Impact of Curriculum Transformation Committee Experience on Faculty Perspectives of their Teaching and its Influence on Student Learning

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I. Introduction

Texas A&M University’s civil engineering (CVEN) program recently underwent a comprehensive Program (Re)Design (PRD) process in order to align the program with both ASCE’s second edition Civil Engineering Body of Knowledge (BOK2) and ABET learning outcome criteria. The integrated PRD process is detailed in an earlier paper (Brumbelow, Fowler, Morgan, & Anthony, 2014). The current paper illustrates the significance of the PRD system approach to inspire transformative change. Faculty who participate in the PRD process, as part of the program’s Curriculum Transformation Team (CTT), experience a major shift in perspective from apprehension of the scope and need for the change to seeing the curriculum as interconnected and an iterative process to enhance student learning. In addition, faculty began to embrace the influence their teaching techniques and reflective practice have on student learning.

While faculty are equipped to deal with the daily requirements and rigors of educating in their own course, not all faculty are aware or familiar with all aspects of the overall program structure in which the course resides. Additionally, not all faculty are well-versed in the pedagogy behind effective teaching methods. While there may be internal departmental committees that oversee components like course approvals and accreditation requirements, there has not been an overarching committee that integrates accreditation requirements, course learning outcomes, consistency across sections, active learning methods, reflective thinking, assessment, and communication with all department faculty. Consequently, the initial step of the PRD process is to orient the faculty and departments to this all-encompassing process which begins the change in faculty perspective.

The following research study was designed to identify the impact of participation in the PRD process (team meetings, process tasks, sustained dialogue with colleagues surrounding teaching and student learning, etc.) on faculty perspectives regarding how their teaching influences student learning as well as to capture the perceived value of the PRD process experienced by the faculty. This paper describes the framework applied in the civil engineering discipline and includes a description of the methodology, findings, potential threats, and implications including next steps.

II. Background and context for change in faculty perspectives

The PRD process follows eight basic steps, and seeks to center the curriculum on the learner, rather than the educator (Fowler, Macik, Turner, & Hohenstein, 2015). The steps are described as the CVEN department faculty, students, and administration involved in this study experienced them.

Step 1) Select team members and orient them to the process. The department chair and curriculum team leadership met with the educational developer on PRD to review and further define the steps of the process and reach agreement. A graduate student, pursuing a professional
master’s degree in civil engineering, was hired to support the effort in September of 2013. The graduate student was selected by the CTT faculty leadership and was a top performing student who recently experienced the undergraduate civil engineering curriculum under study. The civil engineering department head invited pre-selected faculty members to participate on the Curriculum Transformation Team (CTT). Some faculty declined the invitation, citing commitments to other priorities. Thirteen faculty (including the head advisor), three graduate students, one undergraduate student, and one educational developer formed the CTT which convened in November 2013 for bi-weekly meetings. The CTT leader had an additional time commitment for planning and follow-up purposes which included meetings on opposite weeks of the CTT meetings.

Step 2) Gather data from sources internal to the university. A mixed methods approach was utilized for data gathering. Internal data collection included: faculty and student surveys regarding conceptual gaps, a student helpdesk survey, a student prerequisite survey, a student supplemental resources analysis, and student focus groups. Discussions with foundational math and science faculty who taught courses supplemental to the engineering curriculum, also occurred to seek clarification of content and terminology taught (Fowler, Anthony, Poling, Morgan, & Brumbelow, 2014).

Step 3) Gather data external to the university. External data was gathered from employers, advisory board members, and former students using electronic surveys. The CTT conducted a review of peer departmental institution websites and a review of supplemental resources utilized by students such as Khan Academy. The 174 page BOK2 document, including the detailed descriptions of the outcomes was studied by the CTT faculty. During CTT meetings, faculty were put into pairs or groups of three and asked to define the key components of each learning outcome described in the BOK2 appendix. The faculty questioned the relevance to getting to this level of detail.

Step 3) Define learning outcomes at the program level and then further define performance criteria and developmental levels. Program learning outcomes were defined based on the ABET a-k criteria and the BOK2 learning outcomes described in the appendices of the BOK2 (Brumbelow, Fowler, Morgan, & Anthony, 2014). Faculty perceived the rubric creation process as a tedious job and some struggled with the concept early on. An initial draft of the newly designed rubrics was sent to the entire faculty in the department as well as the external advisory board for feedback. The request for feedback served as both information sharing regarding the process as well as an opportunity for additional input.

Step 4) Map the program learning outcomes proposed in the courses. The CTT designed the initial draft of the curriculum map during a six-hour meeting alongside a couple of additional faculty members who were invited based on their teaching of specific key skill areas (writing/communication and computer graphics). Creating the curriculum map included charting the program learning outcomes into specific courses, including transformative or high-impact learning experiences in courses and program requirements across the curriculum, including critical thinking or reflective components in each course, and adding one new course and one zero-credit reflection requirement. The rubrics served as excellent resource documents during the mapping process and assisted with faculty consistency in incorporating concepts at the course
level that linked to program learning outcomes. Departmental faculty external to the CTT were
given the opportunity to give feedback on or ask questions regarding the proposed curriculum,
the rubrics, the data analysis results, or any aspect of the process during open faculty forums
where detailed results of each step were presented on posters and described by a member of the
CTT leadership team. Other members of the CTT were present to illustrate commitment and
assist in addressing questions. Four faculty forums were convened offering all department
faculty ample opportunity to ask questions and share opinions.

Step 6) Create course materials to support curriculum changes. The graduate assistant helped
faculty compose course worksheets to ensure consistency and inclusion of all desired course
components (program and course learning outcomes, proposed assessments, reflection prompts,
active learning components, etc.) for ease of updating by faculty teaching the courses.
Information from the curriculum mapping session and the desired level of cognitive skill
development based on the rubrics was input into the worksheet. Each course coordinator was
then responsible for: a) defining the course-level learning outcomes; b) the foundational concepts
expected or needed coming into the course; c) the reflection component that would be included
in the course; d) developmental resources available if a student felt unprepared for the course
based on the expected foundational concepts coming into the course; e) active learning
components including high-impact practices; and f) the means of assessing course-level
outcomes.

There are two additional steps: Step 7, creating implementation and assessment plans; and Step
8, implementing the new curriculum. However, these steps are in the process of being addressed
fully, and are removed from consideration in the current data analysis as experiential influencers.
These final three steps will be addressed later in this paper as future steps for this redesign
process.

III. Methods

To obtain a greater understanding of how the faculty impressions changed over the course of the
PRD process, faculty members were interviewed toward the end of the process (during Step 6 of
8) to capture their perspectives and perceptions. Interview transcripts were qualitatively analyzed
using grounded theory methods to ascertain the overarching categories and ideas faculty felt
most pertinent regarding the curriculum process. The goals were to identify the impact of
participation in the PRD process (team meetings, process tasks, sustained dialogue with
colleagues surrounding teaching and student learning, etc.) on faculty perspectives regarding
how their teaching influenced student learning as well as to capture the perceived value of the
PRD process experienced by the faculty.

The sample participants for this study consisted of thirteen CVEN faculty participating on the
CTT. Eight faculty members agreed to participate; six participants were associate professors, and
two were full professors. Two participants had been on the CTT for roughly half a year, while
the remaining participants had been on the CTT since the project began in 2013. All participants
currently teach at least one undergraduate course and function as the head coordinator of a multi-
section undergraduate course. Each undergraduate track in the CVEN degree plan was
represented (i.e., general, construction engineering and management, environmental, structures,
water resources, transportation, geotechnical, coastal and ocean). Participants were sent an email
informing them about the study, and faculty willing to participate in the study self-selected through an email response. A date and time was then set to conduct a one-on-one interview between the participant and a graduate student research assistant. Four interview questions guided the semi-structured interviews.

Interview Questions:
1. How did prior expertise and experiences impact engagement with and outcomes from the Curriculum Transformation Process?
2. What was the most influential (positive or negative) aspect about the Curriculum Transformation Process?
3. What was the most difficult to grasp during the Curriculum Transformation Process? Do you have suggestions for what would be helpful in this area?
4. What has changed (or not) in your teaching or advising?

During the interviews, the questions were used to encourage participants to reflect upon their experiences participating in the process as well as how those experiences may have influenced their teaching or advising methods. This study is focusing only on the teaching component. These reflections were then examined to identify similarities and differences of the participants’ perspectives and experiences. The interview responses were also contrasted against the expert perspective of the principal investigator to evaluate the goal alignment and level of understanding of the participants. The principal investigator also offered anecdotal context to the collected data through first-person observations during meetings and activities.

After a graduate assistant transcribed the interviews, the constant comparative method was used to analyze the interview data (Strauss & Corbin, 1990). Researchers used open coding to conceptualize the data, followed by axial coding to make connections among the categories of data. These codes can be seen in Appendix 1A. Two researchers independently coded the interviews and met with the research team for peer debriefing sessions (Lincoln & Guba, 1985). During the peer debriefing sessions, the researchers explored the categories of data and discussed relationships among the categories.

IV. Findings

Overall, faculty indicated that their experiences were positive and that they felt the project had been highly valuable. However, there were varying levels of comprehension of the process and its merit in the long term (Figure 1). Faculty members who more readily participated in the process were more self-reflective and had more interest in the long-term impacts of the revision process on the entire CVEN program. Other faculty focused more closely on the short-term or course-level impacts of the revision process and engaged less in post-process reflection. This disconnect indicates a potential disparity between the program update’s purpose and the faculty’s ability to envision beyond the course level.

Most of the participants responded that at first they experienced a low engagement with the process. Some participants feared that the changes alluded to by both the name of the team and concept of curriculum redesign were going to result in a major overhaul of the program. Other
responses included some misconceptions over the rationale behind the curriculum redesign and a desire to ensure the quality of programs were not negatively impacted. One participant said:

We’re a top 20 department, at least, top 20, and so it implies that we’re doing a lot of things right. So, what are we doing wrong that all of the sudden a transformation is called for? And so I think the name was a little bit of a, as it turns out it’s kind of a misnomer. But I think it was also something that kind of caused the shields to go up at first.

Figure 1. Observations of engagement. This figure illustrates the continuum of experiences indicated by participant responses.

Participants also reported a short-term focus on impacts and activities associated with the PRD process. Data included indicators that participants were uncomfortable or uncertain about their own educational expertise:

I think the typical engineering faculty, despite the fact that she or he has very little training in true pedagogy also feels fairly threatened by being presented with pedagogy so it has to be presented in a way that feels relevant and respectful. Which it was. But, the anxiety was there in the beginning.

Participants also reported a sense of disconnectedness and limited awareness of others within the large civil engineering department. Self-reported behaviors that were correlated within the interviews to lower engagement with the PRD process were irregular meeting attendance, refraining from participating during meetings, relying on external factors for motivation and assessment, and evaluating changes based on individual interests.

However, the participants reflected that as time continued, they began to grow more comfortable with the process. They identified several major shifts that helped increase their engagement in the process. One factor regularly identified was the presence of the educational developer. The educational developer served not only as an expert on educational pedagogy, but also provided vital facilitation and project management expertise. Participants reported that the educational developer’s presence helped keep them on track and enabled deeper engagements with
The structured nature of the PRD process was also served to assist the shift from low to increasing engagement. Participants remarked that what they perceived as a more scientific approach helped to ground educational pedagogy within the engineering discipline. Participants felt that this helped them to internalize the teaching and learning concepts that the PRD process presented. Direct interactions with the curriculum through activities such as curricular mapping and creating program assessment rubrics also helped to build faculty confidence and understanding of how their teaching could influence the overall experience of a graduate in the program. One participant stated:

"You know I think that there was a lot of effort on the part of the [educational developers] to overcome a lot of that stuff to make it, digestible by engineers. To do it in a very non-threatening manner, to do it with the data, very data-driven philosophy. To make it clear that the engineering department faculty were really making the decisions, not that the decisions were being forced on them. I felt very good about that. So, I think it’s been a great process. It’s been a fantastic process."

As participants reported their increasing engagement, they also discussed how they started approaching their teaching differently. Participants noted that they looked at the PRD process and classroom curriculum in a more connected manner. They also noticed that they pursued assessment based on internal factors and a desire to improve student learning, rather than relying on external bodies. Faculty at the highest level of engagement discussed the curriculum and PRD process as a holistic process. The most engaged participants focused on how each course was a component that would help grow the students through learning experiences. In contrast, participants earlier in the process indicated they thought of the curriculum and teaching as a series of courses that were disconnected and separate experiences. A more holistic view of the curriculum also helped faculty feel as though they owned the curriculum, and enabled the interviewed faculty to adopt effective instructional principles in the process:

"It was hard to see how all the stuff threaded together, and I think that was probably the source of my initial reservations because I just couldn’t see the big picture…"

"We’re a large faculty, we have a very broad curriculum that has all these different specialty paths that people can follow and it’s very easy to fall into a trap of really all I care about is my particular specialty area. I think that I feel greater ownership over the whole thing… And I think just the chance to all sit down and think about how we teach…they’ve learned a lot about teaching and learned a lot about learning. Learned a lot about students."

Interviewees identified several factors that helped produce shifts in engagement and pedagogical understanding. Participants explained that including students and engaging them in the process was helpful. One participant mentioned that they did not think that students would provide effective feedback, but was pleased at the depth and understanding students indicated. The same participant also noted that it helped bring about a major turning point in their approach, as the need for learner-centeredness became more apparent. While there were still some uncontrollable external factors, namely BOK2 and ABET standards, these were seen as positive influences in that they supported accountability. As engagement increased, participants began to use BOK2 and ABET standards as a starting point, rather than the goal of the civil engineering program. Other, more internal influences to both the university and the civil engineering discipline also encouraged participants to engage and make informed decisions, despite being beyond the CTT’s control. Such influences included institutional and college priorities, academic reward structures, historical civil engineering perspectives, industry priorities, and external laws governing
industry. As engagement increased, participants began to critically evaluate how they could influence the achievement of the program learning outcomes by incorporating components at the course level, as evidenced by this excerpt:

So as the map comes together, and as we see where things are, we kind of say, ‘okay we’re not addressing this, or we need to be addressing that.’ I think what’s exciting is when you are able to take a look at your course and go oh, okay, maybe if I can put this bit in here, I can address this. Or, how would I address globalization in my course? And some courses, obviously they’re not going to lend themselves to that, but other courses will. And I think it’s interesting, and a cool challenge, to try and figure out how to fit that in.

V. Potential Threats

Key changes that occurred during the PRD process are shared to highlight potential threats for the process to lose momentum or derail. Impacts of the changes are also shared to demonstrate the effectiveness of utilizing a systematic approach.

*Faculty participation and leadership fluctuations.* As Texas A&M University is a research-intensive institution, one can anticipate that many faculty are focused on research over the summer months which often includes extensive travel. The absence of the faculty leads to less engagement with the process. The PRD process addressed this gap with continued efforts by the graduate student to prepare documents for dissemination and for the required university course approval process. The educational developer, a staff position, and the program leader continued oversight during those months. The CTT program leader also had significant travel but made the effort to meet with the educational developer and graduate assistant when in the office allowing many components to continue. Occasional meetings regarding individual courses were also scheduled with faculty as they were available. Upon return to the committee sessions in the fall, process updates were presented and feedback obtained. Another potential threat to the CTT, consisting mostly of faculty members, was the retirement of the program leader a year and a half through the process requiring a change of program and committee leadership (January 2015). Again, one may be concerned that the leader, as the champion of the process, departing would lead to a loss of momentum. However, the process continued with full steam.

*Graduate assistant transitions.* The graduate students who assist with the process are professional master’s students and, therefore, graduate from their program potentially during implementation and continuation of the process. Implementation of the PRD process is currently on the third graduate student supporting the project and all transitions have occurred with great success. The need for transition of the educational developer to a colleague was necessary based on workload. Currently five months after the transition, the faculty interactions with the educational developer as well as the redesign process continue to operate smoothly and the initial educational developer is available as needed.

*Name misnomer.* Based on CTT and other civil department faculty concerns regarding the term ‘transformation’ and the feedback from this research, a recommendation to change the name of the committee was proposed. The name has changed from the Curriculum Transformation Team to the Curriculum Assessment and Implementation Team (CAIT).
One of the most significant reasons that these threats were avoided or resolved was due to the presence of the educational developer. Several participants identified that the educational developer was not only a pedagogical expert who offered clarification and facilitated understanding, but the developer also served as a source of impetus for the group through project management and facilitation skills. Both skills were identified as being vital to continuing the process and ensuring that these threats were considered in a timely manner. One participant said:

I was encouraged because I felt we would have some experts on education. Engineering faculty are not very well versed on educational concepts. I think that as individuals, they know what works for them which is supported only by anecdotal evidence, and not any kind of defensible evidence. So having some folks that could come in and be independent experts was very, very encouraging.

We’ve been kind of cavalier about saying, okay, this is good for lifelong learning, and then [educational developer] would say, how are you going to measure that?

The 90 minute meetings were good meetings and I think were well-structured and those were very important for that sort of building of trust, that sharing of perspectives. I mean those were very, very productive…

There were two kinds of meetings, in some cases there were breakout sessions… I think it’s better in the meeting if you try to do the assignment or task on the spot so as misconceptions arise or confusion arises, you can get an answer right on the spot. I believe an interactive approach in the meeting was effective.

We broke into groups in CTT meetings and I would be paired with a couple of faculty colleagues…if we had a question that none of understood, we asked [educational developer] and then we’d go back and chew on it some more.

VI. Discussion of implications

Literature on transformative learning aligns with findings in the present study. Transformative learning is described as a change in one’s frames of reference or the way in which one makes sense of the world (Mezirow, 2000). Mezirow identified conditions that foster transformative learning in adults, and faculty development researchers have examined such conditions for their impact on faculty member’s views on teaching and learning (Apte, 2009; Balmer & Richards, 2012; Whitelaw, Sears, & Campbell, 2004). The shift that study participants experienced as a result of their participation on a PRD team reflects a transformative change in their perspectives regarding how the teaching in their course influences not only student learning but the overall experience of their education. At first, participants expressed feelings of apprehension, but as their engagement with the PRD process increased, their frames of reference changed, resulting in acceptance and a positive outlook toward curriculum redesign:

And I know there were other faculty, based on their comments, that also took the same impression that, this organization, or this group thought that there was something wrong with the curriculum and they were going to fix it and it was going to be drastic changes.

Yeah, I would say, in the very beginning, it was hopeful slash moderately anxious, and they’ve become more and more positive steadily over time. And I’m very positive on the process now.

Well, I think really what changed my opinion the most from what might have been interpreted as being slightly negative to something that’s far more positive, is actually seeing the process unfold. So that is, becoming a little more plugged in to the process and part of it.
Faculty development researchers indicate that one factor that contributes to transformative learning involves allowing time for “retreat or dormancy” (Apte, 2009, p. 182). The long-term nature of the PRD process provides faculty with the time to reflect on their teaching and its impact on student learning. Another finding in this study supports the notion that increased engagement and time with the process fostered a change in individual faculty perspectives regarding their role in student learning:

A lot of things have changed, actually. There’s a lot of things that are still changing. I’m still figuring out ways to implement things. I think that I’m much more focused on the use of rubrics now. I had used them to a limited extent previously, but I find that they help me with the student evaluation process greatly to keep things in perspective on what it is that we’re trying to achieve in assignments. And it also is beginning to give me a view towards how to collect useful data on how well students are learning and how well they’re performing. So certainly, that’s one big item, the use of rubrics in a very, very formal systematized fashion.

And I think that the intensive rumination on the BOK outcomes has been very useful for me as an individual in each course to think about, what is it that is really important that students leave this course with? Again, you know, kind of back to that, thinking about a course as a collection of microscopic technical problems and making sure they can solve all these little, limited problems, I think it’s gotten me to think in a much bigger picture about, skills, attitudes, and how we develop those in students. I think a lot of what I’ve become more cognizant of is trying to figure out how the students learn.

Transformative learning literature suggests that creating a safe space for exploration and one in which diverse perspectives are welcome contributes to the process of transformation (Mezirow, 2000). As a result of the environment created by the educational developer through the PRD process, findings in this study demonstrate that the participants viewed the process as positive and effective, considering that some factors were in our control while other factors were not:

I think it’s helped us to take ownership of the whole department in the faculty in a much more pronounced way than it was before.

I know conversations with [educational developer] here and there have pushed me to try and do things and think about things that I hadn’t gotten to yet.

The department is actually in the midst of the process of developing another degree program. And I have been doing everything in my ability to make sure that as that program is formulated, we are following the lessons that we’ve learned in this process.

VII. Next Steps for civil engineering department and PRD process

During Fall 2015, CAIT developed a plan to proceed with the revised curriculum. The leadership team held individual meetings with track coordinators to examine potential gaps in the curriculum map where students taking elective courses in flexible tracks could bypass one or more of the program learning outcomes. The supporting graduate student then met with course coordinators one-on-one to share updates on the process as well as gather additional information for course worksheets. In addition, the department head held a meeting with course coordinators to inform them of enhanced responsibilities in ensuring that curriculum revisions would be implemented uniformly across sections. Implementation planning continues in Spring 2016 and communication throughout the process persists. The leader of CAIT provides updates during departmental faculty meetings, retreats, and forums. The communication plan includes quarterly
meetings between the department head and leadership team. Presentations and publications in conferences such as FIE (2014) and ASEE (2015, 2016) serve as a means to share results with the wider engineering education community.

For Spring 2016, two pilot assessment meetings are planned in which CAIT will utilize the rubrics to assess course assignments that reflect the developmental progression of each program learning outcome. These meetings will serve the purposes of calibrating the rubrics as well as provide an opportunity for CAIT to practice assessing student products or evidences of learning. Upon completion of the pilot assessment meetings, CAIT will develop an assessment plan for each semester moving forward, including the collection and analysis of student products. The assessment plan will align with institutional as well as accreditation requirements to enhance the efficiency and effectiveness of program assessment efforts.

Changes implemented as a result of the PRD process include a graphics course (implemented in Summer 2015), a zero-credit reflection requirement (implemented Spring 2016), critical thinking or reflection components embedded in all courses (ongoing), and implementation of civil engineering examples into a mechanical engineering thermodynamics course. Meetings continue with course coordinators and faculty teaching each course to discuss the uniform implementation of program learning outcomes as well as assessment of student products.

VIII. Conclusion

Increasingly, programs are feeling the pressure to graduate students who are creative and adaptive learners, and doing so will require a major shift in the ways that teaching is viewed in higher education (Spence, 2001). As this study demonstrates, the Program (Re)Design process serves as a catalyst for fostering this type of change by transforming faculty members’ perceptions about how their teaching influences student learning both at the course and the integrated program level. Faculty in the CVEN department at Texas A&M University participated in a curriculum redesign process facilitated by an educational developer from the Center for Teaching Excellence. The process involved regular meetings, ongoing conversations about teaching and learning, and constant communication about the redesign team’s efforts. Through qualitative interviews with faculty who were part of the redesign team, researchers identified three major findings. First, as engagement with the PRD process increased, faculty demonstrated a shift in their perspective about curriculum redesign. Initially, faculty were apprehensive about the change effort, but as they engaged with the process, they developed a more comprehensive and positive outlook. Second, participation on a sustained curriculum redesign team resulted in faculty member’s becoming more reflective about how their teaching could be changed to better enhance student learning. The faculty became motivated to try new techniques and look more closely at assessment results for evidence of student learning and not because an accreditor required it. Faculty saw the benefits of the process in improving student learning instead of viewing curriculum redesign as another “checking the box” exercise. Lastly, faculty members recognized the benefits of a systematic process in maintaining momentum, despite uncontrollable factors that occurred. In Spence’s (2001) call to action, he emphasized that for true change to occur in higher education, faculty will need to become designers of learning experiences. By transforming faculty members’ perspectives regarding their contributions to student learning, the PRD process empowers faculty to design learning
experiences so that students are better prepared to meet the demands of an ever-changing and complex world.

IX. Future Research

The influence of change at the program level on the institution and professional association perspective has been noted anecdotally. Future research could study this influence in more detail through analysis of strategic documents at the institutional level and analysis of accreditation and certification documents at the national level. In other words, are some of the new learning outcomes or teaching methods proposed by program faculty informing processes and strategy at the higher levels? Another study could be aligned with the assessment plan of the program to determine effectiveness on student learning. Finally, another qualitative study including interviews with faculty two years out could inform the sustainability of the change in perspective of the faculty as they experiment with new teaching techniques.
References


## Appendix 1A

### Codes and Categories used in Qualitative Analysis

<table>
<thead>
<tr>
<th>Category</th>
<th>Open Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Apprehension</strong></td>
<td>Toward drastic change&lt;br&gt;Toward external educational expertise</td>
</tr>
<tr>
<td><strong>Benefits of the redesigned curriculum</strong></td>
<td>Appropriate level of instruction&lt;br&gt;Being able to identify gaps and redundancies&lt;br&gt;Course consistency&lt;br&gt;Focus on learning outcomes&lt;br&gt;Improved relationships with administration&lt;br&gt;Professional preparation of students&lt;br&gt;Smoother accreditation process&lt;br&gt;Diverse communication among faculty</td>
</tr>
<tr>
<td><strong>Challenge of process and implementation</strong></td>
<td>Faculty load&lt;br&gt;Communicating with non-CTT faculty&lt;br&gt;Distinguishing curriculum map as the ideal or as current state&lt;br&gt;Lack of understanding of educational concepts&lt;br&gt;Meeting attendance-irregular&lt;br&gt;Non-experts contributing to rubric development&lt;br&gt;Time commitment&lt;br&gt; Unsure of the benefit&lt;br&gt;Unsure of the end goal&lt;br&gt;Internal and/or external influences&lt;br&gt;Fear of others making decisions about one's course(s)&lt;br&gt;Talking about teaching - not a part of their culture&lt;br&gt;Tension between academic freedom and uniformity&lt;br&gt;Difficulty moving perspective from course level to program level&lt;br&gt;Lack of awareness due to department size&lt;br&gt;Personal interests or goals</td>
</tr>
<tr>
<td><strong>Empowerment</strong></td>
<td>Course coordinator role&lt;br&gt;Credibility and influence of the leadership team&lt;br&gt;Faculty engagement and input&lt;br&gt;Internalizing effective pedagogy</td>
</tr>
<tr>
<td><strong>External influences</strong></td>
<td>ABET&lt;br&gt;ASCE-BOK&lt;br&gt;Industry&lt;br&gt;Laws&lt;br&gt;Relationship of the process to external factors (interconnectedness)</td>
</tr>
</tbody>
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| Internal influences                      | Academic reward structures  
|                                      | College  
|                                      | College administration  
|                                      | Faculty buy-in  
|                                      | Historical  
|                                      | Institution  
|                                      | Change in leadership  
| Positive aspect of the process        | Structured meetings  
|                                      | Affirming  
|                                      | Applying the process in the future and in other areas  
|                                      | Faculty-driven  
|                                      | Faculty forums  
|                                      | Informed advising  
|                                      | IRD Matrix/Map  
|                                      | Educational developer  
|                                      | Reflecting on and/or learning about teaching and learning  
|                                      | Rubrics  
|                                      | Student input  
|                                      | Systematic approach  
|                                      | Data driven  
|                                      | Informed advising  
|                                      | View of curriculum as interconnected  
| Shift                                 | In attitude and emotion  
|                                      | In knowledge of the process  
|                                      | In knowledge of the process-perception of workload  
|                                      | In perception about expected level of change to curriculum  
|                                      | In understanding the purpose  