

Departmental Action Teams: A five-year update on a model for sustainable change

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Fostering sustainable improvements in undergraduate education remains a formidable challenge. To address this challenge, our team has developed the Departmental Action Team (DAT) model. DATs are small working groups of faculty, students, and staff, that work collaboratively to envision, plan, develop, and build sustainable structures in their department. To support the uptake of such structures, DATs collect and analyze data to reflect on the root causes of an issue, which they use to shift beliefs, values, and practices within their context. This paper provides a five-year status report on the DAT project. We describe the history of the model, its evolution over time, and its impact on a variety of departments.

Introduction

What is required to catalyze widespread changes to undergraduate STEM education? Scholars of higher education study how *top-down* policy shifts and university support structures can be used to improve the student experience (Elrod & Kezar, 2015). At the same time, there is a need for work from the *bottom-up*, that involves faculty, staff, and students on the ground as advocates for meaningful change (Austin, 2011). Our work bridges these two different types of approaches (Reinholz, Corbo, Dancy, Deetz, & Finkelstein, 2015), by focusing on a department as a meaningful unit of change (AAAS, 2011). Because departments have relatively coherent policies, structures, and cultural beliefs, if changes are made at the level of a department, they are more likely to be sustained in the long-term (Reinholz & Apkarian, 2018).

To effect department-level change, we have created the Departmental Action Team (DAT) model (Reinholz, Corbo, Dancy, & Finkelstein, 2017). DATs are small working groups of faculty, students, and staff, that work collaboratively on a shared vision to enact change within their departments. DATs are participant-driven and their activities are guided by a set of six core principles (listed below) that describe the target culture a DAT aims to support.

This paper provides a five-year status report on DATs and their impact to date. To begin, we provide a brief overview of the challenge of improving undergraduate STEM education. Next, we define DATs and how they function. Specifically, we define the essential features that make DATs different from other kinds of campus working groups. Then, we describe multiple iterations of the DAT model and the outcomes of DATs supported to date. We close with a discussion and implications.

The Challenge of Improving STEM Education (And Beyond)

Research shows that poor teaching is one of the primary reasons that students abandon STEM career aspirations (Hunter, 2016; Seymour & Hewitt, 1997). These uninviting classroom environments contribute to a status quo where bachelor degree attainment remains

disproportionately low for students of color, and has actually declined for women in some fields (National Science Foundation (NSF); 2018). At the same time, there is considerable evidence for active learning techniques that can be used to improve student success (Freeman et al., 2014). In addition, there is some evidence that active learning could even mitigate some inequities in STEM persistence (Kogan & Laursen, 2014; Laursen, Hassi, Kogan, & Weston, 2014). In addition, beyond general active learning, there are targeted interventions that create measurable improvements to equity in student learning outcomes (e.g., Cohen & Lotan, 1997; Yeager & Walton, 2011). Despite considerable progress in developing and studying such teaching methodologies, they are not widely used. Why does this problem persist?

Scholars of STEM educational change are actively working to understand this problem. The lack of progress is not for a lack of effort. Nearly 200 STEM educational change efforts have been documented in recent years (Beach, Henderson, & Finkelstein, 2012). However, these efforts tend to use overly simplistic models of change, which are not particularly effective (Beach et al., 2012; Borrego & Henderson, 2014). For example, what we have seen at our own institutions (and is documented in the literature (e.g. Henderson, Beach, and Finkelstein, 2011; Chasteen et al. 2015)) are single faculty members taking on course redesign efforts only to be rotated out of the course one to two years later. As a result, innovations and creations are often forgotten and replaced. Further, when faculty are provided with professional development as a mechanism to improve upon STEM instruction more broadly, those who are interested are often not the ones providing poor instruction (Fairweather, 2008). The challenge of educational reform is current but also historical; some authors argue that the last century has been filled with similar reform efforts yet still modest progress (cf. physics; Otero & Meltzer, 2017).

The evidence is clear; simplistic scale up approaches to change simply do not work (Austin, 2011; Fairweather, 2008; Kezar, 2011). Rather, an effort to create meaningful change must be context-sensitive and attend to the needs of its participants (Kezar, 2011). This is a considerable challenge, because this requires STEM educators to not only become experts in learning but also to become experts in systemic change. To support those involved in STEM programs navigate educational change, we have created the Departmental Action Team (DAT) model, which we now describe. Although the genesis of the DAT model was for the improvement of STEM departments, we have begun to apply it to non-STEM departments, as we describe later in the paper.

Departmental Action Teams

Overview of the Model

A DAT is a group of (roughly four to eight) faculty, students, and staff within a single department. A DAT is an externally facilitated yet participant-driven group that meets regularly for one to four semesters, typically for an hour every other week. DATs aim to create a lasting change to their department, by focusing on cross-cutting issues that cannot be easily solved by a single person (e.g., curricular alignment, equity in the major, community building). DAT participants are volunteers, with a shared commitment to improving their department.

A DAT begins with a series of visioning activities that allow it to determine a shared interest for the focus of its work. DAT participants choose their focus, which supports their ongoing commitment. Once a focus has been chosen, the DAT works collaboratively to address it, often by collecting, analyzing, and interpreting data relevant to the issue at hand. This allows the DAT to make its case to external stakeholders, ultimately so that it can create new

departmental structures for sustained improvement. Stakeholders will vary depending on the nature of the DAT focus. These stakeholders include, but are not limited to, administrators, department faculty members, staff, and students.

The *process* that a DAT goes through is central to its learning and its ability to create lasting changes. By engaging in a functional, collaborative process, participants become more empowered agents of change. As DAT members become more educated about their area of inquiry, it helps shift their beliefs and values in a way that supports their uptake of the structures that they build. In this way, a DAT is a productive tool for working on *any* issue a department may face, because the department benefits as much from the DAT process as the structures the DAT creates.

To support a functional DAT process, DATs are externally facilitated. Facilitators bring expertise in educational research and institutional change, help coordinate logistics, make connections with other campus actors, and provide an outside perspective to DAT participants. The facilitators also provide forms of education for participants, both implicit and explicit. This learning supports DAT members to act as change agents after external facilitation comes to an end.

Facilitators guide DATs with six principles for change (Corbo, Reinholz, Dancy, Deetz, & Finkelstein, 2016):

1. Students are partners in the educational process.
2. Work focuses on achieving collective positive outcomes.
3. Data collection, analysis, and interpretation inform decision-making.
4. Collaboration between group members is enjoyable, productive, and rewarding.
5. Continuous improvement is an upheld practice.
6. Work is grounded in a commitment to equity, diversity, inclusion, and social justice.

These principles are shared with DAT participants. Facilitators guide DAT participants in learning about and following the six principles for effective departmental change, and use these principles in assessing the progress of a group. These principles represent both some of the best practices in organizing teams to make lasting changes (e.g., data collection and analysis, continuous improvement) *and* the commitments of the DAT project more broadly (e.g., partnering with students, attending to equity).

To date, our DATs have been co-facilitated, which provides mutual learning opportunities to the facilitators and allows for co-planning of DAT activities. These are clear benefits to the DAT and its facilitators, and they can support the development of a robust facilitator community. Nevertheless, co-facilitation does require additional costs, and we have some preliminary evidence supporting that DATs *could* be run with a single facilitator. We now turn to the evolution of the DAT model and describe some of its impacts.

First-Generation DATs

The DAT model was developed as a part of the American Association of Universities (AAU) *STEM Education Initiative*. The University of Colorado Boulder was one of eight campuses that received first round seed funding (\$500,000) to study and create changes on its campus. The Boulder project consisted of multiple initiatives, and the DAT model was a successful model that was created as a part of the project. In a five-year status update from the AAU project, DATs were described as a “unique” change model that was capable of aligning top-down and bottom-up initiatives (Association of American Universities, 2017).

We describe the six DATs that were convened with the support of AAU funding as first-generation DATs (see Table 1). In first-generation DATs, the inclusion of students and staff on DATs was optional, and we found that only two of six DATs actually had students and staff involved. In addition, the facilitators taught participants about how change works in mostly *implicit* ways (i.e. modeling their approaches to running the DATs). Intentional questioning, echoing DAT member’s comments, and activity experiences are a few such examples. While the facilitators did include explicit education around change with some of the DATs who convened for multiple years, it was not explicitly planned as part of a DAT curriculum.

Table 1. First-Generation DATs

Department	Participants	Goals	Outcome
Runes (4 semesters)	1 tenured faculty, 4 instructors	Integrate the Runes curriculum by facilitating faculty communication, development of common learning goals, and shared student experiences across courses	The formation of three Departmental Education Specialist Positions
Potions (4 semesters)	3 tenure-track faculty, 1 postdoc, 3 grad students, 1 undergraduate, 1 staff	Increase the inclusion and support of women and students of color in the undergraduate major	Creation of a new Committee on Diversity and Inclusion
Myths (1 semester)	8 tenure-track faculty	Develop the course of study for the undergraduate major	A first version of the course of study was created
Charms (2 semesters)	4 tenure-track faculty	Develop learning outcomes for the major, align courses to the outcomes, and shift the culture of the department to align with the desired outcomes	Submitted proposals to administrators to fund an assessment specialist
Sorcery (1 semester)	6 tenure-track faculty, 1 postdoc	Align the core major courses so that students are better prepared for upper-division coursework, provide clearer advising to students on how to succeed in the major	Revised course pathways and defined majors and non-major version of a key course
Alchemy (5 semesters)	7 tenure-track faculty, 1 instructor, 2 staff	Redesign course learning objectives, improve student satisfaction with major, increase representation of women in the major	Standing committee to improve climate and community; creation of an anonymous feedback box and student action committees

Still, we found evidence that DAT participants *did* develop skills as change agents that lasted beyond their DAT experience. For instance, a former DAT participant Sophia described

her team as “DAT addicts,” because they “found the DATs just to be a really effective mechanism for getting faculty involved in discussions of change within the department.” Another participant from the same team, Anne, agreed that “What’s truly unique about the DAT is that oftentimes it’s identifying a problem that the department doesn’t know it has.” Given their positive experiences with DATs, Sophia and Anne’s team later applied for support to run another DAT. While we cannot speak to the uniformity of these experiences, these quotes suggest that engaging in the DAT process even without explicit change education can be transformative. A summary of the six DATs can be found in Table 1 (all department names are pseudonyms).

Second-Generation DATs

The DAT project continued into its second generation with additional funding received from the National Science Foundation. The goal of the follow-up project was to expand the use of DATs to a partner campus, Colorado State University, and to further study how different institutional contexts could impact the uptake and institutionalization of the model. The second-generation of DATs also featured changes to the facilitation model.

The second-generation facilitators, who collectively work together in a facilitator learning community across campuses, have included explicit change education and discussions about the collaborative process for the DAT participants. Part of this has focused on how to make the DATs develop and sustain as high-functioning teams. This includes: creating and using shared community standards, reflecting on team practices, and talking explicitly about how change in undergraduate education happens. In addition, the facilitators have been able to share best practices learned from prior DATs, given that the project has now matured. All of these efforts are aimed to empower DAT participants as change agents even after that DAT disbands. Second generation DATs are summarized in Table 2.

Table 2. Second-Generation DATs

Department	Participants	Goals	Outcome
Prophecy (2 semesters)	4 tenure-track faculty, 1 grad student	REUs, advising, displays/posters	DAT disbanded without achieving goals (only updated displays)
Divination (ongoing; 2 sem.)	1 dept. chair, 2 tenure-track faculty, 3 support coordinators, 1 grad stu, 1 ugrad stu	Revising student learning outcomes (SLOs) and creating assessments	Designed assessments and revised SLOs for one of the department’s majors
Herbs (ongoing; 2 sem.)	5 tenure-track faculty, 1 graduate student, 1 undergraduate student	Assess development of skills across the department’s major	Developing, piloting, and implementing skills assessment; creating a department-wide assessment plan
Summoning (ongoing; 2 sem.)	2 tenure-track faculty, 2 non-tenure-track faculty, 2 grad stu., 2 ugrad stu.	Creating a sense of community within the new major	Creation of networks, structures/events (e.g., fall welcome, career fair, social networking)

Of these ten DATs formed to date, the Prophecy DAT was the only example of a group that did not achieve its desired outcomes. Due to the political situation in the Prophecy department, the DAT only achieved a minimal outcome of updating some departmental display cases and hanging posters before it disbanded in two semesters. This is a telling case that highlights that no model for change will universally work in all departments, but there must be some level of readiness for change within the department itself.

In addition to these four DATs that all met for at least two semesters, and three of which are continuing at this time, our team launched or is planning to launch eight new DATs, at least three of which are in non-STEM departments. We describe these in more depth below.

Third-Generation DATs

In the 2018-2019 academic year, the project brought on three DATs at the University of Colorado Boulder and 5 DATs at Colorado State University. DATs were recruited through a variety of mechanisms reflective of individual campus context, departmental needs, and administrative suggestion. On the University of Colorado Boulder campus, DATs were recruited by an open solicitation for proposals. At Colorado State University, new DATs were primarily recruited with 2 mechanisms: departments that approached DAT facilitators about hosting a DAT, or through upper administration targeting departments that had the potential to convene a DAT in order to focus on identity and inclusion strategies in the major.

At the University of Colorado Boulder, an open solicitation for DAT proposals was sent to faculty in all STEM departments and student government organizations. The team reached out to Associate Deans and other on-campus supporters of the model to spread the word to potential applicants. Proposals were evaluated based on 1) demonstrated understanding of how the DAT model would be expressed within the department, 2) interest from multiple department members representing diverse perspectives, and 3) existence of resources to help the DAT be successful (e.g., support from the department chair). The team received five applications and moved forward with creating DATs in three departments.

At Colorado State University, one new STEM DAT was recruited through conversations with the department chair and a select group of faculty who were interested in learning more about the DAT Model. A presentation was made to the entire faculty and staff and subsequent follow up conversations and decisions within the department led to the start of a new DAT. Somewhat similar opening strategies were used with another department that eventually chose not to engage with the DAT Model.

The other four new DATs were convened from a pool of 6 potential departments invited by upper administration. Those 6 departments (2 of which declined the offer for a DAT) were identified to align with the university effort known as the Student Success Initiative 2 (SSI 2). In 2007, Colorado State University launched the campus wide Student Success Initiative to “increase the 6-year graduation rate to 70% and eliminate the 6-year graduation rate gap between traditional and minoritized students adjusted for entering background characteristics (CSU SOURCE, May 8, 2017)”. Numerous effective strategies, using student affairs programs targeted to freshman students and a revamp of the advising program, succeeded in reaching those graduation goals. In 2017, SSI 2 began with the intent to build upon the first decade’s successes (CSU SOURCE, May 11, 2017) and push retention, graduation, and achievement rates even higher.

The DAT Model was chosen in 2017 by upper administration as one of the SSI 2 strategies employed as the university strives toward the goal of an 80% graduation rate for all

students irrespective of incoming background characteristics. The DAT Model is currently being used in the four new SSI 2 DATs (two of which are in non-STEM departments). A variation on the DAT model now being tested through SSI 2 is the inclusion of a DAT member from outside of the department who has expertise in student affairs programming. Each of these specifically chosen DAT members from outside of the department is contributing expertise in student programming and departmental culture shifts that can support underrepresented students.

The success of DAT recruitment strategies and the impact of these two variations of the DAT Model: DATs in non-STEM departments and extramural DAT members, will be shared in future publications.

Discussion

In just five years, the DAT model has matured into a robust model for making lasting changes to STEM departments. Above, we have presented multiple iterations of the DAT model, each refined according to the specifics of the situation and the background experiences of the facilitators. In this way, much like a Faculty Learning Community, a DAT is a useful model for working with faculty that can be used in a variety of contexts (Reinholz et al., 2017). DATs are flexible, because they can be used to achieve nearly any cross-cutting goal within the purview of the department. This flexibility overcomes the limitations of externally-imposed, context-insensitive models, because a DAT is customized and cultivates ideas from as many stakeholder groups as possible to meet the needs of its users. Moreover, the DAT model is designed to work synergistically with other campus efforts, and we have seen examples of this both of the campuses. At CU, DATs have worked alongside a DAT-like effort to improve assessment practices for faculty teaching, and at CSU, the DATs have been used as a part of a multifaceted effort to improve student success.

As described above, we have had success in 9 of the 10 departments in which we have formed DATs. Tables 1 and 2 show the breadth of possible outcomes that a DAT can create: departmental education specialist positions, curricular adjustments, committees to support equity and inclusion, improved assessment practices, etc. While not all of these outcomes focus directly on teaching practices, they create the types of structural changes that are needed within a department to support high-quality teaching. Without such changes, efforts are more likely to result in quick-fixes that do not address an issue in an ongoing fashion.

In addition to positive outcomes, all participants in DATs have an opportunity to develop as educators and change agents. For this reason, a DAT has the potential to make *lasting* changes to a department. The DAT model organizes the collective work of the department and at the same time influences the culture of the department as DAT members work through the process. Thus, the DAT *process* is just as critical as the actual structural outcomes of the DAT. Regardless of the specific aims of a DAT, the DAT process supports its members' learning.

As a research team, we continue to take steps to better understand the DAT model and also the contexts within which change work takes place in higher education (e.g. non-STEM departments or other academic units). In forthcoming manuscripts we will further externalize the six principles, provide a validated survey for measuring changes in departmental culture, and present in-depth empirical cases of the changes that DATs make. All of this work will support the goal of improving the DAT model through iterative refinements, and ultimately furthering the aim of educational change.

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