

BOARD # 331: Building psychological safety and conflict resolution capacity to enhance team cohesion within the NSF RED Program

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Introduction

In 2015, the National Science Foundation (NSF) commenced the Revolutionizing Engineering Departments (RED) program to support the ideation and implementation of significant structural, organizational, and cultural changes in engineering education to better equip engineering students with the technical and professional skills needed to holistically address complex societal problems. NSF RED teams represent specific engineering or engineering technology departments or colleges, with department heads serving as principal investigators on the grant. In addition to departmental faculty co-PIs, NSF RED teams typically have members from non-engineering departments who can serve as social/organizational change experts, engineering education experts, and assessment experts on the team.

Members of each interdisciplinary RED team work closely together during a funding period of five years, navigating many challenges along the way, and this paper explores the ways in which these teams attempt to ensure psychological safety and build conflict resolution capacity for their team members. We utilize the definition by Edmondson (1999) that psychological safety is a shared belief held by team members that others on the team will not “embarrass, reject, or punish someone for speaking up.” Inclusive and efficient teams are key to generating innovative, cross-cutting, and sustainable changes in higher education. Research suggests that for highest success, high-performing teams must actively foster psychological safety among the team members (Ruiz Ulloa & Adams, 2004).

This paper is written from the perspective of our participatory action team (REDPAR) which was funded by the NSF to conduct research with the RED change teams and support the teams by facilitating a community of practice. The working session described in this paper is an example of an activity facilitated during the in-person community of practice gathering that we organize on an annual basis to encourage propagation of change-making experiences and ideas.

This paper reviews results of a group working session involving members of 12 current and past RED teams, focused on exploring ways in which RED teams are currently attempting to ensure psychological safety and build conflict resolution capacity for their team members, and providing them with additional skills for fostering psychological safety and for conflict resolution. While teamwork is expected in the workplace, even including the academy, effective teaming strategies are not typically taught in graduate school or once faculty enter the academy. It is prudent, then, to offer opportunities for teams embarking on important academic change projects to learn strategies for, and practice fostering, psychological safety.

Methodology & Activity Context

In September of 2024, forty-three (43) members from twelve (12) current and past RED teams gathered for the annual RED Consortium Conference in Alexandria, VA. As part of the conference, the teams participated in a group workshop during which they both (i) practiced new skills for fostering psychological safety and conflict resolution, and (ii) reflected on ways in which their teams are already successfully fostering a psychologically safe environment.

To support an environment in which individuals could more freely share stories and experiences of their own RED teams, during this group workshop, individuals were placed in small working groups composed of members from different RED teams. The workshop was divided into 4 activities:

1. Individuals completed a vetted seven-question, seven category Likert survey (Edmondson, 1999) to quantify current levels of participants' experiences of psychological safety on their teams;
2. Small groups participated in reflective and role-playing activities to practice speaking and interacting in ways that foster psychological safety;
3. Small groups participated in reflective and role-playing activities to practice having crucial conversations in instances when psychological safety is eroded;
4. Small groups brainstormed ways in which their own RED teams foster and/or suppress psychological safety, and deal with having crucial conversations as a way to manage conflict.

To help improve teaming experiences, we held a discussion about and a role playing activity to teach and allow participants the opportunity to practice psychological safety (Activity 2). This instruction utilized an intervention focused on curiosity where team members are encouraged to consider a broad range of potential outcomes and consequences of actions using a questioning mindset. The goals of the discussion were to encourage the RED team participants to speak and behave in ways that demonstrate that they agree with the attitude that questioning an idea can provide valuable insight. Teams subsequently participated in and reflected on a role playing activity developed to allow practice of asking questions and responding to questions in such a way that that not only maintains, but promotes, psychological safety (Marincel Payne & Hanson, 2023).

While fostering psychological safety early and often can reduce the frequency and potential negative impacts and the severity of conflict, conflict is a part of any change project. To support teams in working together effectively, the conflict-resolution instruction highlighted key concepts from the Crucial Conversations model to prepare team members before and when they speak (Grenny et al., 2002). According to Grenny et al., crucial conversations are usually characterized by three features: high stakes, strong emotions, and opposing opinions (2002). For RED teams, we argue that having these crucial conversations is an opportunity to strengthen

team cohesion, build leadership capacity, and nurture psychological safety, if the conflict is navigated wisely. This mindset mirrors the curiosity-based mindset that supports psychological safety in teams, underscoring that conflict-resolution is an extension of psychological safety.

Following the psychological safety and crucial conversations activities, we asked each working group to brainstorm and discuss ways in which their RED teams foster and/or suppress psychological safety, ways in which they deal with crucial conversations, as well as ways in which their teams could improve their ability to deal with psychological safety and conflict resolution. Participants were asked to record any and all ideas they had on post-it notes and posters, which they later organized into thematic groups. After the activity, the REDPAR facilitators collected all of the artifacts produced by the working groups, and aggregated and categorized the results into general best practices discussed in the following section.

Findings & Discussion

In this section we present the high-level results of using a vetted survey to assess psychological safety of the RED teams (Activity 1; Edmondson, 1999) and present results from Activity 4 during which small groups brainstormed ways in which their own RED teams foster and/or suppress psychological safety, and deal with having crucial conversations as a way to manage conflict.

While the aggregated psychological safety survey results indicate that RED teams generally enable most participants to experience a safe team environment, they also demonstrate that not all team members feel unanimously supported, and the area that could be most improved is in allowing members to feel able to bring up problems and tough issues. It is important to note, that even if the majority of team members feel they experience a high degree of a particular marker of team psychological safety, (e.g., that it is safe to make mistakes), a psychologically safe environment is not considered to be established until all members feel safe.

Moreover, it must be noted that psychological safety must be relentlessly fostered. Teams cannot “check off” having achieved psychological safety; instead, teams must continue to work towards promoting psychological safety in every interaction. Finally, teams can take heart in the fact that in terms of psychological safety, mistakes can be learning experiences - just because someone mistakenly engages in an action that erodes safety does not mean all hope is lost. Behfar et al. (2008) suggest that teams that are successful over time exhibit a proactive approach to anticipating the needs for conflict resolution, while developing conflict resolution strategies that apply to all group members.

The overall survey findings were further supported in the examples that working groups generated during the brainstorming part of the session (Activity 4). When asked about strategies that RED teams currently utilize to foster psychological safety and enable conflict resolution, ideas generated by the groups were coded by the REDPAR team and grouped into three main

categories: creating an appropriate meeting structure, role of project leader, and building trust and respect by all team members.

Teams reflected on the importance of planning and implementing a meeting structure that is governed by clear and agreed-upon meeting norms, where the meeting agenda is collaboratively created and shared with all before the meeting, and where every team member has an opportunity to contribute to discussions (e.g., round-robin style of idea/feedback generation). Groups also discussed ways in which conversations and disagreements between team members can be managed during the meetings, including addressing all concerns and questions before moving onto another discussion point or making a decision, practicing reflecting on ideas of others to confirm intent, and acknowledging that the meetings are an opportunity to create the space to have tough conversations. Most also strongly favored having frequent low-stakes meetings to create more opportunities for discussions.

The groups also highlighted the important role that project leaders can play in developing and maintaining psychologically safe environments. Suggested practices included ensuring that leaders meet with individual team members outside of regular group meetings to compile various perspectives, scheduling separate group meetings to openly discuss prior contentious meetings, having leaders who are skilled at anticipating concerns and seeding conversations that might otherwise be suppressed, encouraging sidebars and back-channel conversations to get team members talking to each other, providing all team members with psychological safety and conflict resolution training, and developing a process for integrating new team members into existing groups. Additionally, some groups reflected on the importance that a team leader can play in creating an environment in which all issues are framed as opportunities for continuous improvement and innovation.

The groups placed high importance on the need for all team members to contribute to the effort of building trust and respect by exhibiting a curiosity mindset and asking questions about others' perspectives, establishing commitments to honor agreed upon ways of interaction and collaboration, and learning ways to provide positive feedback and connect feedback to a team's shared vision. Additionally, groups highlighted the importance that informal non-work meetings can have in helping to build bonds between team members, enabling them to learn more about each other and their varied motivations and perspectives. Finally, groups reflected on the importance that each team member plays in acknowledging power dynamics and in recognizing and calling out when a crucial conversation needs to happen.

The working groups were also asked to consider practices that they have experienced on their RED teams that diminish the psychological safety of a team and their ability to handle conflict. A lack of clear and agreed-upon meeting norms resulting in loud voices dominating conversations and a lack of ability to generate a collaborative agenda were identified as some of the main issues. Additionally, inability of team members to voice their thoughts during meetings

and the inability of team members to provide positive feedback and structure curiosity-focused questions resulted in situations where individuals did not feel psychologically safe. Groups also reflected on the fact that acknowledging the importance of having crucial conversations but never having them, results in situations in which conflict is not effectively or safely resolved.

Conclusion

Our work with the NSF RED teams resulted in identification of strategies that can be useful in helping teams foster a psychologically safe environment. The findings from this paper are domain agnostic and highly transferable, and therefore will be of value to any individual working in a team setting, especially change agents working in teams, as teams that foster psychological safety have been shown to produce more innovative changes (Kark & Carmeli, 2009) and have the power to change perspectives on diversity efforts (Woods et al., 2024).

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References

- Behfar, K. J., Peterson, R. S., Mannix, E. A., and Trochim, W. M. K. (2008). The critical role of conflict resolution in teams: A close look at the links between conflict type, conflict management strategies, and team outcomes. *Journal of Applied Psychology*, Vol.93, No. 1, pp. 170–188.
- Edmondson, A. C. (1999). Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*, Vol. 44, No. 2, pp. 350-383.
- Grenny, J, K. Patterson, R. McMillan, A. Switzler, and E. Gregory. (2022). *Crucial Conversations: Tools for Talking When Stakes are High*. 3rd edition. New York: McGraw Hill.
- Kark, R., and Carmeli, A. (2009). Alive and creating: The mediating role of vitality and aliveness in the relationship between psychological safety and creative work involvement. *Journal of Organizational Behavior*, Vol. 30, No.6, pp. 785–804.
- Marincel Payne, M. K. and Hanson, J. H. (2023). Teaching students skills to foster psychological safety in a team environment, Proceedings from the ASEE 2023 Annual Conference and Exposition, Paper ID 36716.

Ruiz Ulloa, B. C. and Adams, S. G. (2004). Attitude Toward Teamwork and Effective Teaming. *Team Performance Management*, Vol. 10, No. 7/8, pp. 145-151.

Woods, A., Zajac, S. A., Middleton, E. D., Cavanaugh, K. J., Hayes, W. C., Johnson, S. K., & Holladay, C. L. (2024). Doing the work: The role of inclusive leadership in promoting psychological safety and openness to diversity through diversity, equity, and inclusion practices. *Psychology of Leaders and Leadership*, Vol. 27, No. 1, pp. 115–142.