STEM Chalk Talks: Scientific Information Resource Training for All Librarians

Joanna Thielen, Research Data and Science Librarian, Oakland University, Rochester, MI

Email: jthielen@oakland.edu | Phone: 248-370-2477 | Mailing address: Kresge Library, 100 Library Drive, Rochester, MI 48309

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Abstract

To serve diverse patron needs, academic librarians need to be familiar with essential information resources in all disciplines. But many librarians, especially those without a STEM background, have little familiarity or comfort with scientific information resources. Recognizing this need, three STEM librarians gave a series of presentations on research in various STEM disciplines that were aimed at providing higher level, just-in-time training, tailored to their institution's needs, for non-science librarians. This article explores the design, deployment, and assessment of these presentations, in hopes of inspiring other science librarians to help their colleagues overcome their 'science-phobia.'

Keywords

Professional development, non-science librarians, reference, continuing education

Introduction

In any academic library, reference desk staff will encounter questions from patrons across the disciplines and often patrons from the general public, including questions relating to science, technology, engineering, and math (STEM) disciplines. However, most librarians have little familiarity with these disciplines and may feel unqualified to assist STEM patrons. To better serve all patrons, all reference desk staff, not only STEM librarians, need to have basic knowledge of the scientific information resources available at their institution. Therefore, there is a need to offer training in science information resources for non-science librarians.

Non-science or non-STEM librarians (used interchangeably in this article) can receive training on science information resources through various means. Webinars and continuing education courses are available, both through professional organizations and vendors. For example, the Special Library Association Chemistry Division offers a continuing education course at its annual conference entitled ‘Chemistry for the Non-Chemist Librarian.’ While these types of opportunities are valuable, they may be cost- and time-prohibitive for non-science librarians. Additionally, non-science librarians may not need such intense or in-depth trainings because, ultimately, they will refer complex questions to subject specialists.

Another means is for STEM librarians to provide in-house trainings to their colleagues. The benefits of this means of professional development include:

- Training can be tailored to institution’s campus community, the available scientific information resources, and time allocated for training;
- Training has low time and cost commitment for both the presenters and attendees;
- Learning about an unfamiliar or uncomfortable topic in a friendly environment from known colleagues may make attendees more willing to admit what they do not know or are not comfortable with;
- The presenters will get the satisfaction of contributing to their colleagues’ continuing professional development.

The goal of these trainings is to increase non-science librarians comfort in answering STEM reference questions and knowing when to refer more complex questions to a science librarian, rather than training them to become experts within a scientific field.

This article reports a case study of such a presentation series, which were given by three STEM librarians for their non-science librarians colleagues and covered various STEM disciplines and information resources. These librarians were inspired by Peterson and Kajiwara's (1999) article entitled "Scientific Literacy for Non-Science Librarians: Bootstrap Training" to offer these professional development opportunities for their non-science librarian colleagues. While there have been significant changes in the library profession over the past 20 years, the central idea of Peterson and Kajiwara's article holds true: providing professional development opportunities on the STEM disciplines can help non-science librarians become more comfortable assisting STEM patrons. The design, delivery, and assessment of these presentations is discussed in this article, including several tips for implementing this type of training at other institutions, in hopes of inspiring other science librarians to share their STEM knowledge with their colleagues.

Literature Review

Much has been written about the training, recruitment, and retention of STEM librarians (Kuruppu 2006). But the training of non-STEM librarians in the STEM disciplines has been neglected. While not subject specialists in these disciplines, full-time or part-time librarians and staff who work at a reference desk need to be comfortable assisting STEM patrons. However, many non-STEM librarians are at "ill at ease" with STEM or may even consider themselves science-phobic (Peterson and Kajiwara 1999, n.p.). In a survey of librarians at their institution, Peterson and Kajiwara (1999) found that most felt deficient in their knowledge of STEM fields. To ameliorate these feelings, several librarians reported on their efforts to train their fellow non-STEM librarians in the STEM disciplines, including STEM student characteristics and commonly used information resources. The goal of these trainingings is for all librarians and

staff who worked the reference desk to be able to “offer more uniformly excellent service to any student who approaches the reference desk” (Peterson and Kajiwara 1999, n.p.).

Slutsky (1989) recognized this need for his fellow librarians at the Science and Technology Research Center of the New York Public Library and focused his training on chemistry resources. His colleagues lacked training in STEM and therefore often struggled to answer chemistry reference questions. In a one-hour seminar, he presented the fundamentals of searching the print *Chemical Abstracts*. His article presents a detailed outline of searching this print resource, which has been superseded by the online version. However, the outline included many exercises that could easily be re-used by other chemistry librarians seeking to provide this type of training. No assessment of attendee skills, thoughts or views are given, so it is not clear if this seminar was an effective teaching method.

Peterson and Kajiwara (1999) surveyed their fellow reference librarians about training needs for specific information resources, specific disciplines, and other reference issues. The results indicated that STEM disciplines and information resources were the most requested training, thus becoming the major focus of their professional development program. Given their limited time and money, they developed a Bootstrap Training program: a series of workshops with various STEM librarians as the trainers. These trainings provided a “fast, but focused view of a particular science field and its organization, tying that to the literature for that field” (Peterson and Kajiwara 1999, n.p.). Enthusiasm for these trainings was evident as many two-hour sessions lasted almost three, due to extensive audience questions. Attendees also appreciated learning about STEM student characteristics and information needs. One attendee declared that the trainings were a “God send” and they were able to use their newly acquired chemistry knowledge the next day (Peterson and Kajiwara 1999, n.p.). Overall, attendees

reported coming away with “the feeling that they could now succeed with [STEM] areas that previously had given them grief” (Peterson and Kajiwara 1999, n.p.).

Stowell Bracke, Chinnaswamy and Kline (2008) reported on the process of creating 16 STEM subject-specific modules to train Circulation staff who were working at a newly consolidated reference and circulation desk. After this service point consolidation, the goal of these modules was to train staff “to answer general reference questions and to recognize when to refer the more complicated questions to subject specialists” (Stowell Bracke, Chinnaswamy and Kline 2008, n.p.). These self-paced, online modules gave an overview of commonly used resources within a specific STEM field, the different departments using these resources, and the types of research needs of these departments’ patrons. While online modules can be an effective means of providing STEM training for staff (who do not possess a STEM background), they do not facilitate discussion and also require a considerable time investment for both the participant and creator (including module maintenance if they are planned to be used on an ongoing basis).

Institutional Setting

Oakland University (OU) is a public, four-year university located in Rochester, Michigan with a total student population of approximately 19,300 students (Oakland University Communications and Marketing). The School of Engineering and Computer Science as well as several departments within the College of Arts of Sciences (Biological Sciences, Chemistry, Mathematics and Statistics, and Physics) consist of approximately a quarter of the entire student population (Oakland University Office of Institutional Research and Assessment [OIRA]). At OU Libraries, there are 13 full-time library faculty and five part-time lecturers. Three librarians serve the STEM departments. As with many small and mid-size institutions, OU

librarians have additional roles beyond their liaison duties. The Research Help Desk is staffed by a combination of library faculty, lecturers, and staff. In addition to interacting with STEM patrons at this desk, library faculty and lecturers may also work with these patrons in research consultations, 30-minute individual or small group appointments that are tailored to the patron's information needs.

Formative assessment

Prior to these presentations, reference staff were surveyed (*n* = 12) about their training in and comfort with assisting STEM patrons (see Appendix A for survey instrument). Surprisingly, 58% of respondents had had training in STEM information resources, in either formal (library school courses, etc.) or informal avenues (tutorials, vendor trainings, etc.). This formative assessment helped to shape the content presented. For example, 83% of respondents were interested in learning more about common STEM databases, whereas only 17% were interested in an overview of each OU STEM department (degree programs, research strengths, etc.). Finally, respondents were asked what they struggled with when working with STEM patrons. Selected responses include:

> "Convincing the patron to articulate and expand on the full scope of the topic, in an effort to better understand what they are trying to find."
>
> "Understanding the technical terms"
>
> "Understanding what they are looking for. They either assume we understand what they are looking for based on very limited information or they are totally clueless about library research and struggle to explain their need."
>
> "May not understand exactly what they're asking for."

STEM Chalk Talks

During the Fall 2017 semester, the three STEM librarians gave a series of four presentations, entitled STEM Chalk Talks, during OU Libraries' reference group's monthly meetings. Meeting attendees generally are library faculty, lecturers, and staff who work at the Research Help desk but all library personnel are welcome to attend.

These four presentations covered various STEM disciplines: 1) Chemistry & Physics; 2) Mathematics & Statistics; 3) Engineering & Computer Science; and 4) Biological Sciences. Given that the goal of these trainings was to give non-science librarians a basic understanding of each STEM discipline, not to make them disciplinary experts, the presenters followed Peterson and Kajiwara's (1999, n.p.) suggestion to only present "the basics that will enhance the librarian's experience at the reference desk." These presentations were typically 20 minutes and covered an overview of the discipline (including sub-disciplines), pertinent STEM databases and other online resources, and common information needs (i.e. the types of reference questions their colleagues are most likely to encounter from a STEM patron).[1] Two sample slides are shown in Figures 1-2. Knowing that many of their colleagues were uncomfortable with the STEM disciplines, the STEM librarians tried liven up their presentations with easy-to-understand, real-world examples of STEM research as well as injecting in some scientific humor, such as Chemistry Cat memes.

[1] Presentation slides can be found in Oakland University's institutional repository: http://hdl.handle.net/10323/4665

Figure 1. Sample slide from the Chemistry & Physics presentation, listing common information needs for patrons in these disciplines. Subsequent slides described recommended resources for locating each type of information.

Figure 2. Sample slide from the Mathematics & Statistics presentation, recommending specific information resources from the sample research topic of randomized response sampling.

Additionally, during the first presentation, the presenters highlighted some of the main stumbling blocks for working with STEM patrons. First, these patrons are traditionally light library users because library research is often only incorporated into a few courses in the undergraduate and graduate curriculum. Second, as several colleagues mentioned in their formative assessment comments, that STEM terminology is major hurdle when assisting STEM patrons. As noted by Peterson and Kajiwara (1999, n.p.), science "has a large and incomprehensible vocabulary which becomes a barrier for a non-science librarian who is trying to answer a science question." To help alleviate this hurdle, the STEM librarians highlighted several online reference sources, including dictionaries and encyclopedias. Finally, based on the presenters' personal experiences with STEM patrons and feedback from STEM faculty, undergraduates often struggle with selecting and/or scoping a research topic for course assignments. To this end, they presented several reputable popular news sources (*The New York Times* Science Section, EurekAlert!, etc.) as more approachable sources for learning about new research topics. Additionally, the presenters have noticed an increasing number of STEM faculty allowing students to cite reputable popular sources in their assignments. While these three issues may not be unique to STEM patrons, they are important to remember when assisting these patrons and helped to frame the discussion of other STEM disciplines during subsequent presentations.

Finally, the STEM librarians tried to emphasize that non-STEM librarians can use their reference interview and expert searching skills when assisting STEM patrons. For example, explaining how to use quotation marks for phrase searching is the same across the disciplines. They made these comments in part to reassure their colleagues that they have valuable knowledge and skills to contribute in reference and research consultation interactions with STEM patrons.

Summative assessment

After the series of four presentations, attendees were asked to complete a summative assessment (*n* = 9), ranking their comfort with helping STEM patrons on a Likert scale of very uncomfortable to very comfortable (see Appendix B for survey instrument). Although the level of comfort of each individual respondent was not tracked from each assessment, the average level of comfort for respondents was higher after the presentations, as shown in Figure 3. But some respondents did still report feeling uncomfortable with a specific discipline, which is not unexpected due to the brief nature of these presentations. When asked what they found most useful about the STEM Chalk Talks, selected responses include:

> "I thought these were really helpful overviews of how we can more effectively help students in the STEM fields. I really like that the resources will be available for me to refer to when I need them (e.g. in prep for a RC [research consultation] or when helping a student at the [Research Help] desk)."
>
> "Casual format that allowed [for] Q&A"

Figure 3. In both the formative (*n* = 12) and summative (*n* = 9) assessments, respondents were asked to rate their level of comfort with each STEM discipline on a Likert scale of very uncomfortable (score of 1) to very comfortable (score of 5). For all the STEM disciplines, the average level of comfort increased after attending the STEM Chalk Talks.

Limitations of STEM Chalk Talks

While improving non-STEM librarian colleagues' comfort with scientific information resources through brief disciplinary overviews is a laudable goal, this professional development method was not without its limitations. The major limitation was that a presentation during a meeting is inherently disjointed from assisting patrons. As mentioned in the summative assessment, attendees felt the need to have a direct interaction with a STEM patron before they could more definitively rate their comfort with the STEM disciplines. However, to help ameliorate

this issue, the STEM librarians have made their presentations available to their colleagues so that they can use them at the point of need. In the future, the presenters would advocate that this type of training is given more time, such as hosting a stand-alone workshop, which would allow for more discussion and active learning exercises (guided exploration of STEM databases, role playing exercises, etc.).

Suggestions for Trainings at Another Institution

The following suggestions can be used by STEM librarians at other institutions as they seek to provide similar training for their non-STEM librarian colleagues.

- *Any amount of time is better than nothing:* Even devoting a small amount of time (10-15 minutes) to talking about these resources will benefit non-STEM librarians.
- *STEM can be intimidating, so lighten the mood with humor or interesting videos*: To illustrate the research behind an an example reference question on randomized response sampling during the presentation on Mathematics and Statistics, two YouTube videos were imbedded into the presentation, which were entertaining and easy for the non-STEM librarians to understand. (The videos can be found here: https://youtu.be/nwJ0qY_rP0A and https://youtu.be/Awo7ui-iJ9E.)
- *Stick to the basics*: During the Chemistry and Physics presentation, explaining the difference between a reactant and a reagent was met with blank stares. Remember that the audience likely has not taken a science class in many years and terminology will be a hurdle. Peterson and Kajiwara (1999, n.p.) noted that “starting with the simplest foundation was necessary” for their bootstrap training sessions.
- *Talk about why each resource is useful, highlighting strengths, weaknesses, and unique features*: This will help attendees to match resources to a patron’s information needs.

For example, even OU's humanities librarians were visibly impressed by the structure drawing feature in SciFinder, which is unique from other databases.

- *Create guides or handouts for future reference*: As previously mentioned, these presentations were disjointed from actual reference interactions. Providing guides or handouts will give attendees something to refer back to at the point of need.
- *If possible, allow time for hands-on exploration and leave plenty of time for attendee questions:* Although incorporating the STEM Chalk Talks into the monthly reference meetings did not allow for active learning, there were quite a few audience questions. As previously mentioned, Peterson and Kajiwara (1999) scheduled their training sessions for two hours but each session lasted almost three hours due to extensive attendee questions. Active learning exercises could include attendees exploring the information resources and then answering sample reference questions.

Conclusion

One of the hallmarks of the library professional is its emphasis on lifelong learning. By providing training in the STEM disciplines, these three STEM librarians sought to facilitate their colleagues' continued professional growth. For the STEM Chalk Talks, their goal was to make all librarians and staff who work at the Research Help desk more comfortable assisting patrons from all departments and to know when to make a referral to a subject specialist librarian. As Peterson and Kajiwara (1999, n.p.) noted "whenever the discomfort level is reached, frustration and anger can't be far behind."

The goal of these trainings was not to train attendees to become science librarians. But, if after these trainings they are inclined to pursue this career path, this would be a welcome

outcome as one only has to look at the numerous job postings (and re-postings) for STEM librarians to know that demand often outpaces supply.

Overall, the presenters wanted to reassure their non-science librarian colleagues that they have valuable reference interview and expert searching skills that are incredibly valuable in reference interactions and research consultations with STEM patrons. As one STEM librarian without a STEM background said, “while the patron know far more about this topic than I do, as a librarian I usually know more about how to find information on this topic” (Morris-Knower, 2001, pg. 167). Therefore, it is important to emphasize to non-science librarians that they have valuable skills to contribute to these interactions.

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Appendix A. Formative Assessment Instrument

STEM Literacy Training - Initial Survey
This survey to designed to gather information about working with patrons from OU's science, technology, engineering, and mathematics (STEM) departments. No personally identifying information will be collected.

Have you ever received training (formal or informal) in scientific information sources?

- Yes
- No
- Don’t know

Please describe the type of training you received (instructor, duration of training, setting of training, etc.) (free text)

Rank your level of comfort in answering patron questions related to these STEM disciplines or topics:

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Engineering & Computer Science					
Chemistry					
Biological Sciences					
Math, Statistics & Actuarial Science					
Standards					
Patents					

Rank your level of comfort in using these common STEM databases to answer a patron's reference question:

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Web of					

Science					
PubMed					
SciFinder					
Engineering Village					
SAE Digital Library					
IEEE Xplore					
MathSciNet					

During the fall reference meetings, Shawn L, Mariela, and Joanna will be giving brief presentations on information resources in their respective STEM departments. What topics are you interested in hearing about? (Check all that apply)

- Common information needs in the STEM fields
- Brief overview of each OU STEM department (enrollment, degree programs, research strengths, etc.)
- Commonly used scientific databases
- Reference sources (online or print)
- Popular news sources
- E-book collections
- Other: (free text)

What do you struggle with when you're working with a patron from a STEM department? (free text)

Any other questions or comments? (free text)

Appendix B. Summative Assessment Instrument

STEM Literacy Training - Final Survey

Which of the following STEM Chalk Talk sessions did you attend? (check all that apply)

- Chemistry & Physics
- Mathematics & Statistics
- Engineering & Computer Sciences
- Biological Sciences
- None or Not Sure

After hearing the STEM Chalk Talks, rank your level of comfort in answering patron questions related to these STEM disciplines or topics:

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Engineering & Computer Science					
Chemistry					
Biological Sciences					
Math, Statistics & Actuarial Science					
Standards					
Patents					

After hearing the STEM Chalk Talks, rank your level of comfort in using these common STEM databases to answer a patron's reference question:

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Web of Science					
PubMed					
SciFinder					
Engineering Village					
SAE Digital Library					
IEEE Xplore					
MathSciNet					

What did you find most useful about the STEM Chalk Talks? (free text)

What could be improved? (free text)

Any other questions or comments? (free text)