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## Getting Started in SoTL Research: Working as a Team

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## Getting Started in SoTL Research: Working as a Team

By Emily Faulconer

*Getting started in SoTL research can seem daunting. Working with a team can increase support and productivity. This article explores roles in SoTL research teams, how to identify research projects, and pacing projects to maintain a pipeline. Teamwork will divide the workload and develop a community for support in navigating hurdles and celebrating successes.*

Starting in the 1990s, a broader acceptance of the scholarship of teaching emerged in higher education. This has developed into a robust and rigorous area of scholarship referred to as the Scholarship of Teaching and Learning (SoTL). However, not all institutions (or departments within an institution) recognize the value of SoTL research within science disciplines. SoTL efforts by science faculty may either be disregarded or unequally weighted in performance evaluation or formal reward systems compared to efforts in the scholarship of discovery (which develops or tests a new theory to generate new knowledge) of scholarship of application (which applies information to solve problems) (Dolan et al., 2018). I am fortunate that at my institution, even prior to entering tenure track, professional development support was available to support SoTL efforts across all disciplines. Now that I am tenure track, my SoTL research agenda is fully supported through all levels of administration, from my department chair to the provost. For those who are interested in establishing a

SoTL research agenda, I would like to offer some advice on how to form a SoTL research team.

Starting a research team may sound daunting, especially if you have not found yourself in a leadership role within research. I found myself in this role somewhat by default. I was serving as lead investigator for many projects and was continually turning to the same colleagues for collaboration. Eventually, we came to view our collaborations as a team. While my team formation was organic, there was value in intentionally and formally launching a long-term team collaboration.

### Who's who in a Scholarship of Teaching and Learning research team

The first step is to identify your team members. You will need several areas of expertise. To identify the appropriate areas of expertise, it is important to consider Felten's good practices in SoTL. Table 1 shows alignment between Felten's good practices in SoTL and suggested team member roles.

The author will ensure that the communication of the work remains focused on student learning through crafting of a compelling argument. While narrativity in some disciplines has been shown to increase citation count (Hillier et al., 2016), we need to maintain focus on the purpose while also engaging readers. The researcher will perform the literature review, ensuring that the research is grounded in context while remaining germane;

**TABLE 1**

#### Principles of good practice and team roles.

Principles of good practice in Scholarship of Teaching and Learning	Scholarship of Teaching and Learning research team role
Inquiry focused on student learning	Author
Grounded in scholarly and local context	Researcher
Sound methodology	Methodologist
	Data analyst
Conducted in partnership with students	Ethicist
Appropriately public dissemination	Publicist

It can be easy to become distracted by rabbit holes and tangentials. Outside of systematic literature reviews, the goal is not to be exhaustive, but to be representative. There are emerging new tools like Scite.ai that help researchers understand the context and consensus within a discipline. Sound methodology needs to include both research design and data analysis. A methodologist will determine appropriate data collection methods and identify moderating and mediating variables that may influence results. A data analyst will ensure that data collected are analyzed appropriately in order to answer the research questions or hypotheses. Because SoTL research is conducted in partnership with students, it is critical to consider ethical implications of the research and seek approval for the research through the Institutional Review Board. Because a key goal of SoTL is to transform teaching in higher education (Huber & Hutchings, 2005), identifying an accessible dissemination venue is crucial. The publicist will consider the audience (e.g., practitioners, administrators, etc.), impact (including traditional metrics such as impact factor and alternatives such as altmetrics), and accessibility (society membership, publisher paywall, open access, etc.).

Also consider the interdisciplinary nature of your team. My background is bench scale chemistry, but I work in a department largely comprised of mathematics, statistics, and computer science folks. However, I have collaborated with colleagues in engineering and humanities. Unique perspectives are invaluable in a research team.

## Get focused

If you are brand new to SoTL research, it can be daunting to know where to start. With your team, con-

sider aspects of student performance, course design, pedagogical strategies, and student experiences that could be a foundation for a project with broad interest across the team. In 2017, I redesigned my chemistry course so that each quiz allowed students to use two attempts, with automatically generated corrective feedback for wrong answers, turning the feedback into feedforward. I did this originally because it just seemed like a good idea. However, when I was reflecting on this practice, I wanted to find justification in the literature. Surprisingly, I did not find any robust studies that had combined both multiple attempts and automatic feedback. This launched my initial investigation into this practice, with my team publishing results in 2019. After publishing, we did not stop there; we wanted to know if this multiple attempts–immediate feedback scheme offered benefits across science disciplines, so we expanded our study. The resulting manuscript is currently under review. However, we have more questions. We want to know if students are actually using the feedback (and if not, why), if the scheme is increasing cognitive load, and why some students do not use a second attempt. One research project often leads to another. Soon, you will have plenty of ideas.

If you are still unsure of where or how to start, consider what data you already have access to or are easy to collect. You can also peruse SoTL and disciplinary-based educational research (DBER) publications to spark ideas. I have read issues of—and subsequently published in—*Chemistry Education Research and Practice*, *Journal of College Science Teaching*, *Journal of Science Education and Technology*, and *Teaching in Higher Education*.

## Pace yourself

When starting as a new research team, it is easy to focus all efforts on a singular project. However, if you do so, you will not arrive at a healthy research pipeline. Early on in identifying your research team's focus, brainstorm ways to limit the size and scope of your projects so that you can manage several small research projects (at various stages) at the same time. This will ensure that all team members can be productive and there is less lag time. For example, if you work on projects sequentially, the researcher may finish a literature review in two months and then wait another 12–18 months for the team to start another research project. By managing multiple projects at a time, it helps eliminate lulls that may happen when a project fails to get off the ground or experiences an unanticipated interruption. For example, my team wanted to explore the withdrawal reasons in online STEM courses. However, we anticipated our institution would collect these data already. We were wrong! So we designed and launched a survey but—as you can imagine—it is really challenging to convince a student to complete a survey about why they dropped the class, especially if the survey comes after the drop date (the only time we could access the drop list), which could be weeks after they dropped. The COVID-19 pandemic also interrupted several projects we had exploring comparisons between in-person and online chemistry learning. Because our team had several other projects in the works, our pipeline was not significantly impacted.

In the same breath, be cautious about taking on too many projects, diluting the team's time and thus stalling the research pipeline. Perhaps

more important than knowing where to start is knowing when to stop. Because my team also works on other collaborations outside of the team, I speak only for myself here. I currently have six research artifacts under review. I also have seven active research projects spread across various phases. I have two more projects slated to launch in the next quarter, and numerous project ideas waiting for the ideal time to enter the pipeline. With this pacing, I publish two to four research articles per calendar year. Keep in mind that it can take two or more years to move from the preliminary phase to completing dissemination, so there may be some “spin-up” time before you achieve a stable output from your research team.

### Stick to the plan

When managing multiple research projects, it can be challenging to keep up with all of the moving parts. If you are not careful, something will fall through the cracks. Applying project management practices will support the research team. I use a Gantt chart and break the team’s research projects into phases.

In the preliminary phase, we briefly review the literature, develop our research questions, determine the roles within the team for that specific project, brainstorm our resources, and identify a potential dissemination venue. It is important to keep dissemination in mind so that you can ensure that you frame your work to align with the aims and scope of your venue. The preliminary phase also includes establishing a timeline for the project within my Gantt chart

and identifying budgetary needs. Externally funded projects will have a much longer timeline than projects that do not need budget support.

In the planning phase, the first focus is on the literature review, which covers outlining the paper; performing a novelty check; drafting a significance statement; crafting a theoretical or conceptual framework; and evaluating the literature review for currency, focus, structure, and narrative. Next, the design measures and methodology are identified, data validation measures are explored, safety and ethics approval are secured, a data management plan is prepared, and purchases necessary to launch the project are made.

The performance phase covers data collection and analysis. Data are collected according to the methodology and the approved Institutional Review Board proposal. Data are validated and stored according to the data management plan. Data are analyzed and visualized through figures and graphs to tell data stories. In this phase, limitations of the data must be acknowledged and discussed.

The final phase is dissemination, which will include different tasks whether the venue is a conference or a research journal. Because of the visibility of disseminated materials, it is important to have team buy-in on final products. Consider postsubmission tasks in your planning. The team will want to monitor the submission and respond to any correspondence, which may include revisions. Once work is accepted, the team will want to implement a research visibility plan (e.g., social media posts) and

celebrate the success.

### Final thoughts

Getting started in any line of research has a learning curve. There will be frustrations and failures along the way. Do not let that be discouraging. I currently have six research items under peer review. Three have been rejected from the journal they were first submitted to and may still be rejected from the journal where they are currently being reviewed. Two have had multiple rounds of edits and are not yet accepted. I just think of the Thomas Edison quote, “I have not failed. I’ve just found 10,000 ways that won’t work.” To distill my experiences into one piece of advice, as you grow in SoTL research, teamwork will support your success. Through failures and successes, I am confident that you will find the SoTL community—both within your team and beyond—to be engaged, energetic, and passionate about supporting science learners. ■

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