

Considering the Departmental Action Leadership Institute as a Community of Transformation: What's highlighted and what's missed?

Robert P. Dalka, Chandra Turpen, Diana Sachmpazidi, and Fatima N. Abdurrahman
Department of Physics, University of Maryland, College Park, MD 20742

David A. Craig
Department of Physics, Oregon State University, Corvallis, OR 97331

Joel C. Corbo
Center for STEM Learning, University of Colorado Boulder, Boulder, CO 80309

The Communities of Transformation (CoT) framework is a variation on Communities of Practice that models groups aimed at changing existing institutional practices by challenging underlying value systems. The CoT framework has the potential to provide insight into STEM initiatives designed to promote institutional change. We share results from applying this framework to the Effective Practices for Physics Programs' (EP3) Departmental Action Leadership Institute (DALI). DALI supports cohorts of physics faculty (change leaders) in leading change efforts in their departments. Change leaders apprentice into effective change strategies through sustained programming while enacting these strategies within their own Departmental Action Team (DAT). Through analysis of interviews with change leaders, we identify ways in which DALI aligns with, and departs from, the CoT framework. We present the results of this initial study to showcase which aspects of STEM change initiatives can be highlighted, and what may not be captured, by a CoT lens.

I. INTRODUCTION

Physics departments are experiencing a wide range of challenges and opportunities that may require them to transform their undergraduate programs [1–4]. Yet, physics faculty do not often have training in leading change efforts. Many may require a support system to meet them where they are at and guide them in their efforts [5]. The Departmental Action Leadership Institute (DALI) was designed to bridge this gap between training and needs of physics departments by providing sustained resources and guidance to a community of physics faculty pursuing change efforts in their departments [6]. DALI supports important change work within physics higher education and can be compared to similar models for change. The Communities of Transformation (CoT) framework models how communities support individuals transforming cultural practices [7]. While DALI is not specifically designed as a CoT, we see an opportunity to explore how the CoT framework can help understand how DALI supports physics faculty in leading change in their departments.

A. Communities of Transformation

It is helpful to consider the Communities of Transformation framework through comparison to similar models. Professional (or Faculty) Learning Communities (PLCs/FLCs) bring a group of practitioners (e.g., college faculty) to meet under the guidance of a facilitator to learn how to improve their practice (e.g., teaching), with a focus on individual growth [8, 9]. PLC/FLC membership often involves a formal sign up process (e.g., an application) and a well-defined time span (e.g., meeting for one semester) [10, 11]. Facilitators play a central role in providing support tailored to the needs of the PLC/FLC members [12]. In physics both in person and virtual PLCs/FLCs have been shown to increase the reach of many research-based instructional approaches [13–15].

Communities of Practice (CoPs) are more organic, where a group of practitioners come together due to shared interest in a topic (e.g., implementing equitable teaching) with the desire to collectively improve their practice [16, 17]. CoP members collectively share best practices and develop new ideas to help each other improve [18]. Members may come and go, but the community can continue to exist indefinitely, oftentimes crossing institutional boundaries. In education research, CoPs have been shown to support the uptake of instructional strategies within STEM [19–21].

A Community of Transformation is a variation on a Community of Practice that is defined by three core elements: (i) challenging existing values/adopting a new philosophy, (ii) creating space for observing and living the new values/philosophy through practice, and (iii) creating a network of peers/community to help enact new practices [22]. These three core elements distinguish CoTs from more traditional CoPs (themselves distinct from PLCs/FLCs). While CoPs and PLCs/FLCs focus on iterative improvement of existing

practices, the focus of a CoT is actively transforming and/or creating new cultural practices. Researcher have found that the adoption of a new philosophy by CoT members motivates them to engage in practices in their own spaces that often go against the typical practices of those spaces [22, 23]. Additionally, while CoP networks are organically built and PLC/FLC networks are externally organized, CoT networks feature a center group of members, who may both be intentionally and/or organically developed, who serve as mentors and coordinate communication within the community [24].

Through both their design and the forms of participation of their members, CoTs have been shown to have a high potential for supporting institutional change. CoTs support individual outcomes, such as learning about and improving teaching practice as well as feeling reenergized around this work [25]. They also contribute to transformations within institutions through the work of their members [7]. CoTs provide sustained support, involve multiple individuals from different institutions, build skills in members to communicate their work beyond the community, and identify key leaders who can sustain the community [23]. Given the power of CoTs in creating change, our goal in using the CoT framework to understand DALI is to identify how the three CoT core elements are expressed in DALI's structure and how the DALI structure may be different from that of a CoT.

B. Departmental Action Leadership Institute

DALI is part of the Effective Practices for Physics Programs (EP3) Initiative, led by the American Physical Society (APS) and the American Association of Physics Teachers (AAPT) [26]. DALI supports cohorts of physics faculty through high-touch mentorship in change practices so they can become better-equipped to lead change efforts in their own departments, such as building stronger retention practices [6]. (Articulation of the specific change project is part of the department's application to the DALI.) Participating departments designate two faculty members as change leaders. They attend an initial multi-day DALI workshop and subsequent regular meetings with their cohort for one year. Change leaders are responsible for establishing their own Departmental Action Team (DAT) that they facilitate while receiving guidance and feedback from DALI [27]. The DAT is then responsible for carrying out the change effort within each department. Each DALI cohort is led by two facilitators with experience in departmental change work.

The philosophy behind the DALI model of change is that successful change efforts are deliberately designed, context dependent, driven by a sense of ownership and broad stakeholder engagement, grounded in evidence, and built through an ongoing process [28]. These design choices form a philosophy that change leaders come to adopt over the course of their time in DALI. The DALI provides a community of peers who the change leaders can connect with around shared challenges and ways they work to overcome these challenges.

In our previous research, we have seen how change leaders feel more prepared and confident in their ability to lead change after DALI [6]. In case studies of the DALI-supported DATs, we have seen that the change leaders have facilitated teams that take a collective approach to data collection and sensemaking [29]. Change leaders have come to see students as partners in change work and prioritize their perspectives to better understand the challenges their departments face [30].

In bringing CoT as a lens to understand DALI, we seek to highlight the aspects of DALI that have been shown to be important to supporting change in CoT models. Our two goals are to identify (a) implications for the design of DALI and how to further engage change leaders and (b) aspects of DALI that are different from CoT and why we think those differences are important. We ask the following research questions to guide our analysis:

- What evidence do we see of the central elements of the CoT framework within DALI?
- What important features of DALI extend outside of the CoT framework?

II. METHODS

The data for this study comes from the set of interviews conducted with change leaders in the first cohort of DALI. In this cohort, eight of the ten DALI change leaders agreed to participate in our research efforts. This represents four of the five departments that were a part of DALI. Change leaders represent a wide variety of departmental experience. See Table I for more information on the change leaders.

Over the course of their participation in DALI, our research team conducted three rounds of interviews. For this early analysis using the CoT framework, we have focused our analysis on the first round of interviews, which were conducted about a month after the DALI kick-off workshop. Interviews followed a semi-structured protocol with questions that focused on change leaders’ reflections on their DALI participation, the facilitation of their DATs, and their own thoughts and experiences with change work.

A coding protocol was established from the three core elements of the CoT framework described in Sec. I A. A fourth category was used to identify aspects of DALI highlighted by change leaders that were not captured by the three core ele-

Institution	Change Leaders
Cyprus University	Christina & Charles
Hemlock University	Harold & Henry
Maple College	Morgan & Misha
Palmetto University	Paul & Pradeep

TABLE I. The first letter of each change leader’s pseudonym matches with that of their institution’s pseudonym. Within each pair, the more senior faculty member is listed first. However, the exact institutional roles are different between each pair.

ments of CoT. This protocol was used by R. D. to analyze the first round of interviews. In coordination with the rest of the research team, we identified themes that emerged within each category. We use evidence of these themes to show how the CoT framework can highlight certain aspects of DALI and as well as important elements of the DALI model missed in the CoT framework.

III. RESULTS

This section is organized into four subsections, one for each core element of CoT and a fourth for what was not captured by the core elements. Within each core element subsection, we provide examples of how the change leaders’ reflections align with that particular CoT element and note where there are departures from CoT. While there are many different examples that we found within each category, we highlight just one or two in this paper due to space constraints.

A. Adopting a new philosophy

In the CoT model, the philosophy of the community is essential for members to adopt and center in their work to motivate their practice. In interviews, change leaders identify many aspects of the DALI philosophy, including deliberate approaches to change centering data-driven decisions, shared leadership of the DAT that involves multiple stakeholders, building a collective sense of ownership over the change process, and valuing the partnership with student members of the DAT. The DALI philosophy, and the change leaders’ uptake of it, has been written about previously [6, 29, 30], so we will limit the space we dedicate to it here except to note that the DALI approach to change work runs counter to the way that these change leaders have approached change in the past. Here, we will demonstrate how the new philosophy came to be adopted by change leaders by looking at the “change should be deliberately designed” aspect of DALI.

Christina, the department chair of Cypress University, described that she and her change leader partner, Charles, came to DALI to get some “good ideas on how to revitalize our department.” She came in looking for direct answers to what she saw as challenges they faced with the undergraduate program. However, she found that the DALI philosophy was to approach change as an opportunity to better understand those challenges to design more appropriate solutions.

“When I came first to the workshop I was very surprised how slow it was going. But then they told us this is actually an approach we’re going to take [...] it was not very coherent with the way- how I wanted to do it. But as I went [...] it kind of sinked in and then I started enjoying it. And seeing like- yeah, you need you don’t need to overload and rush, you just need to take time and understand things.” — Christina

Although this new approach was not what Christina expected, she came to like the philosophy because she found it compelling. Evidence of similar shifts with regard to various aspects of the DALI philosophy was exhibited among all the change leaders within the first cohort. DALI has built a space where change leaders can come to adopt a new philosophy, even when it challenges previously held cultural beliefs.

B. Space to enact new practice

The DALI workshop and the sustained meetings during the academic year serve as a space where the new change practices are modeled by the facilitators. Change leaders apprentice into these practices through their participation. The local DATs serve as a secondary, highly overlapping space where the practices are enacted by change leaders. The movement of practices between these two spaces is central to how DALI attempts to support change work.

Change leaders discuss how they take the practices modeled in the DALI space into their DAT to create a shared sense of ownership within the team. Harold described how he and his change leader partner, Henry, did this for their DAT.

“Henry and I had our first DAT meeting with our Hemlock University group and we used the norm setting exercise that [the facilitators] did. Pretty much mirrored their methodology on that. [...] So I think you know some of these activities that get people involved and interacting from the administration to the faculty to the students, everybody kind of on the same page and doing the same things. I think [it] really helps break the ice and and let us all realize that we’re kind of on an even playing field.” — Harold

Similar to Harold, Misha describes how she enacted the norm-setting activity within her DAT that was modeled in the DALI workshop. She describes a slightly more rocky implementation than Harold did. Misha is “afraid that the power differentials are going to come in again” with regard to a particular faculty member who “said he wants to be in there but he didn’t show up for the meetings.” Due to some of these interpersonal challenges with implementing the new practice, Misha says that “I don’t think we have done a good job, establishing the ground rules. Because we do feel like we might not be established at all.”

In examples from other change leaders, we see how the practices that they use in the DALI meetings are used in the DATs with varying levels of success. It is important for the change leaders to have both of these overlapping spaces, as they value the opportunity to learn in DALI, try things out in their DATs, and come back to DALI for advice on how to move forward. What is not captured well by the CoT model is this intertwining of the DAT and DALI spaces, which can make implementation of these practices tricky for change leaders.

C. Network of peers

The network of peers within DALI is reminiscent of that within the CoT framework. However the way it is structured is more similar to that of an FLC. Membership is determined by the leadership of DALI, and the formal DALI programming is time-bound, lasting about a calendar year. Even with these differences, it is helpful to view the DALI community through a CoT lens as it opens up opportunities to reflect on how the network of peers in DALI supports its members and may inform future development of the DALI network.

Many of the change leaders describe a sense of togetherness that surprised them. Sharing their own experiences of challenges in their departments and their commitment to change is something that brought them together. Paul describes how these connections were built over the workshop.

“I was impressed by what I felt was a sense of camaraderie that developed initially, maybe not the first meeting, by the second or third meeting. Even though it might have developed a lot faster if you were there in person, but I was impressed with the fact that people are comfortable with each other from different institutions.” — Paul

This cohort had their kick-off workshop over Zoom as there were still travel precautions due to the pandemic. Nevertheless, the change leaders were still able to connect in this virtual environment. This type of supportive community makes a space where change leaders are comfortable to share their struggles and find togetherness in addressing similar challenges.

We also see change leaders in these interviews discuss how they benefit from the stories of others in other departments. Henry described what he saw as important about this community and how it tied to supporting their local change work.

“I thought it was important for us to look outside our own walls, and I saw the DALI is an opportunity to tap into what’s happening at other institutions as well as the direction that the facilitators might take us to think about areas that we can continue to grow.” — Henry

Through connections with individuals, Henry hopes to gain insight into other physics departments. Additionally, we see Henry identify the facilitators as being able to provide additional guidance that goes beyond the way he characterizes his fellow change leaders. Similarly, other change leaders position the facilitators as highly influential in supporting the change work. In the CoT model of a network of peers, there is a central group that organizes the community and provides mentorship for newcomers. However, the role we see the facilitators play in DALI is more similar to an FLC model. The CoT framework has highlighted some ways in which DALI builds a community to help enact new practice, but we see that some of the features are different than CoTs.

D. Unique DALI features

The partnerships between change leaders that represent their respective departments supports the translation of DALI practices into the local change work. We have termed this the change leader *dyad*. Many change leaders reflected about how this was important for them to navigate both the DALI space and in leading their DATs. For Charles, the change leader dyad is also important given the institutional roles that each change leader has.

“I got to meet with my department head, [Christina], to discuss [the workshop]. So it was good to kind of hear what she found interesting from the orientation and I can discuss what I found interesting as well. And it kind of helped us plan our next course of action.” — Charles

There is a sense for change leaders that they are not attempting the change effort alone in their departments. For CoTs, it has been shown that with more members from the same institution, the change work goes further at that institution [23]. However, it is not a central piece of the CoT model, whereas it is for DALI.

In a CoT framework, the change agents would be defined as the community as they are the ones who are a part of DALI. DALI is structured such that change leaders work with DAT members (staff, students, other faculty, etc.) to pursue their change efforts. Through a CoT lens, these DAT members are not captured. On Maple College’s DAT, the student members organized and led a focus group for collecting perspectives on the undergraduate program from other students.

“We’re having the students facilitate [the focus group], because we don’t want the faculty to be there because we don’t want them to worry about like hurting our feelings or the fact that they’re in our classes. So the students are facilitating it and I won’t lie, this is making us both a little bit nervous, [[laughter]] but we’ll see.” — Morgan

The work that students contribute in DATs pushes back against what is typical in departments, leading to Morgan’s nervousness about the process. The inclusion of students on DATs, what they contribute to in the change effort, and the tensions that arise are all important parts of DALI. When just modeling the community of change leaders, we miss this important work by DAT members and how this may be complicated due to institutional power dynamics. The CoT model has been helpful in highlighting particular aspects of DALI, but we find that many of the important, and unique, DALI structures are backgrounded when attempting to frame DALI solely as a CoT. In particular, viewing DALI as a CoT, with its focus on the change leader dyad, overlooks the critical aspect of transformation of departmental culture (not to mention the success of the change efforts led by the DATs in each department) that is central to the DALI model.

IV. DISCUSSION

The DALI philosophy is well established and documented in our other work, where we see how it challenges typical approaches to change work. Change leaders adopt the DALI philosophy themselves even when it went against what they expected. Here, we have used the CoT core elements as a lens to understand some of the features of DALI in more detail.

The CoT framework does not directly model the local institution spaces in which the CoT participants act. However, the DAT is a central focus of the change leader’s work. Each DAT exists within the context of the local institutions and departments, meaning that the ways that change leaders “observe the new practice” are highly influenced by the histories and relationships within their departments. Moreover, there is an important interplay between what the change leaders learn about and share in the DALI and what they enact in their DATs. Thus, it is not possible to completely understand how the DALI functions without looking outside the DALI to understand the DATs.

As with CoTs, DALI helps to create a supportive network of peers for change leaders, building camaraderie across institutional boundaries and energizing change leaders. However, this community differs from typical CoTs in being time-bounded and intentionally-structured by the facilitators. Here, there are opportunities for DALI to borrow from successful CoTs to find ways to keep the cohorts connected after formal DALI activities end as well as to support change leaders who want to move into new mentorship roles. For example, new DALI facilitators have been recruited from earlier cohorts of DALI change leaders.

DALI was not designed as a CoT, yet we have found that using the CoT framework as a lens when analyzing change leader interviews has provided insights into the structure of the DALI. This may help shape the growth and development of the DALI model in useful ways, specifically around how DALI (as well as a growing community of DALI change leaders) can potentially support change efforts over a longer period of time than the initial year of the DALI curriculum. These insights can also help DALI participants better understand how to sustain and institutionalize their change efforts. CoT is a useful framework for researchers and practitioners to use in their work with groups that support STEM institutional change. The unique features of DALI motivate the need for further study in order to develop a model that externalizes the DALI approach to inform physics change initiatives, building from characteristics of CoT and other frameworks.

ACKNOWLEDGMENTS

We thank the change leaders for their participation in this research study and the members of our research group for their insights and feedback. This work is supported by the NSF under Grant No. 1821372. RPD was supported by the NSF GRF under Grant No. DGE 1840340.

-
- [1] E. Redden, When the physics department is under threat, *Inside Higher Education* (2021).
- [2] J. Tyler, P. Mulvey, and S. Nicholson, Size of undergraduate physics and astronomy programs: Results from the enrollments and degrees and academic workforce surveys. focus on., AIP Statistical Research Center (2020).
- [3] S. Chasteen, J. C. Corbo, R. Dalka, and C. Turpen, Results from the 2020 ep3 survey to physics department chairs: External report, (2020).
- [4] S. Chasteen, Results from the 2022 ep3 survey to physics department chairs: External report, (2022).
- [5] R. P. Dalka, C. Turpen, J. C. Corbo, and D. A. Craig, Exploring faculty's explanations of enrollment issues: where does responsibility and control reside?, in *Proceedings of the Physics Education Research Conference (PERC)* (2022) pp. 131–136.
- [6] J. C. Corbo, D. A. Craig, R. P. Dalka, and C. Turpen, Introducing the departmental action leadership institute and its preliminary outcomes, in *Proceedings of the Physics Education Research Conference (PERC)* (2022) pp. 112–117.
- [7] S. Gehrke and A. Kezar, Stem reform outcomes through communities of transformation, *Change: The Magazine of Higher Learning* **48**, 30 (2016).
- [8] R. DuFour, What is a "professional learning community"?, *Educational leadership* **61**, 6 (2004).
- [9] E. Price, A. C. Lau, F. Goldberg, C. Turpen, P. S. Smith, M. Dancy, and S. Robinson, Analyzing a faculty online learning community as a mechanism for supporting faculty implementation of a guided-inquiry curriculum, *International Journal of STEM Education* **8**, 1 (2021).
- [10] L. Stoll, R. Bolam, A. McMahon, M. Wallace, and S. Thomas, Professional learning communities: A review of the literature, *Journal of educational change* **7**, 221 (2006).
- [11] M. D. Cox, Introduction to faculty learning communities, *New directions for teaching and learning* **2004**, 5 (2004).
- [12] M. M. Martin, F. Goldberg, M. McKean, E. Price, and C. Turpen, Understanding how facilitators adapt to needs of stem faculty in online learning communities: a case study, *International Journal of STEM Education* **9**, 1 (2022).
- [13] A. Corrales, F. Goldberg, E. Price, and C. Turpen, Faculty persistence with research-based instructional strategies: A case study of participation in a faculty online learning community, *International Journal of STEM Education* **7**, 1 (2020).
- [14] C. Turpen, A. Olmstead, and H. Jardine, A case of physics faculty engaging in pedagogical sense-making, in *Proceedings of the Physics Education Research Conference. Sacramento, CA* (2016).
- [15] M. Dancy, A. C. Lau, A. Rundquist, and C. Henderson, Faculty online learning communities: A model for sustained teaching transformation, *Physical Review Physics Education Research* **15**, 020147 (2019).
- [16] E. Wenger *et al.*, Communities of practice: Learning as a social system, *Systems thinker* **9**, 2 (1998).
- [17] E. Wenger, R. McDermott, and W. M. Snyder, Seven principles for cultivating communities of practice, *Cultivating Communities of Practice: a guide to managing knowledge* **4** (2002).
- [18] V. Allee, Knowledge networks and communities of practice, *OD practitioner* **32**, 4 (2000).
- [19] P. Irving and M. Caballero, Understanding the picup community of practice, in *Physics Education Research Conference* (2017).
- [20] K. G. Johnson, P. Jakopovic, and C. von Renesse, Supporting teaching and learning reform in college mathematics: Finding value in communities of practice, *Journal for STEM education research* **4**, 380 (2021).
- [21] D. L. Reinholz, I. White, and T. Andrews, Change theory in stem higher education: a systematic review, *International Journal of STEM Education* **8**, 1 (2021).
- [22] A. Kezar, S. Gehrke, and S. Bernstein-Sierra, Communities of transformation: Creating changes to deeply entrenched issues, *The Journal of Higher Education* **89**, 832 (2018).
- [23] A. Kezar and S. Gehrke, Communities of transformation and their work scaling stem reform., Pullias Center for Higher Education (2015).
- [24] S. E. Shadle, Y. Liu, J. E. Lewis, and V. Minderhout, Building a community of transformation and a social network analysis of the pogil project, *Innovative Higher Education* **43**, 475 (2018).
- [25] S. Gehrke and A. Kezar, Perceived outcomes associated with engagement in and design of faculty communities of practice focused on stem reform, *Research in Higher Education* **60**, 844 (2019).
- [26] Departmental action leadership institute (dali), <https://ep3guide.org/dali>, accessed: 2023-05-15.
- [27] C. Ngai, J. C. Corbo, K. L. Falkenberg, C. Geanious, A. Pawlak, M. E. Pilgrim, G. M. Quan, D. L. Reinholz, C. Smith, and S. B. Wise, *Facilitating change in higher education: The Departmental Action Team model* (Glitter Cannon Press, 2020).
- [28] Effective practices for physics programs philosophy of effective departmental change, <https://ep3guide.org/about/philosophy-effective-departmental-change>, accessed: 2023-05-15.
- [29] D. Sachmpazidi, C. Turpen, and R. P. Dalka, Changing the culture: Documenting shifts in a department's norms around data use, in *Proceedings of the Physics Education Research Conference (PERC)* (2022) pp. 401–406.
- [30] F. N. Abdurrahman, C. Turpen, and D. Sachmpazidi, A case study of cultural change: learning to partner with students, in *Proceedings of the Physics Education Research Conference (PERC)* (2022) pp. 24–29.