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putting the pieces together: theory and practice

EScience in Action

Joining Together to Build More: The New England Software Carpentry Library Consortium

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Abstract

In 2017 a group of academic library and information technology staff from institutions across New England piloted a process of joining The Carpentries, an organization developed to train researchers in essential computing skills and practices for automating and improving their handling of data, as a consortium. The New England Software Carpentry Library Consortium (NESCLiC) shared a gold-level tier membership to become a Carpentries member organization. NESCLiC members attended a Software Carpentry workshop together and then participated in instructor training as a cohort, collaborating on learning the material, practicing, and beginning to host and teach workshops as a group.

This article describes both the successes and challenges of forming this new consortium, suggests good practices for those who might wish to form similar collaborations, and discusses the future of this program and other efforts to help researchers improve their computing and data handling skills.

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Introduction

The New England Software Carpentry Library Consortium (NESCLiC 2018a) is a collaboration between a group of libraries and information technology organizations at colleges and universities in New England, who joined The Carpentries (The Carpentries 2018c) together. We are a community of practice of library and information technology staff focused on building skills in research computing and extracting, wrangling, storing, analyzing, and visualizing data. The group formed to receive the Carpentries membership benefit of priority access to the instructor training, but it has also become a space where the members can share ideas and expertise to meet local and regional goals.

NESCLiC member institutions share a gold-level Carpentries membership, which provides NESCLiC with 15 seats in the Carpentries instructor training, six free coordinated workshops, and a fifty percent discount on the cost for additional coordinated workshops per year. In addition, NESCLiC provides the opportunity for individual members to:

- Develop instructional materials and contribute back to the Carpentries community
- Be part of a network of data fluent researchers and instructors
- Refine their skills by participating as instructors at other member institutions
- Learn new skills and improve on existing ones

The first year was an experiment: could we bring together institutional contributions and the staff time of already busy professionals to increase the number of available Carpentries instructors in the region? Who at our institutions would want this training? What would be the benefits to our institutions? We will review our experience and discuss the ways in which the development of the consortium was of value to the participants, their institutions, and the researcher communities in our region.

Literature Review

The Software Carpentry project has existed since 1998, and has taught practical research skills to over 30,000 researchers since it offered its two-day workshop series in 2012 (The Carpentries 2018a). The Carpentries, a foundation formed from the merger of the Software Carpentry, Data Carpentry, and Library Carpentry projects in 2018, sponsors the development of lessons and organization of workshops around the world to teach practical computing skills to researchers. Grounded in evidence-based pedagogical practices such as goal-oriented, hands-on practice with immediate feedback (Ambrose 2010), the Carpentries have developed robust lessons to teach researchers reproducible research computing skills, the data manipulation, and the data management skills they need to competitively conduct their research (Wilson 2006, 66-69; Perkel 2011, 541; Teal et al. 2015, 135; Simperler and Wilson 2015). The Carpentries have also continuously assessed the effectiveness of these training programs, and experimented with a variety of formats before arriving at the current two-day workshop model (Wilson 2014, 62; Wilson et al. 2014; Simperler and Wilson 2015).

The modular, two-day Software Carpentry workshops were quickly identified by libraries and information technology groups that support data science as valuable to the researchers they

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support. In 2013, academic and public libraries began to hold Carpentry workshops to train their staff as well (Library Carpentry n.d.). The skills taught in Carpentries workshops align with the needs of researchers who use libraries and information technology services, and the instructor training process is a way to deliver these skills to the researchers we work with (Duckles 2016). Instructor training in the Carpentries' pedagogy and lessons is also a way to build library services, helping library staff improve their own data savvy and that of their clientele (Goben and Nelson 2018; Burton et al. 2018).

Along with researcher support and service, libraries have a lengthy history of collaboration, making them ideal interlibrary and Carpentries partners. As early as the 1880s, libraries began to form consortia to share collections and technological resources and to leverage economies of scale (Bostick 2001, 128-130). Additionally, library consortia are integral to the "library landscape and considered fundamental to cost effective library management" (Machovec 2013, 199). Consortium creation is a useful tool for formalized collaboration: as long as there is a strong shared strategic alliance, there is great flexibility to form diverse and responsive consortial models (Allen and Hishon 1998). Combining the identified training needs, the Carpentries' volunteer model, and the libraries' consortial experience was the foundation for the NESCLiC's formation.

Development

The Initial Idea

As NESCLiC organizers, we identified the need for additional reproducible research computational skills and wanted the opportunity to become part of the Carpentries as certified instructors. However, the cost of a Carpentries membership was prohibitively expensive to our institutions individually, and there was a long wait list for instructor training for non-members. We contacted the Software Carpentry Foundation membership director to see if we could pursue a consortial membership model to receive the membership benefits as a group. Once we established that the Software Carpentry Foundation would let us pilot a consortial model for at least one year, we reached out to colleagues who had expressed an interest in the Carpentries in past discussions to see if they would be willing to join us. Institutions for the pilot were chosen based on these professional connections, largely developed through involvement in the eScience program out of the National Library of Medicine at the University of Massachusetts in Worcester. This was for expediency for the pilot year, and we plan to reach out more broadly in future years to diversify the types of institutions represented.

The Initial Cohort

The first-year cohort (2017-2018) of participants consisted of 15 staff members (at $1,000 per participant) from library and information technology organizations at seven colleges and universities (NESCLiC 2018b) (Table 1). It was important to include staff from both libraries and information technology because we often provide complementary or joint services to support researchers' data needs. We needed to make sure that we could accurately and persuasively communicate the value of the Carpentries and the Consortium to our administrators, so we wrote a proposal that each of us could use at our own institutions. Prior to entering NESCLiC, very few participants had been part of a Software or Data Carpentry workshop, and none had been trained as instructors. While many of the members of NESCLiC

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are part of other consortia, none of the original organizers had been involved in starting a new consortium.

Table 1: A listing of the member institutions and the number of participants from each institution, in the first NESCLiC cohort.

Member Institution	Number of Participants
Brown University	2
Dartmouth College	2
Harvard University	2
Mount Holyoke College	2
Tufts University	3
University of Massachusetts, Amherst	1
Yale University	3

We took several formative steps to provide a solid foundation for the newly created consortium:

- Identifying other interested and available partners from institutions outside of the original group to ensure we had 15 individuals to participate in the instructor training.

- Choosing one person from each institution to serve as a representative on the Executive Committee to write the documentation about the consortium.

- Developing the Memorandum of Understanding, Vision Statement, Letter of Intent, and other administrative documentation. This step, completed by the initial organizers of NESCLiC, established a shared understanding of roles and responsibilities.

- Organizing a Software Carpentry workshop where the pilot cohort could experience the two-day event as learners while building their own skills.

- Planning and completing the Software Carpentry instructor training session. In the first year, two sites hosted training for the group, with the instructor trainers joining via Zoom. An important component of the training sessions is to complete them with your peers in the room for feedback on teaching practice sessions and discussion of other lesson materials. This involves learning the pedagogical concepts of Software Carpentry, not the actual mechanisms of coding.

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NESCLiC has adopted a structure that leverages the group's autonomy as professionals. The consortium is overseen by an Executive Committee of volunteers, composed of an Executive Committee Chair, Carpentries Liaison, Membership and Recruiting Chair, Assessment Chair, Outreach Chair, and Workshop Coordination chair. Individual instructors are able to self-organize Software Carpentry workshops as needed, without gaining approval from the chair of the consortium. The main requirement is that information is communicated to the group, and that the group's talents are leveraged.

The 2017-18 Pilot Year

During the first year of the Consortium (October 2017 - October 2018), NESCLiC members served as hosts, instructors, and helpers in nine workshops across New England, reaching over 250 librarians and scholars in four states in the region. A git-hosted website was also developed to market and capture the activities of the consortium. It includes information about members, publications, workshops hosted, and the Carpentries organization.

All 15 members of the cohort completed the training and became certified instructors. Once the first round of instructor training was completed and the model appeared to be a success, we began planning for a second year. The original group of representatives, now the Executive Board, agreed to stay on to help the new group get running. See Figure 1 for a complete timeline of NESCLiC's pilot year.

Figure 1: A timeline of the NESCLiC's formation and first year.

Changes to Software Carpentry as an organization changed the value of membership in the organization. The Carpentries was created to consolidate Software and Data Carpentry, which had been separate organizations with similar goals. Practices of the two organizations had to be reconciled, and this meant that the $500 fee that Software Carpentry had suggested for self-organized workshops at non-member institutions was abolished to match Data Carpentry. This meant that any NESCLiC member institutions can leave the consortium once they have certified instructors and still hold self-organized workshops at no cost. The addition of Library Carpentry to The Carpentries organization was added value, as there is now content that can be specifically applied to library work.

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Reflection

NESCLiC started as a way for a group of professionals who work in data roles in higher education to get instructor training through the Carpentries, and we achieved that goal. Initial organizers hoped that the cohort of instructor trainees would also develop into a community of colleagues, creating a network of instructors across New England. While our partnership is still being built, the initial cohort has continued to collaborate in offering and instructing workshops, assisting each other in learning new skills related to the Carpentries curricula, and sharing best practices for building the community. We have expanded the consortium in the second year, 2018-19, adding two institutions and 15 more instructors. Having participants from both library and information technology organizations helped to build and strengthen partnerships within member institutions as well, with the two groups working towards a common goal of providing instruction on campus. The collaborative teaching, lesson creation, and continued involvement of the members in NESCLiC are indicators that we are also succeeding at building a community of colleagues.

The early days of the Consortium were a lot of work. This was not a model of membership that was common for the Carpentries. The Carpentries only wanted one payment and one representative from the consortium, so we had to negotiate how to sign one contract for seven institutions, pay the membership fees, and participate in the broader Carpentries community through representation on the Carpentries Membership Council. Yale has taken on the responsibility for paying the fees and then collecting the money from the other member institutions. We have one contact for each of the schools, to simplify communications and to organize things locally. This foundational work helped us develop a sense of what we wanted to accomplish.

While there is a sense of community within NESCLiC, we are also serving our individual communities. Members struggle in varied ways with finding the time to organize and teach workshops on top of our existing roles and workloads. Many members report having struggled to learn the Carpentries organizational structure at the beginning, but some of this confusion has been removed now that the different Carpentries have come together. Members also report significant learning curves about the logistics of event planning and registration and, where applicable, collecting registration fees, at our respective institutions.

Future Opportunities

As the consortium moves into its second year, we have identified a second cohort of individuals to receive training. We have two new member organizations, totaling nine institutions and 30 members across both cohorts. The second cohort will deepen our pool of experts, and further the reach of the Carpentries across New England. We currently have member institutions in four of the six states in New England (Connecticut, New Hampshire, Massachusetts, and Rhode Island) so there is still room to grow in the region. Members of NESCLiC are also active as lesson maintainers with Library Carpentry. This affords a rich opportunity to help shape the lessons and the community.

There is also a potential to bring the Carpentries' curriculum to other venues, including conferences. Several conferences have included a two-day Carpentries workshop as a pre- or post-conference option (e.g., Society for the Advancement of Chicanos/Hispanics and Native

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Americans in Science, 2018; National Data Integrity Conference 2017; Research Data Access and Preservation 2016 (SACNAS 2018; NDIC 2017; RDAP 2016), and with so many new librarians included in the cohort there are new connections to conferences and other opportunities for instruction.

Conclusion

Computational training, reproducibility, and transparency are three concepts beneficial to supporting researcher needs in higher education. As Software Carpentry is a highly recognized organization that teaches skills that library and information technology professionals can help bring into the research lifecycle, a discussion began around how to establish a group of individuals in New England to support Software Carpentry skills. NESCLiC was formed to establish a pool of Software Carpentry instructors and to leverage the expertise and stability of libraries and librarians in the New England area. Such a consortium offers the stability of trained professional staff instructors, providing a level of continuity not often afforded to research labs which tend to experience higher turnover rates. NESCLiC has quickly established itself in the region and continues to further its reach across New England.

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