2023 Annual Conference & Exposition
Baltimore Convention Center, MD | June 25 - 28, 2023
The Harbor of Engineering Education for 130 Years
ASEE
Paper ID #37278

Mobilizing Resources in a Community of Practice: How Academic Change Agents Work Toward Equity in their Change Projects

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Abstract

Transforming academic organizations to be more equitable and inclusive requires a range of change agents working together and engaging in diversity, equity, and inclusion (DEI) initiatives. Central to this DEI work is learning how to create change. Yet, change agents do not always know at the outset what resources are necessary to enact change; they often acquire the necessary resources and skills over time. This research paper investigates how change agents participating in a community of practice (CoP) across academic institutions learn about and mobilize resources to transform engineering education.

This analysis of resource mobilization mechanisms comes from research with the National Science Foundation (NSF) Revolutionizing Engineering Departments (RED) grant recipient teams. To date, 26 teams have been funded through the RED mechanism to create revolutionary organizational and cultural changes within their departments with the goal of improving equity, inclusion, and educational outcomes. Projects vary in how they define and the degree to which they focus on equity.

We find that resource mobilization practices in the CoP center and strengthen DEI values in two main ways. Firstly, participants learn about and gain access to resources that are explicitly DEI-related: they mobilize resources to advance equity at the institutional level as an outcome of the projects and collaborate on additional projects to embed DEI into the process of change-making itself, starting from the initial stages of writing a proposal. Secondly, the way participants engage with each other, and approach change goals puts equity and inclusion into practice: participants identify and tackle structural barriers to change through DEI-aligned behaviors, from addressing how institutional circumstances create resistance to DEI, to developing a shared vision for systemic change that is inclusive and collaborative.

Introduction

We draw on resource mobilization theory and the scholarship on social movement pedagogies for this analysis [1], [2], [3], [4] to show how a community of practice operating as a contemporary social movement school (SMS) mobilizes a variety of resources through different pathways to institute changes in the field of STEM higher education. Resource mobilization theory proposes resource typologies and lays out the distinct mechanisms through which resources are accessed, produced, and distributed within movements [2]. Studies of social movement pedagogies provide a framework to uncover the role of learning in resource access [3], [4], and to identify the place of community leaders and external patrons in mobilization, vis-a-vis peer-to-peer learning [5]. Bringing these two social theories into engineering education has the potential to broaden our understanding of CoPs and how they accomplish change.

The emergent literature on SMSs, intentional spaces for training movement participants, lets us examine learning processes and the role of organizers in mobilization. Change agents do not always know what resources are necessary to enact change; they acquire the necessary resources

and skills over time. While existing research shows that SMSs blend different pedagogical styles to advance movement goals [3], [4], [5], how that complex pedagogical structure informs the participants' capacity for desired changes has been overlooked so far. Bringing together the literature on pedagogies and resource mobilization, we analyze how movement participants learn to mobilize resources to achieve desired changes in a setting dedicated to learning (i.e., in a CoP). We analyze the role of the leadership and other patrons of a CoP in accessing, aggregating, producing, and distributing resources. Further, we look at what types of resources are mobilized through the interaction of movement participants. We believe our findings will inform practitioners and future research on social movement schools and the structure of learning underlying the work of change agents.

Social Movement Organizations and Communities of Practice

Collective learning processes are central to meaning-making, consciousness transformation, and organizational efforts for social change [3], [6]. Calling attention to educational practices within movement building, an emergent line of research has turned to social movement schools (SMSs): organizational sites designed to bring together, educate, train and mentor individuals to be effective and committed movement actors [6]. These intentional spaces empower their participants to enact change [4], impact participants' subsequent careers [7] and lead to the diffusion of a movement praxis across generations [5]. However, this literature has so far overlooked the resource mobilization processes through which participants build the capacity for change-making. This gap is important, because accessing, producing, and distributing resources are key to the survival and success of social movements [8], [9].

Resource mobilization theory emphasizes the commonalities between institutionalized action and social movements [8], [10], by viewing both as attempts to pursue collective interests [10], [1]. Formal organizations that align with the preference structure of a social movement are defined as social movement organizations [8], and SMSs make up a specific type of social movement organization [11], upholding a post-movement future by employing "an intentional pedagogy and curriculum for directing the mental, moral, and tactical disposition of participants" [6, p. 162].

In this paper, we advance a synergy between education and social movement scholarships by applying the social movement school framework to communities of practice (CoP) that have change-making goals. Communities of practice are sites of collective learning, where participants engage in regular interactions in a shared area of interest and develop shared practices through those engagements [12], [13]. In the collective process of learning and developing a shared repertoire of resources, members develop a collective identity and strategic voice, discuss new developments, problem-solve, coordinate, and build synergy within and across organizational boundaries [12], [13]. CoPs are well suited to bringing newcomers into practice and their leadership can facilitate connections among the participants [12]. The focus on learning and shared practices makes CoPs ideal sites to address learning processes within the framework of a social movement school.

Resource Frameworks for Movement Organizations

Social movement organizations must have access to resources to pursue their target goals [8]. Building on existing theories of resource types and access mechanisms in the literature [9], [14], a resource framework [2] classifies all resources into five types (i.e., material, human, social-organizational, cultural, and moral) and presents four major mechanisms of resource access (i.e., aggregation, self-production, appropriation, and patronage). The specification of resource type and mechanism of access provides a framework to locate learning processes in resource mobilization. For example, we can differentiate when participants produce or pool resources, and when they get connected to existing resources through external patrons.

Resource Access Mechanisms

Before resources can be used for movement goals, they need to be made accessible to the movement actors. Aggregation, self-production, appropriation, and patronage are the four major mechanisms through which resources are made accessible [14], [2]. Aggregation is when dispersed resources are collected to be used by movement actors. While aggregation might typically refer to the collection of preexisting resources, this mechanism could also account for the new collective resources pulled together by individual teams when they participate in a shared SMS setting. Participants could also create or add value to resources (i.e., self-production); exploit or borrow resources from groups they are connected to (i.e., appropriation); or access the resources granted by specialized patrons (i.e., patronage). In an SMS, we would expect the interaction between the leadership and participants to shape resource access. Thus, we will examine the role of leadership in shaping access to resources.

Resource Types

The resource framework [2] classifies all resources into five types: material, human, social-organizational, cultural, and moral. Material resources refer to financial resources and tangible goods within the group such as participants' access to grants, funds, and organizational budgets [9], [2]. Human resources consist of labor, experience, skills, and expertise. They reside in individuals, rather than social-organizational structures or culture [2]. Social-organizational resources comprise formal organizations, social ties and networks, coalitions, and affinity groups. Cultural resources refer to conceptual tools, know-how, and taken for granted templates to execute specific tasks [15], [16]. Finally, moral resources consist of legitimacy, authenticity, and solidaristic and sympathetic support [9], [2], [17].

Social Movement Schools: Learning and Resource Mobilization

Researchers depict learning in SMSs as a mixture of learning from experienced leaders and the collective creation of knowledge and practices by the participants [6], [4]. Learning and enculturation go hand in hand in these intentional spaces, as participants practice a post-movement future [6]. Meanwhile, leadership employs a mix of pedagogical styles, blending content delivery with learner-centered pedagogies [4]. Through interactions, self-reflection, and critical introspection, the participants contribute to the collective creation of knowledge [4].

Research suggests that the resources movement actors gain access to might be closely related to the structure of learning itself. For example, Cornfield and colleagues [5] find that activists of the Nashville nonviolent civil rights movement relied on nonlinear and iterative processes of collective learning to design and implement action. Leaders of the Highlander Folk School, a critical center that trained and empowered many activists during the Civil Rights movement [11], relied on experts and guest speakers to deliver content to the participants, but they also used techniques such as role play and conversation to center the learners, so participants could collectively formulate shared problems and a sense for solving them [4].

To address how CoP leadership impacts resource mobilization, we conceptualize their role in resource processes as having a moderating, mediating, independent, or null effect. *Moderation* refers to instances where leaders do not deliver content directly but facilitate and shape resource mobilization by facilitating conversations and resource exchange between the participants. Leadership has *a mediating* effect when they arbitrate the relationship between resources and participants so that the latter gain access to resources through them. For example, leaders could invite guest speakers to deliver content, and this mediates the mobilization of resources by different participants. The leadership could have an *independent* effect on resource access when they deliver content directly to the participants or grant them direct access to available resources. Lastly, we can observe resource mobilization occurring without the leaders playing a significant part, referred to as *null* effect.

Data and Methods

Setting

This analysis of resource mobilization mechanisms is a part of research with the National Science Foundation (NSF) Revolutionizing Engineering Departments (RED) grant recipient teams. RED teams are funded to create revolutionary organizational and cultural changes within their departments with the goal of improving equity, inclusion, and educational outcomes. As part of the funding requirement, all RED teams are multidisciplinary. Teams include a social scientist or organizational change expert, education researchers, instructional faculty, and administrators. As of 2022, a total of 26 RED grants at 24 institutions have been funded through the funding mechanism.

Despite their shared goal, how the change teams seek to create systemic change varies between the projects. RED strategies include changing the student admission process, making curricular changes in partnership with the students, staff, and industry stakeholders, incorporating active learning approaches in the classroom, formalizing departmental training for inclusive pedagogies, and changing how research and teaching are prioritized in the tenure and promotion processes. Teams are also situated in institutions and departments of varying sizes, histories, disciplines, and location within the US. Thus, there is variation in the context of the change efforts, and different constraints on the projects.

REDPAR has been funded by the NSF alongside the RED teams to conduct research on the change processes, as well as to provide the RED projects support by equipping them with change-making skills to help them achieve their goals. To achieve this, REDPAR facilitates a

community of practice (CoP) and organizes an annual in-person meeting for all of the RED team participants. As the CoP leadership team, REDPAR hosts monthly virtual sessions to deliver content related to change-making and to facilitate community building and the exchange of resources between the teams. The regular meetings provide a deliberative environment for the change teams to collectively reflect on change processes and to articulate challenges and opportunities on their pathway to making long-lasting changes. In this paper, we consider this REDPAR-led CoP as a social movement school, bringing together change agents and empowering them to enact changes in alignment with their goals.

Data Collection

We transcribed the 31 virtual monthly sessions from the 2017-18, 2018-19, and 2019-20 academic years, with participation from a total of 21 RED teams (i.e., all teams that had received RED grants as of the 2019-20 academic year). Transcripts were de-identified prior to analysis. Members from a mean of 12 RED teams (min=5, max=17) participated in each of the meetings, in addition to REDPAR and guest attendees (e.g., NSF program officers and external experts). We categorized the sessions into 15 topical areas: Community-building (9), Institutionalization (5), Diversity, Equity and Inclusion (3), Communication (2), Propagation (2), Higher Education (1), Strategic Partnerships (1), Challenges and Troubleshooting (1), Community of Practice Planning and Sharing Vision (1), Project Management (1), Publication Impact (1), Evaluation (1), Collaboration within the Community of Practice (1), and COVID (1).

Data Analysis

We followed a grounded theory approach, starting with line-by-line coding of the transcripts (in Dedoose), then refining and organizing the codes into categories and themes through the emerging patterns to build a theoretical perspective [18]. We coded to capture the tone of meetings, the content and structure of the discussions, and which attendees spoke. We also coded each participant throughout the transcripts to examine when CoP leadership and the participants are actively participating in the calls. Analytical memos were written for each of the sessions and for the emergent coding structure as it evolved throughout the iterative analysis. Verbatim quotes from the sessions were included in the memos to make comparisons over time and to discover the emerging patterns across the sessions. After developing the conceptual analysis, we went back to the theoretical literature to refine the categories and situate the findings in the existing scholarship. Two of the authors met regularly to discuss the codes, categories, themes, and the patterned relationships in the data.

Results

Table 1 provides an overview of the resource mobilization processes observed in the monthly meetings of the community of practice. The rows display how the leadership participates in the mobilization of resources, while the columns disaggregate the resources based on how the change teams gain access (i.e., aggregation, self-production, appropriation, or patronage) to those resources. For each item listed, we classify the resource type (i.e., cultural, social-organizational, moral, and human resources).

Table 1. Resource Mobilization Processes and Outcomes

	Means of Access to Cultural, Moral, Social-Organizational, and Human Resources (RED Teams)			
CoP Leadership involvement	***Aggregation***	***Self-production***	***Appropriation***	***Patronage***
Moderation (when leaderships facilitates or shapes resource access)	• Adoption and learning through CoP (Moral, cultural) • Impact assessment strategies (cultural) • Cross team collaborations and networking (moral, social-organizational) • Team dynamics I (Human, moral, cultural) • Embedding DEI into change projects (Cultural) • Promoting and communicating change (cultural)	• Implementation and sustainability of change I (cultural) • Diagnostic framing (cultural) • Prognostic framing (cultural)	• Propagation planning and strategies (cultural) • Social media strategies (cultural)	• Effective propagation strategies (cultural)
Mediation (when leadership mediates between resources and RED teams)		• Embedding equity in engineering ed (cultural)	• Implementation and sustainability of change II (cultural) • Dissemination best practices (cultural)	
Independent contribution	• Information about conferences and dissemination outlets (social-organizational)			• Leadership support (social-org, cultural) • Partnership building skills and motivational framing (cultural) • Connections to Funding/Funders (human, moral) • Mailing lists and networks (social-organizational) • Tip sheets (cultural)
Null (no significant involvement in mobilization)	• Team dynamics II (moral, cultural, social-organizational) • Project evaluation know-how (cultural)	• Impact assessment strategies (cultural) • Dissemination materials (human)		

In the following section, we start by presenting how CoP leadership impacts resource mobilization. We then describe how change teams employ each means of access to mobilize resources for their changemaking efforts.

How CoP Leadership Moderates Resource Mobilization

CoP leadership employs various pedagogical techniques to moderate the mobilization of resources during the community of practice meetings. We find that their techniques impact the structure of the conversation, how participants engage with the subjects and each other, and how they connect to external resources.

To facilitate the change-focused conversations, CoP leadership employs rehashing and repetition, probes silent teams to share out, supports reflection exercises and the identification of parallels between projects and employs small group activities for participants to engage deeper with the topics and each other.

- Rehashing and repetition: Leadership draws attention to what has been said by the participants by paraphrasing their statements or rehashing them to ensure common understanding.
- Participation monitoring: As a way to support inclusion, leaders probe silent teams to talk, to avoid a situation where the sessions center on a limited number of community participants.
- Reflection exercises: Through probing and reflection exercises, teams are prompted to describe how their own practices relate to the topics. Participants reflect on their practices and elaborate on the challenges and opportunities that await them. When participants reflect on the barriers to their DEI change goals, the leadership encourages other teams to share advice based on their efforts to effect change.
- Identification of parallels: by identifying the parallels between the different change teams, leaders can moderate the exchange of resources and advice, and compile lists of resources and strategies shared by the teams.

Ultimately, we find that leadership moderation is overwhelmingly common in how participants mobilize resources. Moderation is associated with every type of resource (i.e., cultural, human, moral, and social-organizational) mobilized in this setting, and every means of gaining access to resources (i.e., aggregation, self-production, appropriation, and patronage) (See Table 1).

How CoP Leadership Mediates Resource Mobilization

CoP Leadership also plays a mediating role in access to resources. The leadership connects participants to external resources, invites guest speakers to lead meetings, and offers to act as mediators for the participants and guests to communicate afterwards. Compared to the other ways that leadership impacts mobilization, the role of mediation is rather limited. We find that mediation is exclusively associated with the mobilization of cultural resources in this CoP, and that it is only present in instances when participants produce resources on their own or coopt resources that were originally created for another purpose.

Leadership's Independent Contribution to Resource Mobilization

Alongside moderating and mediating, the leaders also make independent contributions to the mobilization of resources; this is the second most frequent way leaders support resource mobilization. Leaders create and deliver content, build connections with patrons and external funders, and compile mailing lists for participants to connect as a network and access information for change-related events and dissemination outlets. In addition, the leadership works with the teams to produce and deliver practical change-making Tip Sheets by soliciting topics of interest from the participants. We find that the leadership's independent contribution to resource mobilization gives the community access to four types of resources (i.e., cultural, human, moral, and social-organizational) through processes where the participants aggregate resources or access them via patronage.

Without Leadership/The Null Effect: Participant-Led Resource Mobilization

We also observe resource mobilization occurring without any significant involvement by the leadership, that is, when participants take charge of the mobilization process. Participants come together to share institutional perspectives, strategies, and create their own metrics and concept inventories to assess the implemented changes. Furthermore, participants who hold knowledge related to change-making provide their skills and expertise to others in the CoP. We find that participant-led mobilization grants the community access to cultural and human resources, and that the participants either aggregate or self-produce in order to access these resources.

Means of Resource Access: How Change Teams Access Resources

Teams rely on a mix of aggregation, self-production, appropriation, and patronage to access resources to affect change. Below, we present how change teams employ these pathways to mobilize resources, and how each means of access serves the implementation of change efforts.

Aggregation

Aggregation is when dispersed resources are collected to be used by movement actors. While aggregation might typically refer to the collection of preexisting resources, this mechanism could also account for the new collective resources pulled together by individual teams when they participate in a shared CoP setting.

Through aggregation, teams mobilize human, social-organizational, cultural, and moral resources. They arrive at general insights and principles of change-making, compile opportunities (e.g. grants, events, jobs) and dispersed tools and tactics, and generate legitimacy and moral support through coming together as a CoP. We find that aggregation is the most common way through which teams with different change goals and circumstances learn from one another in this collective learning environment.

Firstly, teams acquire general insights and principles about change-making through sharing and comparing their individual experiences. The sessions facilitated by CoP leaders mobilize human and social-organizational resources by informing the functioning of teams and the contribution of

each change actor to the teams. Through participating in the community and connecting with others who fulfill similar roles to them on other teams, participants identify role-specific challenges, learn to manage challenges related to teamwork and build consensus to achieve change goals.

Individuals fulfilling the same role on different teams collaborate to produce cultural know-how that informs change-making practices. For example, social scientists collaborate to tackle issues such as confidentiality and anonymity that arise when conducting research about a single institution or administration. This collaboration leads to an interactive session on embedding DEI into change-making. Participants reflect on power and privilege at the team level, so that change efforts are equitable for the individuals engaged in the projects.

Next, leadership and the teams compile information on opportunities that are of interest to the broader community. Participants announce job opportunities, conferences, professional events, grants, and dissemination outlets through the CoP, leading to a reinforced network of change actors. Participants report learning how to gather resources and opportunities through their participation in the community and rely on the CoP to gain access to those opportunities.

At the CoP meetings, teams aggregate dispersed tools for change assessment as well as tactical repertoires for communication of change to stakeholders. Through the facilitation of CoP leadership, teams gain access to a dispersed set of tools to measure change utilized by other teams. Moreover, teams learn how to promote and communicate change to university administrators, students and other stakeholders by exchanging tactical repertoires and shared understandings for mobilizing support during the activities and learning sessions organized by the leadership.

Lastly, participants report generating credibility and moral support through the CoP. Teams share that partnering with other institutions signals credibility to stakeholders, thereby helping them bring people on board for new partnerships. Teams also access moral support through the supportive community environment to pursue their change goals. Participants communicate challenges about their change processes and affirm the experiences of other teams. In addition, individuals fulfilling similar roles across different projects reflect on role-specific challenges and exchange support. The solidarity produced in the CoP is particularly valuable for the "only's" on the teams, such as the social scientist or the education researcher. This is an affinity-group strategy that can be used in DEI work to support other "only's" who might be marginalized due to social identity.

Self-Production

In addition to compiling existing resources (aggregation), teams who are part of the CoP create and add value to human and cultural resources at the meetings. Teams arrive at contextualized know-how of implementation and sustainability suited to their own institutional circumstances, produce their own change assessment metrics, and gain access to the skills and expertise of individuals on other teams through participating in the CoP.

Firstly, participants produce know-how that helps them envision, implement, and sustain change. During the meetings, participants discuss change models, how to identify levers and barriers for effective action, dealing with unexpected leadership changes, and strategies to institutionalize change. Developing shared understandings of problematic conditions in higher education (i.e., diagnostic framing), yields a structural understanding of the field of higher education: the hidden curriculum's messaging about who belongs where, the faculty's lack of pedagogical training for an inclusive classroom, how teaching is incentivized vis-à-vis research. As they develop shared understandings of the problematic conditions, participants also identify DEI-aligned strategies for systemic change (i.e., prognostic framing): discussing what it would look like to create structural incentives for DEI, embed inclusive pedagogies for a participatory student culture and get students to develop inclusive skills and mindsets through the curriculum. Because participants are embedded in varying contexts, interacting with other teams helps them identify how their own contextual circumstances impact the change efforts.

Secondly, teams create their own metrics and concept inventories for assessing change. During the meetings, teams share the tools they have produced to assess changes, such as measuring enrollment and demographics in their departments over time, conducting climate surveys, and interviewing stakeholders (e.g. faculty). As explained in the aggregation section, teams gain access to a broad array of assessment tools by compiling the metrics across different teams as well as building their own.

Finally, individuals who produce teaching materials for their change projects and individuals who have expertise in change-making mobilize their resources and know-how during the sessions. For example, a social scientist in one of the teams creates educational videos for engineering students, which are then shared with the broader community. Participants from other teams promote these materials on their own webpages and assign them in their own classrooms, leading to broader dissemination. Participants also gain access to cultural resources in the form of know-how and conceptual tools. For instance, an engineering education expert on one of the teams leads a session on equity in engineering education. During the session, the expert elaborates on their definition of equity, and how it differs from related concepts, such as equality. The session continues with exercises to prompt participants to reflect on what embedding equity in education looks like, and participants exchange situated knowledge on how their own teams seek to advance equity, and how it shows up in their teaching.

Appropriation

Appropriation is when the CoP exploits or borrows resources from groups they are connected to and therefore benefits from change-making know-how and best practices that were originally created for a different purpose. Outside experts and members of the CoP lead sessions to diffuse best practices in dissemination and propagation, changemaking and sustainability, and how to use social media to advance change goals. In addition to presenting existing content, community meetings serve as a place where members can reflect on their situated knowledge and practices related to the topics.

CoP members deliver content on dissemination and propagation strategies during several sessions where the leadership serves as facilitators. During the session on dissemination, the presenter lays out best practices for choosing an outlet, optimizing dissemination impact and

strategic planning using content they originally created for a different purpose with other collaborators. During the discussion, participants share their own experiences and exchange situated knowledge on the topic. In another session, a member presents propagation know-how, appropriated from another context. The shared know-how includes strategies to increase the likelihood of propagation, the role of originators versus those who adopt their content, and how to effectively use institutions as resources. Following the presentation, CoP leadership facilitates small group discussions where participants share with each other what they are aiming to propagate through their change projects. The member leading the discussion encourages participants to workshop their plans within the CoP for mutual editing and feedback, therefore strengthening the participants' collective identity as change agents who support each other to effect systemic change.

Sometimes the coopted resources come from outside of the CoP. During several sessions, external experts are invited by the CoP leadership to share their experience in institutionalization and sustainability to advance change efforts. These sessions give participants access to know-how on sustaining changes, arguably the most challenging aspect of the change process.

Finally, CoP members who identify as digital natives share insights about using social media for dissemination, public outreach, and extending professional networks. The presenters borrow tactics from elsewhere and the CoP leadership facilitates a conversation between members on how those tactics can be applied to advance their change projects. To complement, CoP leadership creates and maintains the list of their members on social media platforms for a coordinated online presence.

Patronage

Lastly, change teams gain access to varied change resources granted to them via specialized patrons. CoP leadership, program officers of the grant-making agency, and outside experts invited to the sessions all function as patrons for the advancement of change efforts.

The leadership team, a research-practice partnership, conducts research with the change teams then translates that research output into practical strategies for changemaking in the form of Tip Sheets. During sessions, leadership solicits topics of interest from the teams to guide future Tip Sheet creation. They also ask the members to assess the usefulness of the Tip Sheets and use the feedback to provide them with new resources. The leadership team has so far produced and delivered Tip Sheets on creating strategic partnerships, communicating change to constituents, creating a shared vision with stakeholders, team formation and development, creating a shared vision with stakeholders, communicating change to constituents, starting a change project, and managing planning for leadership succession.

CoP leadership also organizes sessions where they hold workshops to help the teams build strategic partnerships to facilitate changemaking. During such sessions, leadership shares original content on strategic partnerships, shares tools and strategic templates to help the teams build new partnerships to advance their change goals. The content delivery is supplemented by discussions among participants on the benefits of partnerships and how to identify a good partner. As participants learn about partnership building, they learn how it differs from getting

buy-in and discuss ways to approach change-making as a collaborative and inclusive endeavor of building consensus and developing a shared vision for systemic change.

The leadership frequently invites outside experts and contacts at the funding organization so they can provide additional resources to the community. For example, an expert on effective propagation gives a presentation on best practices to smooth the way for potential adopters, the role of suitability and efficacy, and aligning goals with action. As with other sessions, the leadership facilitates a discussion among the participants and rehashes the insights that emerged from the session. The leadership also invites program officers who represent the NSF RED program to participate in the CoP meetings. When program officers are in attendance, they announce solicitations for new cycle grants and share insights about propagation with the CoP. To strengthen communication and relationships with their mutual funder, the CoP leadership mediates patron connections by offering technical assistance with report writing and communication to members of the CoP.

Discussion and Conclusion

We examined a change-making community of practice in the field of higher education as a social movement school by focusing on how they mobilized resources toward their goal of revolutionizing STEM education. We found that the community produces, aggregates, appropriates, and engages in relationships with patrons to mobilize a variety of resources that help them at various stages of the change process. Through aggregation, members gain insights and principles of change-making, compile dispersed tools, and gain moral legitimacy as a change-making community. Through self-production, members create assessment tools and acquire know-how of implementing and sustaining changes suited to their own circumstances. Through appropriation, members benefit from resources that were originally created for a different purpose and reflect on their own situated knowledge and practices. Finally, members gain access to practical strategies pertaining to different stages of the change-making process as well as gain partnership building skills to bring adherents on board through engagements with their leadership and other patrons.

Our analysis also demonstrated how the research-practice partnership team that organizes the meetings contributed to resource mobilization. The leadership moderates how members engage with the topics and each other and connects them to external resources to help with teams' goals. They also create and deliver content based on the needs of the participants and help the latter build connections with each other and external experts. Overall, the CoP leadership plays an essential role in resource mobilization and therefore change-making progress, in alignment with the historical examples of social movement schools examined in the literature [11], [4]. Rather than promoting any ideology, the leadership blends content delivery and reflexivity to create a deliberative and reflective space where members can co-construct knowledge, formulate ways to think about shared problems and strategies for solving them.

Our findings suggest that participants derive significant benefits as a result of resource mobilization processes happening in the community of practice. Firstly, in line with Cornfield and colleagues' [5] depiction of nonlinear processes of learning and tactical design in movement praxis, evaluating practices and the changes initiated through the projects is a central theme in

the community of practice meetings. Members continuously engage in reflexive assessments of team dynamics and achievements with respect to goals, leading members to acquire a heightened reflexivity and critical consciousness with respect to their position and practices as change-makers. Comparing change-making experiences across organizational boundaries gives members a sensitivity to the contexts in which the projects are advanced. By participating in a space that transcends institutional boundaries, change-makers develop a heightened understanding of the opportunities and constraints of their specific location in the broader field.

Secondly, community interactions exhibit a strong focus on ensuring that change-making is collaborative, value-driven, and connected to constituents and available resources in the field. In doing so, members mobilize resources to embed DEI into the change process itself, as well as embedding DEI into higher education as an outcome of the projects. By aligning their ongoing practices with what they seek to institute, members learn to practice and uphold a post-movement future that is consistent with their goals [6].

Thirdly, participants acquire movement diffusion tactics as they gain access to resources related to dissemination and outreach. Participants learn to communicate change with adherents and constituents and strategies to increase the likelihood that their innovations are taken up by potential adopters. Acquiring the materials and strategies for dissemination and propagation help their change-making goals go beyond the limits of their respective teams to transform the broader field of higher education. The central role played by the leadership team regarding movement diffusion tactics contributes to our understanding of how SMS pedagogies shape the process of movement diffusion: Unlike the typical way of mobilizing resources in the community (i.e., aggregation via moderation by the leadership), the leadership plays a more central role in ensuring diffusion by delivering content related to communicating change and brokering access to outside experts so that innovations can be diffused into the broader field.

Finally, participants learn to be a community of practice, develop a collective identity, and connect to patrons and external guests as a community of practice. Members conduct research based on their shared practices, coordinate for dissemination opportunities, and use their network to show up at conferences and other events to expand the footprint of the RED community of practice. Ultimately, the findings suggest that communities of practice are appropriate sites for research on social movement schools and provide opportunities for understanding how collective interests and identities are formed in resource mobilization and other processes for sustaining movements.

Acknowledgements

The authors would like to thank the RED teams for their participation in the RED community of practice. The authors would also like to thank Dr. Jelani Ince for his time and effort in providing us with constructive feedback. This research was supported by the National Science Foundation under Grant No.'s #1649379, #1649318, #2005244, and #2005307. Any opinions, findings, conclusions, or recommendations expressed in the material are those of the authors and do not necessarily reflect those of the National Science Foundation.

References

[1] D. McAdam, *Political Process and the Development of Black Insurgency, 1930-1970.* University of Chicago Press, 1985.

[2] B. Edwards and M. Kane, "Resource mobilization and social and political movements," in *Handbook of political citizenship and social movements*, H. van der Heijden, Ed. MA: Edward Elgar Publishing, 2014, pp. 205-232.

[3] R. Tarlau, “From a Language to a Theory of Resistance: Critical Pedagogy, the Limits of “Framing,” and Social Change,” *Educational Theory,* vol. 64, no. 4, pp. 369-392, Aug. 2014.

[4] N. Slate, ““The Answers Come from The People”: The Highlander Folk School and the Pedagogies of the Civil Rights Movement,” *History of Education Quarterly*, vol. 62, no. 2, pp. 191-210, May 2022.

[5] D. B. Cornfield, J. S. Coley, L. W. Isaac, and D. C. Dickerson, “The Making of a Movement: An Intergenerational Mobilization Model of the Nonviolent Nashville Civil Rights Movement,” *Social Science History,* vol. 45, no. 3, pp. 469-494, 2021.

[6] L. W. Isaac, A. W. Jacobs, A. W. Kucinskas, and A. R. McGrath, “Social movement schools: Sites for consciousness transformation, training, and prefigurative social development," *Social Movement Studies*, vol. 19, no. 2, pp. 160-182, Mar. 2020.

[7] J. S. Coley, D. B. Cornfield, L. W. Isaac, and D. C. Dickerson, Social movements as schooling for careers: career consequences of the Nashville civil rights movement," *Social Movement Studies,* vol. 21, no. 3, pp. 255-273, May 2022.

[8] J. D. McCarthy and M. N. Zald, "Resource mobilization and social movements: A partial theory," *American Journal of Sociology* vol. 82, no. 6, pp. 1212-1241, May 1977.

[9] D. M. Cress and D. A. Snow, "Mobilization at the margins: Resources, benefactors, and the viability of homeless social movement organizations," *American Sociological Review,* pp. 1089-1109, Dec. 1996.

[10] J. C. Jenkins, "Resource mobilization theory and the study of social movements," *Annual Review of Sociology*, vol. 9, no. 1, pp. 527-553, Aug. 1983.

[11] B. Edwards and J. D. McCarthy, "Social movement schools," *Sociological Forum*, vol. 7, no. 3, pp. 541-550, Sep. 1992.

[12] E. Wenger, "Communities of practice: Learning as a social system," *Systems Thinker,* vol. 9, no. 5, pp. 2-3, Jun. 1998.

[13] E. Wenger-Treyner and B. Wenger-Trayner, “Introduction to communities of practice: a brief overview of the concept and its uses,” *Wenger-Trayner,* Jun. 2015. [Online]. Available:

https://wenger-trayner.com/introduction-to-communities-of-practice/. [Accessed 01 Feb 2023].

[14] B. Edwards and J. D. McCarthy, “Resources and social movement mobilization," in *The Blackwell Companion to Social Movements,* D. A Snow, S. A. Soule and H. Kriesi, Ed. MA: Blackwell, 2004, pp. 152-156.

[15] C. M. Schroeder, “Faculty change agents: Individual and organizational factors that enable or impede faculty involvement in organizational change,” Ph.D. dissertation, Dept. Edu. Amin., The University of Wisconsin-Madison, 2001.

[16] R. H. Macdonald, R. J. Beane, E. M. Baer, P. L. Eddy, N. R. Emerson, J. Hodder, E. R. Iverson, J. R. McDaris, K. O’Connell, and C. J. Orman, “Accelerating change: The power of faculty change agents to promote diversity and inclusive teaching practices,” *Journal of Geoscience Education,* vol. 67, no. 4, pp. 330-339, Oct. 2019.

[17] A. N. Pilny, Y. C. Atouba, and J. M. Riles, “How do SMOs create moral resources? The roles of media visibility, networks, activism, and political capacity,” *Western Journal of Communication*, vol. 78, no. 3, pp. 358-377, May 2014.

[18] K. Charmaz, *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. London: Sage. 2006.