

When a group must solve hard problems, it's best to design the team around its learning style

October 10 2016



Credit: Santa Fe Institute

As contributors to businesses, sports teams, or governments, most of us take part in some sort of group problem solving. But what is the best way to collaborate on a difficult problem like developing a budget or designing a new product?

Past research on collective problem solving has come to conflicting conclusions. Some studies have found that people collaborate best when they can communicate with all other group members, emailing or meeting to exchange ideas continuously. Other studies have found that working in smaller subgroups is better, with each member communicating closely with a few neighbors.

In a new paper published today in *Nature Communications*, Daniel Barkoczi of the Max Planck Institute for Human Development and Mirta Galesic, a Santa Fe Institute professor in human social dynamics, modeled how networked groups solve complex problems with measurable payoffs. For such problems, it is usually relatively easy to find a mediocre solution but difficult to discover a superior one.

Striking the right balance between exploration (searching for new ideas) and exploitation (taking an idea and running with it) requires matching a particular group's social learning style with the right type of network, the study finds.

The authors compared two general patterns for social learning in groups. In one strategy, group members use the best solution that any member has discovered so far. The other strategy is to adopt the solution most frequently chosen by other [group members](#), as long as it is better than the solution one currently has.

They discovered that [network structure](#) determines the success of the strategies, and vice versa. "When you copy the best solution your collaborators have found so far, you quickly pick up on promising solutions and explore less, risking zooming in on inferior solutions," Galesic says. "This fast strategy works well in less connected, slower networks that help strike the right balance between exploration and exploitation."

"If you are choosing the most frequent solution used by your collaborators," she says, "you need to wait for the solution to be adopted by several others before accepting it. This slow strategy explores more and benefits from a more tightly connected network structure that spreads information fast and encourages exploitation."

These scenarios have important implications for teams and team design

by highlighting some of the factors that determine how much time a group will spend looking for better solutions, how long it will continue to exploit a known solution that is good but maybe not the best, and whether it will zoom in too quickly on a solution or wait too long to make a decision.

"Our study has broad implications for organizational learning, technological innovation, cultural evolution and the diffusion of innovations," the authors write. "These results highlight that interventions aimed at changing the social environment while disregarding [social learning](#) strategies might not produce the desired effects."

More information: Daniel Barkoczi et al. Social learning strategies modify the effect of network structure on group performance, *Nature Communications* (2016). [DOI: 10.1038/ncomms13109](https://doi.org/10.1038/ncomms13109)

Provided by Santa Fe Institute

Citation: When a group must solve hard problems, it's best to design the team around its learning style (2016, October 10) retrieved 27 April 2024 from <https://phys.org/news/2016-10-group-hard-problems-team-style.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.