Departmental Action Teams: Supporting faculty learning through departmental change

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We introduce a new type of faculty working group, called a Departmental Action Team (DAT). A DAT is a self-selected group of 4-8 participants, consisting primarily of faculty within one department. DAT members select an educational issue of shared interest and work collaboratively to create new departmental structures to sustainably address it. DATs are distinct from but draw from Faculty Learning Communities (FLCs); we distinguish DATs and FLCs using three frameworks. To illustrate the application of these frameworks we describe an extended example of one DAT that was a part of a larger project focused on institutional change.

Introduction

To date, most efforts to improve education in universities have focused on the development and dissemination of teaching innovations (Bennett & Bennett, 2003; Henderson, Beach, & Finkelstein, 2011). While many powerful teaching strategies have been developed through these efforts (e.g., Freeman et al., 2014), analysis of their dissemination has brought attention to the difficulty of supporting and sustaining the use of these strategies (Henderson & Dancy, 2009; Henderson, Dancy, & Niewiadomska-Bugaj, 2012; Kezar, 2011). As a result, we have yet to see widespread change in teaching practices in undergraduate education (Austin, 2011; Fairweather, 2008). Thus, there is an urgent need to create new models and approaches for effecting *and sustaining* educational change.

This paper introduces a new type of faculty working group, a Departmental Action Team (DAT), which helps address this need. A DAT is a self-selected group of mostly faculty within a single department with three primary goals: (1) to influence departmental culture by addressing an educational issue of departmental interest, (2) to sustain improvements related to the issue by creating lasting structural changes, and (3) to provide a collaborative, community-building

experience for DAT members. DATs are departmentally-focused, faculty-driven, team-based, and focused on creating sustainable changes from the offset; thus, the DAT model has a strong likelihood of generating the kinds of sustained educational changes that have been difficult to create with other models.

The development and implementation of DATs draw heavily from the literature on Faculty Learning Communities (FLCs; Cox, 2004a, 2017). FLCs generally consist of faculty members from different disciplines meeting in a group setting on a regular basis to promote individual learning around education (e.g., by transforming individual courses) through ongoing, mutual support. Key features of an FLC include building community and supporting faculty to act as agents of their own learning. FLCs sit in contrast to dissemination approaches, because they focus on providing support to faculty as learners rather than providing faculty with predetermined solutions that they are expected to implement with fidelity. DATs feature many of the community-oriented and learner-centered characteristics of an FLC, but differ in their goals and structure. For example, FLCs generally consist of members from various departments working on individual projects, while DATs consist of members of the same department working on a single, collective enterprise. Although there are some instances of FLCs operating entirely within a single department, this is less common, due to the difficulties of facilitating FLCs within a single department (Cox, 1995, 1996, 2004b). As such, we assume throughout this paper that FLCs focus on cross-department collaboration.

DATs were developed as one component of the Association of American Universities-sponsored STEM Institutional Transformation Action Research (SITAR) Project, which is focused on creating and studying institutional change in STEM departments on the campus of one research-extensive university. This particular university has a long history of engagement in

educational reform efforts (e.g., Chasteen, Perkins, Code, & Wieman, 2016), but FLCs were not a major feature of these efforts. In what follows, we focus on the DAT formed in the "Runes" department (a pseudonym for one of six STEM departments involved in the project), which chose to focus on the integration of the curriculum within their department. Other DATs chose different areas of focus, such as the Potions Department DAT, which chose to focus on increasing undergraduate representation of traditionally underserved populations in their field. Both of these DATs consisted of department members working collectively on a common objective: to create structural changes within their departments to sustain educational improvement. Ultimately, each DAT did change departmental structures, one through the creation of curriculum coordinator positions and one through the creation of a new committee.

In this paper, we introduce the DAT model through an extended example of the Runes DAT and make comparisons to FLCs, which are well established and broadly implemented. We make these comparisons in three ways: (A) comparing the explicit goals of the groups, (B) by examining the approaches as change strategies, and (C) applying a theoretical analysis of the constructs, though an Activity Theoretic lens. Thus, we focus on how DATs draw heavily from FLCs and also on how they are distinct. We provide examples from the Runes DAT to illustrate the operation of a DAT and help characterize and distinguish it from an FLC. While our work has focused specifically on STEM departments, we expect this work should be broadly applicable to any university department.

Background and Framing: Faculty Working Groups

Faculty members enact the educational mission of a university, and yet few of them have significant training or experience in teaching before they are hired. Instead, they typically learn how to teach "on the job," with many universities offering mechanisms to support them in doing

so. The need for good professional development around teaching (cf. Austin, 2002) has resulted in a large body of work focused on faculty development and the creation of professional societies to support those who run faculty development programs, such as: the Professional and Organizational Development (POD) Network in the US, the Higher Education Academy (HEA) in the UK, and the International Society for the Scholarship of Teaching & Learning (ISSOTL). One promising line of inquiry on faculty development focuses on how faculty members learn through participation in working groups. While working groups may serve a variety of purposes, we focus here on groups that have an explicit goal of learning through participation in social practices (Lave, 1996), as opposed to groups that may be formed solely to solve a problem (e.g., setting a department policy) with no explicit goal of learning for participants.

At present, there are limited frameworks for describing faculty working groups, so they are often just described as communities of practice (e.g., Brudzinski & Sikorski, 2010). Alternatively, some authors classify their work as FLCs, even though the groups they describe do not strictly fall under this categorization (e.g., Marbach-Ad, Egan, & Thompson, 2015). As we introduce the DAT model, we distinguish it from FLCs using three different frameworks; these same frameworks can be used by others to provide a richer description of the type of faculty working groups they are developing and/or studying.

Faculty Learning Communities

An FLC is defined as (Cox, 2004a p. 8):

> a cross-disciplinary faculty and staff group of six to fifteen members (eight to twelve members is the recommended size) who engage in an active, collaborative, yearlong program with a curriculum about enhancing teaching and learning and with frequent seminars and activities that provide learning, development, the scholarship of teaching, and community building.

FLCs have voluntary membership, aim to build a culture of openness and trust to empower participants, and involve a collective group contributing to individual projects (Cox, 2004).

Facilitation plays an important role in FLCs. In FLCs, facilitation-related tasks may be distributed across two different individuals: the program director and the specific dedicated facilitator of any given FLC (Cox, 2004a). In general, a program director focuses on multiple FLCs and their relation to an institution; they are responsible for ensuring that the FLC program as a whole continues to run on a campus and may deal with issues like FLC scheduling and recruitment. In contrast, a dedicated facilitator focuses primarily on the internal workings of the FLCs they are facilitating. Dedicated facilitators support their FLCs by helping to build community, provide structure, and find resources for their group. At times, the role of a dedicated facilitator and participant can be blurred. For example, the facilitator of an FLC may be a more experienced faculty member who is explicitly taking on the dual role of participant and facilitator. Even if the facilitator is not explicitly a participant (e.g., if they are a staff member in a Teaching and Learning Center), they will typically take on participant-like roles through sharing opinions, participating in decision-making, helping the group accomplish tasks, and so on (Ortquist-Ahrens & Torosyan, 2009). Henceforth, we will focus on the "dedicated facilitator" component of FLC facilitation, especially with respect to the DAT facilitation that we later describe.

As the name suggests, an FLC aims to develop a community of learners (Boyer, 1990). Baker (1999) argues that learning communities have two key characteristics: all members of the group are learners (individually), and the group is organized to learn collectively, constructing a body of shared knowledge. Although faculty normally interact with colleagues and students in a variety of settings (e.g., classes, committees, colloquia), there is no guarantee that any of these

venues will represent a genuine community. As a result, faculty members may experience isolation, especially in their teaching practices. FLCs seek to remedy this lack of community.

Cox (2004) distinguishes between two types of FLCs: cohort-based and topic-based. A cohort-based FLC brings together individuals in a similar stage of their career (e.g., graduate students, junior faculty) who may have been particularly affected by isolation. Topic-based groups bring together a variety of faculty around a topic of mutual interest, such as assessment, cooperative learning, or technology (Richlin & Essington, 2004a). In their 2004 survey, Richlin and Essington found that almost 80% of FLCs in the US are organized around some sort of topic. In general, each FLC member picks an individual course or project to work on as a means to develop their educational practices related to the topic. In this way, faculty are learning as a community, but their development is at an individual level, aimed at improving their own courses and projects. Nevertheless, there are some examples of FLCs addressing broader issues on a campus, such as curricular revision, advising, or inclusion (Richlin & Essington, 2004b). Given the great diversity of projects that fall under the umbrella of FLCs, we focus primarily on FLCs that attend to the development of individual faculty and courses, as they are the most common form of FLC.

Departmental Action Teams

A DAT is a self-selected group of about 4-8 participants that consists primarily of faculty within a single department, but may also include postdoctoral researchers, students, or staff. DAT participants are volunteers: they join the DAT due to a shared interest in making meaningful educational changes in their department. DATs are facilitated groups; dedicated facilitators from outside the DAT's department bring expertise in educational research and institutional change, help coordinate logistics, and aim to mitigate the impact of existing

departmental power structures within the DAT. Through the use of purposeful planning and design, a DAT aims to function differently from a typical department committee. In SITAR, DATs were facilitated by two postdoctoral researchers on the project who were focused on studying and enacting institutional change. Both facilitators had strong STEM disciplinary backgrounds and familiarity with educational research. While the facilitators participated in the meetings and sometimes did "real work" for the group (e.g., data analysis, finding resources), their aim was for the other DAT members to be mostly responsible for the outcomes of the DAT.

DAT members select an educational issue of shared interest within their department as their focus. Because DAT members choose an issue that is meaningful to them, they tend to be highly motivated in the process and engaged in coming up with meaningful solutions. The issues that DATs focus on go beyond individual course transformation, to issues of crosscutting departmental importance, because working on broad-scale issues is more likely to result in lasting systemic change within the department. Once a focus has been chosen, the DAT works collaboratively to address it. Recognizing that educational issues rarely "stay solved" on their own, a DAT aims to create new structures within a department for sustaining change. Because department members rarely have expertise in institutional change, the expertise of the facilitators is important.

DATs meet regularly, typically for an hour every week or every other week for two or more semesters. Between meetings, DAT members assign their own "homework," determining what needs to be done and how much time they will commit. DAT members also decide whether or not they would like to schedule additional meetings. Thus, while DATs have dedicated facilitators, they are participant-driven.

Finally, the name “Departmental Action Team” was very deliberately chosen (as, we assume, was the name “Faculty Learning Community”). The word “Department” (as opposed to “Faculty” or “Student”) indicates that anyone from a given department could in principle be part of the team. For example, the Potions DAT consisted of a large number of students and staff members in addition to faculty (Corbo, Reinholz, Dancy, & Finkelstein, 2015; Rainey, Corbo, Reinholz, & Betterton, 2016). The word “Action" is a reminder that the purpose of the group is to be transformative; the department should be materially different after the DAT has finished its work than it was before. Finally, this group is a “Team,” not a committee. Teams consist of a group of people working towards a common goal in which they will either succeed or fail together, with members placing the group's goals above their own personal goals and decisions being made via consensus. On the other hand, committees consist of groups of people who often place their own goals or the goals of their “constituency" above the goals of the group; committee decisions involve compromise rather than consensus and committee work often involves talking about whether to do something rather than doing it.

Comparing DATs and FLCs

Like an FLC, a DAT is a collaborative model for faculty learning that emphasizes the importance of agency. Agency refers to an individual’s ability to influence their circumstances (Bandura, 2006; Wenger, 1998). When individuals have agency over a process, it increases their intrinsic motivation, which makes them more likely to sustain effort in the face of challenges (Deci & Ryan, 2000). This agency is crucial, because DAT participants generally engage in a change effort without strong external incentives. To understand how a DAT is similar and different from an FLC, we compare these groups through an analysis of their *goals*, their *strategies* for creating change, and their organization as *activity systems*.

Goals

A DAT is created with three explicit goals in mind: (1) to influence departmental culture by addressing an educational issue of departmental interest, (2) to create lasting departmental structures to sustain improvements related to that issue, and (3) to provide a collaborative, community-building experience for DAT members within their own department. These parallel the FLC goals of: (1) influencing the practices of individual faculty members (e.g., through course development), (2) promoting ongoing faculty learning, and (3) building a community of learners across campus. These goals are summarized in Table 1 and discussed in more detail in the following paragraphs.

Table 1. A comparison of goals for FLCs and DATs.

Goal	FLC	DAT
1. Objective	Influence individual faculty members (e.g., through course development, SoTL)	Influence departmental culture (e.g., by addressing a department-wide educational issue)
2. Mechanism	Support ongoing learning for faculty as individual instructors	Alter departmental structures to creates sustainable solutions and continuous improvement
3. Organization	Community of faculty across departments	Community and collaboration within a single department

DATs are a unique type of faculty group because they focus on changes that extend beyond individual courses and are of broader interest to the department (e.g., the department's curriculum as a whole, admissions procedures, representation of different groups of students). Because such changes cut across a department, they tend to be structural and require coordination among faculty, which makes them more likely to be sustained; local changes, such as an individual course transformation, are much more easily undone, for instance by the rotation of a new faculty member into that course. Moreover, an overarching goal of such changes in the context of a DAT is to influence the culture of the department. Change processes that aim for

"cultural change" as an abstraction are unlikely to be effective; instead a change process should focus on a concrete outcome while simultaneously improving culture (Schein, 2010). Yet, we note that cultural change is time consuming and may take many years to come to fruition. In contrast to DATs, FLCs generally focus on the improvement of individual faculty rather than whole departments. This may be achieved by having faculty iterate on their individual courses: work may be organized around a general topic such as technology-assisted learning (Richlin & Essington, 2004a), the Scholarship of Teaching and Learning (SoTL; Cox, 2003a, 2003b), or even the development of teaching portfolios (Cox, 1995, 1996). In any case, the general goal is to help faculty learn new techniques for improving their individual teaching. While this may result in lasting changes in that particular faculty member's practices, it is less likely to result in sustained changes in the department itself.

Rather than simply aiming to "solve" an educational problem, DATs focus on making structural changes within a department. This is to ensure that improvements can be sustained and revisited on an ongoing basis. To make such changes, DATs draw on the organizational change literature (Corbo, Reinholz, Dancy, Deetz, & Finkelstein, 2016; Kezar, 2013). It is a role of the facilitators to bring this expertise to the DAT, because it is not expected that STEM disciplinary faculty will be familiar with this literature. Nevertheless, through their participation in the DAT, faculty also learn about institutional change. FLCs focus on the sustained development of faculty as instructors, helping them to build skills they can use in a variety of courses, not just their project of focus in the FLC. Accordingly, FLCs draw upon theories of individual learning to support the growth of their participants.

The final goal of a DAT is to provide its participants with a productive collaborative experience within their department. The use of external facilitators is key, because it allows for

work to be organized in ways that may not be typical for the department. This is possible because the facilitators draw on the organizational change literature to guide their work. For instance, the facilitators organize the group around outcomes, rather than problems, which is more likely to lead to success (Cooperrider, Whitney, & Stavros, 2008). FLCs also value community, but they generally build that community across a campus rather than locally within a single department. Thus, the community of an FLC has the potential to lead to cross-campus collaborations, while the community of a DAT has the potential to impact internal departmental culture by spreading new collaborative and organizational models from within the DAT to the department at large.

Change Strategies

Through a 191-article meta-analysis of change efforts in STEM education, Henderson et al. (2011) developed a four-category typology of change efforts. This "four-square" classifies change efforts along two dimensions: which aspect of a system is to be changed (individuals or environments) and the nature of the intended outcomes (prescribed or emergent). The intersection of these two dimensions leads to the following categories:

I. *Disseminating Curriculum and Pedagogy*: "communicating the change agent's vision of good teaching to individual instructors" (Henderson et al. p. 960)

II. *Developing Reflective Teachers*: "encouraging teachers to use their own knowledge/experience/skill to improve their instructional practices" (Henderson et al. p. 961)

III. *Enacting Policy*: "developing appropriate environments (e.g., rules, reward systems, reporting requirements, investments in support structures) to facilitate instructors engaging in specific or desired activities" (Henderson et al. p. 962)

IV. *Developing Shared Vision*: "developing a new collective vision for the department,

> institutional unit, or institution (and, on occasion, even supra-institutional entities) that will support new modes of instruction" (Henderson et al. p. 962)

One of the key takeaways from the meta-analysis is that to be effective, change efforts should work across quadrants when possible. This also implies that at least some aspect of the outcomes in question should be emergent, which means that participants should have some agency in the change process. By generalizing this typology beyond a focus on classroom instruction, we can compare FLCs and DATs as change strategies (see Table 2).

The primary goal of an FLC is to promote individual learning in its participants, so FLCs are most aligned with quadrants I and II. An FLC focuses on bringing research on student learning and new curricula to its participants so that they can improve their teaching; this approach is aligned with the dissemination aspect of quadrant I, although the goal is not for the FLC participants to align their teaching with ideas imposed by its facilitator. Simultaneously, an FLC introduces a collaborative process for faculty to grow as educators through shared reflection on their own and their fellow participants' courses (quadrant II). While FLCs may do some work in the other quadrants, these are generally not their areas of focus. For example, the existence of an FLC makes some statements about desired structures and vision within a university (related to quadrants III and IV), but changing the environment of the university is not an explicit aim for the FLC participants (although it may be for the FLC organizers).

DATs emphasize the importance of all four quadrants. To achieve change within a department, DAT members create a shared vision (quadrant IV), and then enact it as a new structure or policy within the department, by working through the appropriate channels (quadrant III). In contrast to most STEM change efforts situated in quadrant III, DATs support a faculty-driven bottom-up approach, rather than an administrator-led top-down mandate; this aligns with

the finding in Henderson et al. (2011) that top-down mandates rarely succeed at creating sustained change on their own. To support their work, members of the DAT must become more familiar with institutional change theories as well as their issue of concern; again, this aligns with the dissemination aspects of quadrant I. Finally, the DAT members learn new ways of collaborating and using their collective experiences and skills to improve their department through the purposeful facilitation of the group (quadrant II). By deliberately adopting aspects of all four quadrants, the DAT model stands a better chance at making significant change in a department than strategies that are restricted to just one.

Table 2. A comparison of FLCs and DATs as change efforts in terms of the four-square of change strategies

Aspect of System to be Changed *Individuals* / *Environments*	**Intended Outcome** *Prescribed*	**Intended Outcome** *Emergent*
Individuals	I. Disseminating Curriculum and Pedagogy FLC workshops provide concrete skills and knowledge to participants. DAT members learn about an issue of departmental concern and cultural change theories.	II. Developing Reflective Teachers FLC structure creates community and provides opportunities for reflection. DAT structure helps members develop new collaborative processes for learning and collective reflection.
Environments	III. Enacting Policy DATs propose policy changes and new departmental structures.	IV. Developing Shared Vision DATs work to create a collective vision for changes in a department.

Activity Theory

We also draw upon activity theory (Engeström, 1991) as a framework for comparing the structure of a DAT to an FLC. Activity theory stems from a large history of sociocultural theorists, building on Vygotksy's work and heavily influenced by Marx (Sannino, Daniels, & Gutiérrez, 2009). Activity theory takes an "activity system"—a collection of people with a common object of activity—as the basic unit of analysis for understanding human behavior in cultural systems. In an activity system, a human agent (*subject*) engages in an activity to achieve some purpose (*object*), which results in an *outcome*. The activity is mediated by *tools*, which may be physical (e.g., a hammer) or symbolic (e.g., a language), and is conducted with others (*community*) as both collaborators and stakeholders. Constraints on the activity arise from cultural conventions and norms (*rules*) and social roles and hierarchies (*division of labor)*. While we may consider each of these components separately, they are highly interdependent and therefore must be understood collectively. The choice of *subject*, in particular, is critical. For example, consider an activity system that consists of a parent encouraging a child to play with an educational toy. If one chooses the parent as the *subject*, then the *object* may be "to help my child become smarter" and the child would be part of the *community*, whereas if one chooses the child as the *subject*, then the *object* may be "to play with a fun toy" and the parent would be part of the *community*. However, the *outcome*, a fun learning experience for the child and a satisfied parent, may be the same in either case. In Table 3, we present our analysis of both FLCs and DATs as activity systems, taking a participant (as opposed to, e.g., a facilitator) as the *subject*.

Table 3. Activity theory analysis of FLCs and DATs.

	FLC	**DAT**
Subject	FLC participant (typically faculty)	DAT participant (faculty, postdoc, student, or staff)

Object	Teaching of individual courses	Department-wide educational issue
Tools	Education research Course-level data Dedicated facilitation	Education, institutional change, and object-related research Department-level data Dedicated facilitation
Community	Fellow participants (from multiple departments) Facilitator(s) Students in the participants' courses	Fellow participants (from inside the department) Facilitators (from outside the department) Department members (faculty, students, and/or staff)
Division of Labor	Participants transform their own courses individually Facilitators sometimes act as participants	Participants work collectively on a common goal Facilitators sometimes act as participants Departmental hierarchies/roles
Rules	Participant agency Community	Participant agency Community Collaboration
Outcome	Participant growth as individual teachers Transformed courses Engagement with SoTL	Participant growth as collective change agents Transformed department Cultural change

In both FLCs and DATs, we center the activity system on individual participants as *subjects*; for a DAT and an FLC, the participants are primarily faculty members, but DATs also ideally include a mix of graduate and undergraduate students, staff, postdocs, and potentially even external stakeholders. The *object* is different for the participants in these two types of group: FLC participants focus on the teaching of their individual courses while DAT participants focus on addressing an educational issue in their department. The broader nature of the DAT participants' *object* is one reason for the need to increase their diversity as *subjects*. Given their different *objects* of focus and (as we shall see below) organizational structures, the two groups have different *outcomes* as well: an FLC is generally aimed at individual course transformation,

the growth of participants as teachers, and sometimes engagement with SoTL (e.g., generating publications), while a DAT is aimed at departmental transformation, the participants' growth as collective change agents, and broader cultural change. As we have previously noted, FLCs sometimes focus on department-wide initiatives (Cox, 1995, 1996), but this type of FLC is less common than those that focus on individual courses. Thus, DATs can be seen as an FLC-inspired model, modified to focus particularly on collective change.

To achieve their different goals, FLC and DAT participants require different variations on similar *tools*. Both sets of participants rely on education research generally (e.g., Discipline-Based Education Research (DBER), Scholarship of Teaching and Learning (SoTL), the learning sciences, educational psychology focused on higher education) as well as specialized areas of research related to their specific *object* (e.g., psychology research on stereotype threat for a DAT with the *object* of reducing the underrepresentation of people of color in the major). In addition, DATs draw from research on institutional change to help sustain their impact. Both groups also use institutional data. However, FLC participants typically rely on data collected from their own courses, while those in a DAT are more likely to use department-level data (e.g., data from courses taken by all students in their major over 10 years). Both FLCs and DATs also rely on dedicated facilitation as a *tool* to help them achieve their *object*. In both cases, the facilitators support the agency of the participants, rather than "forcing" a change upon them.

The *community* of an FLC or DAT participant consists of individuals internal to the FLC or DAT as well as external stakeholders. The internal *community* consists of fellow participants (from different departments in an FLC and from the same department in a DAT) and one or more facilitators (our DATs have been co-facilitated by two postdocs external to the DAT's department). The difference in internal *community* is aligned with the difference in *objects* by

allowing for more collective, collaborative action among the DAT participants. The difference in *object* also leads to different external *communities*; for the FLC, the stakeholders are the students in the participants' courses, while for the DAT, the stakeholders could be any subset of the department (faculty, students, or staff) depending on the exact nature of the DAT's *object*.

The *division of labor* among the participants in an FLC consists of participants doing similar work in parallel (e.g., refining their own courses) while supporting each other's progress. In a DAT, participants work collectively on a single goal, although they may choose to take on different roles in the collaboration that suit their strengths (e.g., one person focuses on data analysis while another presents results at a faculty meeting). In both cases, facilitators handle logistical tasks (e.g., scheduling meetings and taking notes) and support the work of the participants (e.g., providing external resources or moderating discussions). Moreover, the facilitator/participant distinction can be blurred within these groups, as the DAT facilitators may also contribute work towards achieving the group's goal (e.g., they may help to write a report) and FLC facilitators may be individual participants themselves, as discussed above. Finally, because the participants in a DAT are from the same department, power relationships and hierarchies from the department (e.g., between tenured and untenured faculty members or between faculty and students) may influence the operation of the DAT in unproductive ways. Thus, the DAT facilitators must play a role in mitigating such power imbalances, which may not be present in the same way in an FLC. This is why it is particularly important that DAT facilitators be external to the DAT's department.

The *rules* for operating in an FLC focus on participant agency, in that participants have control both over the changes that they make in their classrooms, and over the community that forms in their FLC, in that the participants meet regularly to learn together and support each

other in their course transformations. DATs also emphasize participant agency (e.g., in choosing the departmental issue that forms the DAT's *object* of focus or what homework they will assign themselves between meetings) and building community through shared learning. However, because the object of a DAT requires collective work, DATs also emphasize explicit collaboration among the participants; depending on the composition of the group, this may be the participants' first experience collaborating so closely with each other, especially across, e.g., faculty/student boundaries.

Extended Example: The Runes DAT

To illustrate the DAT model, we describe one DAT created as part of the SITAR project. The purpose of the following illustration is not to evaluate the effectiveness of the DAT, but rather to illustrate the operation of the DAT and how the above frameworks help characterize its key features. We use pseudonyms to protect the identity of the department and DAT participants.

The department of interest, the Runes Department, was formed approximately a decade ago as a merger between components of two other departments. Soon after its formation, the department received funding from the Science Education Initiative (SEI; Chasteen et al., 2016), which provided the department with approximately $600,000 over the course of five years to support individual course transformation, including the establishment of learning goals and assessments. Much of this funding was used by the department to hire Science Teaching Fellows (STFs), who were postdocs with a PhD in Runes or a related field. STFs received training in education research from SEI and were intended to serve as educational experts for the Runes Department.

The Runes DAT consisted of two facilitators from the SITAR project team and five faculty members from the Runes Department: Anne, Bart, Elly, Karen, and Sophia. Four of the

participants are women, and one is a man. Additionally, one is a tenured professor and four are full-time, non-tenure track instructors (one of whom recently retired). Racial demographics were not collected. The recruitment of these participants is described in more detail below.

The Runes DAT met for 16 one-hour meetings over the course of the 2014-2015 academic year, and has continued meeting through the subsequent year. All DAT participants were interviewed at the end of the DAT's first year, and all quotes from DAT participants below are drawn from these end-of-year interviews.

While each individual DAT is unique, in general a DAT has four major phases: (A) forming the DAT and recruiting participants, (B) developing a shared vision, (C) gathering data and exploring solutions, and (D) proposing and implementing new department structures. While a DAT typically progresses through these four phases sequentially, it is possible that any of these activities may be revisited multiple times throughout the DAT's operation. We describe the Runes DAT in terms of these four phases.

In viewing the DAT as a change strategy, many of the phases of the DAT map closely to quadrants in the four-square (Henderson et al., 2011). For example, there is a direct mapping between phase B and quadrant IV, focused on creating a shared vision. Similarly, phase D, implementing new structures, maps closely to quadrant III, enacting policy. Quadrants I and II, focused on facilitators bringing in information and supporting participants in collaborating to enact their vision, take place throughout phases B-D, but are most concentrated in phase C. Given that the various quadrants closely relate to the different phases of an operation of a DAT, DATs necessarily work across quadrants by their very design.

As we describe the operation of the DAT below, we highlight the various components that relate to activity theory in *italics*. In doing so, we draw attention to how the activity theory

framework is useful for describing many of the key aspects of a DAT. We also draw attention to how the operation of the DAT relates to the three goals for a DAT, highlighted in **bold**.

Forming the DAT and Recruiting Participants

The first step to forming a successful DAT is receiving the approval and sanction of department leadership. Without such sanction, it is unlikely that structures proposed by DAT members will be accepted and integrated into the department (the DAT's external *community*). To form the Runes DAT, the facilitators first met with Runes department chair and received approval to move forward with forming the DAT.

Upon receiving this approval, the facilitators worked to recruit participants. Through interviews with 9 of the department's 31 faculty members, the facilitators gathered background information about the department and determined potential participants. In seeking potential DAT members, the facilitators reached out to faculty at a variety of different levels, trying to develop a good distribution of rank and gender (the department was mostly racially homogenous). Two of the participants were recruited to join the DAT as a result of the initial interviews, and these two DAT members recruited the rest of the group. These five faculty members were the *subjects* of the DAT.

Developing a Shared Vision

A DAT's first task is to develop a vision for what hopes to accomplish. This relates to a DAT's first goal, **influencing department culture by addressing an issue of departmental importance.** Rather than simply picking a problem to solve or a preferred solution to an already existing problem, the facilitators focus participants on developing a shared vision. In this way, DATs are outcome-driven, rather than problem-focused, which has been show to lead to more positive results in organizational learning (Cooperrider et al., 2008). When individuals focus on

problems, rather than outcomes, they are more likely to argue about their preferred solutions for solving a problem, which often leads to stalling in progress. In contrast, if individuals are able to agree on the outcome they wish to achieve, they are likely able to find a mutually agreeable course of action to reach that outcome. This visioning process also affords agency to the participants, because they are determining the changes they would like to see. Because cultural change is a long-term process, we cannot yet speak to whether or not cultural change has actually "happened" in the department, but interviews with DAT participants indicated preliminary changes in a positive direction.

In Runes, our initial interviews with faculty provided insight into possible areas of focus for the DAT: the coherence of the department's curriculum; department-wide learning, retention, and degree outcomes for undergraduate students; student study skills; exam design; and the use of case studies as pedagogical tools. The facilitators shared these preliminary ideas with the DAT participants, but also made it clear that the participants could choose to focus on whatever they desired.

To develop a shared vision, the Runes DAT began by dedicating its first two meetings to defining its goals and coming to a consensus as a group about what it desired to achieve. This shared vision was used as a guide for the group, and it was continuously refined throughout the duration of the DAT. As Sophia noted in her interview:

> [The facilitators] started us out doing kind of a thought experiment where we had sticky notes and we put them up on the wall to decide, or think about, what issues we saw with our department and students in our department. That was a really good thought experiment and we actually keep going back to that.

As a result of these meetings, the DAT members decided that the *object* of the DAT would be to create greater coherence in the curriculum within the department. One aspect of this goal was to revisit, update, and expand learning goals beyond a content focus to include skills and practices

and to create a framework through which the goals of individual courses could be seen as part of a larger whole. Not only would this provide more ambitious targets for instruction, it would also serve as a mechanism for faculty to gain better understanding of what was taught in courses beyond their own, so they could more easily build upon earlier courses and prepare students for later courses. Another aspect of integrating the curriculum involved explicitly connecting the activities engaged in by students in different courses in the major (e.g., using data collected in one of the lab courses as a source of data to be analyzed in a math course).

This emphasis on curriculum and learning goals was likely chosen as a result of the department's prior experiences with SEI, and the fact that two prominent members of the department's SEI efforts were on the DAT. Because the Runes Department received SEI funding shortly after its formation, SEI played an important role in helping it define the department's major. However, in the few years following the end of SEI funding, some faculty members perceived that the department was backsliding in its progress; faculty members teaching courses for the first time did not always faithfully adopt existing learning goals or teaching methods, and there was no mechanism for communicating and coordinating across courses, even for those that are part of a multi-course sequence.

Along with developing a shared vision, the facilitators worked early on in the DAT to establish *rules* related to participant agency, community, and collaboration to support the work of the DAT, and participants noted this. This related to the third goal of a DAT, **providing a collaborative, community-building experience for DAT members within their own department**. Karen highlighted the collaborative nature of the group:

> [I]t was productive and it went very well. Everyone present is on the same page in terms of goals for students. The conversations were always...They were always positive in the sense that people were just trying to put their best thoughts into this process, into this goal that we wanted to accomplish.

Elly pointed out that the facilitation (a *tool*) was crucial in keeping the group focused while simultaneously promoting participant agency in setting the direction of the group:

> [The facilitators are] definitely necessary. They're more facilitators of conversation, so they definitely sit back and let us drive, but they're the ones that are keeping us on track and coordinating everything. I think if they weren't here it'd be easier for us to maybe skip a meeting or so if we had other things that we needed to do. So I think just knowing that they're going to be there helps accountability in a way.

Anne similarly noted:

> I really think [the facilitators] did a fabulous job of letting all of us kind of speak our piece and keeping it harmonious and letting us kind of find our own way. I think- Like I said, I think, I'm hoping that everybody's as excited about this as I am, because I think we've struck on something that'll really work for our department.

Anne also pointed out that the sense of community that developed among DAT participants has started to spread beyond the context of the DAT:

> I'll sit down and talk to [Bart] about things more than I probably ever would've before. I don't necessarily seek him out to have discussions, but if we're in a meeting and sitting together, you know, we'll talk about things…if anything, I think we're all a little bit more collegial than we were before.

Gathering Data and Exploring Solutions

Once the group determined its *object* of focus, it began to get gather data and explore possible solutions. One difficulty that multiple DAT members noted in creating coherence across the curriculum was that it seemed like many Runes students were taking courses out of sequence. To gather more information, the DAT members invited a member of the teaching committee, Jesse, who was familiar with the curriculum and student trajectories through it. In this meeting, Jesse explained that many of the Runes majors are transfers from other institutions, and that students do not officially declare the major until their sophomore year, because introductory courses are taken from other departments. This provided a rationale for why pre-requisites are not strongly enforced within the department and why students take courses in various sequences.

This is an example where DAT members attempted to gather more data (a *tool*) to understand how the department was operating. Another purpose of this meeting was to inform Jesse of the DAT's activities, to build greater support within the department (the DAT's external *community*).

Related to the same issue, the facilitators of the DAT pushed for further data collection and analysis. By working through the office of institutional research, the DAT was able to get student enrollment data and analyze the paths that students actually take through the major. This analysis added nuance to the information presented by Jesse; for example, while some students violated prerequisites, any given prerequisite was violated by at most 10% of Runes graduates; additionally, while about 20% of Runes graduates were transfer students, only a handful of them transferred credit for core Runes courses. The use of data to separate fact from anecdote was an important *tool* for the progress of the DAT. Ultimately, these data were used a part of a presentation of the DAT's proposal for departmental change. As Bart noted:

> I think a great example of [the importance of the facilitators] was I talked about the data that we needed to gather for the undergraduate courses, and did it really support our thought, you know, on this process. When are students taking these classes? Are they taking it in their sophomore year or their senior year or their junior year, and when should they be taking these classes? [The facilitators] got that together really quickly and really fast for us.

Sophia echoed this in her interview, as well as noting the need for research literature as a *tool*:

> [The facilitators] also were able to collect some data for us about our majors and what courses they're taking, what sequence, and I don't know that any of us would have had the time to sort through that. And there were a couple of cases where they found literature. So it was very beneficial to have the outside moderators.

The facilitators' role in analyzing the student data is an example where they took on the role of a participant, thus blurring the distinction between the two (*division of labor).*

In parallel to gathering more data to better understand issues in the department, DAT members came up with a variety of proposals for how they might provide students with a more

holistic learning experience. Early in the DAT, there was a proposal to create a new introductory course to help students develop skills that were crucial for the major, which could be built upon throughout the curriculum. However, this approach was not unanimously agreed upon, and when the perceived logistical difficulties outweighed the perceived benefits, the group dropped this solution and took on a new approach. Because the group wasn't tied to any particular approach, but a common vision for its students, it could change its approach and move forward. Anne, who was a strong proponent of the new course idea, highlighted the need for focusing on outcomes rather than preferred solutions:

> So I came in thinking this is what I want to do and this is going to be great for our department, and not everyone was on board with that. We just had some really good discussions, and there were things that other people really wanted to do that I wasn't super excited about…I generally think of myself as someone who's willing to listen, anyway, and be open to other suggestions. But I think it was that everybody else was willing to compromise, and we all were able to recognize the value in what the other person was saying but also recognize that we all had these different ideas of what we wanted to happen, but let's think about what the department as a whole is, what we can accomplish with the group of people we have in our department and move forward with.

As the group explored solutions, there was a productive *division of labor* in support of a collective goal. Anne also highlighted this:

> And we were all really willing, I think, to jump in at different times when we felt like we had an idea that was in our head and put that on paper and send it out. So I never felt like it was one person taking the brunt of the work…someone would volunteer and say let me take a shot at that and then send it out to the group.

Proposing New Departmental Structures

Ultimately, the group proposed the creation of three "curriculum coordinator" positions within the department who would be responsible for updating and integrating learning goals across courses on an ongoing basis in collaboration with other faculty members who were teaching those courses. This proposal was approved by the department chair and teaching committee, and will be implemented into the department's organizational structure. Most

importantly, the department has offered three course releases to faculty who take on the coordinating roles, meaning that the department is institutionalizing this support. This is a key part of the second goal of a DAT, **creating lasting departmental structures to sustain improvements proposed by the DAT.** As Bart described in his interview:

> I'm really impressed and surprised - and I think it's probably the DAT that has done this [the creation of the three coordinator positions] in terms of interacting with our teaching committee and the chair - that the department has jumped on board in this way. I could have seen one person be given one course relief kind of thing and stuff, but to have three people and to support that whole program, that's kind of a pleasant surprise.

Rather than trying to solve the problem of integrating the curriculum, the DAT created structures within the department that could be used for ongoing and continuous growth. This was an important *outcome* after a year of work.

Initially, the Runes DAT was intended to end after one academic year. However, the participants found that the group was so productive for them that they wished to continue working for another year to help actually implement the coordinator positions in the department. Our project thus supported another year of the Runes DAT's activities (another *outcome*). In this way, the end state of a DAT is not well defined, and may extend as long as the DAT members find it useful. Nevertheless, we hypothesize that developing a well-founded proposed structural change will generally take at least two semesters of work. Table 4 summarizes the Runes DAT in terms of activity theory.

Table 4. Activity Theory Analysis of the Runes DAT.

Component	**Description**
Subject	Five faculty members

Object	Integration of the Runes curriculum
Tools	Institutional data about Runes graduates' course-taking patterns Effective facilitation
Community	Runes department Two dedicated facilitators from outside Runes
Division of Labor	Participants assigned their own homework Facilitators contributed to data analysis and resource gathering
Rules	Participants chose the focus for the group and frequency of meetings Participants worked collaboratively to create a proposal for departmental change
Outcome	Creation of curriculum coordinator positions Continuation of the DAT

Conclusion

Department Action Teams (DATs) provide a new model for making departmental change and supporting faculty to develop as change agents. Like FLCs, they treat the participants as drivers of their own learning, rather than focusing on disseminating a prescribed curriculum. DATs and FLCs are complementary models, each serving related by distinct purposes in educational transformation. DATs differ from FLCs in their goals; a DAT aims to: (1) influence departmental culture by addressing an educational issue of departmental interest, (2) create lasting departmental structures to sustain improvements related to that issue, and (3) provide a collaborative, community-building experience for DAT members within their own department. To achieve these goals, dedicated facilitators play an important role by providing expertise in education and organizational change and helping the group operate in alignment with these goals. DATs also differ from FLCs in their structure, as highlighted by our activity theory analysis.

The design features of a DAT support its efficacy in key ways. First, participant agency is essential because it increases motivation, engagement, and the likelihood that participants will participate in sustained efforts to make change, rather than giving up. Second, the department focus helps make ownership of the change collective rather than individual, and as such it cannot

be easily undone, such as through the rotation of a new faculty member into a single course. Third, DATs focus on creating lasting structures, in contrast to changes that are strongly driven by external support and are therefore difficult to sustain when external funding is exhausted. Finally, the DAT's focus on building community helps promote a culture of collaboration and engagement within the department that may support ongoing and future change efforts by shifting the culture of the department.

As the Runes example highlights, all of these features enable DATs to make lasting changes in a department. Our analysis of the differences between DATs and FLCs also highlights the rich theoretical structures that underlie both models. Thus, DATs have both practical and theoretical interest, and their continued implementation and analysis will help to create sustained improvements in undergraduate education.

Given that the timescale of institutional change is many years, we have not yet been able to assess the impact of the Runes DAT, particularly as a mechanism for cultural change. Nevertheless, participant interviews and departmental sanction and support of the creation of curriculum coordinator positions are promising signs of success. Moving forward, the curriculum coordinators will work to develop metrics (e.g., surveys) for assessing curricular alignment and cultural changes within the Runes department.

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References

Austin, A. E. (2002). Preparing the next generation of faculty: Graduate school as socialization to the academic career. *The Journal of Higher Education*, *73*(1), 94–122.

Austin, A. E. (2011). *Promoting evidence-based change in undergraduate science education*. East Lansing, MI: Michigan State University.

Baker, P. (1999). Creating learning communities: The unfinished agenda. In B. A. Pescosolido & R. Aminzade (Eds.), *The social worlds of higher education*. Thousand Oaks, CA: Pine Forge Press.

Bandura, A. (2006). Toward a Psychology of Human Agency. *Perspectives on Psychological Science*, *1*(2), 164–180.

Bennett, J., & Bennett, L. (2003). A review of factors that influence the diffusion of innovation when structuring a faculty training program. *The Internet and Higher Education*, *6*(1), 53–63. https://doi.org/10.1016/S1096-7516(02)00161-6

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Brudzinski, M. R., & Sikorski, J. J. (2010). Impact of the COPEL on active-learning revisions to an introductory geology course: Focus on student development. *Learning Communities Journal*, *2*(2), 53–69.

Chasteen, S. V., Perkins, K. K., Code, W. J., & Wieman, C. E. (2016). The Science Education Initiative: An Experiment in Scaling Up Educational Improvements in a Research University. In G. C. Weaver, W. D. Burgess, A. L. Childress, & L. Slakey (Eds.), *Transforming Institutions: Undergraduate STEM Education for the 21st Century*. West Lafayette, IN: Purdue University Press.

Cooperrider, D., Whitney, D., & Stavros, J. M. (2008). *The appreciative inquiry handbook: For leaders of change*. San Francisco, CA: Berrett-Koehler Publishers.

Corbo, J. C., Reinholz, D. L., Dancy, M. H., Deetz, S., & Finkelstein, N. (2016). Framework for transforming departmental culture to support educational innovation. *Physical Review Physics Education Research*, *12*(1), 10113. https://doi.org/10.1103/PhysRevPhysEducRes.12.010113

Corbo, J. C., Reinholz, D. L., Dancy, M. H., & Finkelstein, N. (2015). Departmental Action Teams: Empowering faculty to make sustainable change. Presented at the Physics Education Research Conference, College Park. MD.

Cox, M. D. (1995). A Department-Based Approach to Developing Teaching Portfolios: Perspectives for Faculty and Department Chairs. *Journal on Excellence in College Teaching*, *6*(1), 117–43.

Cox, M. D. (1996). A Department-Based Approach to Developing Teaching Portfolios: Perspectives for Faculty Developers. In L. Richlin (Ed.), *To Improve the Academy* (Vol. 15, pp. 275–302). Stillwater, OK: New Forms Press and the Professional and Organizational Development Network in Higher Education. Retrieved from http://digitalcommons.unl.edu/podimproveacad/354

Cox, M. D. (2003a). Fostering the scholarship of teaching and learning through faculty learning communities. *Journal on Excellence in College Teaching*, *14*(2/3), 161–198.

Cox, M. D. (2003b). Proven faculty development tools that foster the scholarship of teaching in faculty learning communities. *To Improve the Academy*, *21*, 109–142.

Cox, M. D. (2004a). Introduction to faculty learning communities. *New Directions for Teaching and Learning*, *2004*(97), 5–23. https://doi.org/10.1002/tl.129

Cox, M. D. (2004b). Using multiple pathways to foster portfolio development. In P. Seldin (Ed.), *The teaching portfolio (3rd ed.)* (pp. 61–70). Bolton, MA: Anker.

Cox, M. D. (2017). Website for Developing Faculty Learning Communities (FLCs): Communities of Practice in Higher Education. Retrieved from http://www.units.miamioh.edu/flc/

Deci, E. L., & Ryan, R. M. (2000). The“ what” and“ why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268.

Engeström, Y. (1991). Non scolae sed vitae discimus: Toward overcoming the encapsulation of school learning. *Learning and Instruction*, *1*(3), 243–259.

Fairweather, J. (2008). Linking evidence and promising practices in science, technology, engineering, and mathematics (STEM) undergraduate education. *Board of Science Education, National Research Council, The National Academies, Washington, DC*. Retrieved from http://otl.wayne.edu/wider/linking_evidence--fairweather.pdf

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 201319030. https://doi.org/10.1073/pnas.1319030111

Henderson, C., Beach, A., & Finkelstein, N. (2011). Facilitating change in undergraduate STEM instructional practices: an analytic review of the literature. *Journal of Research in Science Teaching*, *48*(8), 952–984.

Henderson, C., & Dancy, M. (2009). Impact of physics education research on the teaching of introductory quantitative physics in the United States. *Physical Review Special Topics-Physics Education Research*, *5*(2), 20107.

Henderson, C., Dancy, M., & Niewiadomska-Bugaj, M. (2012). Use of research-based instructional strategies in introductory physics: Where do faculty leave the innovation-decision process? *Physical Review Special Topics - Physics Education Research*, *8*(2), 20104. https://doi.org/10.1103/PhysRevSTPER.8.020104

Kezar, A. (2011). What is the best way to achieve broader reach of improved practices in higher education? *Innovative Higher Education*, *36*(4), 235–247. https://doi.org/10.1007/s10755-011-9174-z

Kezar, A. (2013). *How colleges change: Understanding, leading, and enacting change*. New York, NY: Routledge.

Lave, J. (1996). Teaching as learning, in practice. *Mind, Culture, & Activity*, *3*(3), 149–164.

Marbach-Ad, G., Egan, L. C., & Thompson, K. V. (2015). *A Discipline-Based Teaching and Learning Center*. Gewerbestrasse, Cham, Switzerland: Springer International Publishing.

Ortquist-Ahrens, L., & Torosyan, R. (2009). The role of the facilitator in faculty learning communities: Paving the way for growth, productivity, and collegiality. *Learning Communities Journal*, *1*(1), 29–62.

Rainey, K., Corbo, J. C., Reinholz, D. L., & Betterton, M. (2016). Improving representation in physical sciences using a Departmental Action Team. In D. L. Jones, L. Ding, & A. Traxler (Eds.), *2016 Physics Education Research Conference Proceedings* (pp. 264–267). Sacramento, CA. https://doi.org/10.1119/perc.2016.pr.061

Richlin, L., & Essington, A. (2004a). Faculty learning communities for preparing future faculty. *New Directions for Teaching and Learning*, *2004*(97), 149–157. https://doi.org/10.1002/tl.141

Richlin, L., & Essington, A. (2004b). Overview of faculty learning communities. *New Directions for Teaching and Learning*, *2004*(97), 25–39. https://doi.org/10.1002/tl.130

Sannino, A., Daniels, H., & Gutiérrez, K. D. (Eds.). (2009). *Learning and expanding with activity theory*. Cambridge, UK: Cambridge University Press.

Schein, E. H. (2010). *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. New York, NY: Cambridge University Press.