How to be a good member of a scientific software community [Article v0.1]

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This LiveCoMS document is maintained online on GitHub at https://github.com/GrossfieldLab/software_community; to provide feedback, suggestions, or help improve it, please visit the GitHub repository and participate via the issue tracker.

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Abstract

Software is ubiquitous in modern science — almost any project, in almost any discipline, requires some code to work. However, many (or even most) scientists are not programmers, and must rely on programs written and maintained by others. As a result, a crucial but often neglected part of a scientist's training is learning how to use new tools, and how to exist as part of a community of users. This article will discuss key behaviors that can make the experience quicker, more efficient, and more pleasant for the user and developer alike.

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1 Introduction

Most practicing scientists (even the ones who write code as part of their research) spend more time as consumers as opposed to producers of software. Moreover, we are constantly learning new skills and solving new problems, which often means learning to use new programs or new aspects of large packages. This, combined with the complex nature of scientific software (and the often low quality of the associated documentation) means we have to ask for help. Sometimes it's because we don't know how to accomplish a specific task. Others, it's because there's a feature we need that isn't implemented. Inevitably, there are bugs.

In all of these cases, it is necessary to interact with the people who develop and support the code. How you go about it has an enormous impact on your likelihood of success and how you are viewed, and asking complete strangers for help is often intimidating, especially the first time you do it. However, the best way to do so is rarely taught explicitly — at best, it's something one picks up by example, from fellow lab members or the PI. *T*he goal of this paper is to reveal the hidden curriculum – what's expected of a software consumer, how to ask for help, how to contribute productively to a software community (regardless of whether you can write code).

This article is written from a perspective of academic open-source scientific software. Much of what we suggest is universal, but some points — like the reminder that the people providing the support are likely volunteers — are not. Regardless, we view the interaction between developers and users as an informal social contract, where each has obligations and expectations for the other. Obviously, every software community is unique, and many have specific conventions for interaction, but we hope that the recommendations we make are at the very least a good starting point for new users of scientific software.

connect to open science: FAIR principles say developers should want code to be reusable. Publishing the code isn't enough, you need to make it usable as well. That means support.

2 Target Audience

This paper is primarily aimed at junior scientists who are new to performing research and inexperienced at asking for help. However, we hope it will be valuable to anyone who uses software to do their research and struggles to ask for help.

3 Good practices in asking for help

3.1 Try to solve your own problem

There's absolutely nothing wrong with needing help to figure out how to do something with a new piece of software. Perhaps your use case wasn't considered in the manual, or you're seeing behavior you don't expect. Perhaps you can't even get it to install. Asking for help is very reasonable — the developers want people to use their software, and with that comes an implied obligation to support those users. However, keep in mind that the developers of scientific software are, for the most part, volunteering their time to provide that support, and as such it's important to respect their time.

For this reason, asking the developers for help shouldn't be the *first* thing you do. Especially for software with a large community, chances are someone else has run into similar difficulties, and you can probably save yourself and the developers a lot of time if you look for solutions on your own first. Indeed, quickly debugging your use of other people's software is one of the major skills one develops when learning to do computational research.

The first step is to read the error message carefully, if there is one; this obviously doesn't apply in all cases, but it's often applicable and far too often skipped. It's true that many software packages have cryptic unhelpful error messages, but far too often people write for help when the solution is right in front of them. If the error message says "Could not open file foo.dat", it's worth checking whether there is a file called "foo.dat" and if not figuring out what was supposed to create it.

The second step is to check the manual. This might seem trivially obvious, but you'd be astonished how many emails developers get that are directly answered in the manual. If the manual is short, you can read the whole thing. If it's longer, search for relevant-seeming keywords, scan the sections that seem to pertain to your error message. If there's an FAQ (frequently asked questions) list, check that first.

Next, search the internet for the error message; this works very well for software with thousands of users, where it might very well deserve to be the first option. It is less effective with less common packages, but it's an easy thing to check, so you'd be foolish to skip it.

Finally, you can consider diving into the code. This decision depends very much on the complexity of the package, your skill level, and how urgently you need the solution. More often than not, comprehending the whole software package will be too time consuming, but there are tricks and shortcuts one can use to at least figure out where things might be going wrong. Figuring out where the error is occurring can sometimes help you figure out why it happened, so examine the stack trace if there is one. Alternatively, you can search the code base for the error message, to see what drove the error; it's not uncommon for the comments in the code to be clearer and more indicative of what could go wrong than the error message itself. To be clear: as an end user, *you are not obligated to check the code*, but it can sometimes be a good shortcut to help you either solve your problem on your own or give the developers what they need to solve it.

4 Obligations of software developers

This paper has focused on what software consumers should do when asking for help. However, this does not mean that the developers of scientific software are without responsibilities. If we want users to behave in a certain way, it behooves us to tell them that. Users approaching us in good faith deserve to be treated fairly and courteously.

5 Checklists

6 Author Contributions

The initial version of this paper was written by Alan Grossfield.

For a more detailed description of author contributions, see the GitHub issue tracking and changelog at https://github.com/GrossfieldLab/software_community.

7 Other Contributions

For a more detailed description of contributions from the community and others, see the GitHub issue tracking and changelog at https://github.com/GrossfieldLab/software_community.

8 Potentially Conflicting Interests

Alan Grossfield serves as a consultant to two companies, Moderna Therapeutics and Atelerix Life Sciences.

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References

GOOD COMMUNITY MEMBER

- ☐ Tries to solve problem themselves first
- ☐ Asks for help in the right place
- ☐ Writes informative bug reports
- ☐ Cites and acknowledges software appropriately
- ☐ Treats fellow members and developers with courtesy and respect
- ☐ Contributes to the community

POOR COMMUNITY MEMBER

- ☐ Doesn't read the manual or search the internet before asking for help
- ☐ Doesn't use the correct venue to ask for help
- ☐ Writes vague or unhelpful bug reports, or doesn't respond to questions
- ☐ Is rude or demanding when requesting support
- ☐ Treats fellow community members disrespectfully

A GOOD COMMUNITY

- ☐ Helps users solve their problems
- ☐ Is friendly and supportive when responding to questions
- ☐ Is receptive to suggestions and critiques, regardless of the source
- ☐ Encourages participation from users of all experience levels
- ☐ Encourages respectful treatment of all community members, and calls out disrespectful behavior