What Makes a Group Succeed?¹

Some unscientific notes for success in group work and the Mid-Term hackathon
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Our Hackathon evaluates you solely on the success of your group. While this is likely in explicit contrast to how you’ve been commonly assessed in the past, it is reflective of how success (often) functions in the real world.²

The work of a group takes place on two levels; somewhat like the Bridge and the Engine Room of an aircraft carrier (or starship, since most science fiction series copy the aircraft carrier pattern in their stories).

1. What vs. Why: the Bridge

On the bridge, the group has to decide not only what to do (what project to undertake), but also why that particular goal is worth pursuing. For example, a group might decide, after some discussion, to investigate the behavioral patterns of pedestrians in traffic. They might decide that this is interesting because they see it as a game involving not just cooperation (don’t get hit / don’t hit someone) but also conflict (save time / allow the other person to save time).

If the group doesn’t know what they’re doing, failure is practically assured. Importantly, however, successful groups are explicit not just about the what (“we’re studying crosswalks!”) but also the why (“because we’re interested in how people solve games with partially-aligned incentives—like Prisoner’s Dilemma or Battle of the Sexes.”)

2. Team of Equals

Successful groups tend to have high cohesion on the Bridge. They tend to build consensus (general agreement) around the purposes of the group’s activity.³

Rather than voting (majority rules), or delegating the what or why questions to a single person, they spend a lot of time going back and forth. They have the mental skills to dynamically adjust their own beliefs and desires in response to what they hear.

This level of cohesion allows a group to be flexible if they hit a snag: “we’re studying crosswalks, but it’s snowing too hard and nobody’s on the streets.” If a group has taken the time to discuss why they wanted to observe crosswalks, they will be able to come up with an alternative plan much more quickly.⁴

¹. Prof. Abe Rutchick (CSU Northridge, and my old friend from high school) summarizes this three page document: “Have both a plan and a purpose; get to know each other; work together, value consensus, and stay in close contact; be resilient. Be kind.” Johannes Castner summarizes it as “Diversity! ... depending on the complexity of the task.”

². Not only for scientists investigating nature and society, but for policy makers and elected officials, business leaders (and small business owners), professionals (doctors in an ER, lawyers on a case, architects and engineers on a project), and (very likely) the best projects and social groups that have yet to be imagined.

³. In this way, things are more Firefly than Star Trek, and more Battlestar Galactica than Firefly; more X-men than Batman; more Angel than Buffy; more Law and Order than Sherlock Holmes.

⁴. There’s no obvious answer to what this group should do next: study people cutting in line at the
Where some people see distinctions of ability (“X doesn’t get it at all, let’s follow Y”), others can perceive a deeper equality (“X is trying to express an intuition about Y’s plan that we need to understand”). This is a particularly valuable form of leadership that generalizes well to intellectual work.

The lesson for the Bridge is clear: take the time not only to bring a good idea to the table, but also to listen to the ideas of others and construct a shared idea within the room.

3. How and When: moving to the Engine Room

Down in the Engine Room is where some of the work takes place. You might need to write code, gather data, estimate a quantity like Mutual Information or the Stationary Distribution of a Markov Chain. You will need to make plots, create a presentation, practice that presentation and give feedback.

A good group will have people with differing abilities—not just technical abilities, but also interpersonal skills (such as the ability to listen to others, or to resolve conflicts) and life skills (such as the ability to not procrastinate).

Use the diverse skill sets of your group: find ways for your project (the what) to use the group to the fullest extent.

Someone with programming skills should make them known, and put them at the disposal of the group; someone who understands Bayesian reasoning can propose, and explain, a way to use the tool if she thinks it’s relevant. Someone with a deep understanding of a relevant concept can explain it, and relate it to the topic at hand.

Some skills are obvious (the person who can program); others much less so (the person who can reason carefully about null models). Use your time on the Bridge to learn people’s strengths. Do not dismiss someone who is quiet—even if they dismiss themselves. A common strategy in highly-successful groups is to recognize a talent that others have under-rated.

The more you are aware of the group’s abilities, the more you can use them, and the greater your scope of action will be.  

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Starbucks? Study how people ride the bus and share seats? Track donations to a busker on Kirkwood? Go online and look at pro-social helping in an internet forum? Where’s the parallel project that we can switch to with least disruption? There’s no best answer: the ideal next step for the group is highly dependent on the particular interests, goals, and needs of the individuals, and unless you’ve taken the time to do this, you’ll be as much at a loss as you might be right now.

5. This extends to interpersonal skills. If you have someone who is great at conflict resolution, for example, you will be able to propose something more ambitious—that person will be able to step in at crucial times to make sure people mesh.
4. Making and Keeping Commitments in the Engine Room

In contrast to the Bridge, where everyone can hear each other, the Engine Room is noisy. If one person is hacking away in the corner, even for just ten minutes, they are out of the discussion, and can not immediately adjust to changing circumstances.

Being out of communication can lead to coordination problems, wasted time, and even ill-will that can undermine the entire group. If the programmer is working on an analysis, but the person sent to gather data changes his mind, the programmer’s effort is wasted.

In order for that not to happen, people have to be able to stay synchronized when they’re not in front of each other. The primary method we have for solving this problem is making commitments.

Commitments should arise organically from discussions on the Bridge. As the group develops the what and why, it will naturally generate mini-projects. Is the data good enough to measure that? Does this signal exist, and if it does, does it beat a null model? How, exactly, should that totally plausible null model that made lots of sense be implemented?

You should be comfortable making commitments when the time is right; not in the first ten minutes (you need time for the what and why) but certainly by the end of the first meeting. You should make them clearly (“I think I can figure out how to read that data in”), and others should both acknowledge them and figure out whether the time is right (“That is awesome; we will need that” vs. “I’m not sure if that’s what we need, because...”) Do not allow others to make commitments that seem unnecessary.

Commitments may need to be broken. The most common reason (among rookies) is overcommitment: you promise more than you can deliver. Face up to it as soon as you can; e-mail the group, explain you’ve over-committed, and explain exactly what reduced commitment you will take on instead. Apologize, and fix the problem.

The second most common reason is that circumstances change. You may realize that something you’ve promised to do doesn’t actually make sense; you may realize that something else needs to be done first, and you can’t do it yourself. Before sending a panicked e-mail, think: can you solve the problem another way? Who needs to know about the redirection? Touch base with others if it will change their plans.

5. Thoughts from the Bridge

The Engine Room—particularly early in your career—is where much of the work gets done. You are still building skills, and taking hours to complete a task that will later be a matter of minutes.

No idea will get off the ground if the group does not invest serious effort into the mechanics of taking data, analysing it, and critically re-examining the results; no amount of big picture thinking will compensate for the demo you don’t have.
That said, do not neglect the Bridge. The Bridge is where you (and your collaborators) make the most important decisions, where your own learning is the greatest, and where you will discover the intrinsic motivations that will serve for years, guiding and shaping your career.

You can get very far by staying in the Engine Room, but you can’t get far enough; conversely, those who invest serious time on the Bridge generally find that they can work like dogs to catch up in the Engine Room when they need to.