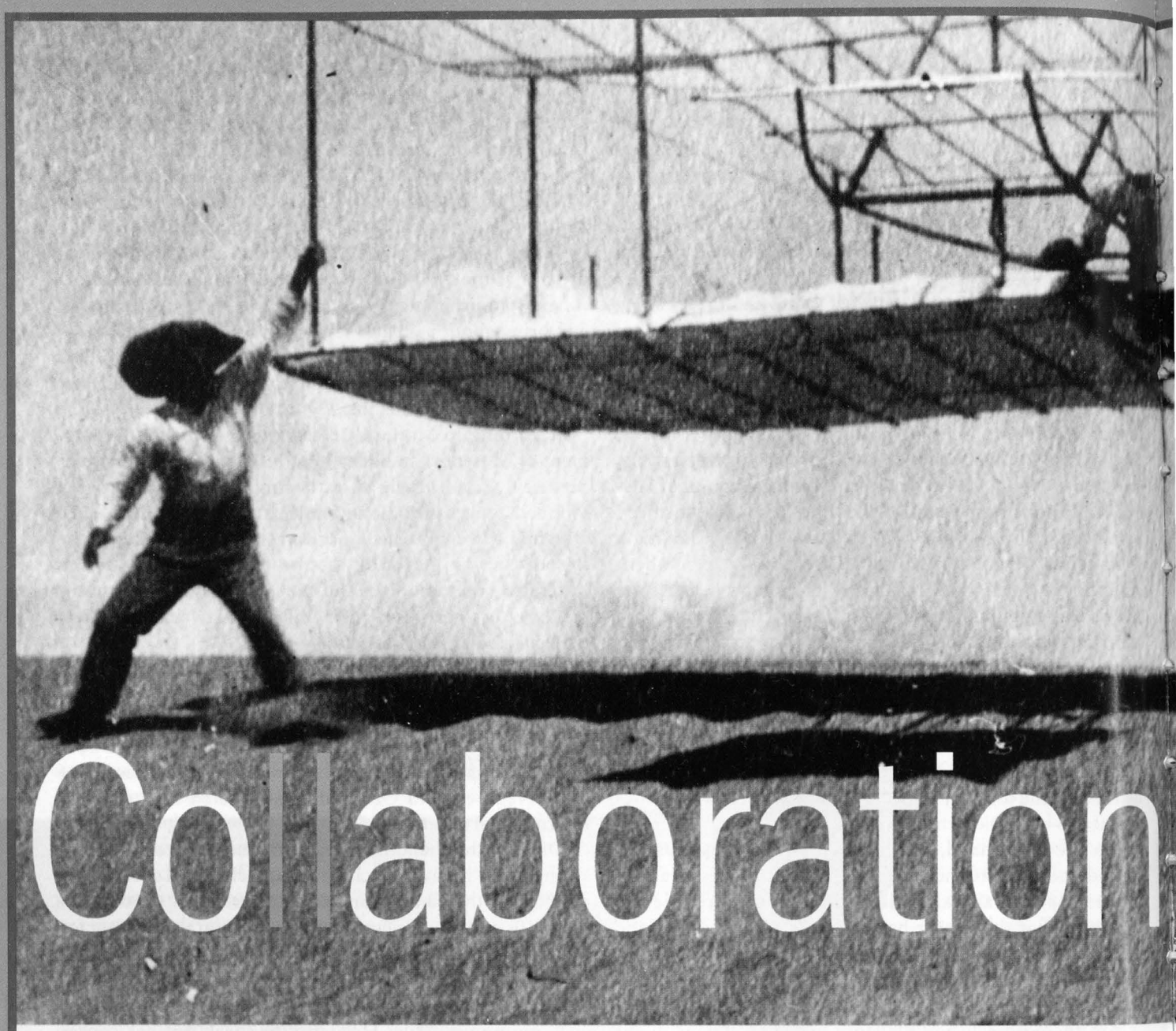
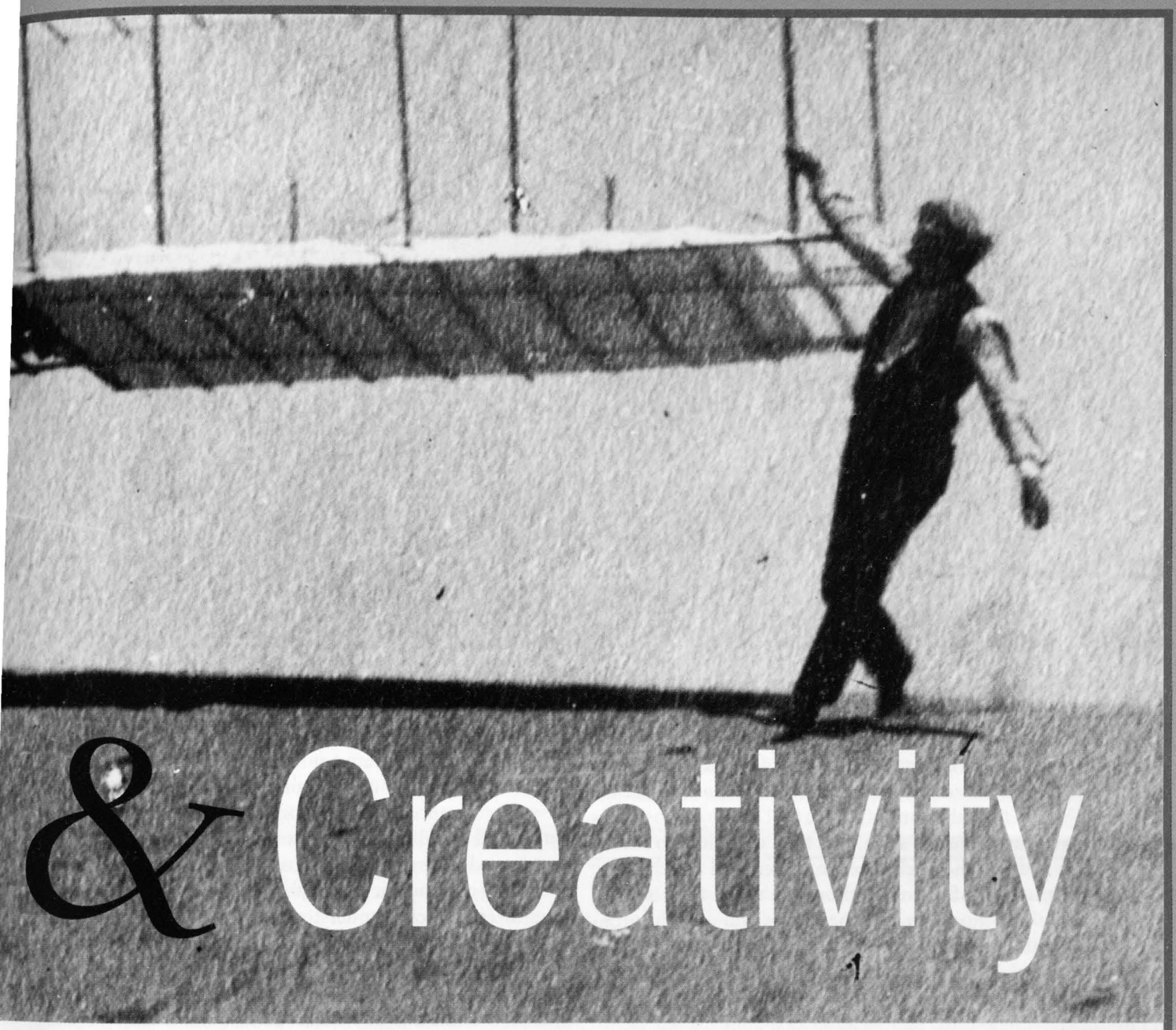


Collaboration

"The act of collaboration is an act of shared creation and/or shared discovery," writes author and MIT professor Michael Shrage. For museums and other organizations, collaboration may be a trend that can't be avoided. "On one hand," writes Shrage, "problems, opportunities, and the environment in which they appear are becoming more complex. On the other hand, to survive this explosion of complexity, people cultivate specialties. They want to be experts at something. Organizations increasingly hire and train experts to deal with the daily plethora of problems and opportunities. In society, academe, the sciences, business, and the arts, the age of complexity confronts the era of specialization. The new reality is that it will take the collaborative efforts of people with different skills to create innovative solutions and innovative products."



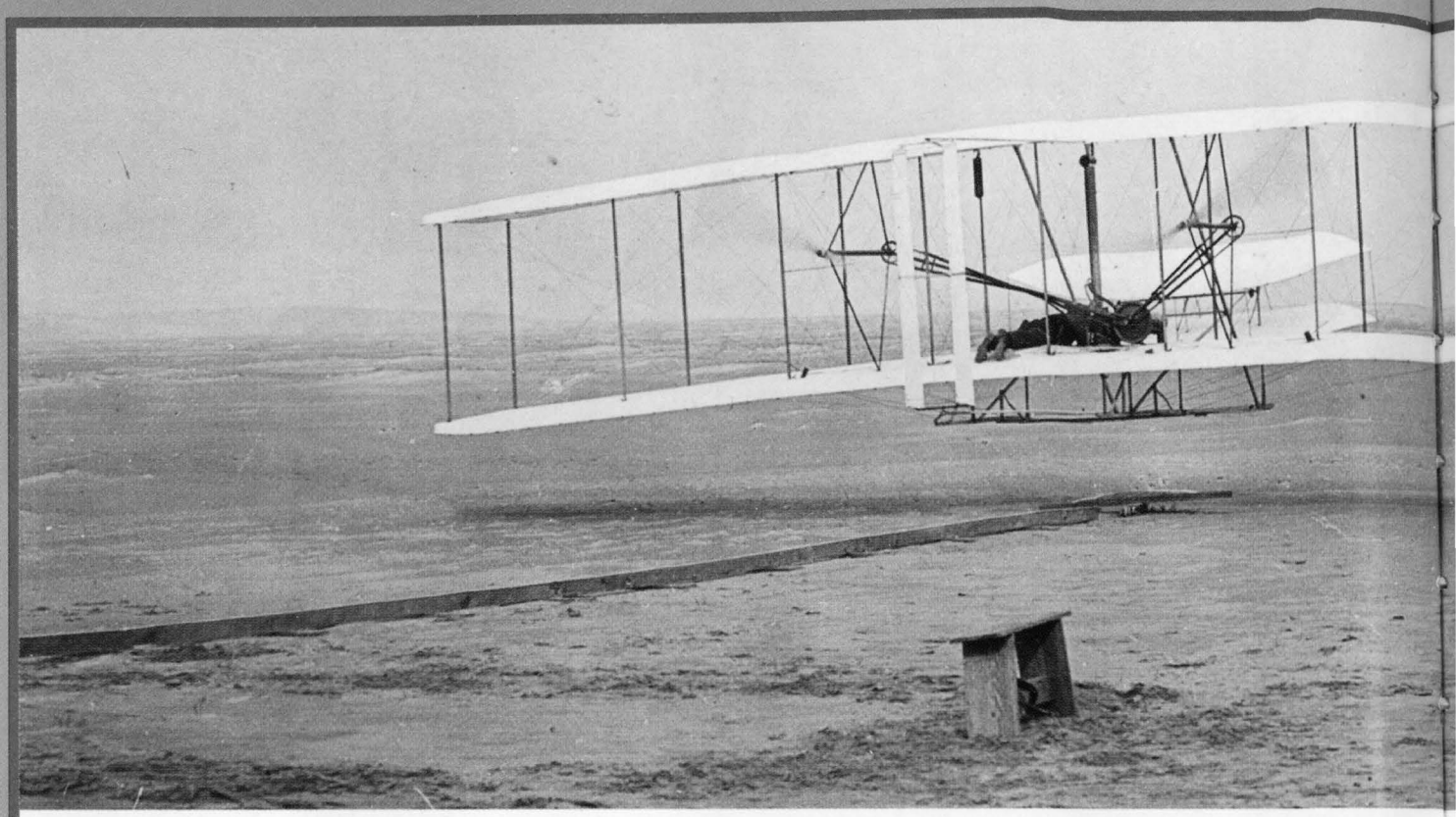
& Creativity

By Michael Schrage

Pablo Picasso and Georges Braque collaborated on their art quite differently from the way Apple Computer cofounders Steve Jobs and Steve Wozniak collaborated on their computer. The Wright brothers approached heavier-than-air machine flight in ways quite alien to Gilbert and Sullivan's approach to comic opera.

And yet, though the characters, personalities, eras, and fields are all different, certain aspects and themes of collaboration constantly recur. They seem to transcend business, the arts, and the sciences as well as language, culture, and time. Most successful collaborations have these themes and characteristics woven through them. That doesn't mean that replicating these behaviors guarantees success. What these behaviors do reveal are patterns of interaction that have consistently led to successful collaborative outcomes.

This page: The 1901 Wright Glider, piloted by Wilbur Wright. Photo from the Library of Congress. Page 46: The 1903 Wright Flyer makes its first flight. Both images courtesy of the National Air and Space Museum, Smithsonian Institution. © Smithsonian Institution.



1. Competence

A collaboration of incompetents, no matter how diligent or well meaning, cannot be successful. Whether in business or biochemistry, a certain minimal threshold of competence is required of each member of the collaborative team, or else the whole is less than the sum of its parts. The Wright brothers may have run a bicycle shop, but they were superb model builders and had the intelligence to understand aerodynamic phenomena. Individual collaborators don't have to be brilliant but, at the very least, they must be able to deal with the problem they face. A collaboration can compensate for an individual technical of conceptual gap, but it can't paper over a fundamental deficiency.

2. A Shared, Understood Goal

Collaborations are classic examples of management by objective—except that the focus is almost exclusively on the objective rather than on the task of managing. Collaborative scientists tend to answer questions about their work in the context of how far along they are in understanding a particular set of phenomena. Theater ensembles talk about how close they are to achieving the best performance. The collaboration is treated as a means to an end. When it is going exceptionally well, people talk about it. When it's going particularly poorly, people talk about it. Otherwise, they treat the collaboration as a medium to accomplish their goals.

3. Mutual Respect, Tolerance, and Trust

Wilbur and Orville Wright got along famously; John Lennon and Paul McCartney did not. Successful collaborations don't require friendship or even that the collaborators like one another very much. Collaborative emotions tend to be utilitarian.

However, there must be a minimum threshold of mutual respect, tolerance, and trust for a collaboration to succeed. Successful collaborators tend to ignore the more irritating quirks and idiosyncrasies of their colleagues; they focus on managing one another's strengths rather than their lesser qualities. It is implicitly understood that the task at hand transcends personal annoyance.

Trust is almost always assumed; there is precious little gamesmanship about proving oneself trustworthy or responsible. Nor is this a fragile trust. A collaborator has to break a commitment, betray a confidence, or consistently underperform before the collaboration comes apart. The collaboration exists precisely because the collaborators believe they need the other to get the job done.

4. Creation and Manipulation of Shared Spaces

All collaborations rely on a shared space. It may be a blackboard, a piano keyboard, an exhibit design, or a prototype. Whether the collaborators are artists, scientists, professionals, managers, or mechanics, they are inevitably drawn to a space where they can share ideas and insights. The shared space becomes a partner in collaboration.

Shared spaces usually permit real-time access by all the collaborators. They serve as both a model and a map for what the

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Michael Schrage is a research associate at MIT Media Lab, whose work focuses on the kinds of environments that cultivate innovation and success. This essay is adapted from his book, *No More Teams! Mastering the Dynamics of Creative Collaboration* (Doubleday, 1995); he also is the author of *Serious Play: How the World's Best Companies Simulate to Innovate* (Harvard Business School Press, 2000). Schrage will deliver the keynote address at the AAM Annual Meeting in New Orleans on Sunday, May 9, 2004.

collaborators are trying to accomplish. In effect, they are the collaborative tools that people wield to make sure that the whole of the relationship is greater than the sum of the individuals' expertise.

5. Multiple Forms of Representation

Molecular biologists are quick to build computer or Tinkertoy three-dimensional models of organic structures to complement their experimental data and discussions. Theater directors rely on critical interpretations of text, actors' impressions, set designers' suggestions, and audience reactions to fine-tune performances.

Since collaboration inherently fuses multiple perspectives to address a task, it must use multiple representations to manage those perspectives. Collaborators require a repertoire of different languages to hone in on the problem to be solved or the innovation to be created. These multiple representations create a web of information that makes it significantly easier to construct meaning. To put it another way, each level of representation—mathematical, linguistic, structural, conversational, visual—represents a different lens though which to view the collaborative task. Some views put others in context; some are deceptive and create illusions; still others reveal precisely what needs to be seen.

6. Playing with the Representations

Instead of treating uncertainty as a problem to be solved, successful collaborators treat it as an opportunity to be explored. Uncertainty fuels the sense of play and experimentation. Even scientists aren't initially searching for solutions; they're playing with the parameters and underlying dynamics to see what constraints they have to obey. In contrast, artists play with the parameters and dynamics to see what constraints they can shatter.

Successful collaborators take play seriously. They tend to view their shared spaces and multiple representations as Silly Putty that can be stretched and molded to test their ideas. Exaggeration, oddball perspectives, and understatements all fall under the anything-goes category that collaborators indulge in freely as they sort out their options.

7. Continuous but Not Continual Communication

Unless it is mandated by circumstance—for example, an emergency in a hospital operating theater—collaborators do not maintain constant communication. Instead, they try to create a rhythm, a tempo, and a flow of communication that prevents them from interfering with one another while ensuring that events are proceeding apace.

In effect, successful collaborators create patterns of communication appropriate to their relationship and their task. The initiative for the communication comes from the collaborators themselves, not from any externally imposed arbiter. This maximizes both flexibility and spontaneity—two qualities of communication that successful collaborators stress are essential. Successful collaborators try to create an appropriate flow of communication rather than a structure for communication.

What does Innovation Mean?

As a child, I loved going to museums. As an adult, I like going to museums. The critical difference doesn't lie in my increasing age or sophistication but in my expectations. I want more.

These days, I usually don't visit "a museum," I go to "an exhibit." The destination–the experience–has materially changed. In fact, when I go to a museum, "I" am not going to the museum: I'm going with a child or children or with a friend or friends–in other words, not as an individual but as part of a relationship. And yet, museum audio-guides are designed for individual consumption (You try to have a conversation when you and your companions are wearing those things). Most "interactive" displays do little to invite collaborative use. Exhibits that simultaneously appeal to and intrigue parent and child–think *Finding Nemo*–are surprisingly rare.

What does innovation mean? What should innovation mean to the people who design exhibits and those who experience them? Where do their sensibilities connect? How do their expectations clash? Is there something about museum-based innovation that's inherently unique?

I'm struck by these questions and I look forward to exploring them. My core interest is in the nature of collaborative design for innovation and collaborative innovation for design. These themes offer, I think, a useful framework to discuss how the museum experience could and should evolve, as our technologies and expectations evolve.–*M. S.*

8. Formal and Informal Environments

As one surveys the sociology of science and art, it's striking—but ultimately not surprising—that creative communities and collaborators meet in a variety of formal and informal environments. One could make the case that because these people are all working intently on the same problems, it's inevitable that they work together in different types of settings. However, a more powerful argument might be that it is precisely because people collaborate in formal and informal environments that they expand their ability to solve problems.

In both the biographies and the comments of great scientists and artists—from Niels Bohr to Vincent van Gogh—it is consistently the informal meetings, the café arguments, and the wilderness trips that are cited as pivotal events in the creative cycle. Of course, the "Eureka!" also strikes at the laboratory bench or in front of the easel or at the more "appropriate" settings. But one can't ignore the possibility that informal collaboration fathered the inspiration that hatched in the more formal setting.

9. Clear Lines of Responsibility but No Restrictive Boundaries

There is no division of labor in successful collaborations, at least not in the way most organizations define the phrase. Typically, organizations assign specific responsibilities to individuals and expect the goods on schedule and at the appropriate level of quality.

In a collaboration, individuals are explicitly responsible for certain tasks but are also free to consult, assist, and solicit ideas from their collaborators. The individual has both a defined functional role and a charter to go where the task takes him. Collaborators are expected to ask one another the tough questions. There is little turf warfare precisely because the collaborators are supposed to create collective solutions to problems. Everyone remains responsible for his own functional duties, but also is encouraged to create shared understandings about the entire task.

10. Decisions Do Not Have to Be Made by Consensus

One of the most persistent myths about collaboration is that it requires consensus. This is emphatically not so. Collaborators constantly bicker and argue. For the most part, these arguments are depersonalized and focus on genuine areas of disagreement. Then again, collaborators argue precisely because they come to the task with different perspectives and backgrounds—which is exactly why they're collaborating.

For obvious reasons, collaborators usually agree about the directions they are taking. If they consistently diverge, the collaboration ultimately dissolves. However, it's also clear that chance, circumstance, and necessity will dictate that, ultimately, key individuals will make decisions about where the collaboration should go. Consensus is often irrelevant to the act of creation or discovery. The real challenge is for the collaboration to generate the collective ideas and insights that accomplish the desired task.

11. Physical Presence Is Not Necessary

Even before technology redefined presence, there were successful long-distance collaborations. Thomas Wolfe and his editor, Maxwell Perkins, enjoyed a tremendously productive correspondence. Cambridge University mathematicians Hardy and Littlewood collaborated by letter for years even though they worked only a few hundred yards apart. Today, it is clear that the information technology infrastructure has acquired a collaborative overtone. While there is no substitute for face-to-face contact, technology has rendered physical presence a useful but unnecessary part of a successful collaborative experience.

12. Selective Use of Outsiders for Complementary Insights and Information

As intense and demanding as most professional collaborations are, the successful ones have historically relied upon a network of outside advisers who are familiar with either the technical area, the personality of the collaborators, or both. What's intriguing to note, however, is that collaborators often solicit this outside assistance. It is not imposed upon them. Successful collaborators are constantly on the lookout for people and information that will help them achieve their mission, but they do so on their own terms. Apparently, one cannot impose assistance on a collaboration, even if that assistance would be precisely what the collaboration needed to meet success.

13. Collaborations End

One should always enter a collaborative relationship with the idea that it will end. Collaborations are purposeful; once the purpose is achieved, the need for collaboration usually evaporates. In that sense successful collaborations are more like trysts than great romances. And a consistently productive long-term collaboration is as rare as a great friendship or a great marriage. Because collaborators are also individuals, it is completely understandable that they grow apart over time. They are captured by new interests and perspectives—and new collaborators.

The idea that even the most successful collaborations come to an end is simultaneously sad and liberating. On one hand, it's a pity that such a productive and beneficial relationship ultimately dies. On the other hand, it reaffirms that people are individuals who are free to go their own ways and pursue other interests, either on their own or with others. The reality that collaborations end may indeed be one of the best reasons why bright, talented people are willing to be a part of them. The long-term benefits can greatly exceed the short-term costs.

Damon Runyon once noted that "The race isn't always to the swift or the battle to the strong—but that's the way to bet." No doubt many collaborations have succeeded outside the themes mentioned here, but the odds favor the collaborators and technologies that respect them. M