Pandemic Pivots Show Sustained Faculty Change

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Abstract

In this research paper, we focus on evidence of successful and sustained faculty change as part of our design-based implementation research project contextualized in the COVID-19 pandemic. This work draws on previous collaborative change efforts implemented in a multidisciplinary engineering department at a Hispanic-serving research institution in the Southwest and supported by a multiple-year NSF-funded Revolutionizing Engineering Departments (RED) grant. The abrupt shifts in instructional environments and practices brought on by the pandemic provide a valuable opportunity for us to explore whether and how faculty changes inspired and supported by RED-related activities were sustained during a time of crisis and upheaval. By analyzing and triangulating qualitative data sources such as interviews, recorded faculty meetings and professional development workshops, archived emails, and student surveys, we identified and reported salient indicators of sustained faculty changes, including their awareness and care related to students' success, their readiness and implementation of online teaching pedagogy, and their initiatives in creating inclusive learning environments for diverse student needs. Results suggest the importance of fostering and sustaining change by creating collaborative spaces for faculty to reflect on and support each other's teaching practice. A departmental Community of Practice (COP) related to teaching provided faculty with existing space, norms, and practice supporting each other in reflecting on, adapting, and improving their teaching to support the needs of diverse learners. We share our findings and implications in a traditional lecture.

Introduction

The emergence of COVID-19 exerted a significant impact on higher education, including a new era of emergency remote instruction to cope with the worldwide spread of the pandemic [1]. Overnight, instructors and students had to leave their classrooms and laboratories. Although online learning is not new, both instructors and students faced an unprecedented challenge in adapting to emergency remote learning environments that were home- or dormitory-based. Previous research has found that less-experienced faculty often feel underprepared and underestimate their capabilities in the delivery of online instruction [2]. Although studies have found that faculty commit similar amounts of time to face-to-face versus online teaching, how they spend this time differs, with more time allocated to preparation in online courses [3, 4], and this may contribute to the perception that online teaching requires more time. The pandemic exacerbated many faculty members' concerns as they had to adapt to online teaching in an instant. At the same time, students experienced unique challenges adapting to emergency online teaching as well, finding themselves under new and more challenging circumstances that affected their learning experiences in a variety of ways.

In this paper, we consider the challenges faculty faced in quickly transitioning to remote online education and meeting diverse students' needs in light of the COVID-19 pandemic. We explore these challenges in the context of an engineering department at a Hispanic-serving research institution in the Southwest United States in the midst of an NSF-funded Revolutionizing Engineering Departments (RED) project that had been, in the four years prior, working to better support diverse student success by collaboratively redesigning program curriculum and instruction. This RED project aims to develop faculty's capacity to identify and build on student assets, create realistic design challenges in core courses, and integrate support for writing in the

discipline. The core strategies for this change initiative included implementing faculty professional development workshops, integrating a learning scientist and writing instructor into the department, supporting faculty in conducting collaborative engineering education research, and developing a departmental community of practice (COP) around teaching. Pre-pandemic analyses demonstrated faculty growth around RED-related goals, including an increase in the use of asset-oriented, student-centered pedagogies, their understanding of how people learn, and their capacity to adapt and improvise in their teaching [5]. When the pandemic upended faculty's teaching routines and practices, we wondered: Would faculty sustain the asset-oriented, student-centered mindsets and teaching practices they were increasingly adopting? Would the abrupt changes cause faculty to revert to the more traditional approaches more common before the start of the RED project? We explore whether shifts to more asset-based, student-centered pedagogies were sustained in the context of emergency remote teaching and a global crisis through analysis of qualitative data collected in the course of the RED project's design-based implementation research [6].

Teaching through a pandemic

Researchers have explored how faculty responded to the disruptive circumstances related to COVID-19 and how faculty members' beliefs and practices change when transitioning from traditional instructional modes to remote online delivery [7-10]. For instance, limiting the research period to the early weeks of the pandemic (April 6-19, 2020), Johnson and colleagues [8] surveyed 897 faculty and administrators from 672 institutions across 47 states in the United States about their experiences and approaches in response to the emergent situation. They inquired about their current situation, experiences, and what types of assistance were needed. Administrators' responses revealed that the majority of institutions transitioned their face-to-face class delivery to remote teaching modes, or suspended or cancelled certain courses. They reported engaging a variety of internal institutional supports and resources for the transition process, including instructional designers, digital learning centers, and peer-mentor facilitations. Findings from faculty participants indicated that they invested efforts in online teaching through a wide range of professional development opportunities, including taking courses or seeking assistive resources. Faculty employed different teaching strategies in their use of institutionally-based learning management systems, including creating synchronous course lectures, providing pre-recorded videos, and using a variety of communication methods such as mail, email, and phone to promote teacher-student interaction. Faculty also expressed the need to modify curriculum, grading policies, and expectations of student work, and suggested that information and best practices to support students' success remotely were much needed.

Moralista and Oducado [9] conducted a survey study in the last week of May 2020 with 27 faculty respondents from a state college in the Philippines. The majority of faculty did not have sufficient training and preparation in online learning, and they were asked for their opinions regarding challenges and obstacles in online teaching. Respondents were not certain about the viability of online learning in replacing traditional face-to-face lectures. They observed less engagement in students' interactions via online discussion and increasing academic dishonesty. They were also uncertain about how to evaluate the students' learning progress.

Ramlo [10] employed Q methodology, a mixed methodology, to study the subjective experiences of 78 college and university faculty across disciplines related to COVID-19 in a way that facilitated differentiated rather than aggregate viewpoints. Data analysis revealed three main

viewpoints. The first viewpoint, summarized as "techies who like to teach," included faculty who had taught online before or had extensive experience with learning management systems and felt relatively ready to teach online. They maintained some concerns about teaching certain courses—such as laboratories and design courses—online, and they still expressed that they valued and missed interactions with students. The second viewpoint, summarized as "overwhelmed as human beings," included faculty who, like those in the first group, were prepared to teach online, but who felt overwhelmed by their caregiving responsibilities on top of moving to teaching online. In some cases, their situations were complicated by technology, such as not have access to adequate computers, but most in this category were women with experience teaching online. The third viewpoint, summarized as "it's about what cannot be done online," included faculty who were concerned about their capacity and the potential of technology to support interactional and experiential forms of learning. They tended to not see teaching online as enjoyable and expressed a sense of loss over the missing physical settings and face-to-face meetings. These different viewpoints highlight the diversity of faculty needs, even when faculty have similar levels of experience teaching online, as seen in the first and second viewpoint. In the current study, where most of the faculty had no prior experience teaching courses online and had taken up experiential and interactional forms of teaching, we would expect to find them expressing the third viewpoint, and perhaps a variant of the second viewpoint.

Purpose of this study

This study of faculty change attempts to better understand whether previous faculty change has been sustained in the context of the COVID-19 pandemic. We agree with previous research that the management, implementation, and sustaining of a major change process in higher education settings involves complex factors, such as administrative approaches, curriculum development, pedagogical innovation, and teaching evaluation [11-16]. Many change projects fail to bring about change [17, 18]; complicating this, what counts as evidence of sustained successful change is poorly defined. However, our prior work also suggested that by supporting faculty to implement sociotechnical design challenges in core classes, faculty became more aware of student potential, because such teaching brought them into closer proximity with students and such experiences brought out students' passion [19]. We argue that the 2020 pandemic, which brought about an abrupt shift to teaching online, provided a fair test of faculty beliefs and revealed a great deal about their values related to student learning. With little time to plan, faculty might have "relapsed" into well-known ways of teaching, suggesting the change was incomplete or superficial.

In this paper, we present evidence of successful and sustained faculty change during this transitional period based on our previous work. We were particularly interested in investigating whether shifts in faculty instructional practices were sustained during the COVID-19 pandemic. This change project sought to support faculty to adopt asset-based pedagogies, and earlier analyses demonstrated growth in this area. We wondered if faculty sustained beliefs that our diverse students' prior every day and cultural experiences could serve as a foundation for learning to frame and solve engineering problems. We sought answers for the research question: What are indicators, if any, that faculty sustained prior changes in perceptions and practices amidst the COVID-19 pandemic?

Methodology

Context and participants

This study takes place in the context of a collaborative change effort supported by a multiple-year NSF-funded RED grant within a multidisciplinary engineering department at a Hispanic-serving research institution in the Southwest United States. Our stakeholders in this change process include all teaching department faculty (around 20 tenure- and non-tenure track faculty, including a lecturer) and around 300 undergraduate students. We employed design-based implementation research [6] and Kotter's change model [20], which is one of the most well-known frameworks for change management [21]. Our work revealed how an emergent and iterative approach to Kotter's change model can effectively guide major departmental change initiatives in academia [14]. We identified four roles of peers in accelerating faculty development and mindset change through a COP theoretical framework [22], including departmental colleague peers, disciplinary colleagues from other institutions who had already embarked on teaching innovations, teaching and learning experts, and students who helped faculty understand their experiences and points of view [19]. The current study included the same participants as the larger study: departmental faculty members, including both senior and newly-hired faculty, administrators, and students.

Data collection and analysis

For the present study, we drew from previous data sources from our design-based implementation research, as well as more recent data collected during the COVID-19 crisis (since March 2020). We relied primarily on participant observation across the third through fifth years of the change project, including the spring 2020 shift, as well as summer and fall 2020, when faculty reflected and planned for COVID-19 adaptations. We collected faculty interviews, audio recordings of faculty meetings, emails, revised course policies, and student reactions collected through a survey. We transcribed audio records and iteratively reviewed data, first for (dis)confirmatory evidence of faculty alignment to change goals. We then used an in vivo approach [23], grounding insight in data. We also relied on supplementary data collected during faculty meetings, where programmatic issues and plans are discussed more openly, though these may still be subject to social desirability concerns. Throughout this process, we attended to faculty members' explicit and implicit values, paired with their pedagogical practices that aligned or contrasted with them.

Results

We identified three primary indicators that faculty sustained prior changes related to understanding and implementing asset-based, student-centered teaching amidst the COVID-19 pandemic: first, they negotiated tensions in maintaining high standards while showing care; second, they displayed pedagogical flexibility and responsiveness to support diverse students' success; and third, they continuously supported one another in overcoming challenges, reflective of a mature community of practice.

Faculty negotiated tensions in maintaining high standards while showing care

Particularly at the very beginning of emergency remote teaching, faculty grappled with how difficult it was to recreate course structures and practices in ways that worked for students' learning. In a faculty meeting in late March, one faculty member acknowledged the difficulty of the task:

I think the main thing I've learned over the last week, which probably all of you, all of you already knew is that if you're really going to transition to an asynchronous online format, it's essentially developing an entirely new course, and so I think we shouldn't minimize how much effort is going to be involved in that… I mean, you just basically, you know, you have your plan for what you would do in a normal classroom and so forth, and you just might as well throw that away and reorganize the entire course… So we shouldn't minimize the effort that's going to be involved in doing this.

In the same meeting, another faculty member talked about the difficulty of gauging students' learning without the kind of in-person interaction they[1] were used to:

[In class in the past] I very much kind of gauged students' reactions, and I like to ask questions as the lecture proceeds. And so I can't do that now. So it's tough for me, because I don't have that instant kind of feedback on if they're confused or if they, you know—I can't ask them questions in real time and so forth. So that's been the tough part.

At this point early in the pandemic, faculty discussion largely revolved around how to maintain high standards for student learning while "trying hard to be reasonable about what we expect from the students under the circumstances." They discussed the pros and cons of various grading options (e.g., credit/no credit versus a regular grading scheme), tools for synchronous and asynchronous learning, and strategies for assessing learning. For example, in a late March faculty meeting, faculty spoke about a decision not to give any midterm exams and grappled with how to show care for all the hardships and uncertainty students were experiencing, while also trying to figure out how to monitor student learning. One faculty member said: "In the classroom setting, you can walk around and watch the students do a problem. [Online], how do I determine whether the students are actually working on material or not? That's, that's what I don't have an answer for."

At meetings from spring 2020 all the way to the present, faculty have regularly discussed strategies for monitoring student learning, ranging from low-stakes homework problems, to quizzes and exams where students' devices are locked down and their eye movements tracked to detect cheating, to project-based assignments to portfolios. Ideas about the best approach for particular courses have shifted as the context and student needs have shifted. Early in the process, just as faculty were transitioning to online instruction, two faculty members co-teaching a course discussed a quiz they used in place of the usual midterm exam. One spoke about how "there was one hundred percent participation even [from] the international students who had gone home" and the "results were pretty good." The other acknowledged that "it was also much easier than what they would have gotten on a real exam, unfortunately."

Faculty expressed tensions between maintaining high standards and meeting student learning goals while also showing care for and attending to students' difficult circumstances during the COVID-19 crisis. For example, after talking to students extensively about their "pain points," one faculty member said:

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[1] In order to better ensure confidentiality, we have chosen to use the singular, gender neutral "they" when referring to participants.

In our class and—this is kind of a challenge to all of us in our classes, you know—we would like to deliver the same material, we would like to keep the rigor, at which, you know—in [class] you know, we are, but there better ways to do some of the things I feel like after talking to our students in terms of flexibility. What I'm realizing when again, when I talk to students is that, you know—timed exams on a particular day—you know, some of our students have spouses who are essential workers, so they're not home. And they're home taking care of their three-year old. I mean, there were just a lot of circumstances going on, you know, certain ways of doing things just makes it easier for the students. Not easier in the sense of they do less work, but, you know, just lower the barrier for them to do the work… Just keep that in mind and be very flexible when they do ask for extensions on homework or projects, et cetera.

Throughout the pandemic, department faculty have reached out to each other within the department and to others outside the department for support. Their continuous reflection and discussion have helped address these tensions between learning and care over time. Even by mid-April, faculty were already reflecting together in departmental faculty meetings on what they had learned over the previous month. For example, one faculty member reflected:

I've seen a couple of very interesting things. One is I thought that students would prefer asynchronous [classes] and by and large, most of them have preferred synchronous because it keeps them—basically, they say it keeps them on track. Otherwise things build up too much. I offer my lectures in a synchronous format and also prerecorded on Zoom. And I was quite surprised, because I thought the time flexibility would be to their advantage. But the feedback I got… is [that] by and large, they liked the structure of having a class at a specific time, even if it's on Zoom.

Another faculty member talked about building on a strategy they'd seen another faculty member use for an exam, how that strategy had worked well, and how they had worked flexibly given students' home-based limitations:

I followed the way that [another faculty member gave exams]. And you gave the exam on Monday morning at midnight and it was due on Friday afternoon or evening at midnight. You give them a whole week, and I decided on purpose to make the questions completely open ended so that they couldn't just copy and paste from somewhere, so they would have to write. And several students told me they didn't have printers. They can't print the exam, and I said, no problem. You don't have to print anything. You'll just write it up. And they—all 30 students literally beautifully handwrote the exam. I was grading it on the weekend, and I was impressed with how well it worked. So I think it's a question of what kind of problem you give that you feel you can assess the core understanding of an application.

During a more recent (January 2021) department workshop on facilitating collaboration in online teaching, several faculty members spoke confidently about different assessment strategies they'd used and what had worked—both in terms of gauging student learning and maintaining the kind of flexibility needed for students to thrive during this unique time. For example, faculty discussed using portfolios or having project-based assignments in place of exams.

Faculty showed pedagogical flexibility and responsiveness to support diverse students' success

In delivering remote online instruction, faculty demonstrated pedagogical flexibility and responsiveness to support student learning. For example, faculty observed and collected feedback on students' online learning experiences, including challenges related to studying at home. In addition to a departmental survey of students' experiences and challenges, faculty learned about their students' experiences by talking with students in their classes and through reports from university-based student services. They learned that, for example, some students who were living with their families were struggling to complete their work because of distractions around the house, such as younger siblings. The students also faced internet access and bandwidth issues, including slow internet connections for rural inhabitants. For example, one faculty member stated in a faculty meeting that:

> I asked them: How was the online learning going? Does it work in your family situation? And the answer which I'm getting is it's really tough for people who are back at home. Some of our students have rented an apartment rental, and they're staying there and there. And so the environment is not so difficult, but when you have, when you're in a house, which has a number of younger siblings and they're all trying to get their work done, parents trying to work online, and literally I have one student said, I need to do my work in a bathroom. That's how difficult it can be.

In the same meeting, another faculty member brought up challenges for rural students:

> You have a number of kids who live in very rural areas that don't—their internet services are spotty at best. And even when they have it, they don't have the bandwidth to do what we need them to do. I've heard that comment and also—yeah, I've heard that a few times.

The care that faculty had demonstrated pre-pandemic in supporting diverse students' success persisted in the new online environment. For example, previous concern about international students' success extended to situations brought on by the national policies and travel restrictions related to the pandemic. Faculty indicated a commitment to supporting diverse students through online learning modalities, as seen in this email sent in April by a department faculty member:

> I have also gotten many questions from students about what to expect for the fall. The international students who have been able to go home asked what would happen if the border is still closed and they can't get back to [institution]. I know we don't have answers to these questions, but as we had started to talk about in our faculty meeting, it's really time to make contingency plans for our fall classes and beyond. Let's see if we can make a continued education possible for all of our students.

In another email, a faculty leader informed other department faculty about the "tremendous challenges that our students face, from job, food and housing insecurities, to academic concerns," offering two vignettes from department students gathered through a university-based student services group that they served as a liaison for. The students spoke about how engineering classes were "going way more hardcore," with lengthier and more difficult homework assignments ("to accommodate for no final") and tight deadlines. They cited more difficult group work and home-based distractions as reasons that "everything has gotten 100% more difficult with what seems like no good resources." The faculty leader then shared their own response to these representative student experiences:

From talking to my own students, the sentiments shared by the above students are definitely true for almost all of our students. I'm one of the instructors who had gone "hardcore" during the beginning of the pandemic and had many deadlines and deliverables due with little flexibility to deadlines (which was how the class was run before the COVID-19 crisis). I have since taken their comments to heart and made many changes to [course] to lower barriers to student success, including accepting late homework submissions (students having last minute trouble submitting homework online) and re-submissions of team project deliverables, etc.

From talking to most of my class… I've learned that the students are doing okay and are working very hard, while balancing work, providing daycare, homeschooling, taking care of grandparents, etc. They singled out the most challenging aspect of their classes, which is teamwork-based projects/deliverables. Although there are many platforms to use for group meetings and teamwork, it's just harder and not the same. In response and taking inspiration from what [another faculty is] doing in [their course], I have… changed my [assignment] deliverable for our [course] design challenge to… [one that] shouldn't rely on as much team coordination.

As this faculty member demonstrates above, faculty across the department showed that they cared about and listened to students' diverse experiences managing their academic and personal responsibilities during a global crisis. Their demonstrated commitments to understanding and serving the needs of students from diverse and traditionally underserved communities suggests that the changes in faculty mindsets and practices we'd seen related to our change efforts had been sustained even under emergency pandemic-related circumstances where faculty needed to move their face-to-face courses online immediately. Faculty provided pedagogical flexibility rather than reverting to more traditional, less student-centered modes of instruction, while also holding asset-based assumptions and positive expectations for students' learning. For example, faculty developed and updated course materials using short video lectures, often with associated practice problems or low-stakes quizzes to gauge student learning; provided deadline extensions; created new grading schemes; and tried and evaluated different strategies for effectively facilitating teamwork in small groups. In a special, extra faculty meeting the department head called to discuss how online teaching was going, several faculty members discussed accommodations they'd made and ways they'd flexibly adapted to diverse students' needs. Responses in this meeting included:

I'm making a slight change to the video deliverable to make it not so reliant on group coordination.

I have told all my students to ask for extensions in their classes if they feel like they just can't get it in on time for one reason or another. This has to be a time period and situation where we give them extensions.

I mean, just imagine how many of our students might perform a whole lot better if you give them a little more time to think about it and answer those questions, you might do better.

I think you can give—you can make accommodations for the students that have unique situations.

So for [course], since I started the design challenge, I've been doing away with a final exam. Before online instruction, we will have five mini-exams in the class, plus all the design project deliverables. So I feel like that is enough assessment, you know, without a final exam this semester.

How do we deal with classes that have like 60 people instead of a really small one? And I think that if you do this kind of team exam [a colleague discussed], it can help because you're only doing like five of these little discussions instead of 60 of them… And it doesn't matter if they talk to each other, 'cause you can come up with different questions for different teams and so forth.

Throughout the pandemic, faculty have demonstrated sustained use of a core teaching strategy encouraged through the RED-related professional development supports: they continuously reflected on their practice related to feedback and assessment of student learning, shifting their practices to balance the need for students demonstrating their learning for a grade with the need for accommodating diverse students' needs and circumstances in order to help all students— including and especially those from underserved communities—succeed. One faculty member, for instance, showed flexibility and responsiveness by allowing students to earn credit for submitting drafts of their assignments, even though this decision resulted in much more work for the faculty member. On the other hand, another advantage of this strategy was that the faculty member felt that they were able to gauge the students' progress more accurately and intervene earlier with additional support as needed.

Faculty continuously supported one another in overcoming challenges

The cultivation of a COP [24, 25] during the four years of RED-related change efforts prior to the pandemic created shared spaces (including faculty meetings, professional development seminars, and retreats) where faculty could discuss challenges and opportunities related to teaching. These collaborative structures provided opportunities for members to both reflect on their own practice and learn from their colleagues' experiences and practices [26]. Data, particularly from faculty meetings and retreats, suggests that this COP continued and developed during the pandemic. While there were some logistics-centered discussions of teaching related to shifting departmental and institutional policies in response to COVID-19, we also observed increasingly generative, asset-oriented, learner-centered discussions of students' experiences and needs and how to best serve them through programmatic, course-related policies and pedagogies. During the pandemic, faculty regularly shared their experiences, practices, and reflections on their teaching through faculty meetings, professional development seminars, retreats, informal collaborations, and email communication. In fact, discussions of teaching increased as the department leaders added additional faculty meetings and retreats where the sole agenda was to discuss students' experiences as they related to teaching, as the majority of faculty voluntarily went through a multi-week professional development course on online teaching offered by the institution, and as additional biweekly faculty meetings to discuss different teaching-related topics were added over the course of Summer 2020.

In these collaborative contexts, observational data indicated that faculty took leadership roles in supporting peers to reflect on and evaluate different strategies for emergency online teaching and later planned online teaching for Summer and Fall 2020. Faculty shared their understandings of students' needs; experiences teaching and working with students; and the strategies and tools they had engaged to listen to, communicate with, and address students' challenges during the

COVID-19 global crisis. Faculty acknowledged each other's' expertise and reached out for support. For example, in a faculty meeting in late March, they sought the expertise of those among them who had taught online classes before (including an instructor outside engineering who had been helping them with improving writing instruction) as well as a faculty member who had previously recorded classes for the benefit of absent students. During this meeting, the department ensured that all faculty had a chance to speak and say what was going on in their courses and what questions they had or supports they needed.

Faculty also sought each other's expertise related to teaching through other means, including by emailing with one another and engaging in institutional and cross-institutional discussions. For example, faculty members from different institutions discussed problems that required the "collective wisdom of everyone" in a group email exchange about how to run labs remotely during the semester. One faculty member on this exchange requested advice from colleagues on how to involve remote students in the necessary learning tasks that usually require students to be physically on site, such as inspecting lab equipment.

Faculty also worked to facilitate remote online collaboration and support among students, even beyond their courses. For example, they sustained the departmental peer-mentoring program efforts, continuing to assign experienced student volunteers with five first-year or newly-transferred mentees. One faculty member was impressed with how many mentors volunteered for this program, explaining that they had enough volunteers to mentor the entire new student population.

Significance and implications

Prior to the pandemic, we saw evidence of the development and maturation of a departmental COP [24, 25] related to teaching [26]. We saw shifts in the nature of faculty's talk about teaching, from logistics- and accreditation-centered talk to discussions of curricular and pedagogical strategies, tools, and practices where faculty were positioned as teaching experts. Over time, the focus of discussions shifted more and more towards fostering student learning. Faculty's voice was brought into creation of the RED projects' supports, as seen in the emergent focus on supporting writing instruction that had not been present at the proposal stage. Departmental leaders supported the development of the COP by integrating learning-centered discussions of teaching into regular faculty meetings and supporting the development of and encouraging participation in new collaborative structures, such as the professional development workshops and, particularly during the pandemic, extra faculty meetings held explicitly to discuss teaching.

Knowing faculty often feel unprepared to shift to online instruction [2] and need a lot of support to do so under emergency circumstances [8, 9], we feared that with such an abrupt, mid-semester shift to online teaching—a mode of teaching these faculty had little to no experience with—faculty might retreat to more traditional, less student-centered teaching. Instead, we saw faculty work to adapt their teaching in flexible ways to support students' needs and learning during a tumultuous time. They accomplished this by engaging the COP that they had co-created over the last four years and drawing on other resources and supports that had been put in place by the RED project, including professional development workshops, the department-embedded learning scientist and writing instructor, and course-embedded design challenges. They also collaborated and learned from each other, drawing on the collective expertise that existed in the department, including both colleagues on the core RED team and those who were not.

Sustaining a major change initiative in higher education is complex and difficult, and change initiatives often fail [17, 18]. We are heartened to see that the web of support we created in the context of our RED project, including the development of a teaching-focused COP within the department, appears to have supported faculty to continue the student-centered, asset-based pedagogies they had been increasingly adopting prior to the pandemic. In the face of a wholly unexpected global crisis that disrupted the lives of students and university employees as well as existing structures and practices in higher education, this engineering department's faculty worked together to solve difficult problems related to their teaching while keeping flexibility, student learning, and care at the forefront of the equation. Future research is needed to determine if and how faculty change in this department and others is sustained as the pandemic continues and beyond. While we did not conduct pre- and post-surveys of faculty to quantify the prevalence of shifts in faculty beliefs and reported practices, insights from this study could help inform the development of such a survey, which could potentially be used across sites to enable comparison. This research is limited by its focus on one departmental context; future cross-site research, including other departments engaged in program improvement efforts, would help shed light on what contextual factors and supports help faculty adapt to new realities related to the COVID-19 pandemic and best address the needs of students from underrepresented and underserved communities across a broader variety of contexts.

Acknowledgments

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