Lattuca, Terenzini, Volkwein report the results [21–22]. A comparison of student learning outcomes before and after the revision showed improvement [22]. Lattuca, Terenzini, Volkwein explored the impact of ABET's new criteria on student learning outcomes and on organizational and educational policies and practices, which may lead to improved student outcomes [22]. Lattuca and her colleagues found that over 75% of engineering department chairs reported "moderate to significant increases in their program's emphasis on communication, teamwork, use of modern engineering tools, technical writing, lifelong learning, and engineering design." [22]. While two-thirds of respondents reported an increased usage of active learning in their regular courses, only 28 percent attribute these changes directly to ABET [22]. This increases our interest in knowing more about the influence of ABET accreditation processes on teaching decisions.

3. Methods

The research questions for this study were: How do faculty describe the influence of the ABET accreditation process on quality teaching? How do faculty definitions of quality teaching influence their views of the ABET accreditation process? How are faculty perceptions of the ABET accreditation process related to faculty teaching practices? To answer these questions, the researchers used both qualitative and quantitative approaches. The qualitative study is phenomenological, because we are interested in the experience of faculty who are involved in or affected by the ABET accreditation process. Phenomenological studies describe "the common meaning for several individuals of their lived experiences of a concept" [23], in this case, the experience of faculty with ABET accreditation and its effect on quality teaching.

3.1 Qualitative analysis of open-ended responses

As part of larger study of faculty definitions of quality teaching and influences on faculty teaching practices, faculty were asked "How has the ABET accreditation process affected how you teach, if at all?" as an open-ended survey question. Among the 91 survey respondents from four participating institutions (approximately a 10% response rate), there were 43 responses to this open-ended question. Because these responses were surprisingly rich, this question was analyzed using open and axial coding. Among the respondents to the open-ended question, 60 percent identified as male, 23 percent identified as female, and the remaining 17 percent did not identify as either. Women are over-represented in the survey responses, typical of the higher response rates commonly observed for females [24]. Gender has been shown to be the single greatest predictor of survey completion [25]. Responses were not equally distributed by institution, with 21, 23, 49, and 9 percent responding from the four institutions, but there was surprising variability in the primary departmental affiliation of the respondents, as shown in Table 1. A primary departmental affiliation was identified by 91 percent of respondents.

Table 2 shows the primary position of the faculty participating in this survey. All respondents to the open-ended question reported their primary position. Compared to the overall survey respondents, the respondents to the open-ended question were more likely to be teaching/research faculty.

Table 3 is the reported rank of respondents to the open-ended ABET question. All respondents had reported a rank. There is variability in the respondent rank. The average length of faculty service was 18 years, with an average of 15 years at their current

Table 1. Primary department affiliation of respondents

Primary Department	%
Aerospace	9
Chemical	5
Civil	7
Construction Engineering	2
Electrical and/or Computer	9
Environmental	5
General (Freshman, Fundamentals) Engineering	12
Industrial and/or Systems	5
Materials	7
Mechanical	19
Mining and Minerals	2
Nuclear and/or Radiological	2
Other	7

Table 2. Primary position of respondents

Primary Position	%
Teaching Faculty	16
Teaching/Research Faculty	60
Research Faculty	16
Department Chair	0
Dean's Office or other administration	5
Other	2

Table 3. Faculty rank of respondents

Current Rank	%
Assistant Professor	7
Associate Professor	26
Professor	47
Instructor/Lecturer	14
Faculty of Practice	0
Adjunct/Visiting (any rank)	2
Emeritus/Retired (any rank)	0
Other	5

institution. More complete details of the survey administration are available elsewhere [7–8].

3.2 Quantitative analysis of Likert-type survey responses

Ordinal logistic regression was used to analyze several Likert-type questions measuring faculty responses to ABET accreditation related to teaching. Ordinal logistic regression is used for categorical dependent variables [26]. Participants received the instructions: "In this question, we ask to what extent the student outcomes focus of ABET accreditation has influenced your approach to undergraduate teaching. Please indicate your agreement with the following statements (1 to 5 with 1 being 'do not agree' and 5 being 'agree completely'):

- Documenting student outcomes takes time away that I would spend preparing to teach.
- Multiple-choice tests provide a more direct measure of student learning.
- Since becoming involved in accreditation, I've started using terms like "student outcomes" and "learning objectives."
- I design learning experiences that address multiple student outcomes simultaneously.

The survey also included multiple questions about specific teaching techniques. These were taken from an earlier survey of teaching practices in the SUCCEED Coalition [27]:

"Please think of a typical undergraduate course that you teach, and indicate how frequently you use each of the following teaching techniques as indicated by the response choices." (1 to 5 with 1 being 'Every class,' 2 was 'one or more times per week', 3 referred to 'one or more times per month', 4 was 'one or more times per semester', and 5 was 'never'.

- Lecture for most of the class period?
- Use demonstrations (live or multimedia)?
- Address questions to the class as a whole?
- Put students into pairs or small groups for BRIEF INTERVALS during class to answer questions or solve problems?
- Put students into pairs or small groups for MOST of the class period to answer questions or solve problems?
- Assign homework to individuals (as opposed to teams)?
- Give students the option of working in teams (2 or more) to complete homework?
- REQUIRE students to work in teams (2 or more) to complete homework?
- Give writing assignments (any exercise that requires verbal explanations and not just calculations)?

These questions received between 70 and 86 responses out of the 91 survey respondents.

3.3 Data quality and limitations

Considering the quality of the qualitative data [28], the theoretical validation of this data, while limited by including participants only from large, public, research institutions, is supported by other modes of variation. The perspective of those of different ranks and positions is included, consistent with an average engineering department. The average amount of time teaching was 16 years, which would indicate that we are not measuring novelty effects. Procedural validation is established through the triangulation of qualitative and quantitative data.

Further, the constant comparative method was used to make sure that the researchers were staying consistent with coding the definitions of quality teaching [28]. A limitation is that communicative validation was impossible in this study design, because this data was collected using an open-ended survey, so there was only one-way communication. This approach had the benefit of enhancing process reliability through the use of a

consistent survey message given to all the universities [28].

4. Findings and discussion

There were 91 surveys collected and 43 faculty responded to the ABET open-ended question, which is 47 percent. The faculty that did comment had done so with length and candor, which is a condition of quality qualitative research [28]. Among the open-ended responses, faculty views were overwhelmingly negative. Comments were identified as negative when they used words or phrases such as: waste of resources/time, not much, hasn't, not at all, awkward, confined my creative process, serve Big Brother ABET, all powerful academic dictator, adds administrative burden, contributes very little, false sense of quality control, false security, not valuable, burdensome, does not contribute to student learning, red tape, administrative nonsense, cripples creativity, huge labor costs, dehumanizes, destroys quality, creates toxic environment, many other negative effects, and drains time and energy. Positive comments were typified by phrases and words such as: helped, make possible, giving students more variety, overall goal is positive, good, and good sense. A brief assessment of the tone reveals 29 negative comments (67 percent), 11 positive comments (26 percent), and three neutral comments (seven percent) that consisted primarily of factual comments such as: collect student work, aware of ABET accreditation, didn't change my approach, more sensitive. There were a few comments that had positive, neutral, and negative comments in them, and the researcher compared the number of negative versus positive versus neutral phrases, and coded the comment according to the dominant tone. All comments in this data had a majority of either positive, neutral, or negative comments. With an eye toward the misinterpretation of our research findings, and indeed our motives, we remind the reader that it is not necessarily the criteria that are perceived so negatively. Rather, perceptions are also shaped by the way the criteria are enacted by the institution, the person coordinating the collection of Self-Study data, and other stakeholders involved in the process.

4.1 Faculty views of accreditation

Faculty felt that accreditation processes stifled creativity. Of the 29 negative comments, 19 respondents specifically discussed ways in which faculty teaching is negatively affected by ABET accreditation processes, and the respondents touched on surprisingly similar themes. One common theme was that ABET stifles faculty creativity in teaching because of the mandatory requirements for ABET accreditation. One faculty complained that the process "confined my creative process such that I try to satisfy contrived ABET requirements rather than improve content. We serve Big Brother ABET, not the students. On the bright side, being told what to do and how to teach by an unaccountable all powerful academic dictator does make my job easier (at the expense of those we are teaching)" (#34). This faculty member thinks that ABET accreditation compliance takes away from students and from quality teaching—and expresses an extreme view of ABET's externality. Another faculty states: "ABET has made me far, far more pessimistic of the future of education. ABET cripples creativity . . . distracts professors from teaching and from the students, dehumanizes the teaching process, destroys quality in teaching, drives good people from academia, creates a toxic environment for discussing teaching among colleagues, and many other negative effects. . . . and stifling our creative excellence" (#66). The inflexibility perceived by some faculty extended to the curriculum as well as approaches to teaching: " . . .Worse, the fear of ABET creates inertia and inflexibility in curriculum that stifles creative approaches to teaching . . ." (#77). The ABET accreditation criteria provide flexibility in how a program helps students achieve the outcomes and in how the program provides evidence that students have achieved them, but these faculty do not see the flexibility. This observation relates to other research that has found that faculty responded negatively to being told how to teach in their classrooms and that faculty believe that they should have academic freedom in the classrooms [29].

Consequently, there is no resolution except to help faculty understand the process and the reason for its design. On the other hand, to the extent that faculty believe that their creativity is hindered by the way student outcomes are assessed, is a matter of local implementation—how each faculty member's institution, college, program, and colleagues have decided that evidence shall be provided that the student outcomes are being met. Clearly, among our respondents, there is a disconnect between the flexibility of the criteria and those implementing the criteria at the program level.

Some faculty who commented positively about the accreditation process noted the same constraints, but seemed to see this constraint as a normal part of a design process: "It certainly constrains our program, however, we are now in the process of rethinking how we meet the requirements while at the same time giving the students more variety." (#44). Another respondent acknowledged the same standardization of curriculum, but recognized the benefit: "The importance of consistency

from faculty member to faculty member is the key piece. I am not the only one who teaches my course, but making sure that the content and outcomes that I pursue are consistent with those of my colleagues is very valuable . . .It has caused me to standardize my topics/goals with those of my peers. This is good." (#90).

Other faculty members were more positive still, and did not address the aspect of constraint that so bothered those who responded negatively: "It has helped bring focus to the more qualitative aims of engineering education—and to make it possible for faculty to discuss these" (#22); this contradicts respondents who indicated that accreditation processes made it harder to talk about teaching with their colleagues—this signals either a difference in how accreditation processes are being implemented or a difference in the perspective of these faculty that causes them to respond very differently to the same conditions. The departmental climate regarding accreditation may have more impact than the accreditation process itself. Other faculty report new ways of thinking: "It forces me to think about outcomes, which is a good thing" (#68), "I became more sensitive to ensuring that specific assignments map to ABET learning objectives, and I include a discussion of those learning objectives in the introduction to the course" (#76), and "It helps me create a list of subject specific learning objectives at the semester level." (#88).

4.2 Faculty say that the workload of accreditation keeps them from more important activities

Faculty who feel burdened by the accreditation process see it as unproductive time: "ABET harms my teaching by soaking up countless hours in unproductive work. ABET restricts creativity in teaching. ABET destroys our innate love of teaching . . ." (#86). Some faculty who acknowledge the benefit of accreditation and assessment in general, but resent the current implementation: "The overall goal of ABET is positive, but the current structure of the process is burdensome, and does not contribute to student learning." (#56). Another faculty comments, "What a waste of time. Real evaluation great. This is an exercise in red tape and administrative nonsense." (#63). This faculty member thinks that the way ABET does evaluations is not actually evaluating anything and is wasteful. These faculty members do not see ABET as a quality standard that helps students' learning, which is disconcerting because quality education is in both ABET's vision and mission statements.

Some faculty express the burden of accreditation in terms of its financial cost. While some faculty expressed this cost concern briefly " . . .ABET drives up the cost of education." (#86), others expounded the cost in time and money: "ABET is a tremendous waste of resources. It detracts greatly from time which could be spent improving teaching. Show me represented graded exams from the courses and I will tell you whether the students are learning the appropriate material and how well they are learning it. Everything else is just a waste of time and money" (#4).

Some faculty felt so strongly about this issue that they suggested that engineering programs take collective action to change the process. One faculty writes, "I find ABET a complete waste of time and I think it is time for engineering departments to stand up and say this is not what we are going to do" (#45). Another makes more specific recommendations " . . .induces huge labor costs at universities . . .Quality can be improved immediately by: 1. Providing time, money, and support staff (true support staff, not administrators) to professors to implement their good ideas, 2. Join with other [peer] engineering schools to declare publicly that the ridiculous and hyper-expensive ABET process is driving up the cost of education . . ." (#66). One faculty member felt that the accreditation process was particularly unnecessary in the case of elite institutions: " . . .adds administrative burden and contributes very little to improving student outcomes. I was teaching long before ABET and it adds nothing but more work and a false sense of quality control. If [a particular elite institution] eschewed ABET accreditation would anyone doubt the quality of the education they provided? It provides nothing more than a false security and 'image over substance'." (#36). This faculty's comments clearly resonate with the exceptionality definition of quality— that if only the best students attend the best schools, then quality would naturally result. Faculty with this view emerged even more strongly in the next theme.

4.3 Some faculty believe that restricting access is the way to ensure quality

Among Harvey and Green's definitions of quality in higher education, we noted that accreditation process are associated with the 'Value for Money' definition because it is associated with meeting the needs of an external stakeholder [11]. Where faculty hold a different view of quality, it affects their views of the accreditation process. Faculty who hold the "quality is exceptionality" definition describe accreditation as a normative process that inhibits quality: " . . . ABET is out of touch with reality [that] the world's top schools teach more successfully than the lesser schools. ABET works to drag down the top schools to the level of the lesser schools . . ." (#66). This faculty member proposes that the way to improve quality in education is to improve the

students admitted to the school: "Admit only the qualified students; it's shocking how many engineering undergrads cannot write a sentence and don't know high school algebra and geometry." (#66). This creates a lot of tension when faculty, administrators, industry leaders, students, and stakeholders try to collaborate on maintaining or improving quality in higher education. This resonates with some of the criticisms of No Child Left Behind—that excessive standardization stifles exceptionality [30].

If faculty view ABET accreditation as a barrier to quality education, nobody benefits—if faculty feel stifled or burdened, they will challenge the efforts of administrators, and withdraw from interaction with students. To the extent that accreditation intends to assure and improve the quality of engineering education, when faculty have different perspectives of quality, it is naturally challenging to reach consensus on the best approach to accreditation. It is therefore important to consider varying faculty perspectives of quality when designing local practices in preparing for accreditation. It is valuable to consider how faculty with each definition of quality can contribute to the accreditation process.

4.4 Accreditation influence on approach to teaching

The relationship of ABET influence on faculty's approach to teaching was studied using logistic regression of the data obtained from the survey. The survey questions summarized in Tables 4, 5, and 6 are discussed in the Methods section. Neither gender nor faculty rank was found to play a role in a faculty member's attitude about ABET's influence on teaching quality, so those were removed from the model and are not discussed further.

Table 4. Means of each of the ABET influences by gender

	Gender	
ABET influences	**Male**	**Female**
Documenting is a distraction	2.97	2.90
Multiple-choice tests	1.37	1.50
Uses "student outcomes" & "learning objectives"	3.07	2.94
Creates multiple levels of learning	3.32	3.76

4.5 Faculty perceptions of the accreditation process are related to their teaching practices

As a measure of how the process of ABET accreditation influences faculty approaches to undergraduate teaching, faculty were asked to express their level of agreement with various statement related to the faculty member's interpretation of ABET's principles and practices.

Responses to "documenting student outcomes takes time away that I would spend preparing to teach" are unrelated to gender, total years as a professor, and institution. Faculty who disagreed with that statement were more likely to "require students to work in teams (2 or more) to complete homework". Specifically, faculty who disagreed with the statement had a 38% probability of requiring students to work in teams (2 or more) to complete homework each week [$b = -0.50$, χ^2 (1, $N = 84$) = 7.62, $p < 0.05$ (odds ratio = 0.607)].

Faculty also indicated their agreement/disagreement with the statement: 'Multiple-choice tests provide a more direct measure of student learning.' Again, responses to this statement were unrelated to the faculty's gender, total years as a professor, or their university. 'Do not agree' was the referent group in this analysis. Faculty who disagreed that "multiple-choice tests provide a more direct measure of student learning" were unlikely (18 percent probability) to "Address questions to the class as a whole" [$b = -1.53$, χ^2 (1, $N = 80$) = 7.05, $p < 0.05$ (odds ratio = 0.217)].

Table 5. Means of each of the ABET influences by university

	University			
ABET influences	**A**	**B**	**C**	**D**
Documenting is a distraction	3.13	2.71	3.23	2.83
Multiple-choice tests	1.63	1.43	1.14	1.20
Uses "student outcomes" & "learning objectives"	2.75	3.17	2.71	3.50
Creates multiple levels of learning	3.26	3.54	3.10	4.00

Table 6. Means of each of the ABET influences by rank

	Rank			
ABET influences	**Assistant**	**Associate**	**Professor**	**Instructor**
Documenting is a distraction	3.42	2.61	3.12	3.46
Multiple-choice tests	1.54	1.18	1.40	1.67
Uses "student outcomes" & "learning objectives"	3.27	2.85	2.79	3.27
Creates multiple levels of learning	3.62	3.65	3.27	3.31

Since one step in adopting a new paradigm is learning and using new terminology, we asked a question about the adoption of terminology related to ABET accreditation and a pedagogically related term: "Since becoming involved in accreditation, I've started using terms like 'student outcomes' and 'learning objectives'. Responses to this statement had no relationship to gender or total years as a professor, but agreement with this statement was related to the respondent's university [$b = 0.28$, χ^2 $(1, N = 72) = 4.28$, $p < 0.05$ (odds ratio = 1.32)]. 'Do not agree' was the referent group in this analysis. We have previously noted that the observed reactions to the ABET's accreditation is really a reaction to the way that those processes are applied at the program level. This finding is a reminder that there are typically institutional norms regarding how engineering programs manage reaccreditation. At the large public universities sampled in this study, there is college-level coordination of the response to accreditation processes, so it is not surprising that the degree to which faculty are educated about and adopt ABET-related terminology would differ by institution. Increased agreement with this statement regarding accreditation terminology predicted decreased likelihood of "Put students into pairs or small groups for BRIEF INTERVALS during class to answer questions or solve problems". [$b = –0.39$, χ^2 $(1, N = 77) = 4.05$, $p < 0.05$ (odds ratio = 0.68)].

The data show no relationship between "'I design learning experiences that address multiple student outcomes simultaneously" and their gender, total years as a professor, and their university. 'Do not agree' was the referent group in this analysis. An increase in agreement with that statement resulted in increase that a faculty member would "require students to work in teams (2 or more) to complete homework" [$b = 0.36$, χ^2 $(1, N = 82) = 4.12$, $p < 0.05$ (odds ratio = 1.44)].

The implementation of ABET accreditation may not be taking full advantage of the flexibility in the student outcomes focus in Criterion 3. Whereas the shift of the ABET accreditation process to a student outcomes focus should give programs and faculty flexibility in how to achieve and measure those outcomes, that flexibility is not being realized by a large majority of the faculty in this study. This issue cannot be addressed simply by educating faculty about the value of accreditation, because our qualitative findings show that even faculty who understand and value the goals of the accreditation process express significant concerns about the way that it is being implemented at the program level. Thus to help many faculty realize the benefits of the accreditation process, it will be necessary to address how it is being implemented—the policies and practices established by program administrators and others who influence—or constrain—the way in which program faculty achieve and document student outcomes. As a Program Evaluator for ABET, Matthew Ohland sometimes provides input to programs on how assessment process might be simplified and reduced where they appear to be burdensome. This work will be shared with the staff at ABET headquarters, so one possible outcome of this work will be to help Program Evaluators see how they might recognize, value, and promote a diversity of ways of achieving and assessing student outcomes while minimizing the burden on administrators and program faculty.

5. Conclusions

The research questions for this study were: How do faculty describe the influence of the ABET accreditation process on quality teaching? How do faculty definitions of quality teaching -influence their views of the ABET accreditation process? How are faculty perceptions of the ABET accreditation process related to faculty teaching practices?

In our qualitative findings, faculty largely described the ABET accreditation process as having a negative influence on quality teaching—some faculty expressed concern that the accreditation process distracts faculty from having a positive influence, whereas others expressed more dire views that the accreditation process imposes a uniformity that benefits neither the students nor the faculty. A minority of faculty expressed more positive views, describing how the accreditation process has helped them think more about teaching or in improving their teaching through improved coordination with other faculty. Some qualitative responses revealed a connection between a faculty member's definition of quality teaching and their view of the accreditation process, but this was not a dominant theme.

Through quantitative analysis, we showed that faculty who express various negative views of either the goals or the practice of accreditation are less likely to engage in certain teaching techniques that are more student-centered and more likely to engage in passive delivery. More positively, our findings show that faculty who tend to agree with the student outcomes focus of the ABET criteria engage in richer educational experiences—they give students requirements to work in teams and allow students to learn collaboratively. Unfortunately, the majority of faculty still disagree with the philosophy of the accreditation process or how it is practiced.

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