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Healthy Vulnerable Community and Institutional Change

Timothee Bryan, Gabriela Bulancea, Karen Crossin, Joanna G. Jauchen, Mary Nelson, Robert Sachs, and Catherine Sausville

ABSTRACT

Since its inception, we have thought of our active learning project at George Mason University as a community of practice: a network of like-minded faculty interested in student-centered teaching. This community approach is evident in our 2019 goals for institutional change which were to “diffuse active learning approaches to our department.” Very simply, we wanted to grow our community of active learning practitioners. In this article, we reflect on how a community foundation of vulnerability and trust shepherded us through rapid institutional change during a global pandemic. We describe how vulnerable leadership led to individual professional growth and then connect that professional growth to structural changes within our department.

KEYWORDS

Active learning; precalculus; calculus; recitations; grassroots leadership; communities of practice; vulnerability; institutional change; structuration

1. INTRODUCTION: GRASSROOTS LEADERS AND COMMUNITY

In our previous article, we described our multiyear project aimed at nurturing a departmental culture that values and supports active learning [3]. Our project benefits from collaboration with other STEM departments at George Mason University (GMU) and also nationally-recognized experts in grassroots leadership: Jaime Lester and Carrie Klein [8,13,14]. With their guidance, we mapped our departmental culture and planned an NSF IUSE funded project that would (hopefully) diffuse active learning without generating unnecessary faculty resistance. This mapping led us to a Communities of Practice (CoPs) model which allowed us to advocate for structural changes within a department that values independence and autonomy [15]. CoPs are groups of individuals who organize themselves around a common set of values, goals, interests, or projects. CoPs have the potential to create a network of relationships in which knowledge can be shared and also co-created. As members gain a sense of “belonging” in the CoP, they individually align more strongly with community values, leading to cultural diffusion [15]. In our previous article, we described the process of beginning a CoP committed to active learning, cohered through work on a centralized departmental project (changing all Calculus I and II recitations to active learning recitations) [3]. We leveraged existing university discourses and logistics; built and relied on departmental, university, and national networks of support; and created value for individual members of our

CONTACT Joanna G. Jauchen  jjauchen@gmu.edu,  Department of Mathematical Sciences, George Mason University, Fairfax, VA 22030 USA.

CoP and our department as a whole. In this article, we provide further reflection about how this loosely organized, healthy community has encouraged the diffusion of active learning through a global pandemic and led to structural changes. We begin by framing structural change in our project through the lens of Giddens' Structuration Theory.

2. STRUCTURAL CHANGE

To describe departmental change in our initiative, we rely on understandings of structural change from Giddens' Structuration Theory [9]. Giddens defined structures as “rules” (explicit or implicit understanding of “the way things are” and “the way things should be done”) and paired resources (allocations of personnel, money, and institutional capabilities that facilitate enactment of the rules). Rules include a communally-understood range of variation [5,18]. The rules that guide faculty can be hard to change because of this variation: deviations from the norm are seen as “within margin of error” and not as substantial changes (see also [20]).

Neither rules nor resources are static; they are always in the process of being changed and perpetuated through human action. Structural change occurs when changes in rules and resources persist over a longer span of time¹ [18]. We focus on changes in structures as they exist in our department: (1) changes in communal resources developed for and allocated to active learning and (2) changes in communally held, institutionalized rules about how faculty should act (again, related to active learning). Rules might include understanding what it means to “teach” a course, what it means to assess student learning, and what it means to assign grades fairly.

Additionally, communally-held understandings of departmental relational networks are also rules: rules that guide faculty in their interactions with one another. These include a range of reciprocal commitments and privileges (things I am allowed to expect from others and things they can expect of me) [5]. Changes in these relational and emotional commitments can be very powerful in solidifying structural change. It is one thing to direct me to teach in an active learning way, but it is quite another for me to be embedded in a relational network of active learning practitioners that encourages me to teach via active learning, supports my understanding, and facilitates my sense of being “part of the group.” When I feel part of that group, I am drawn to act in alignment with their values and practices through my internal understandings of what the group might want me to do. Thrift describes this as the “ghost of networked others that continually inform that action” [19, p. 54].

Individual faculty have the power to change rules and resources that impact other faculty in the department by changing their individual practices. This power is magnified when coalitions of faculty act in concert, when those actions are respected by colleagues, and when resources are developed and allocated to support changes in

¹ Structural change can also occur when they spread over geographic space or relational networks—for example changes that spread from one university to another.

rules [17]. In the following section, we describe our reflective process that led to this article.

3. REFLECTION AS ORGANIZATIONAL KNOWLEDGE BUILDING

Since the beginning of our project, we have engaged in a series of collective reflections that form the basis of this article. The data used is primarily from collective-based reflective conversations. Because of the length of the grant and because of a sense of collective investment in grant goals and outcomes, this article uses the word “we” as a collective pronoun. When using “we,” it refers to Gabriela, Karen, Joanna, Mary, Robert (Bob), and Catherine who have all been involved in the NSF-IUSE project from its inception. Bob and Mary have led the math IUSE grant team from the beginning of the project. Gabriela, Joanna, and Catherine were all involved beginning with departmental planning in Spring of 2019. Karen’s involvement has become more formal as time progressed, but she has been engaged in active learning since 2013, and has worked behind-the-scenes in informal new faculty membership for at least ten years. Tim Bryan joined our department in fall of 2021 and has become an integral part of the project as GTA coordinator, as well as departmental leadership. While his knowledge of the project only dates back to 2021, his reflections for this article are essential to understanding how new faculty enculturated into our active learning approach.

Over the course of the grant, different subsets of the CoP leadership (all authors here) have participated in eight separate reflective conversations about our initiative. All reflective conversations were distinct from administrative meetings focused on implementation. These were practitioner reflections intended to explore the value of our CoP, the collective challenges we faced, the progress we had made, and visions for our future collective work. These reflective conversations were about 1.5 hours each. A list of these reflections is contained in the Appendix.

The ideas in this article arose through six reflective conversations that took place in 2022, 2023, and 2024. Conversations in 2022 became focused on the ways that our “healthy” CoP facilitated departmental change and enabled our community to stay connected and grow throughout the pandemic. When we defined what “healthy” meant for us in this context, we arrived at four major characteristics: (1) our CoP is a space that embraces innovation; (2) our CoP supports the professional growth of members; (3) our CoP is a place where we care about each other as human beings; and (4) our CoP is committed to pursuing equity. Joanna conducted a brief literature review of these concepts and found some reference to “vulnerability” in each of them. Joanna reported this connection back to Bob, Catherine, Karen, and Gabriela and asked them to reflect on whether or not this concept had meaning for them as well. Using different conceptions of vulnerability as a foundation for reflection, all authors gathered for two focused conversations in May of 2023. We reflected on the ways the vulnerable leadership of Bob Sachs and Mary Nelson had made such an impact on the other leadership of the CoP. We also reflected that these moments of vulnerability—both when individuals led with vulnerability and

when others took risks based on vulnerable leadership—had led to many structural changes.

We consider this article an example of “organizational knowledge creation” in which we strive to bring tacitly understood individual knowledge to more explicit forms of collective knowledge, what Nonaka and von Krogh called the process of “externalization” [16]. As they note:

When making knowledge increasingly explicit along the continuum, the individuals justify their beliefs based on their observation of objects, events, and relationships (Nonaka et al. 1996). Over time, these beliefs may become true if they can be justified and are useful to them and/or their group in coordinating individual action.

This is not a “how-to” on institutional change. It is simply a description of our efforts to invite faculty into meaningful, research-based pedagogies; welcome them into deeper reflective community; and cultivate institutional change based not in requirement, but in collegial, supportive relationships. The ideas presented here have been useful to us, and we hope will be useful to the reader.

4. VULNERABILITY IN PRACTICE

The first paragraph in each of the following five subsections presents a conception of vulnerability from the literature. In the second paragraph of each section, we describe events that occurred over the course of the IUSE project and reflect on our experiences. In the third paragraph of each section, we tie those experiences to structural changes we observed. An overview of the five sections is provided in Table 1. While each section highlights the actions of one or two faculty, it is important to note that the CoP was providing support for all described activity. So, for example, while Joanna and Catherine had more visible roles in the Spring of 2020, they were routinely discussing their engagement with Karen, Gabriela, Mary, and Bob. The support of the CoP has been essential at every stage of this project.

4.1. Leading Vulnerably: Building Capacity for Change (Spring 2019)

Two types of vulnerability drive innovation in workplaces: psychological safety and trust [6]. In psychologically safe communities, individuals feel free to float ideas, disagree, and ask questions without fear of negative consequences. In these spaces, individuals also trust in the relational goodwill of others: they believe that others’ actions will benefit them, or at minimum, not harm them [6]. Leaders can encourage psychological safety and trust in their communities by (1) being available and approachable; (2) explicitly inviting input and feedback; and (3) modeling openness and fallibility [6]. We refer to this set of practices as “vulnerable leadership.”

Throughout the first semester of the IUSE project (Spring 2019), Bob and Mary intentionally engaged in vulnerable leadership in a bi-weekly series of listening conversations. Bob and Mary’s goal that spring was to cultivate faculty buy-in by listening to faculty ideas, concerns, or comments. They regularly and transparently communicated IUSE goals and timeline; explicitly invited input from faculty;

Table 1. Overview of Section 4.

	Vulnerability	Experience	Structural changes
4.1	Vulnerable leadership [6]	Bob and Mary building capacity	(1) Pedagogical expertise (2) Increased leadership skills (3) TLC as a collective idea
4.2	Vulnerability as fundamental [10,11]	Joanna and Catherine step up during COVID	(1) TLC Implemented (2) Relational shifts in expertise valuation (3) Increased opportunities to influence departmental decision making
4.3	Critical hope [1]	Equity in TLCs	(1) Associate Chair for Teaching and Equity created (2) Opportunity for extended discussions about equity
4.4	Vulnerable leadership revisited [6]	Tim: Hiring and Listening to New Faculty	(1) New faculty hired with teaching expectations shifted (2) Increased Support for new faculty (3) TLCs expected – leads to deepened relational expectations.
4.5	Radical vulnerability [4]	Tim, Karen, and Gabriela: New Leadership	(1) Additional leadership position established (2) Leadership transfer

and modeled curiosity and humility. Vulnerable leadership practices align with research-based strategies to cultivate faculty buy-in, but Bob and Mary’s approach was also a result of their natural leadership styles. As Bob reflected, “I have never liked being told what to do, from a very early age, and our department values independence and autonomy.”

As a result of this process, three structural resources were developed in the department. First, through participation in the bi-weekly series, Joanna, Catherine, and Gabriela all developed additional pedagogical expertise (now a departmental resource). Catherine reflected:

I was really struggling to transition from regular lecture to active learning. As we started talking about the project, Mary would talk about struggles she was having and I’d think, “I’m also having trouble with that!” And so even the first conversation it was like, “Oh wow, this is [the discussions are] a great resource.”

Second, the trio also developed leadership skills. The bi-weekly discussions encouraged Joanna, Catherine, and Gabriela to pursue official leadership roles to fulfill the needs of the IUSE project. Joanna became the departmental scheduler, Catherine the undergraduate director, and Gabriela the Calculus II coordinator. Joanna reflected:

I remember Bob talking about how much work he was doing to reserve rooms for this project. So, I asked the chair about taking over departmental scheduling. It was kind of a big deal because there hadn’t been an instructional faculty who was the associate chair for a while.

Third, the open planning process in Spring of 2019 also created opportunity for Catherine to suggest we organize weekly, one-hour “teaching seminars” for the department, what we would eventually call “Teaching and Learning Conversations” (TLCs):

Out of the open-ended discussion, we had this great, unexpected idea that came from Catherine, which was that we should have a teaching seminar. And that wasn't on my radar whatsoever as a Co-PI. So I think that idea, for me, reinforced that having a big open process and getting multiple ideas on the table could be incredibly powerful. (Bob)

Catherine's idea needed to be put on hold while we began our active learning recitations in fall of 2019, but it would eventually become a very powerful resource for our department. Three structural resources were gained in Spring of 2019 as a result of Bob and Mary's vulnerable leadership: (1) new pedagogical expertise, (2) leadership skills, and (3) an idea for establishing consistent pedagogical discussion (the TLCs). While these resources existed, they were mostly invisible to the majority of the department. They would become visible when Joanna and Catherine leveraged them to help face the challenges created by the COVID pandemic in Spring of 2020.

4.2. Vulnerably Human: Changing Perceptions (Spring 2020)

Questioning the negative connotation that vulnerability sometimes evokes, Erinn Gilson describes vulnerability as a neutral "unavoidable feature" of the human experience:

Vulnerability is defined by openness and, more specifically, to be vulnerable is to be open to being affected and affecting in ways that one cannot control... [11, p.2]

For Gilson, vulnerability is a condition full of potential, potential for pain, sorrow, and hardship, but also for love, friendship, and connection.

Being vulnerable makes it possible for us to suffer, to fall prey to violence and be harmed, but also to fall in love, to learn to take pleasure and find comfort in the presence of others, and to experience the simultaneity of these feelings. [10, p. 310]

While COVID was undoubtedly negative, our heightened attention to the vulnerability inherent in the human experience also allowed our department to learn, to share expertise, and to support each other.

Catherine and Joanna relied on the three resources developed the previous spring to support their department during the pandemic: (1) their increased pedagogical expertise; (2) their leadership skills; and (3) the TLCs as a location for pedagogical conversation. This shifted potential resources created in Spring of 2019 to enacted resources. In Spring of 2020, GMU allocated an extra week of spring break to transition courses online in response to COVID. During that week, Catherine and Joanna put together an asynchronous primer on how to teach online. Catherine also suggested that we hold an online teaching discussion for the whole department to ask questions and crowdsource solutions. Those teaching discussions, held each week for 1 hour on Fridays, began our Teaching and Learning Conversations (TLCs). During that first spring, most topics were based on the immediate questions faculty had about teaching online (for example, how to proctor exams online or how to run synchronous versus asynchronous classes). Over time, the focus of the conversations has changed, but still has remained predominantly focused on topics that interest faculty. We meet for 1 hour on Friday mornings, sometime virtually and

sometimes in person. Topics for the semester are solidified in a group conversation at the beginning of each term. Sometimes experts are invited to present information and respond to questions (see [Section 4.3](#)). Bob and Mary's example of vulnerable leadership guided Joanna's approach to facilitating the TLCs. The communal nature of the TLCs encouraged faculty to ask questions publicly:

The meeting structure allowed the department to be more communal, which also encouraged people to be public with their questions. Here's this faculty who would never talk about teaching and now they're here in the teaching discussion. (Bob)

Catherine and Joanna's leadership during COVID led to structural changes. First, when Joanna and Catherine implemented the TLCs, it provided a communal space for pedagogical discussions. Second, Joanna and Catherine's more visible leadership, along with the visible expertise of other instructors during the TLCs (Gabriela and Karen) created a significant relational shift for the department in terms of how teaching faculty were viewed (changes in relational rules). Bob and Gabriela both observed this change:

I think the TLCs ended up to be a really important aspect of making this work visible to the department and affirming that yes, this activity [thinking seriously about pedagogy] counts in the department's array of intellectual life. (Bob)

The TLCs during COVID showed that there is a place for the expertise from teaching faculty. (Gabriela)

These new structures, (1) the implemented TLCs, and (2) the relational shifts in expertise valuation, facilitated Joanna and Catherine's transition to official departmental leadership. In these roles, they encountered additional opportunities to influence department decisions. The next two subsections focus on two of these additional opportunities.

4.3. Embracing Vulnerability: Pursuing Equity Through Critical Hope (Spring 2021)

Barbara Applebaum writes about vulnerability as a key factor for racial social education, especially when the learning community is predominantly composed of white, cis-hetero, able-bodied individuals [1]. Discussions about systems of oppression, like racism, can evoke defensiveness or denial in white individuals, what Applebaum describes as "active performance of invulnerability" (p. 864). The result of this self-protective performance of invulnerability is ignorance: ignorance of the trauma inflicted by racism, ignorance of the ways white individuals have benefited from racist systems, and ignorance of white individuals' own complicity in oppression. Applebaum offers the idea of epistemic vulnerability facilitated through the practice of critical hope, as a solution. Critical hope is a set of community practices that provide accountability for individuals to remain vulnerable in discomfort. These practices include understanding "discomfort as a signal to be alert for what one does not know about others but also about oneself," recognizing "systemic oppression exists," and cultivating "openness toward continued struggle" [1, p. 872]. Engaging

in critical hope is a vital part of cultivating inclusive and equitable communities. White faculty will need to sit in discomfort with challenging ideas in order to be able to contest institutionalized systems of oppression.

In our department, many faculty are committed to social justice but are looking for concrete, research-based approaches to implement. When Joanna moved from “scheduler” to the Associate Chair position, she requested the position be named “Associate Chair of Teaching and Equity” as a nominal departmental investment in equity. This came with no resources, but it did build into her position some structural freedom (freedom in the rules that guided her position) to address issues of equity without needing to always connect them to active learning or teaching. As part of this freedom, Joanna (with Bob’s help and support) organized a series of outside speakers for the TLC in the Spring of 2021. These speakers included Christine Andrews-Larson, Nancy Kress, Luis Leyva, Daniel Reinholz, and Kendra Pleasant, who all graciously gave talks. The talks were well-attended (by full-time faculty, adjuncts, and GTAs) and gave the CoP solid research-based information on equity. In addition, these conversations began to cultivate a deeper sense of vulnerability—a commitment to engage in practices of critical hope. Reflections on these talks continued into the fall as individuals in the CoP set semester goals for equity and committed themselves to action in their classrooms. In addition to this work, GMU was engaged in an institutionalized response to the police violence and BLM marches of 2020. Those college and university-wide initiatives have significant resources attached, which are slowly making their way to our department.

Universities need to allocate resources to support equity initiatives, but given the politicization of diversity and equity, it is likely that a lot of work will continue to be done at the departmental level by small groups of grassroots leaders. Two structural changes occurred in Spring of 2021: (1) the department instituted the position “Associate Chair for Teaching and Equity” and (2) Joanna’s leadership combined with significant faculty buy-in from TLC attendees created an opportunity to engage with research-based ideas about equity. Especially because there is often so much relational pressure to avoid uncomfortable topics (e.g. racism, sexism, ableism, and homophobia), this semester of explicit attention to equity shifted the rules of what counts as “appropriate” conversation for our TLC meetings. While we continue to work on cultivating critical hope practices, we also recognize the role vulnerability has played in the beginning of that process. In the next section, we discuss another opportunity and challenge we experienced as a result of the shifts in expertise valuation—opportunities to influence hiring, and the responsibility to support those new faculty.

4.4. Listening Vulnerably: Hard Conversations (Fall 2021)

Leading vulnerably can be very fulfilling but it can also be challenging. Throughout the IUSE grant, it has been useful to revisit the ideals of vulnerable leadership: (1) being available and approachable; (2) explicitly inviting input and feedback; and (3) modeling openness and fallibility [6]. Explicitly inviting input includes

both positive and negative feedback. Modeling fallibility includes making mistakes and needing to correct them. In this section we discuss a period in which we were challenged to remain vulnerable by feedback that contradicted our own perceptions.

Between 2020 and 2023, our department hired twelve new instructional faculty members. Bob, Joanna, Karen, Catherine, and Gabriela all served on hiring committees. CoP members advocated for changes to the job posting historically used and redesigned the interview process to emphasize active learning and equity. As exciting as this was from a CoP perspective, many of these new faculty were unaware that there had been a recent relational shift in the department. They were in the unfortunate position of coming into our department during a global pandemic, at the beginning of our active learning project, in the midst of major departmental change. Tim Bryan started at GMU during the fall of 2021. GMU was mostly back on campus, but still felt like a ghost-town. Tim reflected:

It's been a lot weirder for me. There was this pressure institutionally and culturally to be engaged in active learning, to present a sense of community and collaboration, and to use group work. I had no idea how to do it. And I couldn't get an answer from any of you about what that was and what that looked like. The viewpoint for me was that you had an established culture, an established program of active learning, and you all knew what you were doing. And I was trying to fit into whatever that was. I felt so culturally out of step with you.

For faculty who had been part of GMU before the IUSE grant, the culture made sense, but for new faculty, it felt like mixed messages and a lack of support.

We didn't want to be prescriptive, but there were a couple new faculty who described it not as freedom, but as lack of structure and support. We needed the new faculty so badly to do so many things, but we didn't have time to explain because of the pandemic. Some of the new people that came in had only ever been at highly coordinated places. They felt like we were not supporting them. (Karen)

And it was the most support this department had ever given anybody! (Catherine)

This feedback from new faculty was hard to hear, especially because collectively, Karen, Bob, Joanna, Catherine, and Gabriela all felt we were working very hard to provide teaching support during the pandemic.² But we were committed to listening to new faculty, to explicitly inviting input, and to modeling fallibility.

I think it's that willingness to just hear that stuff too and not be defensive. (Bob)

I appreciated new faculty feeling like they could tell us, and us taking a pause to listen to those things and see what is true in them and how we could respond. (Joanna)

The culture let people express that what we think is awesome, they think sucks. (Karen)

Our work supporting faculty (new and old) is ongoing. Three structural changes occurred as a result of our hiring work: (1) the job description for instructional

² In retrospect, part of this dynamic is/was due to GMU's status as a "post-striving" institution [7]. Many of GMU's resources have been allocated to support infrastructure related to our recent R1 status. The math department is experiencing and driving major changes on a small budget.

faculty was changed to reflect an emphasis on active learning and equity; (2) between 2020 and 2023, 12 new faculty were hired and understood their teaching roles to include some aspect of active learning; (3) the department began to provide additional resources to support new instructional faculty. Some of these included loose course coordination, formally assigned mentors, and more explicit teaching expectations. Though informal mentoring had been the norm for at least the last 10 years, the department had not formally assigned mentor pairs. We continue to strive to support faculty, to invite their feedback, and to respond as well as we are able. In our final subsection, we focus on transfer of leadership.

4.5. Depending on Vulnerability: Emotional Labor, Burnout, and Leadership Transitions (Spring 2022)

I've reflected a lot about what things can persist. It's the same as the NSF language: sustainability after the grant. There's this question of what happens to the project when big drivers of change go away. (Bob)

CoPs that nurture psychological safety and trust require labor, most of it relational and emotional. This is especially true in communities committed to equity, diversity, and social justice. This type of labor is undervalued by universities and often rendered invisible through standard evaluation and promotion processes [2]. Because of this, it has been vital for our community to actively advocate for the well-being of our faculty, to be sure they are cared for, and that their needs, especially related to this work, are being met. Elisabeth Chan writes that self-care has been dangerously dehistoricized and distanced from the oppressive systems that necessitate it: "placing the responsibility of self-care on the individual ignores its connections to power and privilege, relegating it to a luxury" [4, p. 81]. Especially as the academy becomes more and more oriented to individual metrics of productivity, Chan urges faculty committed to social justice to return to practicing self-care as a collective endeavor. This requires the creation of work communities where our colleagues care about our well-being as humans, where our boundaries are respected, where our humanness is celebrated, and where our needs, especially needs related to the work we are undertaking together, are identified and met with community support. But making our individual needs known to the community requires, yet again, the ability to feel safe and vulnerable in community [4]. Chan argues that radical vulnerability is essential for collective self care.

[R]adical vulnerability requires digging deep to understand what your honest needs and emotions are, including their connections to systemic oppression, and then being able to communicate those needs... On the other hand, radical vulnerability also means you must be cognizant of when you do not have the capacity to provide support for others and then communicate that openly to yourself and your community. In turn, appreciate and acknowledge when others are transparent with you about their needs, boundaries, and rituals.

In the Spring of 2021, GMU was still offering most classes virtually. The additional labor from the initiative and the pandemic began to cause some burnout.

I think the Spring of 2021 is when like my big burnout really started. Joanna and I had been on 3–4 hiring committees. We were hiring adjuncts, we were hiring term faculty. It was just like so much. So you're just kind of trying to get through it. (Catherine)

I didn't burn out until fall of 2021. I remember halfway through the semester, I had zero ideas for the TLC. I showed up one Friday and said, "We have to collectively plan the rest of the semester, because I am out of ideas." That was a really great moment for me to just trust the group to be supportive. (Joanna)

A new department chair (with renewed energy) took leadership in summer of 2021. Burnout and the needs of the project necessitated several transfers of leadership to new individuals in Spring of 2022. Mary Nelson retired and Karen served as the interim math faculty in the STEM Accelerator. Joanna stepped down as Associate Chair for Teaching and Equity. Gabriela took over that role. We advocated for and secured an official GTA coordinator position. The GTA mentoring and coordination was transferred from Bob to Tim when Tim took on this position.

While not without challenges, we interpret this transfer as a sign of strength of the community, and as an indication that CoP leaders felt free to make their individual needs known to the community without worrying that the project would suffer. Vulnerability within the CoP continued to build leadership capacity:

Being asked to be the Associate Chair was very unexpected. The fact that you (Joanna) did this job paved the way for me. I had some confidence that I knew a little bit how things work. That encouraged me to agree to this because never, ever in 10 years that I was in the department, I never opened my mouth in any department meeting. (Gabriela)

Additionally, the CoP provided support for individuals to set boundaries, both in relation to the department, but also in relation to the college and university more broadly.

Mary was retiring and it was late in Spring 2022. At first, they wanted me to serve as interim *as a favor* and I was like, "That is not gonna happen." There was a whole lot of negotiating. People in the STEM Accelerator were pushing me to do more. I had Bob help me put the actual expectations of my job in writing and set a solid end date. (Karen)

Three structural changes occurred in this time period. First, we successfully advocated for a new GTA coordinator position. Second, two other leadership positions successfully transitioned to other faculty, allowing people who had done a lot of work during COVID to step down and recover. Third, we have not observed a decrease in commitment to active learning after the leadership transfer. In Section 5, we summarize the structural changes we observed.

5. STRUCTURAL CHANGE

In Spring of 2019, Bob and Mary's vulnerable leadership cultivated new pedagogical expertise, increased leadership skills among CoP members, and created space for Catherine to suggest the TLCs. Joanna and Catherine leveraged their pedagogical expertise and leadership skills to offer pedagogical guidance to their department during the pandemic (Spring 2020). By implementing the TLCs, they

created a space for teaching conversations centered on active learning and equity. New faculty and adjuncts, especially, were able to attend and learn. The TLCs created a shared and visible meeting space where faculty could discuss pedagogical approaches and grow together. The shared space helped enculturate faculty into our active learning approach, but also served a second function: to raise awareness within the department about the work instructional faculty were doing. This shift in expertise valuation created opportunities to advocate for the IUSE project, for a culture that valued equity and active learning, and for resources that were needed for implementation.

As a result of these new opportunities, other structural changes occurred. First, the “rules” that governed faculty teaching shifted. Lecture is not completely out of the norm, but more and more faculty (new and old) are engaged in active learning. This is especially true for new instructional faculty who are expected to engage in active learning, are encouraged to come to the TLCs, and are expected to be committed to pursuing equity in their teaching decisions. Unfortunately, since evaluation and merit processes are largely established at the college and university level, we have not seen this structural change extend beyond our department.

Second, new personnel resources have been allocated for active learning in the form of new faculty hired (more institutional allocation of personnel). We have hired twelve new instructional faculty members over the life of this project, and all of them had experience with or were open to active learning. The CoP successfully advocated for hiring practitioners who aligned with these new “rules” that governed faculty teaching (commitment to active learning and equitable teaching). These commitments were formalized into institutional records and processes through newly written job postings, and redesigned interview structure.

Third, new relational and pedagogical resources were allocated for faculty to engage in active learning. The TLCs operate as a resource, providing space for new and experienced faculty to discuss their teaching, to explore active learning approaches together, and to continue to understand equity as related to mathematics. The TLCs have also led to relational changes within the network of instructional faculty. At a group level, what we can expect from others within the CoP has expanded. We expect to see each other each week at the TLCs. We expect to be met with vulnerability, understanding, and support as we discuss teaching and equity. In the fall of 2022, new instructional faculty were formally assigned a faculty mentor, a programmatic resource for new faculty. All of these resources are in addition to our extensive undergraduate learning assistant program, and the support provided by university-wide investment in active learning classrooms.³ All of these resources support active learning as a pedagogical approach in our department.

Fourth, changes in faculty expectations have spilled over to GTAs. All GTAs in Calculus I and II are expected to engage in active learning in their recitations. We often assign new GTAs to these courses to help them understand the value of active

³ At present, there are approximately 45 active learning classrooms on campus, ranging in size from 24 seats to 120 seats.

learning. To support this, the CoP successfully advocated for the establishment of a GTA coordinator (a new resource) committed to active learning. That position was implemented in the fall of 2022. Tim leads the GTA training during the semester, and has designed a new GTA training program which includes formal pedagogical mentorship by experienced faculty. Several GTAs have requested to be paired with a faculty who would allow them to engage in active learning in their other recitations (for Calculus III and Differential Equations).

Finally, we see evidence that these new rules and resource allocations are supported by a significant subset of our department. The successful transfer of leadership, both at the departmental and CoP level, without radical changes to the project indicate early institutionalization of our approach to active learning. In addition, we have also started to see our active learning course structure (one faculty or GTA, two ULAs leading a class or recitation) transfer to other initiatives and courses in our department. Active learning had been implemented in four specific course sections prior to 2019 and now it is being used in all calculus I and II recitations, several other undergraduate courses, and 6 graduate courses through our Graduate Learning Assistants in Mathematical Sciences (GLAMS) program [12]. This has exposed graduate students to active learning (both as students and as practitioners). The transfer of this course structure extends beyond our department—our NSF IUSE project included changes in physics and CS. CS has recently established a two semester version of their introductory course which can be co-offered with our calculus 1A/1B sequence, a transfer across disciplines facilitated by our larger STEM active learning diffusion grant [8].

6. CONCLUSION

It has been illuminating to discuss vulnerability with other math faculty. Several people questioned the relevance of vulnerability for understanding institutional change. Others mentioned feeling skeptical of workplace vulnerability, voicing concerns about problematic “family” workplace discourses.⁴ Certainly one meaning of vulnerability is understood “to be somehow weaker, defenseless and dependent, open to harm and injury” [10, p.310]. If this is the only meaning of vulnerability, it is reasonable that we distance ourselves as much as possible. However, as we have engaged in reflection on the role of vulnerability, we have been challenged to understand vulnerability as neither negative or positive, but simply as a part of the human experience, at work and home. Being vulnerable can open us to injury and harm, but it can also enable learning, growth, friendships, and meaningful connections to our work, to our students, and to our colleagues.

⁴ In our reflections in [Section 4.3](#), we discussed how boundary setting is an integral part of healthy vulnerable communities. We are not referring to forced vulnerability in workplaces or vulnerability that widens power differentials. In healthy vulnerable communities, leaders are responsible for psychological safety and trust, and for making sure people with less power are legitimately safe when they choose to be vulnerable.

Vulnerability is pervasive, fundamental, shared, and something we cannot ever entirely avoid... Vulnerability is the basis for learning and for empathy, connection, and community, and that only by being vulnerable can one extend oneself beyond oneself [11, p.2].

Reflecting on the work we did over the pandemic has been an exercise in vulnerability itself. There were so many moments of both joy and sorrow. Moments of fear and uncertainty. Moments of gratitude for having jobs that (easily or not) we could do online. And moments of real pride at the ways that we served our department during this tumultuous time. We see this evidence of structural change as solid indications of long-term departmental commitment to effective and equitable teaching. But the structure we most hope will remain is our relational culture of vulnerability and trust.

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APPENDIX

Table A1. Record of reflective conversations.

Date	Primary Focus (Facilitator)	Participants	Artifact
April 2020	Reflections on Value Created by CoP (Joanna Jauchen)	Bob Sachs, Mary Nelson, Patty Granfield, Catherine Sausville, Joanna Jauchen, Gabriela Bulancea	Zoom recording
*April 2020	History of NSF IUUSE grant (Joanna Jauchen)	Bob Sachs and Joanna Jauchen	Zoom recording
Sept 2022	Challenges Faced and Progress achieved (Joanna Jauchen)	Catherine Sausville, Bob Sachs, Joanna Jauchen	Written Notes
Nov 2022	Reflecting on our plan and any changes we wanted to make (Jalme Lester)	Bob Sachs, Sam Fairchild, Catherine Sausville, Joanna Jauchen, Ahsan Choudhury, Gabriela Bulancea, Jill Nelson, Jessica Rosenberg	Zoom Recording
*Dec 2022	Discussing vulnerability as a basis for our reflections (Joanna Jauchen)	Catherine Sausville, Karen Crossin, and Joanna Jauchen	Zoom Recording
May 2023	Vulnerability and Moments of Change (Joanna Jauchen)	Joanna Jauchen, Bob Sachs, Gabriela Bulancea, Karen Crossin, Catherine Sausville, Tim Bryan	Zoom Recording
May 2023	More Moments of Change (Joanna Jauchen)	Joanna Jauchen, Bob Sachs, Gabriela Bulancea, Karen Crossin, Catherine Sausville, Tim Bryan	zoom recording
Jan 2024	More Reflection, Feedback, and Revisioning (Joanna Jauchen)	Joanna Jauchen, Catherine Sausville, Tim Bryan	Notes Taken

Note: All conversations were about 1.5 hours long except those marked with an *. April 2020 and Dec 2022 conversations were a little more than 30 minutes each.

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BIOGRAPHICAL SKETCHES

Timothee Bryan is Assistant Term Professor in the Department of Mathematical Sciences at George Mason University. He also serves as Graduate Teaching Coordinator and has been teaching at GMU since 2021.

Gabriela Bulancea is Term Associate Professor in the Department of Mathematical Sciences at George Mason University. She also currently serves as Associate Chair for Teaching and Learning. She has been teaching at GMU since 2012.

Karen Crossin is Senior Instructor in the Department of Mathematical Sciences at George Mason University and serves as Course Coordinator for multiple active learning classes as well as mentor for new faculty and Graduate Teaching Assistants. She has taught in the math department since 2000 and briefly filled Mary Nelson's role in the STEM Accelerator.

Joanna Jauchen is Senior Instructor in the Department of Mathematical Sciences at George Mason University and PhD candidate in Mathematics Education studying STEM education in post-secondary institutions. She has been teaching at GMU since 2012. She served as Associate Chair for Teaching and Equity from Spring 2020 to Spring 2022.

Mary Nelson was Associate Director of the STEM Accelerator at George Mason University. She was active internationally in the Learning Assistants Alliance. She created our extended Calculus I with Precalculus course first at CU Boulder during her time there and then upon her return to GMU. She has won multiple teaching awards at CU and GMU. She retired in Spring 2022.

Robert Sachs is Professor in the Department of Mathematical Sciences at George Mason University. He served 8 years as Department Chair. He is a co-PI on the NSF-IUSE grant and is always actively learning about Active Learning.

Catherine Sausville is Senior Instructor in the Department of Mathematical Sciences at George Mason University. She started her journey at George Mason University as an undergraduate in 2000 and transitioned to a full-time faculty member in the Mathematical Sciences Department in 2010. In addition to her teaching, she also serves as Director of Undergraduate Studies, Precalculus Coordinator and Faculty Senator for the College of Science.