Partnering to Give Researchers Needed Technical Skills

Software Carpentry in the Library
Agenda

- Introduction
- Identifying researchers’ needs
- Developing a partnership
- Hosting workshops
- Creating a community
- Conclusion
  - Lessons Learned
  - Expansion
Introduction

Carl Grant
Associate Dean for Knowledge Services & Chief Technology Officer
A.K.A. - old hand
ˈold ˈhand/
noun
noun: old hand; plural noun: old hands
a person with a lot of experience in something.
Introduction

Sarah Clayton | Movers & Shakers 2017 – Digital Developers
By on March 15, 2017 Leave a Comment

Super-Synergist
Sarah Clayton is fearless, says Carl Grant, the University of Oklahoma’s associate dean, Knowledge Services, and CTO. That’s fortunate, because a month after starting at the university library, Clayton dove into work on the “Presidential Dream Course.” This ambitious class combined the efforts of the library and the university’s history department and is built around the question, “What sort of class would faculty members devise if money were no object?”

Working on an offering called “Making Modern America: Discovering the Great Depression and New Deal,” digital scholarship specialist Clayton gathered a subject librarian, archivist, curator, and oral historian to help 48 students perform primary source research. She also designed and built an online platform that ended up hosting 950 student-created items in 11 online exhibits with videos, archival documents, interactive maps, and more.

Clayton draws connections between the Presidential Dream Course and her previous work in archives and special collections, as well as an undergraduate degree in history, and grad school curricula in GIS and web development, which ties in with the tech and mapping portions of the course. In turn, she notes, she was able to use some aspects of the Dream Course in a “Software Carpentry” course—short, intensive computing workshops—also turning them into teaching materials for workshops in the university’s
Introduction

- Background
  - Started by Greg Wilson at Los Alamos Nat’l Lab 20 years ago
  - Materials released under CC license
  - Over 120 videos available
  - Teaches basic lab skills for research computing
Introduction

- Offers intensive, two-day workshops on command line tools, a programming language, and version control
- Also offers instructor certification
- Over 500 certified instructors, over 16,000 learners to-date
- https://software-carpentry.org
Developing a Partnership

“A lot of campuses, this would go into the IT department. But it’s the perfect opportunity [for academic libraries] to connect data management planning, all of the resources of the library, the librarians, and research. Not only do you get to teach the researchers, the librarians learn how to do this as well. So they become experts and can serve as this nucleus for research on their campuses by utilizing this capability and becoming a member of this organization, becoming able to certify instructors… If libraries continue to default this type of training to IT staff, they’re missing a huge opportunity.”

Jonah Duckles, Executive Director
Software Carpentry
Developing a Partnership

Becoming Institutional Members of Software Carpentry

• We formed a coalition between:
  • OU Libraries
  • Vice President of Research
  • College of Arts and Sciences
  • Bio Survey
  • South Central Climate Science Center
Identifying Researchers’ Needs

- Growing need to automate research processes for speed and reproducibility

- Less well-funded researchers (in particular) have little money to hire programmers or informatics specialists (or they identify the need late)

- No training in graduate curriculum for computing skills
Positions library as the crossroads for research on campus

Allows staff to gain a better understanding of researchers’ needs

Utilizes the University Libraries’ team of functional specialists
Hosting Workshops

Intellectual Crossroads of the University
Hosting Workshops

- 2 full days from 9:00AM to 4:30PM
- 2 instructors and multiple helpers
- Limit the participation to 40 learners per workshop
- 3 open workshops per per semester
Hosting Workshops

- 13 open workshops so far
  - Additional workshops for research groups

- Over 300 faculty, graduate students, and staff

- Over 30 departments and research groups (primarily sciences and social sciences)
<table>
<thead>
<tr>
<th>Time</th>
<th>Workshop Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 12:00</td>
<td>Automating task with the Unix Shell</td>
</tr>
<tr>
<td>12:00 - 1:00</td>
<td>Lunch break</td>
</tr>
<tr>
<td>1:00-4:00</td>
<td>Building Program with Python</td>
</tr>
<tr>
<td>4:15-4:30</td>
<td>Wrap Up</td>
</tr>
</tbody>
</table>
## Hosting Workshops

### Day Two

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 12:00</td>
<td>Version Control with Git and GitHub</td>
</tr>
<tr>
<td>12:00 - 1:00</td>
<td>Lunch break</td>
</tr>
<tr>
<td>1:00-4:00</td>
<td>Building Program with Python Continued</td>
</tr>
<tr>
<td>4:15-4:30</td>
<td>Wrap Up</td>
</tr>
</tbody>
</table>
Hosting Workshops

- Instructors live-code alongside learners
- Helpers provide one-on-one assistance as needed
Hosting Workshops

- Use etherpad for collaborative notetaking
- Helpers monitor the chat and add notes, tips, and additional resources
Hosting Workshops

- Red and green sticky notes allow instructors and helpers to monitor the learners’ progress and pace workshop

- Collect comments on sticky notes after each day
Hosting Workshops

- “This workshop should be mandatory for every RA at OU. Useful, very useful!”

- “Thank you. I can now figure out where to begin with python, shell, and github, and can learn it by myself, not afraid of it.”
Creating a Community

- Connect learners with the Libraries’ team of specialists including
  - Research Data Management
  - Informatics
  - Digital Scholarship
  - Emerging Technology
Creating a Community

- Digital Scholarship Office Hours
  - Identifies learners and provides intermediate assistance
- Advertise subsequent workshops
  - Data Viz, VR, 3D Printing, Research Bazaar

Intellectual Crossroads of the University

UNIVERSITY LIBRARIES
The UNIVERSITY of OKLAHOMA
Creating a Community

- Foster a local community of instructors and helpers
- Offer participants opportunities to become helpers or advocates
- Offer helpers the opportunities to become instructors
Creating a Community

- 10 new instructors each year
  - Library employees, IT from other departments, graduate students, faculty advocates, partner organizations

- 2-day pedagogically focused training

- Apply these skills to other workshops
# Creating a Community

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00</td>
<td>Welcome</td>
<td>Who is participating in this workshop and what do they know? What will we cover (or not) in this workshop? What prior knowledge do workshop participants have?</td>
</tr>
<tr>
<td>09:15</td>
<td>Novices and Formative Assessment</td>
<td>How can we describe the difference in learning between a novice and competent practitioner?</td>
</tr>
<tr>
<td>10:15</td>
<td>Terms</td>
<td>How can we describe teaching and learning how to teach? What common vocabulary do we need to talk about teaching and learning?</td>
</tr>
<tr>
<td>10:30</td>
<td>Morning Coffee</td>
<td>Break</td>
</tr>
<tr>
<td>10:45</td>
<td>Teaching as a Performance Art</td>
<td>How do teachers improve?</td>
</tr>
<tr>
<td>11:45</td>
<td>Morning Wrap-Up</td>
<td>What have we learned?</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td>Break</td>
</tr>
<tr>
<td>13:00</td>
<td>Expertise and Memory</td>
<td>How can we describe the difference in learning between a novice and expert? How is memory a limiting factor in learning?</td>
</tr>
<tr>
<td>14:15</td>
<td>Afternoon Coffee</td>
<td>Break</td>
</tr>
<tr>
<td>14:30</td>
<td>Performance Revised</td>
<td>How does having a concept map change the way you teach?</td>
</tr>
<tr>
<td>15:15</td>
<td>Cognitive Load</td>
<td>How does inquiry-based learning perform compared to guided learning? What is cognitive load theory? What is the split-attention effect, and how should it affect the design of teaching materials?</td>
</tr>
<tr>
<td>15:55</td>
<td>Afternoon Wrap-Up</td>
<td>What have we learned?</td>
</tr>
</tbody>
</table>
### Creating a Community

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<tr>
<th>Time</th>
<th>Session</th>
<th>Question</th>
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<tbody>
<tr>
<td>09:00</td>
<td>Live Coding</td>
<td>How do we teach programming using live coding?</td>
</tr>
<tr>
<td>10:15</td>
<td>Morning Coffee</td>
<td>Break</td>
</tr>
<tr>
<td>10:30</td>
<td>Carpentry Teaching Practices</td>
<td>What teaching practices are common to Software and Data Carpentry?</td>
</tr>
<tr>
<td>11:00</td>
<td>Motivation and Demotivation</td>
<td>What motivates and demotivates learners and instructors?</td>
</tr>
<tr>
<td>11:55</td>
<td>Morning Wrap-Up</td>
<td>What have we learned?</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td>Break</td>
</tr>
<tr>
<td>13:00</td>
<td>Lessons and Objectives</td>
<td>How can I design more effective lessons?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What lessons do Software and Data Carpentry currently contain?</td>
</tr>
<tr>
<td>14:00</td>
<td>Afternoon Coffee</td>
<td>Break</td>
</tr>
<tr>
<td>14:15</td>
<td>The Carpentries</td>
<td>How are Software and Data Carpentry organized and run?</td>
</tr>
<tr>
<td>15:15</td>
<td>Afternoon Wrap-Up</td>
<td>What have we learned?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What do we do next?</td>
</tr>
<tr>
<td>16:00</td>
<td>Finish</td>
<td></td>
</tr>
</tbody>
</table>
Creating a Community

- Monthly instructors meetups
- Instructor listserv for discussion in between meetings
- Listserv for former participants
Creating a Community

- Encourage local instructors to participate in larger Software Carpentry community
  - Listserv
  - GitHub

- Teach non-local Software Carpentry Workshops

- Join committees and discussions
Conclusion
Lessons Learned

- Try different scheduling patterns
  - Spring Break, week of Thanksgiving
  - Friday and Saturday
- Advertise through a variety of means
Lessons Learned

- Have plenty of helpers available
- “I appreciate that the helpers helped us every moment to be on the right track.”
Lessons Learned

- Be prepared for all skill levels
- Have participants arrive early for installation problems
- Have experts in both Windows and Mac OS
Lessons Learned

- Host the workshops in strategic locations
Lessons Learned

“The organization of the furniture and placement of the TV screens made for an open learning environment.”
Expansion

- Training more instructors at OU so we can offer more workshops with less time commitment from individual instructors

- Improving outreach through utilizing our local Software Carpentry community

- Offering a larger variety of programming languages to serve different communities
Expansion

- Forming regional partnerships with Oklahoma State University and University of North Texas

- Organizing annual meet up opportunity for former workshop attendees
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