

UC Santa Cruz

Professional Development

Title

Transforming an Academic into a Leader: Providing a Framework and Behaviors for Leading Teams in the Workplace

Permalink

<https://escholarship.org/uc/item/9dq6b611>

Authors

Tarjan, L. Max
Raschke, Lynne
Hunter, Lisa

Publication Date

2022-10-02

Supplemental Material

<https://escholarship.org/uc/item/9dq6b611#supplemental>

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Transforming an Academic into a Leader: Providing a Framework and Behaviors for Leading Teams in the Workplace

L. Max Tarjan^{*1}, Lynne Raschke², and Lisa Hunter³

¹ NatureServe, Arlington, VA, USA

² Department of Mathematics & Physics, The College of St. Scholastica, Duluth, MN, USA

³ Institute for Scientist & Engineer Educators, University of California Santa Cruz, Santa Cruz, CA, USA

* Corresponding author, max.tarjan@gmail.com

Abstract

In many organizations (e.g., higher education, non-profits, small companies), individuals are called upon to lead small groups of people to complete one or more tasks both in formal roles and in informal settings. For example, department heads, committee chairs, project leads, and program managers are all roles that require an individual to utilize leadership skills to lead their team to the successful completion of the tasks at hand. However, in many science, technology, engineering, and math (STEM) fields and their associated jobs, training and support in leadership development are often lacking. To meet this need, the Institute for Scientist and Engineer Educators (ISEE) at the University of California - Santa Cruz (UCSC) made supporting and mentoring leadership development a key component of the Professional Development Program (PDP) for graduate students and postdoctoral scholars in STEM, which ran for over 20 years. Building off of the ISEE leadership development model (ISEE 2020), this workshop is designed to give professionals an opportunity to learn about and practice important leadership skills that can be used in their organizations. In this workshop, participants learn to apply three elements of effective leadership that are useful in practice and inclusive of multiple perspectives on leadership. Participants apply actionable leadership practices to their own challenges at work and develop the language to discuss their own leadership skills. Workshop duration: 15 minutes individual reading, 2 hours in-person workshop, 15 minutes follow up.

Keywords: leadership, management, professional development, teams

1. Need for leadership development in STEM

Leadership development and management training is an integral part of employee development at corporations across the United States. However, most

professionals in science, technology, and engineering (STEM) do not receive leadership training as part of their undergraduate or graduate education and many STEM workplaces, including academia, research labs, and STEM non-profits, lack institutional programs to develop leadership skills in their

employees (Leiserson and McVinney, 2015; Akdere, Hickman, and Kirchner, 2019). Yet, STEM professionals in these settings are often called upon to assume leadership roles such as project managers, department chairs, and principal investigators (PIs) of research groups. The lack of leadership training and structured leadership development in institutions and organizations is apparent to members and a detriment to the success of the institution or organization.

2. Leadership development in the PDP

The Institute for Scientist & Engineer Educators (ISEE) offered the Professional Development Program (PDP) for twenty years, and though the primary focus was on inclusive teaching, inclusive leadership became an increasingly supported and valued aspect of the PDP. In the PDP, small teams of 3–4 graduate students and postdocs collaborated to design and teach an inquiry lab unit, and teams were led by a participant who had already completed the PDP once. The task of collaboratively designing an activity from scratch, including meeting many PDP requirements, such as making design choices based on the science of learning and incorporating approaches for inclusive teaching, was challenging. On top of being a challenging task with an accelerated timeline, the teams were led by participants who had little or no training or experience in leading a team. Team leaders had to manage effective meetings, make decisions, maintain collaboration, be inclusive of all team members, and resolve differing perspectives, all while tackling a tough problem. Team leaders struggled, and the PDP core instructional team realized that this was the perfect way to develop leadership skills.

The PDP leadership development strand was developed over many years, with refinements made every year and a few years in which major new components were designed with funding from the Astronomy Division of the National Science Foundation. In alignment with ISEE's values and focus

areas, the PDP leadership strand evolved and incorporated inclusion into leadership to become “inclusive leadership.” PDP leadership development incorporated key aspects of effective leadership development, including: 1) using a research framework; 2) emphasizing reflection and self-awareness; 3) simulations or actual experience; and 4) assessment, including results of team led activities (Riggio 2008). In addition, professional development is learning, so research from the learning sciences also informs PDP leadership development. For example, PDP leaders were scaffolded in their leadership experience, with more support for tasks initially, which gradually faded as the leader starts acting more independently. The curricular components of the PDP leadership strand included:

- **Introduction to inclusive leadership session:** 70-minute prompted discussion on leadership, the leadership framework and tools used in the PDP
- **Leadership scenarios session:** 40-minute prompted discussion in which team leaders consider typical PDP team scenarios
- **Leadership experience** (20–30 hours of leading PDP team)
- **Coaching** (check-in's with PDP instructors)
- **Online reflective prompts:** at key points in the PDP leadership experience, leaders reflect on what they've done so far, and plan what they should do next, using the framework and meeting guide
- **Final reflective prompt:** leaders are asked to synthesize what they learned about leadership in a way that will be useful to them in future job interviews

Many PDP alumni found that the leadership skills they gained from participating in the leadership strand were extremely useful when they entered the workforce. For many PDP participants, this was the only formal leadership training they had received

throughout their STEM education and career development.

In this paper, we report on the piloting of a leadership development activity based on the PDP's leadership development. The context was different, and we had many constraints which precluded implementing anything like the full PDP leadership experience. Our goal was to begin creating leadership development activities that we could continue to build on, and learn about the potential of PDP leadership resources for uses in other contexts.

3. Adapting PDP leadership development to the professional context

We adapted PDP leadership strand materials for use in STEM workplaces in order to provide leadership development to STEM professionals. The workshop presented here was designed for a STEM nonprofit where STEM professionals lead project teams—however, this workshop could easily be adapted and used in other settings, such as academia, where it could be used as a leadership development tool for department chairs.

The workshop consists of the following components: a pre-workshop reading assignment, an introductory lecture, a guided discussion, participant written responses, and peer feedback. The workshop duration is approximately 2 hours. This workshop and supporting materials follow closely from the PDP leadership strand offered in 2019.

Developing and running this workshop was intended as a pilot project. The aim was to test and determine how useful one component of the PDP leadership strand could be in a new context and to collect participant feedback to further refine the workshop for professionals in STEM. Lessons learned during the pilot include the importance of an experienced facilitator to orient the discussion around the principles from the reading, in particular during the peer feedback portion of the workshop.

Group composition is also key; workshop leaders should ensure that participants are grouped such that they are comfortable expressing their own challenges with leadership in their organization. In the last section we illustrate these challenges and suggest how they could be addressed.

4. Workshop components

An overview of the workshop components and their suggested duration is provided in table 1. Details about each workshop component follow in this section and further information can be found in the Staff Guide for the workshop (Supplement 1).

4.1 Prior to the workshop

Prior to the workshop, participants are assigned two readings that ground the discussions in leadership theory: “Guide to Effective Meetings” (ISEE, 2022) and “Introduction to Leadership Development” (Supplement 2).

There is an extensive body of literature on leadership and leadership development. For several years ISEE has framed their development of leadership skills around a paper by Martin Chemers (2001), who integrated the various models for leadership at that time and put forward what he called “three elements of effective leadership”. All text in the “Introduction to Leadership Development” is directly from Chemers (2001), with the addition of italicized passages that represent ISEE's interpretation of his themes. This document defines leadership and describes Chemers' three elements of leadership: image management, relationship development, and resource deployment. Participants make use of these themes in the workshop as they interpret scenarios that they are likely to encounter in the workplace and give each other feedback on addressing personal leadership challenges.

4.2 Introduction to the workshop

Workshop facilitators open the workshop by introducing the structure, framework, and background

for the workshop. The introduction includes the day's agenda, a statement of need and supporting evidence for the workshop content, and an overview of Chemers' (2001) leadership principles. Sample slides are provided in Supplement 2.

The introduction includes key ideas about leadership that set the stage for the remainder of the workshop. Distinguishing leadership from management makes leadership immediately relevant to workshop participants, despite their hierarchical role in their current organization. Leadership is setting a vision and determining in which direction to proceed, whereas management is ensuring that tasks are executed properly. Based on this clarified definition, workshop participants are engaged in leadership in their current role and can expect to be engaged in leadership in their future roles as they gain more responsibility. Participants are motivated to focus on improvement by recognizing that leadership is a crucial skill that can be continually improved through practice, reflection, and adjustment. Relevant skills are not often taught outside of business-oriented education. In the cases where leadership is taught, it is often not taught through direct experience. This workshop is one step towards filling that need.

Introducing a framework for leadership grounds the workshop in research and stems from the general learning principle that having a framework to contextualize new ideas allows for better organization of knowledge (Chapter 2 in Ambrose et al. 2010). The framework allows participants to develop an understanding of *why* the presented strategies work in the suggested contexts, which paves the way for participants to build their own knowledge and skills as they practice leadership behaviors.

Selecting a framework for leadership is difficult because there are many different theories and understandings of leadership. The PDP and this workshop make use of Chemers (2001) because it is grounded in research, is relevant to the cultural context at the time of writing, and is approachable for the target audience. Chemers offers a specific and

approachable definition of leadership: "a process of social influence through which an individual enlists and mobilizes the aid of others in the attainment of a collective goal" and breaks leadership down into three elements: image management, relationship development, and resource deployment. The facilitator should emphasize that the terminology may be new or even uncomfortable; participants should strive to look beyond this and determine how the framework can be useful for their own development.

The presenter then illustrates the outcomes of successful leadership. For the workshop, a task is defined as any collaborative task, for example, writing or submitting a grant or planning and coordinating a project. Success is then defined as the team completing the task in an appropriate amount of time, the team completing the task collaboratively, all team members experiencing an inclusive environment, and team members gaining an effective learning experience. After providing the context and terminology, and after making assumptions about team success explicit, facilitators move into the discussion portion of the workshop.

4.3 Leadership scenario discussion

In the leadership scenario discussion, participants improve their ability to prevent and respond to challenges to group work. They read through realistic scenarios (Supplement 3) and participate in a guided discussion. The scenarios arose from nearly 20 years of observations of group-work within the PDP and showcase commonly observed leadership challenges. For example, one scenario describes a team that keeps circling back to the same decision points without moving forward due to the leader's desire for complete consensus on every decision. Each scenario describes a unique pitfall, which allows larger workshops to break into groups and discuss a unique scenario.

After individuals read the scenario, they work together to identify which of Chemers' three leadership elements might be affecting the situation and

how. They then suggest strategies from the Meeting Guide that could help prevent or resolve the scenario. These prompts are grounded in the assigned reading, which gives participants a shared framework for the discussion.

4.4 Synthesis

Following the discussion, the facilitator wraps up this section of the workshop with brief remarks and a share-out from the other group facilitators, if applicable. This portion serves as a summary of the first section of the workshop and a transition to the next section of the workshop. The facilitator acknowledges the connections made between a scenario, at least one of the leadership elements, and a strategy that is relevant. The facilitator illustrates this with one example from their group and can request additional examples from other facilitators if applicable. Useful examples include the balance between consensus and directive decision making and the importance of giving teammates the opportunity to convey their strengths and interests to both develop relationships and deploy resources effectively. The facilitator concludes by reminding the participants of the availability of the “Effective Meetings Guide” as a resource for strategies that will help participants lead a team effectively.

4.5 Introduction to team leadership plan

The facilitator introduces the next task: planning to lead a team. In this section of the workshop, participants define their own scenario and plan which strategies will be effective in that scenario. At this point, facilitators should tell participants that their written responses will be collected at the end of the workshop.

4.6 Plan to lead a team

The section on planning to lead a team begins with individual writing. Participants have 15 minutes to respond to the following prompts:

“Briefly (in 2–3 sentences), describe a scenario you can imagine arising in your own work context where it would be challenging to get or keep your team motivated.”

“Articulate 2–3 specific leadership behaviors discussed in the ‘Three Elements of Effective Leadership’ handout that you would employ to motivate your teammates to complete their goal and why you chose those behaviors. What could your team do or say that would show whether these leadership behaviors were effective at motivating them to complete the goal?”

Facilitators can optionally include a 10-minute break after this component.

4.7 Peer feedback on team leadership plan

Participants work in small groups to improve their ability to respond to their scenario. Each participant shares their scenario, leadership behaviors, and rationale with the group. The group takes 15 minutes to hear and discuss each scenario. Peer feedback is structured by prompts and grounded in the readings.

4.8 Revise written responses

Participants process and learn from peer feedback through a final written response, where they update their initial response by adding new ideas or revisions. These responses are submitted to the facilitator and can be assessed for evidence of learning.

4.9 Wrap-up

A facilitator wraps up the synchronous section of the workshop by making closing remarks. Points to reiterate include: 1) good leadership is based on well-developed skills and takes practice, 2) reflection on leadership after practice is one of the most

Table 1: Leading small teams workshop schedule. The workshop components with duration, participant structure, and key prompts.

Component	Duration (min)	Participant Structure	Prompt or description of what is presented
Pre-workshop	20	Reading	Participants read the “Guide to Effective Meetings” and “Introduction to Leadership Development”
Introduction	5	Presentation	Facilitators introduce the workshop with accompanying slides
Leadership scenario discussion	35	Discussion (~6 in a group)	Participants discuss prompts on leading small group scenarios: Which of Chemers’ three leadership elements might be affecting this situation? How? What strategies (from the Meeting Guide) addressing this element of leadership could help prevent or resolve the scenario?
Synthesis	5	Presentation	Facilitator summarizes comments and provides example from one group
Intro to team leadership plan	2	Presentation	Introduce next task: planning to lead a team
Plan to lead a team	15	Individual writing	Participants respond in writing to prompts on handout
Break	10	Optional break	
Peer feedback on team leadership plan	45	Peer discussion (groups of 3)	Each participant shares their response to the writing prompts and gets feedback or ideas from peers. (15 min/person)
Revise written responses	5	Individual writing	Add any new ideas to your written response for handling your scenario based on the conversation you had with your peers.
Wrap-up	2	Presentation	Final comments, focusing on importance of practice 1 month for implementation
Homework: Implement and reflect			Implement what you’ve learned from the workshop and reflect on the effect
Participant reflection and assessment	15	Reflect	Share whether and how often you implemented leadership behaviors you learned in the workshop (link to “Three Elements of Effective Leadership” handout) and how the workshop impacted your team’s work.

important steps for growth, and 3) everyone can become a good leader by working with their strengths and personality and being vigilant about turning weaknesses into strengths. Participants should implement ideas from the workshop in the month

following the training and then expect to fill out a survey reflecting on their experiences.

4.10 After the workshop

The workshop will only have meaningful impact if participants put their new knowledge to work by

altering their leadership behaviors. Facilitators share their expectation that participants will implement what they learned in the workshop in the one month following the workshop. Participants should be prepared to reflect on their actions and the effects of those actions.

4.11 Participant reflection and assessment

Workshop facilitators follow up with participants one month after the workshop to re-engage learners in the process of leadership reflection and to assess the impact of the workshop on participants. This follow up was completed using an online survey. Participants are asked to respond to the following prompt: “Share whether and how often you implemented leadership behaviors you learned in the workshop and how the workshop impacted your team’s work.” This component enables participants to do the important practice of reflecting on their leadership in a condensed 15-minute task. This component also enables facilitators to re-engage with participants and offer expert advice if participants express difficulties in improving their leadership skills.

5. Facilitation during workshop

Prior to running the workshop, workshop facilitators should closely review all supplementary materials, which include workshop logistics and expert guidance on facilitating the discussions. This knowledge was gained across multiple years of running this workshop for Design Team Leaders (DTLs) in the PDP.

Generally, facilitators should be prepared to provide context for the structure of the discussion. The facilitator can set the stage for success by stating norms of discussion, such as: 1) participants should talk to each other directly and not exclusively to the facilitator, 2) one goal of the discussion is for everyone to engage and contribute, so the facilitator

may request to hear from different or specific participants as the discussion progresses, and 3) participants should show respect for the contributions of everyone in the group. Additional tips on facilitating discussions are described in Supplement 3.

In providing the context for this discussion, the facilitator should emphasize that participant contributions should be derived primarily from the framework presented in the reading, rather than from personal experience. A frequent challenge of facilitating this discussion is that participants often draw from personal experience more frequently than from the reading material in their discussions. While personal experience can inform understanding, facilitators must be prepared to evaluate whether the discussion needs to be further grounded in the framework presented in the reading. Pointing out the emphasis on using the framework during the initial contexting of the discussion can make participants cognizant of the objective and more accepting of redirection when needed.

6. Field testing and recommendations for future versions

The workshop was field tested at a small (~20 employees) science non-profit in the San Francisco Bay Area. Four employees participated, so discussion and peer feedback were conducted as a single group. Participants included directors, support staff, and direct reports. Two participants responded to a post-workshop feedback survey. Participants responded with scores on a scale from 1–5, with 1 indicating strong disagreement and 5 indicating strong agreement. Participants considered the workshop to be moderately useful for professional development (scores: 3 and 4) and a very efficient use of time (scores: 4 and 5). Participants found the format of the workshop to be an efficient way to improve leadership skills (scores: 3 and 4). The structure and execution of the workshop made participants feel included and valued (scores 4 and 5).

In open-ended responses, participants indicated that the most valuable take-aways from the workshop were a “shared vocabulary for describing leadership flaws/weaknesses” and to “remind myself not [to assign] myself more activities that I have bandwidth for [and] to set clear expectations for those on my team.”

One participant made a comment that illustrates an opportunity to improve the workshop: [the structure of the workshop (interactive discussions with minimal lecturing)] “made it feel like we were mostly getting advice from other people who self-identify as not being strong leaders rather than facilitators who are experts.” This concern was not encountered frequently in the context of the PDP because participants interacted with PDP instructors frequently for a long duration (at least 8 days of in-person workshops, in addition to written feedback and virtual check ins) and were given opportunities to get feedback from experts. The authors suggest two modifications to address this feedback. First, facilitators should introduce the value of peer feedback and hearing the opinions of other participants early in the workshop. This should be supported by research about peer-to-peer learning to show the participants of the legitimacy of this approach and to get buy-in. Second, facilitators should add opportunities for one-on-one feedback from experts. For example, facilitators could review the written responses of participants and schedule one-on-one calls/meetings with participants to give further feedback on their plans for leading a team, and/or facilitators could check in with individuals one month after to workshop to discuss the participants’ follow-up survey responses.

A second opportunity for improvement is in response to this comment: “the activity of using a real-life example is great for some contexts, but can easily get awkward in a context where you’re in the session with coworkers.” This barrier to sharing was anticipated by facilitators. One approach to alleviate this concern is to arrange discussion groups that exclude members on the same team, line of

reporting, or organization. The PDP utilized this approach by limiting participation to team leaders, so no group had members of the same team. We also suggest emphasizing the specific wording of the prompt that solicits individual scenarios, which gives participants the option to “imagine” a scenario. However, discussing an authentic scenario is preferable because working through a personal scenario will make the experience more immediately applicable for participants.

Acknowledgements

A huge thank you to the PDP instructors who conceived of and refined the leadership strand, including Nicholas McConnell, Austin Barnes, Rafael Palomino, Scott Seagroves, and Tiffani Quan. Thank you to the Design Team Leaders and all PDP participants for helping to improve these materials by experiencing the trainings firsthand and thoughtfully responding to multiple feedback surveys. Thank you to the authors’ professional colleagues who participated in the workshop during field testing and provided useful feedback on the structure and effectiveness of the workshop.

This work was supported in part through the ISEE Advancing Inclusive Leaders in STEM project, funded by the National Science Foundation (AST#1743117). The PDP was a national program led by the UC Santa Cruz Institute for Scientist & Engineer Educators. The PDP was originally developed by the Center for Adaptive Optics with funding from the National Science Foundation (NSF) (PI: J. Nelson: AST#9876783), and was further developed with funding from the NSF (PI: L. Hunter: AST#0836053, DUE#0816754, DUE#1226140, AST#1347767, AST#1643390, AST#1743117) and University of California, Santa Cruz through funding to ISEE.

References

- Akdere, M., Hickman, L., and Kirchner, M. (2019). Developing Leadership Competencies for STEM Fields: The Case of Purdue Polytechnic Leadership Academy, *Advances in Developing Human Resources*, Volume 21(1), 49-71.
<https://doi.org/10.1177/1523422318814546>
- Ambrose, S. A. (2010). *How Learning Works: Seven Research-Based Principles for Smart Teaching*. John Wiley & Sons.
- Chemers, M. M. (2001). Leadership effectiveness: An integrative review. In *Blackwell Handbook of Social Psychology: Group Processes* (ed M. A. Hogg & R. S. Tindale).
<https://doi.org/10.1002/9780470998458.ch16>.
- Institute for Scientist and Engineer Educators. (2022). *Guide to Effective Meetings*. UC Santa Cruz: ISEE Professional Development Resources for Teaching STEM (PDP). Retrieved from
<https://escholarship.org/uc/item/0838q69j>
- Leiserson, C., McVinney, C. (2015). Lifelong learning: Science professors need leadership training. *Nature* **523**, 279–281.
<https://doi.org/10.1038/523279a>
- Riggio, R. E. (2008). Leadership Development: The Current State and future Expectations. *Consulting Psychology Journal Practice and Research* **60**(4), 383–392. DOI:10.1037/1065-9293.60.4.383

Appendix

This paper includes all items necessary to teach this workshop in the supplementary materials, which are either available on ISEE’s eScholarship site and cited above, or included in supplementary materials noted below.

Explanation of Supplementary Materials.

1. Facilitator Guide
2. Introduction to Leadership Development
3. Workshop slide deck (introduction and prompts)
4. Leadership Scenarios

