

# The advantages of doing research in teams (essay)

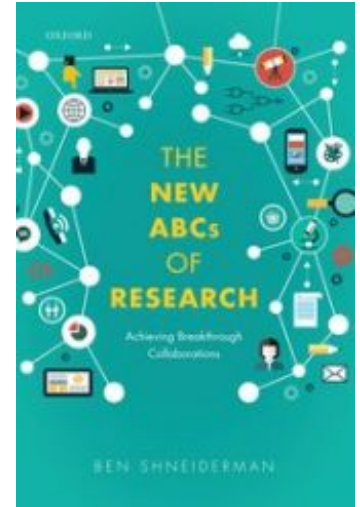
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The New ABCs of Research: Achieving Breakthrough Collaborations, by Ben Shneiderman

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## How to Do Team Research

Such teamwork can be difficult but quite productive, writes Ben Shneiderman, and the most successful teams share certain key characteristics.

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### By

[Ben Shneiderman](#)

Team research is the source of some of the great breakthroughs of all time, such as the 1947 invention of the transistor, which took the complementary skills of applied researcher Walter Brattain, quantum theory researcher John Bardeen and solid-state physicist William Shockley. And today, despite the expediency of individual work, researchers are moving strongly and clearly in favor of teamwork because of its often strong advantages.

Teams are often helpful in tackling complex and important problems. They often produce better work because they take on more ambitious projects, bring complementary knowledge and apply diverse research methods. Teams also have larger social networks than individuals do to collect input during research and disseminate results as they emerge. In addition, in the best situations, teamwork promotes not only timely but also high-quality work, as people in the team have a strong incentive to demonstrate excellence to their partners.

A further advantage of team research is the opportunity for all members to learn from each other. Diverse experiences and skills are clearly a benefit, but team members may also productively complement each other by balancing breadth versus depth, basic versus applied research directions and quantitative versus qualitative approaches.

Many team members report satisfaction and fun with team processes, but there is a dark side to teamwork. While mild respectful disagreements can be productive, forceful personality differences that lead to disruptive conflicts can undermine team performance. The opposite effect is groupthink, in which team members all too quietly accept initial

ideas without sufficient spirited discussion of alternatives. Teams also face difficulties when one or more team members don't contribute as much as others expect.

Creating an effective and productive research team requires thought and planning. Based on my experience working on a variety of teams and extensive research literature, I believe that successful teams have the following characteristics:

*Previously successful collaborations.* A strong correlate of team success is a history of fruitful previous collaborations. Successful collaborations call for establishing common ground -- a shared vocabulary and compatible working styles -- and building trust. In fact, when companies or existing teams ask me to work with them, I like to start with some small collaboration before committing to a longer-term one.

*Balanced teams.* Teams with mixtures of senior and junior members, women and men, or business and academic members are likely to produce higher-quality work than homogenous teams. Teams with members of the same discipline can be effective when they have complementary skills, but you should consider team members from nearby or even distant disciplines, who can bring fresh problems, research methods or analytic tools.

*Clearly defined goals and roles.* As your team forms, you should write a shared vision of the overall goals and clarify individual roles, especially when working in large distributed teams. When authoring a proposal, report or paper, people's specializations may emerge. For example, some people may be great at producing titles, abstracts and introductions, while others may do excellent reviews of previous work. Some team members may focus on evaluations, which others develop compelling and comprehensible data. Finally, there may be social roles in teams, such as cheerleaders, gatekeepers, spokespersons, budget managers or schedule keepers.

*Explicit statements of who does what by when.* You should also develop an initial schedule that allocates tasks to be accomplished with deadlines to be met. You can change it later, but having a clear specification of contributions from each team member is helpful -- whether the plan is short-term work leading to a conference submission or a multiple-year endeavor to deliver major breakthroughs, working systems or mature products. This strategy requires outlining specific, concrete steps and timelines for completing them. For example, team members must commit to having Annette make the first draft of the screen design or first pilot implementation by 9 p.m. Tuesday evening. Then Bharat will provide feedback by noon Wednesday. And so on.

*Regular and open discussion.* Teams are best when they hold regular and open discussions. Groups in which a number of different people speak during meetings tend to perform better than teams in which one or two people dominate the discussion. Modest controversy is often healthy in choosing among alternative directions as well as in promoting trust among team members. Another commonly stated principle is that you should always be open to seemingly wild ideas that may offer unorthodox solutions or initiate new lines of thinking.

*Good communication.* Team members may have to learn how to speak to each other in constructive and positive ways during informal one-on-one discussions and in face-to-face group meetings. Often, getting team members to agree on terminology is a big step forward in forming common ground. Communication also includes respectful dialogue, so replacing "your idea just won't work" with "I don't understand why you want to do it that way" changes the atmosphere in the room, raising the willingness of team members to contribute and inviting productive differences of opinion. When team members rehearse talks within the team, they not only promote team cohesion but probably produce better presentations to outsiders. Simply describing your work to other team members helps to clarify your intentions.

*Collaboration readiness.* This occurs when team members are eager to work in the team and their management is supportive of team participation. Loners who are reluctant to work in teams are unlikely to become productive team members, and managers who fail to encourage teamwork may undermine the team by providing inadequate resources or disparaging team successes. Some institutions promote a culture of collaboration by training for teamwork, making collaboration technologies readily available and celebrating successful teams.

*Technological readiness for remote teamwork.* The reality of contemporary teamwork is that inevitably some members will be traveling, while others are embedded in distant organizations, making regular face-to-face meetings difficult. You should rely on technology to facilitate collaboration at a distance and help to bring team members closer together regularly to describe progress, share problems, exchange ideas and forge agreements about future plans. Meetings by phone, Skype or video conference can help groups of three to 30 to coordinate their activities, learn from each other and build trust. For larger groups, web conferencing tools like WebEx or GoToMeeting support presentations and discussions, while wikis, blogs and deliberation systems provide durable records of substantive discussions including documents, links, data sets, videos and more.

*Trained experienced leadership.* Great leaders set visionary goals, inspire younger team members, push for high quality and share the recognition and rewards. They also are attentive to and step in to resolve conflicts among team members, keep the project on schedule, deal well with setbacks, and even know when to remove someone from the team. In small teams, democratic management with no designated leader is possible, but as the size of your team grows, a strong leader will become an increasingly valuable asset.

*Adequate administrative resources and services.* As teams grow larger, the successful teams also have specialists to handle the administrative load of budgets, technology support, travel coordination, meeting planning and human-resource management (hiring, insurance, benefits, etc.). You should make sure resources for these areas are in the budget.

*Effective brainstorming strategies.* Thousands of studies of brainstorming, usually in design and engineering, have shown that there are good and bad practices. While it can sometimes be helpful to have lively group discussions to develop new ideas, fresher and more diverse ideas emerge more reliably if individuals begin brainstorming on their own. Your team members should then meet to present their ideas in a safe, nonjudgmental process that allows for clarification, questions and refinements. Facilitated brainstorming sessions, with trained leaders, often elicit bold innovative ideas, which the team can discuss and refine.

## **Other Considerations**

An increasing number of journals now require teams to spell out the different roles that various people have played at the end of the published paper. Your team should discuss authorship order early in the project to ensure that expectations are clear to all. In fact, disagreement about credit for ideas is one of the major reasons for research groups to break up. On one occasion we resolved a strong disagreement about author order by pushing the research farther to develop the ideas into two strong papers.

Size of teams is another issue. Increasingly research projects require teams of dozens or even hundreds of researchers, especially if they are distributed across organizations and are geographically remote. The U.S. National Institutes of Health have launched many research centers to tackle complex problems such as cancer prevention; alcohol, drug and tobacco abuse reduction; environmental health interventions; and behavioral strategies to promote wellness, health disparity decrease and so on.

Opportunities for breakthroughs expand with more team members, but challenges with coordination become greater. Even when adequate funding is available, setting goals and managing large teams can be difficult. In fact, ultimately, it's not how big your network is, but how you use it. Large networks can be helpful in broadcasting ideas, but the more potent networks are those that trigger discussions and provide productive feedback in response to well-defined questions.

In summary, teamwork in the small and the large can be difficult, but when done well it can be astonishingly productive, satisfying and even fun. And the bottom line is that perseverance and resilience in the face of difficulties is just as important for teamwork as it is for individual work.

*Ben Shneiderman is a distinguished university professor in the department of computer science and founding director of the Human-Computer Interaction Laboratory at the University of Maryland. This article is adapted from his book, The New ABCs of Research: Achieving Breakthrough Collaborations , published with permission from [Oxford University Press](#).*

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