

From Research Design to Publication: Empowering Faculty in the Scholarship of Teaching and Learning

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Faculty encounter difficulties conducting Scholarship of Teaching and Learning (SoTL) due to the lack of familiarity with methodologies. To address gaps in knowledge, faculty were provided a "SoTL in 60" series, a Summer Scholarship Institute (SSI) expanded to pair faculty with a data analysis mentor, and a new standalone SoTL Fellows Program. After participating in the SSI Data Analysis program, faculty reported significant gains in comfort with the SoTL research methodologies, assessments, and IRB protocols. SSI participants also reported significant progress on manuscript preparation toward promotion and tenure requirements, supporting this project as an effective model for SoTL professional development at other teaching intensive institutions. Finally, challenges and accountability structures needed for successful scholarship programming are discussed.

Keywords: scholarship of teaching and learning, data analysis mentor, professional development

Introduction & Literature Review

The Scholarship of Teaching and Learning (SoTL) is now widely recognized as a valid form of scholarship (Boyer, 1990; Gurung & Schwartz, 2010). SoTL involves the "systematic study of teaching and/or learning and the public sharing and review of such work through presentations, performance, or publications" (McKinney, 2006, p. 39). While SoTL is an accepted form of scholarship to earn tenure and promotion—especially at teaching-intensive institutions—the majority of research on SoTL engagement has focused on faculty at research-intensive institutions (Gansemer-Topf et al., 2023; Hubball et al., 2010; Webb et al., 2013; Webb & Tierney, 2019) compared to evaluations of SoTL engagement at teaching-intensive institutions (Carney et al., 2016; Webb & Tierney, 2019). Regardless of institution type, faculty are rarely formally trained in pedagogy and instead trained in discipline-specific content and methodologies. Therefore, the majority of academic faculty who want to engage in SoTL have little experience with the norms and expectations required to conduct and publish SoTL (Boshier, 2009; Kim et al., 2021; McKinney, 2006). This article explores common challenges to engaging in SoTL, professional development options, and impediments to successful dissemination or publication of SoTL projects—namely, faculty gaps in knowledge around data analysis and interpretation. To strengthen faculty's research competencies, faculty experts were identified and paired with SoTL novices to support data analysis to move research projects towards publication.

Challenges to Engaging in SoTL

Faculty face a variety of challenges and barriers when beginning to engage in SoTL (Boshier, 2009;

Happel & Song, 2020; Kim et al., 2021; Miller-Young et al., 2018). The most prevalent theme is that faculty lack familiarity with the SoTL literature and SoTL methodologies due to rigorous training in discipline-specific theories and research (Kim et al., 2021; Miller-Young et al., 2018). Further, faculty in some disciplines such as Science, Technology, Engineering, and Math (STEM) often perceive their own discipline's methodologies as more valid, robust, or objective, which also tend to correspond to prestigious journals in their fields (Kelly et al., 2012; Miller-Young et al., 2018). Moving past these barriers requires mastery of threshold concepts; these are concepts in a given discipline or field that are initially considered challenging, but once understood, the learner experiences a noticeable shift in understanding and can better engage with the content moving forward (Meyer & Land, 2003, 2005).

Concepts related to research methodology and data analysis are examples of threshold concepts in SoTL that novices must wrestle with in order to progress in scholarly activities (Miller-Young et al., 2018; Webb, 2015; Webb & Tierney, 2019). Webb and Tierney (2019) conceded that "even the acknowledgment of what is recognized as data" (p. 618) is a preliminary hurdle experienced by SoTL novices. For example, Miller-Young and colleagues (2018) found that some faculty experienced "epistemological discomfort" when comparing SoTL methods against their discipline-specific methods. Faculty in STEM disciplines expressed skepticism because they perceived self-reported surveys or qualitative reflections as too subjective in nature compared to methods customary in their disciplines. In contrast, faculty in the humanities felt discomfort with the required objectivity of SoTL, which places an emphasis on empirical methods that require systematic observation and data collection. These preliminary

hurdles are not surprising given discipline norms; however, they require thoughtful consideration on how to increase faculty's readiness to undertake study design, data collection, and data analysis using new methodologies.

SoTL Development Programs

Educational developers of SoTL, often the Center for Teaching and Learning (CTL), are at the forefront of curating programming that is robust enough to develop faculty's pedagogical knowledge. For example, Svinicki (2012) concluded that effective SoTL researchers would have expertise in three areas—1) pedagogy, 2) their discipline, and 3) educational research. However, few faculty have received training in all three areas to be considered SoTL experts. One solution Svinicki (2012) proposed was the use of cross-disciplinary research teams where disciplinary scholars are supported by education researchers, social scientists, or other experts that bring a diverse skill set to the team. Notably, many CTL professional development opportunities are rooted in a 'community of practice' model where faculty meet to discuss, learn, and exchange ideas about a shared topic such as SoTL (Lave & Wenger, 1991; Wenger et al., 2002). This practice also capitalizes on faculty experts from within one's own institution to serve as SoTL leaders, facilitators, or mentors to novices (Bernstein, 2013; Henry et al., 2021; Webb, 2015).

To support faculty engagement with SoTL, educational developers offer a variety of professional development opportunities that range from individual consultations, small-group learning communities, and campus-wide workshops or programs (Schwartz & Haynie, 2013). One of the most popular methods to support faculty engagement with SoTL is Faculty Learning Communities (FLCs; Bailey et al., 2022; Cox, 2003; Happel & Song, 2020; Richlin & Cox, 2004). In terms of structure, many SoTL FLCs occur over the entire academic year and follow a curriculum that loosely guides faculty through the research development process. For example, Richlin and Cox (2004) describe ten developmental steps that foster SoTL in an FLC—modeled after the FLC program at Miami University (a research-intensive institution). The program starts with applications and early planning, followed by participating in seminars and a retreat, working on SoTL projects during the academic year, and culminating with dissemination and publication (Richlin & Cox, 2004). The University of North Georgia (a teaching-intensive institution) offers a similar a year-long SoTL Academy organized around Bishop-Clark and Dietz-Uhler's (2012) book, "Engaging in the Scholarship of Teaching and Learning: A Guide to the Process, and How to Develop a Project from Start to Finish" (Carney et al., 2016). SoTL meetings covered definitions, refining research questions, assessment techniques, Institutional Review Board (IRB) process, writing support, and

a culminating presentation event. Evaluations of these programs suggest that faculty experience a wide range of benefits including cross-disciplinary collaborations, strong community of practice, and increased dissemination via presentations and publications that also increase an institution's reputation and possibility for grant funding (Bernstein, 2013; Carney et al., 2016; Henry et al., 2021). These comprehensive programs are designed to engage inexperienced faculty in learning about and developing a SoTL project fully.

However, to measure the success of these programs, it is important to consider the number of SoTL projects that result in successful publication—the currency faculty use to successfully earn tenure or promotion. Richlin and Cox (2004) conducted a survey of over 100 institutions regarding the types of FLC programming offered. While they did not directly assess faculty publication rate in SoTL, they found that only one third of institution's FLCs explicitly focused on the publication of SoTL work. A review of several FLC curriculums suggests that these programs spend considerable time on research methodology and assessment but are less explicit about time spent on other parts of the research design or data analysis (Carney et al., 2016; Henry et al., 2021; Richlin & Cox, 2004). For example, Carney et al. (2016) conceded that their FLC needed to spend more time focusing on project design in the early stages of project development before moving to discussing research tools and methodologies. These findings suggest that reaching SoTL project publications require extensive training and support over a lengthy timeframe.

SoTL programming must consider how to support data analysis and interpretation needs, especially for faculty in STEM and humanities disciplines (Miller-Young et al., 2018; Svinicki, 2012; Webb & Tierney, 2019). Faculty not trained as social scientists, are unlikely to have familiarity with collecting and analyzing quantitative data generated by self-reported surveys or qualitative data from student artifacts or reflections. While SoTL FLCs appear to provide necessary support for project development and assessment, non-social science faculty may be unsure how to analyze or interpret their data in a way that meets reviewers' expectations and is suitable for publication (e.g., using inferential statistics; conducting content analysis; identifying qualitative themes). As Svinicki (2012) suggests, campuses cannot expect faculty to become experts in all forms of pedagogy or educational research. Instead, Svinicki (2012) suggests engaging in cross-discipline collaborative research teams that involve education research or social scientists. Because much of SoTL development relies on faculty supporting other faculty (Bernstein, 2013; Henry et al., 2021; Webb, 2015; Webb & Tierney, 2019), this project identified faculty experts to serve as data analysis collaborators to move SoTL research to publication.

SoTL Programming at a Teaching-Intensive Institution

Nevada State University (NSU), established in 2002, is a primarily undergraduate teaching institution with high teaching loads; faculty teach four courses per semester (12 units). In addition to demonstrating teaching excellence, faculty are required to engage in scholarship that results in peer-reviewed publications or juried creative works which explicitly includes SoTL publications. Although NSU's publication requirements are low, faculty express concern about meeting the scholarship requirement by tenure. As a result, many of our faculty have begun to explore conducting SoTL to meet scholarship requirements because it aligns with the institution's mission of teaching excellence and the substantive teaching workload. To support faculty scholarship, this project expanded the institution's existing scholarly programming with funding from a National Science Foundation (NSF) ADVANCE award #2204389 to the Principal Investigators (first two co-authors). Programming was expanded to address the full lifecycle of research—design, data collection, data analysis, and manuscript preparation. This project entailed three programs—SoTL in 60 speaker series, Summer Scholarship Institute-Data Analysis Track, and SoTL Fellows Program—that leverage faculty expertise internal to our institution to promote engagement with SoTL and foster peer-reviewed publications. To address faculty's data analysis needs, SoTL novices were paired with faculty who have expertise in quantitative or qualitative data analysis. These collaborators helped the SoTL novices analyze and conduct statistical interpretation of classroom data and provided writing support such as drafting the results section for a manuscript. As Schwartz and Haynie (2013) recommend, faculty participants and data analysis collaborators received \$1000 stipends for their contributions to the SoTL research project.

Program Descriptions

SoTL in 60 Series

The "SoTL in 60" series was established to expose faculty to various forms of educational research as well as motivate engagement in SoTL-related research—efforts valued at our teaching-intensive institution. The SoTL in 60 series showcased faculty from NSU who had successfully conducted and published SoTL work in journals. This project had two explicit goals: (1) to demonstrate that SoTL research takes many forms and uses varied methods beyond quantitative design, and (2) to demystify the road to publication. To address these goals, speakers prepared a 30-45 minute presentation that discussed the research project findings and the publication process. Faculty participated in an open question and answer session to address any additional information related to the research and publication process. This series was designed to have broad reach including full-time and part-time faculty from all academic disciplines. As shown in Figure 1, there were six speakers over the course of the 2022-2023 academic year that highlighted different methodological approaches to SoTL (e.g., quantitative; qualitative; case study; reflective). One session was hosted in person with a catered lunch and the rest of the sessions were offered virtually. Faculty completed evaluation surveys that assessed motivations that led to attending the workshop, self-perceived SoTL knowledge prior to and after the session, and the likelihood of pursuing a SoTL project. The programming staff plan to host the SoTL in 60 Series again in the 2024-2025 academic year to highlight research projects from faculty participating in the scholarship development programs (see Figure 1).

Summer Scholarship Institute-Data Analysis Track

The NSU Provost Office sponsors a virtual, six-week Summer Scholarship Institute (SSI) to support

Figure 1

Scholarship Development Programming, Fall 2022 – Summer 2025

FACULTY PROGRAM	FALL 2022	SPRING 2023	SUMMER 2023	FALL 2023	SPRING 2024	SUMMER 2024	FALL 2024	SPRING 2025	SUMMER 2025
SoTL in 60 Speakers	N = 6 speakers						TBD		
SSI - Proj. Development			N = 6			N = 8			TBD
SSI - Data Analysis*			N = 3			N = 2			TBD
SoTL Fellows Program*				N = 10		N = 8	N = 3		TBD

Note. SoTL = Scholarship of Teaching and Learning, SSI = Summer Scholarship Institute.

* Faculty in these programs were paired with data analysis faculty collaborators.

faculty progress on research or creative works. Due to SSI's short time frame, previous iterations only provided time for project development, which included completing literature reviews, identifying or developing assessments, and drafting IRB protocols. In Summer 2023, funding provided by the NSF ADVANCE grant supported expansion of SSI to begin offering a new Data Analysis track in which three faculty participated (see Figure 1). In Summer 2024, two faculty participated in the data analysis track and eight faculty participated in the project development track. An additional eight faculty from the SoTL Fellows Program (see below) also participated in data analysis with a paired collaborator.

The programming staff recruited data analysis collaborators from among NSU's faculty, which included social scientists, data scientists or statisticians, and educational researchers. Faculty who applied to the Data Analysis track described their research project and hypotheses, data that they had collected, and what type of analysis support they needed. The programming staff matched SSI fellows with collaborators considering factors such as the type of data analyses needed (quantitative or qualitative), discipline similarity, and faculty preference. SSI fellows and collaborators each received a \$1,000 stipend for participating.

The SSI facilitator (third-author) coordinated consultation meetings between the fellow and collaborator to discuss their project, outline program expectations, and finalize a timeline for the six-week program (12, three-hour sessions). The fellow and collaborator then created a schedule to carry out the data analysis and writing. Data analysis collaborators assisted fellows with various components of the data analysis process, including how to organize and clean the data, determine the appropriate data analysis tools to use, how to frame and report the findings, and refine their assessment tools for future data collection. Fellows were encouraged to discuss co-authorship should their collaborator provide additional support beyond data analysis and interpretation.

In addition to meeting with their data analysis collaborator, fellows participated in a variety of

workshops and accountability check-ins during the six-week program. For example, the SSI facilitator hosted workshops on the research process pertaining to the cohort needs (e.g., manuscript development, survey design, quantitative and qualitative analysis, IRB protocols). During each biweekly session, fellows sent emails or provided virtual updates of their weekly goals and progress to the SSI facilitator.

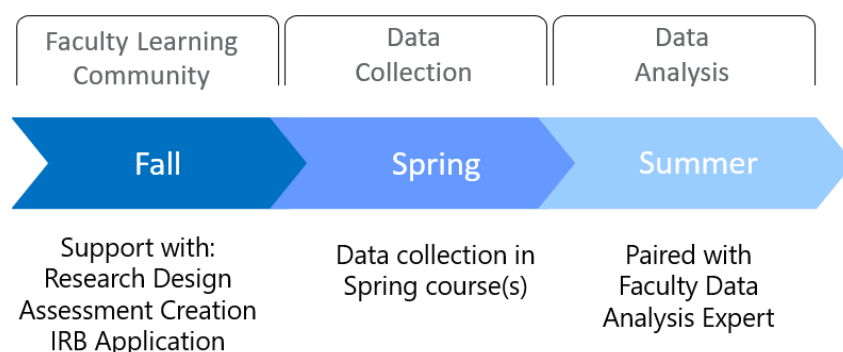
SoTL Fellows Program

Recognizing that faculty had interest in SoTL research, but minimal experience and limited time during the 6-week SSI program, programming staff sought to expand the SSI program into a separate, stand-alone program over a year, and with the support of a facilitators and data analysis collaborators. The SoTL Fellows program emerged to provide structured mentorship that addressed the full lifecycle of research—design, data collection, data analysis, and manuscript preparation—during a full academic year and summer. As shown in Figure 2, SoTL fellows worked with the facilitator during the fall semester over four meetings (modeled after FLCs on campus) to design and develop their SoTL project. In the spring semester, fellows worked independently to collect data in one or more of their courses. At the conclusion of the academic year, SoTL Fellows participated in SSI to conduct data analysis and prepare a manuscript for publication with the assistance of a data analysis collaborator.

Application Process

The initial project aimed to accept six SoTL projects, partially due to funding limitations, but also to recognize the anticipated workload the FLC facilitator would incur providing individual consultations to each SoTL Fellow. Faculty who applied to the SoTL Fellows program described the proposed project, the Spring course(s) planned for data collection, and the type of scholarship support needed (e.g., writing; data analysis). The programming staff evaluated the clarity of the project idea and feasibility to collect data during

Figure 2
SoTL Fellows Program Activity Timeline



the academic year, and prioritized applicants who were untenured and underrepresented, followed by faculty needing a scholarship publication to apply for tenure or promotion. During its inaugural year, the SoTL Fellows program received applications for 15 projects and 10 faculty were selected for the program (as shown in Figure 1). In the second iteration, three faculty applied and were accepted to participate.

Fall Semester: Faculty Learning Community

During the 16-week fall semester, faculty participated in a FLC led by a SoTL expert using the Bishop-Clark and Dietz-Uhler's (2012) SoTL handbook. The FLC facilitator (recruited from NSU's faculty) was eligible for a course release or a stipend to run the FLC and provide individual consultations on projects conducted in the fellows' spring course(s). Using the SoTL handbook (Bishop-Clark & Dietz-Uhler, 2012), the FLC facilitator organized four monthly meetings and assigned the following chapters: (1) Generating Research Ideas (Chs. 1-4), (2) Study Design and Data Collection (Chs. 5-6), (3) Preparing for Data Analysis and Publication (Chs. 7-8), and (4) Overcoming SoTL Challenges (Ch. 9 and Appendices). During this process, the facilitator provided group-based instruction on how to develop SoTL research, and independently, fellows were expected to develop their research design, create assessment measures, and complete their IRB application by the start of the spring semester. During the first iteration of SoTL Fellows, all 10 participants completed the FLC; however, only 8 moved forward to conduct data analysis (see Figure 1). One faculty received a workload adjustment and would not be teaching the courses she had identified for data collection. The other faculty members' project was impacted by a change in the proprietary testing tool she planned to use as her outcome measure.

Spring: Data Collection

During the spring semester, fellows worked independently according to their stated IRB protocols by conducting the consent process with their students and implementing their data collection. The majority of faculty collected data at the beginning and end of the semester using pre- and post-test surveys or through the use of pre-post written reflections before and after participating in an activity or completion of an assignment. Per the IRB guidelines, faculty could not begin analysis of any data collected until final grades were submitted. Program staff sent email communication to fellows offering support and resources, if needed.

Summer: Data Analysis

The final component of the SoTL Fellows program involved participating in the SSI-Data Analysis track with their assigned data analysis

collaborator (see description above).

Results

SoTL in 60 Series

Across 5 workshops, a total of 106 people attended; the majority were assistant professors in rank ($n = 23$) or identified as professional staff ($n = 23$). There was broad representation from faculty in all academic schools. The average size of attendance was 21 attendees (range 18 - 24). The most common reason for attending was "to gain new ideas for a future SOTL project" (24% of respondents) followed by supporting the speaker (21%), learning a new SoTL methodology (19%), learning what SoTL is (18%), and learning how to publish in SoTL (15%). Prior to the workshops a few indicated no prior SoTL knowledge (12%), most indicated minimal (35%) or moderate knowledge (38%) and only small subset reported high level knowledge (15%). After participating in the workshops, a few faculty indicated no increase in SoTL knowledge (3%) indicating existing expertise. Nearly a third of participants reported a minimal increase (29%), and over half the faculty surveyed reported moderate (39%) or significant gains in SoTL knowledge (18%), suggesting that the majority of faculty gained new knowledge after attending the workshops. Across all workshops, an average of 86% of respondents reported the highest level of satisfaction with the workshops (range 62-100%) and 56% said they were very or extremely likely to pursue SOTL in the future. The qualitative feedback indicated that for many participants the workshops enabled faculty to envision SoTL research and receive guidance on how to initiate a SoTL project. These sessions appeared to be both informative and motivational. For example, one participant commented:

The most helpful was defining what good SOTL questions look like such as: something that troubles an instructor, something that is exciting, and something that I'd like to understand better. The most informative was listing the types of evidence such as: student artifacts, student grades, student perception, and satisfaction data which I think is so important.

Summer Scholarship Institute

Data in this section that was previously reported in Naumann et al. (2023) has been updated to reflect the addition of the second cohort of SSI and the first cohort of SoTL Fellows Program at the data analysis stage, for a total of 27 faculty participants (see Figure 1).

Table 1
Goals Identified by SSI Participants, Summers 2023 and 2024

Goals for Summer Scholarship Institute	Total (n = 27)	DA (n = 13)	PD (n = 14)
Be held accountable to work on my writing or scholarship	78%	54%	67%
Complete data analysis	70%	100%	32%
Develop good scholarship productivity habits	67%	46%	67%
Establish a consistent writing schedule	67%	54%	61%
Receive feedback from other SSI participants	63%	62%	53%
Make progress on a manuscript draft	52%	62%	43%
Receive one-on-one guidance from SSI Facilitator	44%	46%	50%
Design a sound study or research design	33%	23%	67%
Complete literature review	26%	15%	71%
Develop a survey instrument or assessment	26%	15%	71%
Complete IRB requirements (Training, Protocol, Consent)	15%	8%	75%

Note. Total N = 27. DA = Data analysis track, includes 8 SoTL Fellows. PD = Professional development track.

Table 2
Pre- and Post-SSI Levels of Comfort Engaging in Components of Research

Comfort level	Pre-SSI (n=27)			Post-SSI (n=23)		d
	M	SD		M	SD	
Narrowing research questions/topic	3.26	0.64	=	3.36	0.73	0.15
Developing a sound research design	3.11	0.79	=	3.26	0.56	0.22
Conducting a literature review	3.19	0.61	<	3.45	0.67	0.41
Developing an IRB protocol	2.74	1.07	<	3.53	0.62	0.93
Writing a Consent Form	2.87	0.99	<	3.40	0.63	0.65
Finding/creating survey instruments	2.61	0.92	<	3.12	0.70	0.63
Programming an online survey	2.92	0.95	<	3.39	0.50	0.65
Conducting quantitative analyses	2.46	0.96	<	3.00	0.71	0.65
Interpreting quantitative analyses	2.42	1.00	<	3.06	0.83	0.70
Conducting qualitative coding	2.19	1.05	<	2.94	0.77	0.82
Summarizing qualitative findings	2.27	0.96	<	3.12	0.70	1.03
Writing the Literature Review	2.92	0.83	<	3.36	0.49	0.67
Writing the Method section	2.69	1.07	<	3.20	0.77	0.55
Writing the Results section	2.56	0.98	<	3.11	0.66	0.67
Writing the Discussion section	2.68	0.88	<	3.16	0.60	0.65

Note. Greater than (>) or less than (<) signs indicate a significant difference at the $p < .05$ threshold.

Faculty Goals

On pre-test surveys from our two SSI cohorts, faculty indicated the specific areas of the research life cycle they wanted to accomplish during SSI. Faculty in the Data Analysis track (n = 13) indicated the greatest need to complete their

data analysis (100%), make progress on their manuscript draft (62%), and receive feedback from other SSI participants (62%). Faculty in the Project Development track (n = 14) indicated the greatest need to complete IRB requirements (75%), complete their literature review (71%), and develop a survey instrument or assessment

tool (71%). Faculty in both tracks wanted to be accountable for their writing or scholarship (78%).

Comfort with Research Abilities

Next, faculty were asked to rate their level of comfort (1 = very uncomfortable, 5 = very comfortable) with a variety of components related to the SoTL research and writing process before and after participating in SSI. Prior to participating in SSI, faculty reported discomfort with most elements of the research and writing process (means below the midpoint of 3). After participating in SSI, faculty experienced significant increase in all but two of the research components. Faculty experienced the greatest increases in summarizing quantitative findings (paired-samples $t(15) = 4.04$, $p = .001$, $d = 1.03$), developing an IRB protocol (paired-samples $t(15) = 3.96$, $p = .001$, $d = .93$), and conducting qualitative coding (paired-samples $t(14) = 3.15$, $p = .007$, $d = .82$).

Perceived Progress

On pre- and post-test surveys, all fellows were asked to estimate how close their project was to submitting a manuscript for publication, where 0% = no project idea and 100% = ready for submission. There was a significant difference in pre-test estimates ($M = 28.55\%$, $SD = 17.07\%$) compared to post-test estimates ($M = 48.50\%$, $SD = 21.99\%$), $t(21) = 5.46$, $p < .001$, Cohen's $d = 1.02$.

SoTL Fellows Program

Data in this section that was previously reported in Naumann et al. (2023) has been updated to reflect data from pre-tests ($n = 7$) and post-tests ($n = 4$) from the first iteration of SoTL Fellows.

Identified Need

On their application, faculty indicated the specific areas of the research life cycle that required support. Across 18 applications, the majority of faculty needed support conducting data analysis (72.2%), developing survey assessments (66.7%), and programming surveys (55.6%). The next most common areas of need were related to executing a research project—developing the research design (44.4%) and completing an IRB protocol (44.4%). Fewer faculty said they needed help with narrowing their research question (16.7%) or support with manuscript preparation (22.2%).

SoTL Knowledge

Prior to participating in the SoTL FLC, no faculty indicated no prior SoTL knowledge (0%), most indicated minimal knowledge (57%), followed by moderate knowledge (43%), and none reported high knowledge (0%). After participating in the SoTL FLC, no one indicated no prior SoTL knowledge (0%) or minimal knowledge (0%), and

most faculty achieved moderate knowledge (75%), and followed by high knowledge (25%). Due to a small sample size, these differences were not statistically significant, $t(9) = 1.77$, $p = .11$, Cohen's $d = 1.59$.

Perceived Progress

On pre- and post-test surveys, all fellows were asked to estimate how close their project was to begin data collection, where 0% = no project idea and 100% = fully developed project idea; ready to execute. There was a significant difference in pre-test estimates ($M = 30.67\%$, $SD = 11.86\%$) compared to post-test estimates ($M = 66.00\%$, $SD = 19.70\%$), $t(7) = 3.06$, $p = .01$, Cohen's $d = 2.24$.

Discussion

Faculty in the two scholarship development programs—SSI and SoTL Fellows—initially showed greatest discomfort in the areas of assessment creation, completing IRB applications, and conducting data analysis. These patterns replicate previous research on barriers to conducting SoTL research (Miller-Young et al., 2018; Webb, 2015; Webb & Tierney, 2019) and highlight the importance of developing programming that allows faculty to develop these competencies.

The programming described here addressed several threshold concepts in SoTL including reviewing different research approaches or methods, discussing how to develop assessments, and reviewing how to develop IRB protocols. At the conclusion of the programming, faculty showed increased comfort in these areas and indicated increased progress on project development. To support faculty not proficient in data analysis, the programming staff paired faculty with data analysis collaborators who guided faculty on data cleaning, analysis, interpretation, writing, and improving assessments for future data collection. Faculty at the stage of data analysis indicated increased progress that moved them closer to manuscript submission.

Challenges and Improvements

After initial iterations of our scholarship programming, several challenges emerged that warrant attention and additional redesign to improve program delivery in future iterations.

Low Accountability

Faculty progress on their research project development, data collection, and analysis was contingent upon ongoing support and accountability. Many participants were navigating competing time interests due to heavy teaching and service loads. In the first iteration of the SoTL Fellows Program, the SoTL facilitator assigned readings from the Bishop-Clark and Dietz-Uhler

(2012) book with the expectation that faculty would complete the brainstorming worksheets to further clarify their project idea and goals prior to attending the associated monthly meeting. However, there was no built-in accountability structure ensuring that faculty advanced their project design in a timely, scaffolded manner. The facilitator and program staff experienced minimal interaction from faculty, limiting the anticipated informal guidance needed for effective project development. As a result, many faculty did not finalize the assessment measures and had not completed their IRB applications until right before the spring semester in which they planned to collect data. To meet IRB deadlines, the programming staff shared sample language that addressed various sections of the IRB protocol form such as participant recruitment, inclusion/exclusion criteria, confidentiality, benefits and risks, and subject withdrawal. Finally, the institutional IRB chair was able to expedite review so that faculty could begin the consent process in the spring classes.

In the second iteration (Fall 2024), the programming staff are developing an online course (using the institution's existing learning management system) that complements the Bishop-Clark and Dietz-Uhler (2012) book. Each month, faculty will respond to the handbook's brainstorming prompts within the online course. Scaffolded completion will allow the SoTL facilitator to provide more guidance and feedback on the project design. By the end of fall semester, faculty will have met deliverables related to assessment creation, completion of human subjects training, and IRB protocols.

Developing Knowledge

While our programming helped demystify several SoTL threshold concepts for faculty, it became clear that maturing from a novice to expert SoTL scholar requires significant time and experience. All faculty participants were capable of developing a research question, identifying a method to test their questions, and executing their assessments during their courses. For example, most of the proposed projects used traditional research design based on a single research approach (quantitative or qualitative) and data collected via pre-and post-tests or student artifacts (e.g. written work, reflections). However, per IRB requirements, faculty could not review their data until the completion of the semester; therefore faculty entering the SSI Data Analysis track did not have a sense of students' response rates or what their data might show. Anecdotally, faculty using quantitative data came to the realization that low sample sizes limit statistical significance (i.e., low power). Faculty collecting qualitative data realized that designing a study with a number of written reflection texts across multiple time points would require considerable time to sort and organize the data.

Due to faculty's inexperience with SoTL methodologies, faculty encountered challenges with small sample sizes, lack of understanding for how to code qualitative data, and how to present mixed methods results. And although the data analysis collaborator provides assistance with analysis, novice SoTL researchers will benefit from the expertise of a data analysis collaborator earlier in the program. Thus, to expedite faculty preparedness, collaborators will receive an additional stipend to begin their mentorship at the beginning of the research development process in order to lend support for research design and development. We anticipate stronger research methodology, instrument creation, and guidance for the IRB application, ultimately leading to an improved experience conducting data analysis in the final stage of the program.

Time Limitations

Despite the increased length of the SoTL Fellows program, time limitations continued to be a challenge. Data analysis takes place over a 6-week timeframe with a total of 36 dedicated hours. While this may seem feasible to conduct analysis, this timeframe needs to include interpretation and formalizing results for publication. As indicated in the prior section on developing knowledge, the analysis process requires extensive time to organize and clean data, run or code analyses, and interpret and write results in order to construct a full manuscript. Anecdotally, it has taken the first three weeks for faculty to reach the analysis stage of their projects.

In addition to the time spent on analysis, not all faculty will be able to develop a manuscript due to small sample sizes and lack of statistical significance. Instead these faculty will work on building out a robust literature review and the introduction section of their manuscripts. For faculty affected by the smaller sample sizes, multiple iterations of data collection will need to take place in future semesters, which is dependent on class offerings. Further, data analysis collaborators are able to inform the redesign of assessment tools, if needed. However, this raises another possible issue regarding long-term mentorship. The project does not have a sustainable model for ongoing or long-term collaboration. It is imperative that junior faculty form mutually beneficial connections and collaborations that foster ongoing support for future data analysis needs or assistance fielding reviewer feedback.

Conclusion

Past research has identified significant challenges—or threshold concepts—that faculty must master in order to successfully conduct and publish within SoTL (Boshier, 2009; Happel & Song, 2020; Kim et al., 2021; Miller-Young et al., 2018; Webb & Tierney, 2019). The SoTL programming presented here met faculty gaps in knowledge via

the SoTL in 60 series (introduction and exploration of SoTL), the SSI-Data Analysis track (support from a paid faculty collaborator with methodological or data analysis expertise), and the SoTL Fellows program (year-long mentoring program to design, collect, and analyze data in SoTL). Faculty identified benefits from their participation in all programs; however, programming had the greatest impact on new, untenured faculty in terms of building their knowledge and skills as well supporting their scholarly productivity. It is evident that early access to data analysis experts, structured assignments to guide project development, and accountability at every stage of the research process strengthens the likelihood of project completion and anticipated publication. Research and productive literary careers are built on collaborations and a logical next step with this project is to determine the key skills needed to develop sustainable connections across higher education. Institutions should leverage (and compensate!) existing faculty expertise to provide continuity of support across the research cycle, but especially in the areas of methodology and data analysis.

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