

Trends Talk

Teamwork, Soft Skills, and Research Training

Anais Gibert,¹
Wade C. Tozer,¹ and
Mark Westoby^{1,*}

We provide a list of soft skills that are important for collaboration and teamwork, based on our own experience and from an opinion survey of team leaders. Each skill can be learned to some extent. We also outline workable short courses for graduate schools to strengthen teamwork and collaboration skills among research students.

About Soft Skills in Scientific Collaboration

Teamwork and collaboration are expected from scientists. Recently, an increasing number of voices have been asking for explicit training in 'soft skills' for university graduates [1–4] to prepare them for careers both in academia and outside. However, what soft skills are most valued by scientists and by recruiters? Are some soft skills more important than others for research collaboration? Are they in fact learnable? How might a postgraduate program be set up to inculcate them?

Published studies about scientific collaboration are mainly statistics of authorship pattern [5,6], case studies and individual testimony [7–9], or material for self-training mainly about leadership (e.g., how to set up your own lab? [10]) or tricks for tackling teamwork [8,11] (e.g., writing 'prenuptial' agreements, handling conflict etc.). Here,

we consider which soft skills are ranked highest by research team leaders, and how relevant training might be delivered to early-career scientists. What we offer is based on two main sources of evidence. We have been running short courses for postgraduates and postdocs within our Genes to Geoscience Research Enrichment Program. We have refined these courses through discussion and reflection over several years. We have also surveyed opinion among leaders of research labs.

The Set of Soft Skills that Makes A Good Scientific Collaborator

As well as being scientifically competent, good research collaborators need to be able to work with others towards common goals, such as project objectives, publishing articles, and graduating students. Our current list of 14 soft skills that contribute to scientific collaboration or teamwork is provided in Table 1. It began from a list of

Table 1. List of Soft Skills as They Were Presented to Research Leaders in the Survey Described in the Main Text and in Figure 1^a

Soft Skill	Description
Building external working relationships ('Networking' in Figure 1)	'Establish and maintain positive relationships with people beyond your own team, forge links with other teams, forge useful partnerships with people across other organizations and countries'
Cultural and diversity awareness	'Appreciate team diversity (career stage, language, culture, gender), communicate well with diverse people, see issues from the perspective of others, show respect for values of others'
Emotional intelligence	'Actively create a pleasant human environment for work, show empathy, accountability, humility, friendliness, unselfishness'
Inspiring moral trust	'Value trust and loyalty within the team, share information, treat all individuals fairly, act with integrity, keep your word, meet deadlines and fulfill expectations'
Inspiring competence-based trust	'Inspire confidence in your capacities and skills, be able to explain and underline your competences and their value to others'
Strategic thinking	'Think at a big picture level, take a long-term view, entertain wide-ranging possibilities in developing a vision for the future'
Elicit emotional engagement	'Inspire a strong desire to succeed among team members; steer others towards successful goal and task accomplishment'
Empower talents of others	'Ask questions that bring the best from others, actively improve skills and talents of others via constructive feedback, empower others with authority and latitude to accomplish tasks effectively'
Initiative	'Proactive and self-starting; seize opportunities and act upon them; originate action and actively influence events'
Decision-making	'Make quick decisions when required; commit to definite courses of action; make rational and sound decisions based on a consideration of the facts and alternatives available'
Conflict resolution	'Promote harmony and consensus through diplomatic handling of disagreements'
Persuasion	'Gain agreement to proposals and ideas; stand ground in the face of opposition; negotiate skillfully'
Resilience	'Respond effectively to disappointments and setbacks; remain calm and in control even under pressure; receive criticism in a constructive manner rather than becoming defensive'
Flexibility	'Be adaptable and receptive to new ideas; respond and adjust easily to changing work demands and circumstances; not bound by old ways of doing things'

^aOther suggestions that have come forward after people have seen this list include 'listening', 'being reasonable', and 'actively understanding other disciplines'. We warmly agree that listening and being reasonable are important. However, we would regard them not so much as separate skills, rather as embedded within skills listed above.

skills targeted during recruiting processes by a large government science agency. It has been refined and rephrased over time through discussion with colleagues, short-courses with postgraduates, and our own reflection. Some skills seen as critical to sustain collaboration [7,9,11] have also been added. Others, such as ‘written communication’ or ‘project management’, have been removed, being at a tangent to teamwork.

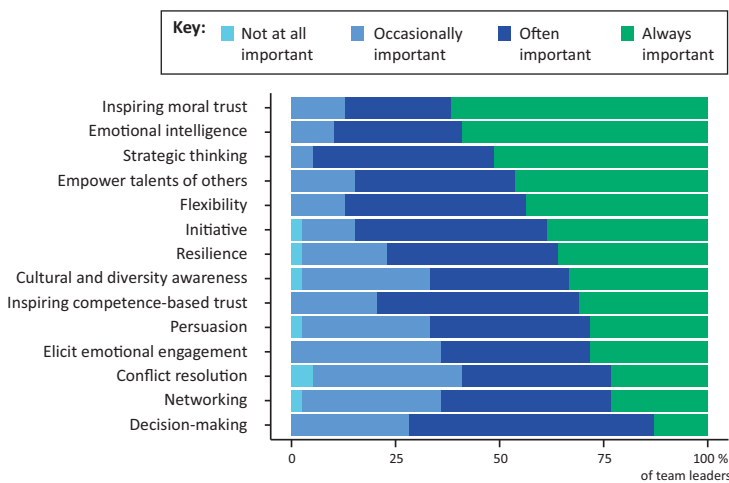
We believe that the list in Table 1 is now a good one, meaning that each skill is important, is clearly described, and is sufficiently distinct from the others. When we gathered opinion from research team leaders worldwide (Figure 1), each of the skills listed was seen as always or often important by most of the 46 respondents. Few suggestions came forward for further skills to be added, and preference among them was quite balanced (no single skill

was ranked top by more than 20% of team leaders).

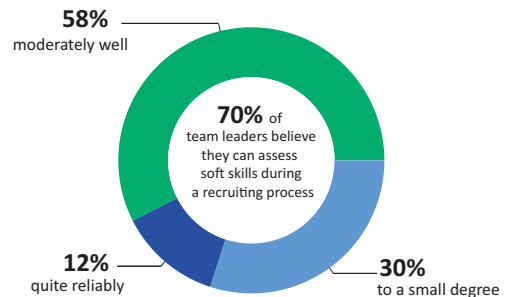
Soft Skills and Job Interviews

Most of the team leaders whom we surveyed believed that soft skills could be assessed in candidates during interviews (Figure 1). Other colleagues have expressed the same view to us. We have heard varying opinions about how much such assessments arise from general

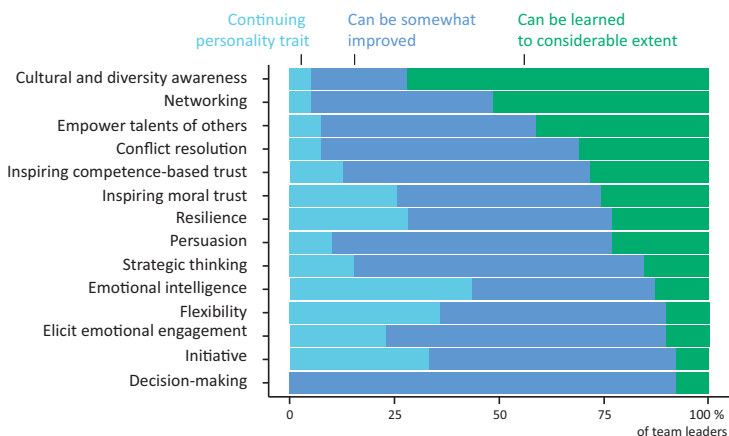
Q. How important are the following skills for effective collaboration in a research team?



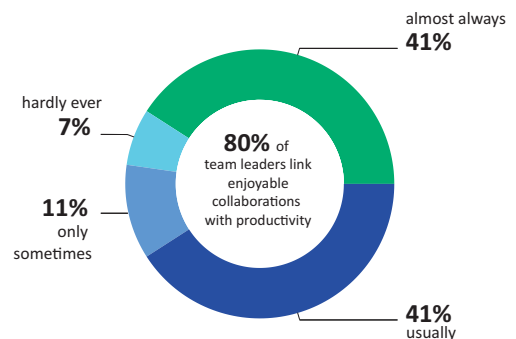
Q. How well can you assess soft skills when considering candidates during a recruiting process?



Q. Are the following skills continuing traits of people’s personalities, or rather skills that can potentially be learned?



Q. Are enjoyable collaborations also the most productive*?



*in terms of achieving project outcomes or publication and citation impact

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Figure 1. Overview of Opinion on Soft Skills from Influential Research Team Leaders. The top 235 people from a highly cited list (<http://thomsonreuters.com/en/articles/2014/worlds-most-influential-scientific-minds-2014.html>, inspected May 2015) in Ecology and Environment were approached during July 2015, and 46 of them responded. Their responses are summarized here to four of the questions asked.

Box 1. Suggestions for Short Courses

The short courses outlined here are built around role-play interviews with behavioral questions that take the form 'Tell us about a time when ...'. For example 'Tell us about a time when you won a group of people round to your way of thinking' would be a behavioral question that addressed the skill of persuasion. Follow-up questions during the ensuing conversation might include 'What was your opinion?' ... 'How did this contrast with the group's original position?' ... 'What were the key things you did that persuaded the group?' Participants (including faculty) play roles both as recruiters and candidates. All participants listen to all interviews. See the Supplemental Information online for further behavioral questions dealing with other skills.

The learning process includes:

- Thinking through beforehand what would be a strong answer that you personally might give to the question;
- Delivering that answer to an interview panel comprising other participants, and also responding to follow-up questions;
- Listening to answers given by others, reflecting on the answers as a group, thinking about what strengths or skills you might have that you had not previously recognized in yourself;
- After the interviews and reflection, developing two products:
 - One addressed to potential teams you might join, showing your self-awareness about the importance of these soft skills and how you can contribute them to a team;
 - One addressed to your own planning over the next 1–2 years; this might involve consciously seeking out further experience, or embedding self appraisal and group appraisal into personal or lab routines so that your skills are sustained and developed.
- Reading the written statements from others, developing your opinions about what is a convincing answer and what is not, discussing these with the group;
- Revising your own statements in light of that discussion.

There might be three meetings, spaced 1–2 weeks apart. The duration of meetings depends on the number of participants. A program of (say) three half-day meetings with ten participants would provide for 40–60 mins speaking time per participant. Add to the three half-days perhaps 3×2 h for reflection and preparing material before meetings, and the total time commitment would be of 2–3 days per participant.

impressions versus from purposeful questioning. In any event, being aware of your own soft skills and being able to articulate them during interviews seems likely to be an advantage to job applicants.

Can Training Make People Better Collaborators?

Skills such as emotional intelligence undoubtedly vary intrinsically between individuals, but nevertheless our experience is that there can be much benefit simply from raising awareness. Even a 1-day short course can considerably enhance the capacity of postgraduates and postdocs to recognize what soft skills they have, to be proud of them, to deploy them routinely, and to articulate them to potential employers. The most common response from team leaders (Figure 1) was that these skills could be learned 'to some extent'.

Practical Training and Advice

On the basis that some or most of the potential gain from training is via

awareness, much can be achieved by short courses. In Box 1, we outline exercises that most graduate programs should be able to implement easily. They call for only 2–3 days each year per student, so supervisors need not fret that they detract too much from progress on the main research project. They need leadership from thoughtful and experienced researchers, but no special training or equipment.

In a nutshell, these courses are built around role-play interviews where students answer questions such as 'Tell us about a time when you won a group of people around to your way of thinking'. This is what is known as a behavioural interview question. This particular question addresses the skill of persuasion. When occasion is made for students and postdocs to think through such a question, many are surprised and pleased to realize what skills they have. Their surprise comes first when they prepare answers beforehand; many

have participated in research collaborations more than they realized, and many also draw on their experiences outside the research world, as girl guides or members of parent-and-teacher associations or similar. Then they are surprised again to hear the variety of answers that others give. It has been common to hear comments such as 'That was a really convincing answer from X, and actually I could have answered in the same vein except it hadn't occurred to me'.

No doubt skills could be learned by self-analysis to some extent, but learning in a group is more powerful. By listening to each other's responses, people get a variety of ideas they did not think about for themselves. After that, discussion and reflection help participants to find expressive words and to understand how their answers are perceived by others.

Finally, a short course should aim for awareness to translate into continuing value. Depending on the individual and the skill in question, several pathways are possible. The individual might resolve to consciously seek out particular further experience, and make career plans accordingly. They might build a routine into their lab, such as systematically discussing strategic direction every 6 months. They might draft short documents for use in job applications, summarizing skills that they have and their value to a research team.

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Supplemental information

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¹Department of Biological Sciences, Macquarie University, Sydney, NSW 2109, Australia

*Correspondence: mark.westoby@mq.edu.au (M. Westoby).

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