The Carpentries: Programmatic Assessment Report

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Introduction: The Carpentries

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What is The Carpentries?

Software Carpentry (SWC) and Data Carpentry (DC) are two programs of The Carpentries (a fiscally sponsored project of Community Initiatives). We teach essential computing and data skills. We exist because the skills needed to do computational, data-intensive research are not part of basic research training in most disciplines.

About Software Carpentry

Software Carpentry enables researchers to create purpose-built tools, whether it be a Unix shell script to automate repetitive tasks, or software code in programming languages such as Python, R, or MATLAB. These enable researchers to build programs that can be read, re-used, and validated, greatly enhancing the sharing and reproducibility of their research.

About Data Carpentry

Data Carpentry learners are taught to work with data more effectively. Workshops focus on the data lifecycle, covering data organization, cleaning and management through to data analysis and visualization. Lessons are domain-specific, with coverage in ecology, genomics, and social sciences. Future releases include lessons for working with geospatial data and additional lessons in genomics and social sciences.

What The Carpentries offers

- A suite of open source, collaboratively-built, community-developed lessons
- Workshops based on a learn-by-doing, ‘code with me’ approach
- Instructor training in evidence-based pedagogical training methods
- An active global community subscribing to an inclusive code of conduct
- A supportive learning culture
- Ongoing development opportunities via our peer mentoring program
- Community-led discussions of open source software, open science, and teaching methodology

The Carpentries began systematically recording data for our workshops in 2012. We use this data to investigate how The Carpentries has grown over the years including number and geographic reach of our workshops, and learners at these workshops. We also look at our Instructor Training program, including number and geographic reach of instructor training events, number of trainees and their completion rates, and onboarding of new Instructor Trainers.

Data are collected by a team of Workshop Administrators. In Africa, Australia, Canada, New Zealand, and the United Kingdom, Workshop Administrators are affiliated with our member institutions and provide in-kind staff time. A full-time Carpentries staff member is the Workshop Administrator for the rest the world.

Introduction: This Report

Section 1: Carpentries Workshops

This section revisits data and projections made in an earlier report (https://carpentries.github.io/assessment/programmatic-assessment/workshops/outputs/programmatic_report_20180615.html), noting specific instances of unexpected growth or reach to new communities.

Section 2: Instructor Training Applications

For this report, we analyzed the applications to our Instructor Training program. The goal was to compare the applicant pool with the badged instructor pool and to be able to look at application and completion rates across certain characteristics. These findings are explored further below.

As the source data includes individual application data, we can not share the source data publicly. If you are interested in learning more about how this data was analyzed, please contact us at team@carpentries.org.

Section 1: Carpentries Workshops

January 1, 2012 through June 30, 2018

We revisited some of the data explored in an earlier report (https://carpentries.github.io/assessment/programmatic-assessment/workshops/outputs/programmatic_report_20180615.html). Looking at our expected growth, we see that projections for the number of workshops in 2018 have not changed significantly from the first quarter to the second quarter. Our first quarter projections showed 137 Data Carpentry and 299 Software Carpentry workshops, for a total of 436 workshops. Our revised projections show 122 Data Carpentry and 304 Software Carpentry workshops, for a total of 426 workshops. This shows us running about 41 more Data Carpentry and 47 more Software Carpentry workshops in 2018 than we did in 2017.

We did see geographic growth. In June 2018, The Carpentries saw its first workshop in Pakistan. By the second quarter of 2018, we also saw Ethiopia join the ranks of countries hosting 10 or more workshops. This growth happened in only two years, representing the remarkable growth of The Carpentries community across Africa.

Figure 1: Workshops by Carpentry by Year

This bar chart shows the number of Data Carpentry (DC) and Software Carpentry (SWC) workshops each year. Data for 2018 is a projection. The proportion of workshops in the first two quarters of 2017 relative to the full year was applied to actual first two quarters data from 2018 to calculate this projection. Source data can be found in Table 1 in the Appendix.

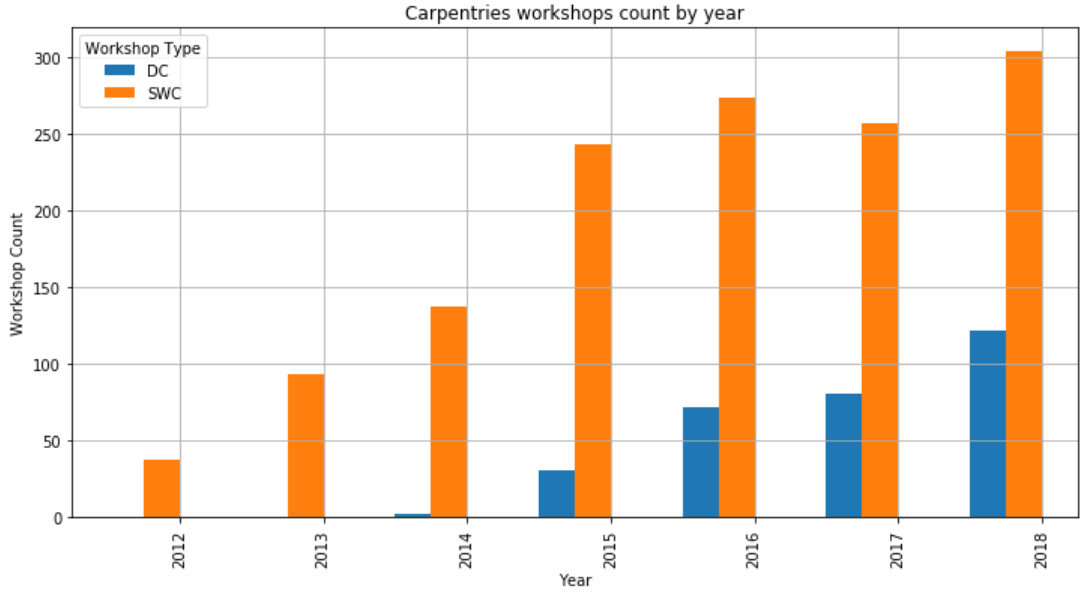


Figure 2: First workshop by year

This map notes the year each country held its first workshop. Source data can be found in Table 2 in the appendix.

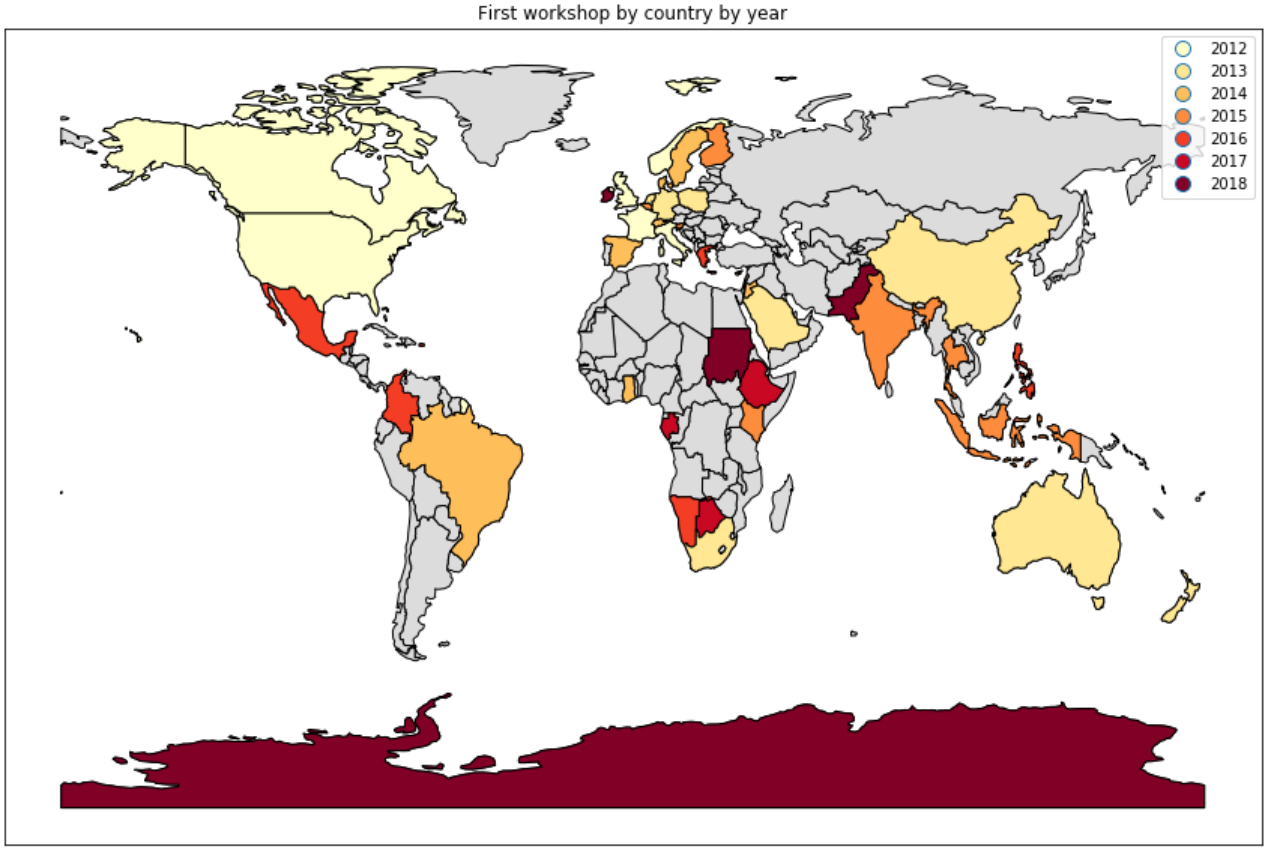
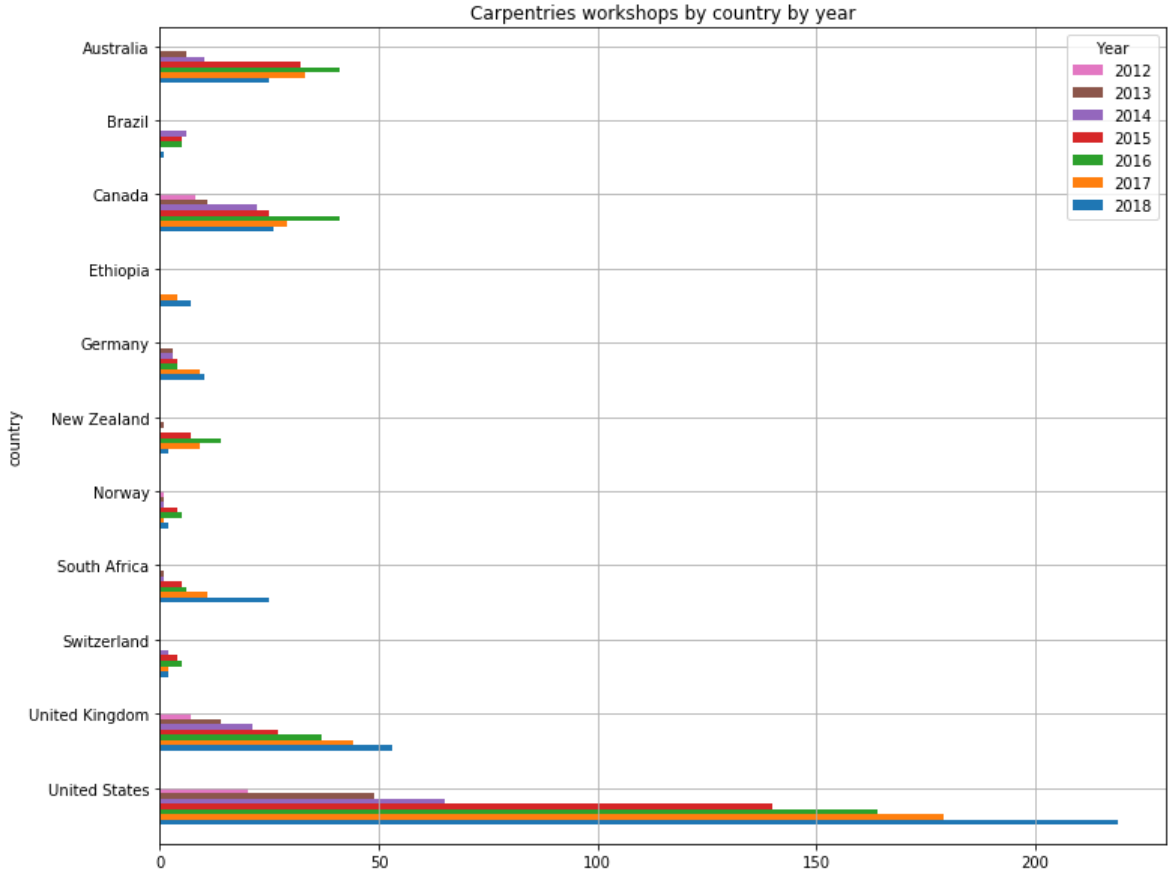


Figure 3: Countries hosting 10 or more workshops

This chart notes all countries hosting 10 or more workshops since 2012. Figures for 2018 are a projection. Source data can be found in Table 3 in the appendix.


Carpentries workshops by country by year
country
Australia
Brazil
Canada
Ethiopia
Germany
New Zealand
Norway
South Africa
Switzerland
United Kingdom
United States
0
50
100
150
200
Year
2012
2013
2014
2015
2016
2017
2018

Section 2: Carpentries Instructor Training

July 1, 2016 through June 30, 2018

The Carpentries runs instructor training events as a benefit to member sites who want to build a pool of onsite instructors, increasing their capacity to run self organized, onsite workshops for their community. When possible, The Carpentries also offers seats in these events to those applying from an open pool, as a way to increase our reach and connect with individuals who may not otherwise have access to our resources.

This two-day class has the following overall goals:

- Introduction to evidence-based best-practices of teaching.
- Teaching how to create a positive environment for learners at your workshops.
- Provide opportunities for practicing and building teaching skills.
- Help integrate trainees into The Carpentries community.
- Prepare trainees to use these teaching skills in teaching Carpentry workshops.

Because we have only two days, some things are beyond the scope of this class. This training does not cover:

- How to program in R or Python, use git, or any of the other topics taught in Carpentry workshops.
- How to create new lessons from scratch

For this report, we looked at all applications that came in through our open application process (those that did not specifically identify themselves with a member site), from July 1, 2016 through June 30, 2018. In looking at completion rates, we only looked at people who attended events before March 31, 2018. Because all trainees have three months to complete the checkout process, those who attended later would not be expected to complete certification before June 30, 2018. The analyses below do not include applications from member sites, as these trainees are selected by the member site, and do not go through our review process.

This review included

- Open training applications (n=892)
- Attendees at open training events (n=454)
- Badged instructors from open training events (n=257)

This represents an overall completion rate of 56.6%. In this report, we compare this overall completion rate with completion rates by previous training in teaching, previous experience in teaching, previous involvement with The Carpentries, areas of expertise, programming language experience, by occupation, and by country.

We did not look at how many people attended events in relation to the overall application rate for several reasons. First, not all applicants have had their applications reviewed to be invited to a training event. Then, of those who have been invited, not all have had the opportunity to attend (typically due to scheduling constraints). Lastly, of those who have not yet been invited, they may be invited to a future event or asked to re-apply, so are not considered to be rejected from the application process.

Open Applications by Previous Training in Teaching

We looked at our applications by our applicants' previous training in teaching. Most people have had no previous training in teaching. This demonstrates the importance and singularity of work we do - while it is a needed skill, people are not getting this type of training anywhere else. Just like The Carpentries is motivated by seeing scientists and researchers who are not being taught programming skills, we see people who may teach or want to teach are not being taught teaching skills.

At the same time, people with at least some previous training in teaching tend to certify at higher rates, possibly indicating that coming in with some teaching background motivates people to continue through the Carpentries certification process.

Figure 4: Open Applications by Previous Training in Teaching

This bar chart shows the number of applications received by people by their previous training in teaching between July 1, 2016 and June 30, 2018. Source data can be found in Table 4 in the appendix.

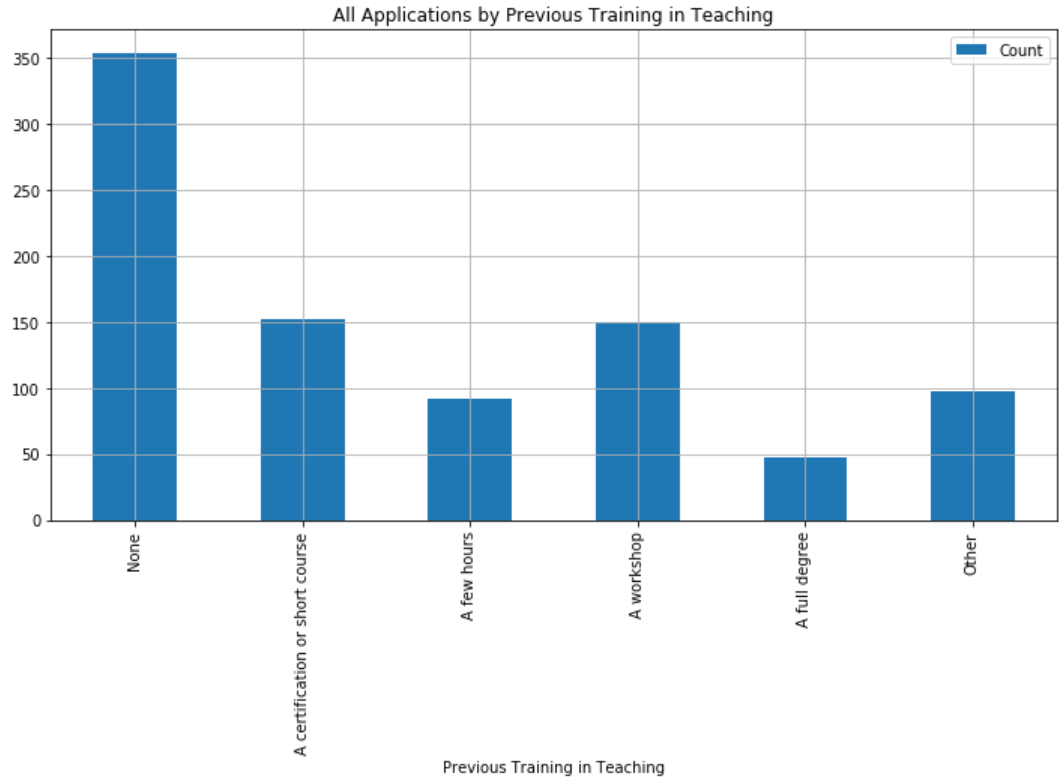
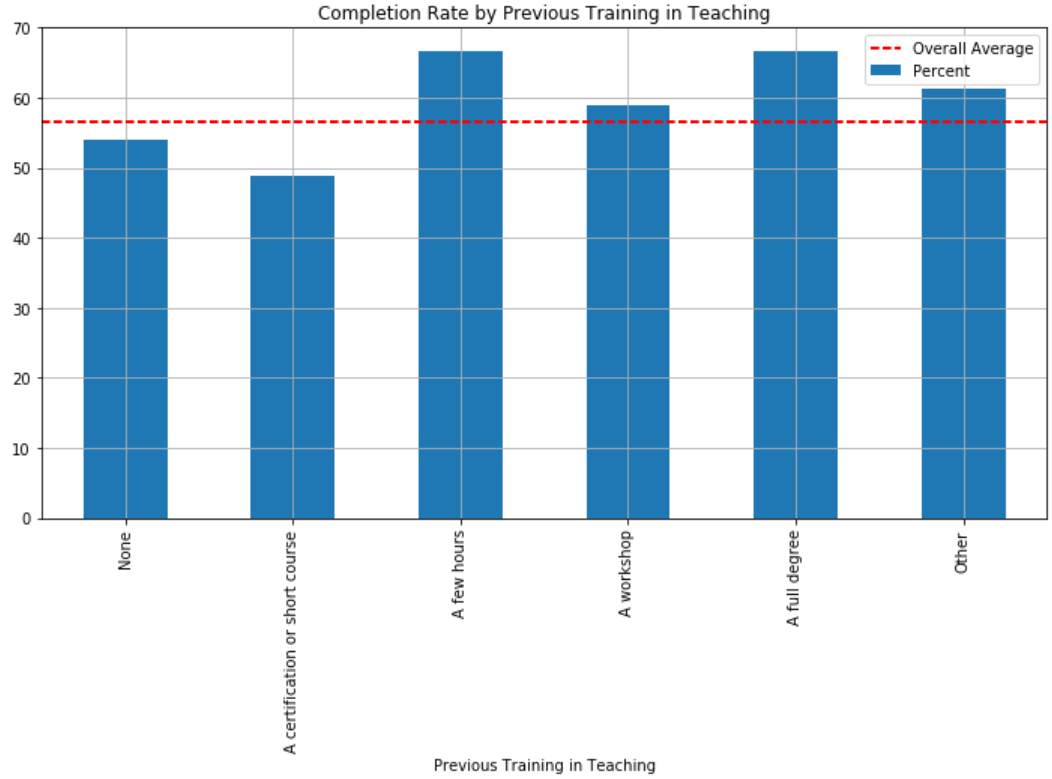


Figure 5: Completion Rates by Previous Training in Teaching

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by their previous training in teaching. The overall average of 56.6% is represented by the red line. Source data can be found in Table 4 in the appendix.



Open Applications by Previous Experience in Teaching

In addition to looking at applicants' previous training in teaching, we looked at their previous experience in teaching. The majority of applications come from people who have experience teaching a full course. This demonstrates that while they have this experience, they may not have had training in how to teach, and want to become better at it. Completion rates are steady around 50% for most groups. Those whose only teaching experience was a few hours or as at teaching assistant did not certify at all. These also represent the smallest number of applications and may not be a representative sample.

Figure 6: Open Applications by Previous Experience in Teaching

This bar chart shows the number of applications received by people by their previous experience teaching between July 1, 2016 and June 30, 2018. Source data can be found in Table 5 in the appendix.

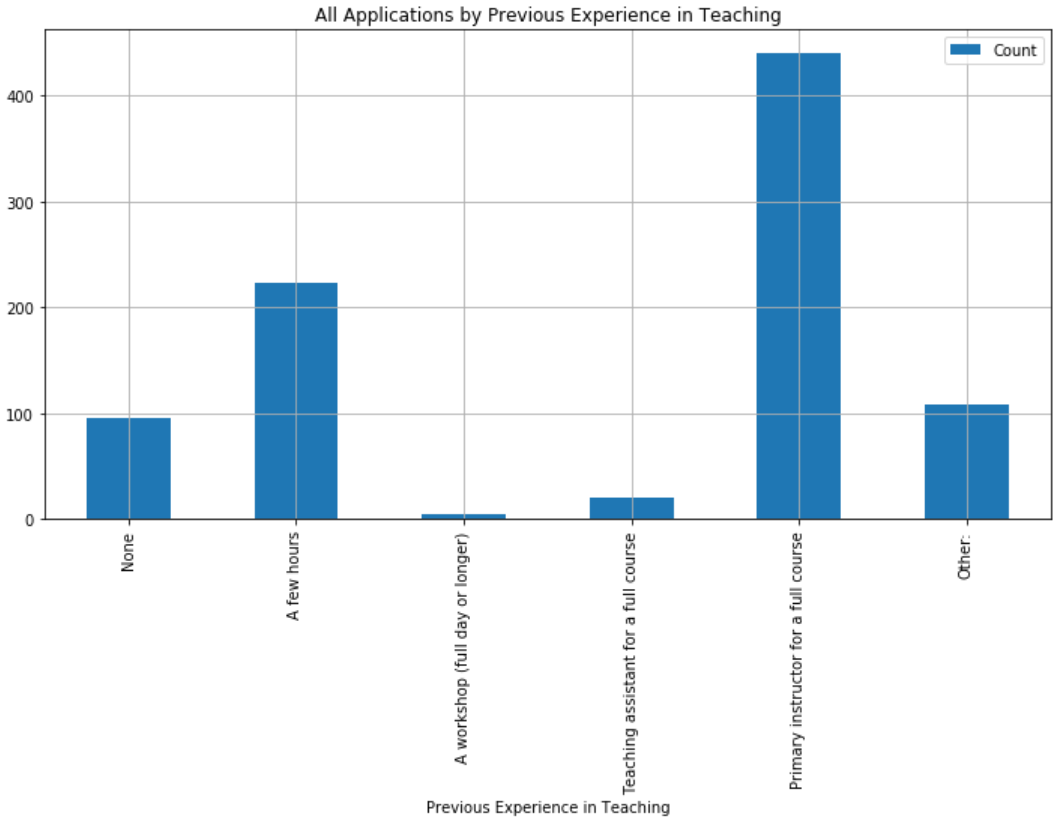
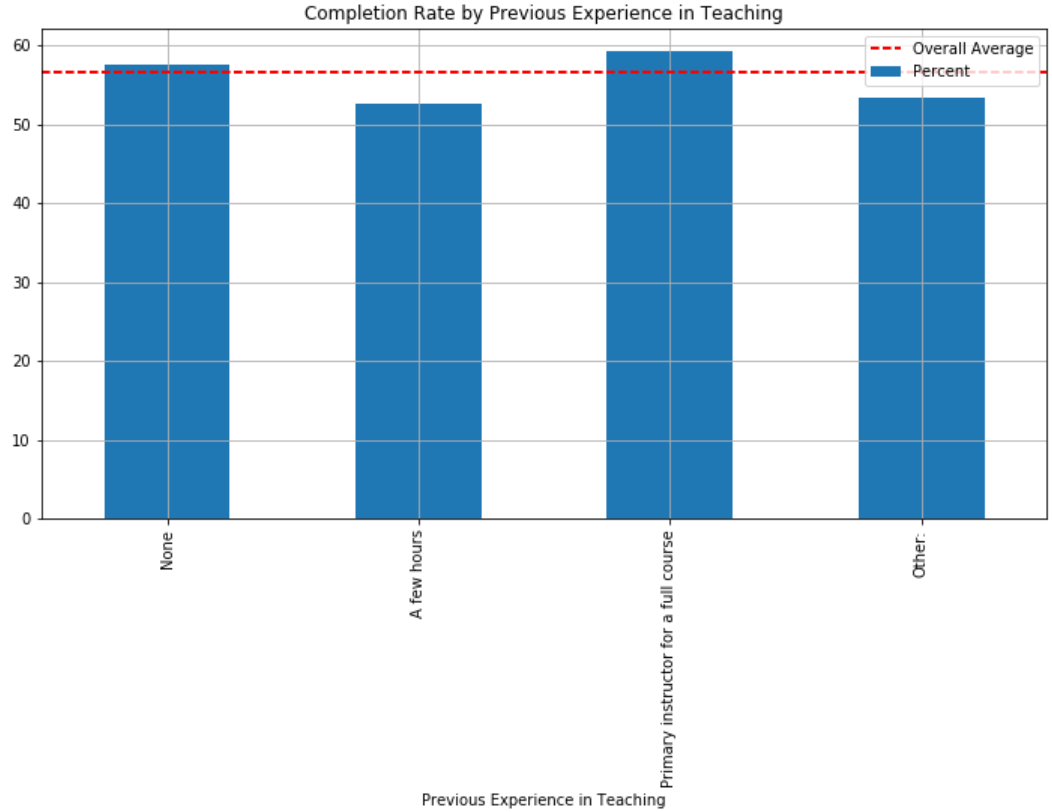


Figure 7: Completion Rates by Previous Experience in Teaching

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by their previous experience in teaching. The overall average of 56.6% is represented by the red line. Source data can be found in Table 5 in the appendix.



Open Applications by Previous Involvement with The Carpentries

We looked at our applications by previous involvement with The Carpentries. Applicants could self identify that they had experience as a helper, instructor, host, organizer, or contributor. Many applicants had multiple roles. We can not directly compare between groups as many people held more than one role. However, we can look at some characteristics of each group.

The majority of our applications came from people who had no previous involvement with us. This is impetus for us to understand how they learned about The Carpentries and to better understand their motivations for going through our instructor training events.

The next highest group of applications is from learners. However, they complete the certification process at lowest levels. This may be because they still feel they are at the learner/novice level and don't feel they know enough to teach. This may be an indication that while they value what they learned, they may not feel ready to teach it to others. Our pedagogical model values instructors who are only slightly ahead of their learners, because these instructors are often better able to relate to the learners and less affected by the expert blind spot. However, this may show that they don't feel confident or motivated enough to be in an instructor role.

People who have had previous experience with The Carpentries (helpers, hosts, instructors, contributors) all badge at levels higher than overall average. These are people who have had deeper experiences with The Carpentries, have more buy in and motivation, and are already coming in knowing about how we work. This may indicate that people who have seen our teaching practices, and are familiar with our curriculum are motivated to complete the certification process to make them official Carpentries instructors.

Figure 8: Open Applications by Previous Involvement with The Carpentries

This bar chart shows the number of applications received by people by previous involvement with The Carpentries between July 1, 2016 and June 30, 2018. Applicants could choose multiple roles, so the total will be more than the actual number of applications. Source data can be found in Table 6 in the appendix.

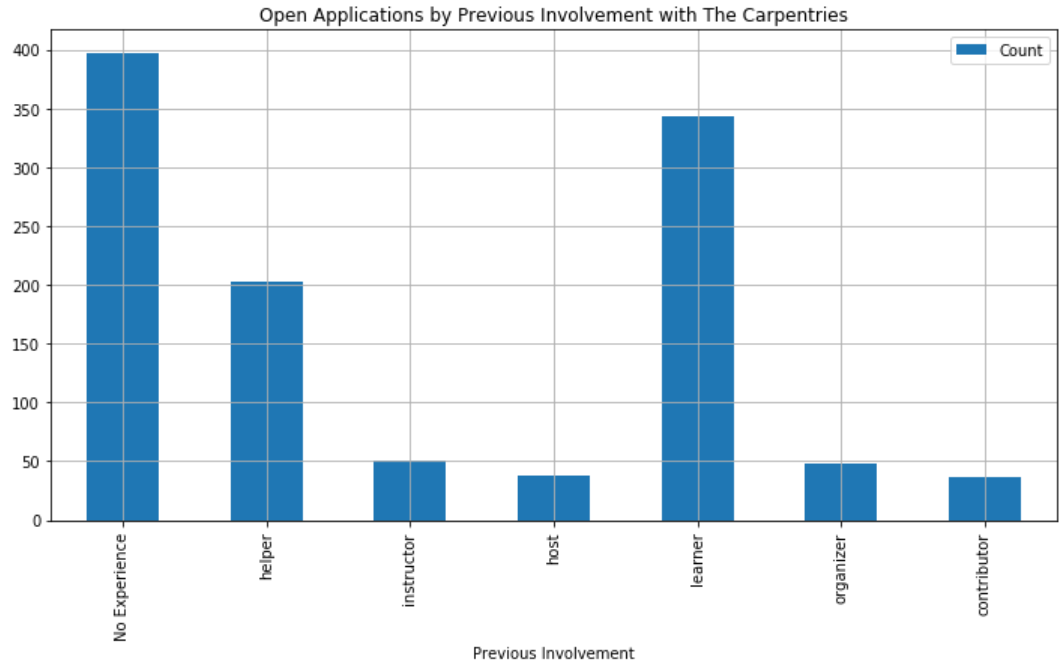
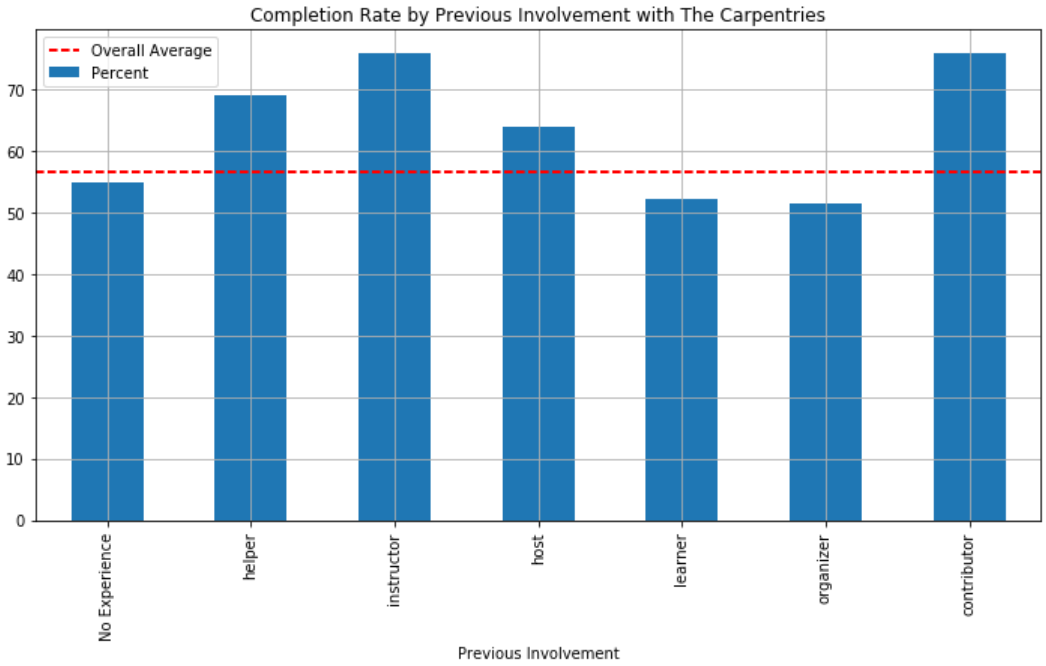


Figure 9: Completion Rate by Previous Involvement with The Carpentries

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by their previous involvement with The Carpentries. The overall average of 56.6% is represented by the red line. Source data can be found in Table 6 in the appendix.



Open Applications by Areas of Expertise

We looked at our applications by area of expertise. Applicants could self identify their areas of expertise. Many applicants identify with multiple domains. We can not directly compare between groups. However, we can look at some characteristics of each group.

The majority of applications came from people with a background in the life sciences, computer science, high performance computing, and/or mathematics and statistics. These groups were all near or slightly above the average completion rate.

Through a recent grant from the Alfred P. Sloan Foundation (https://datacarpentry.org/blog/2018/02/curriculum-dev-scaling) we are expanding our reach to new curricula including Social Sciences, Chemistry, and Economics. The data here show the importance of developing strategies for recruiting new instructors and onboarding existing instructors to develop, teach, and maintain these lessons.

Figure 10: Open Applications by Area of Expertise

This bar chart shows the number of applications received by people by their areas of expertise between July 1, 2016 and June 30, 2018. Applicants could choose multiple domains, so the total will be more than the actual number of applications. Source data can be found in Table 7 in the appendix.

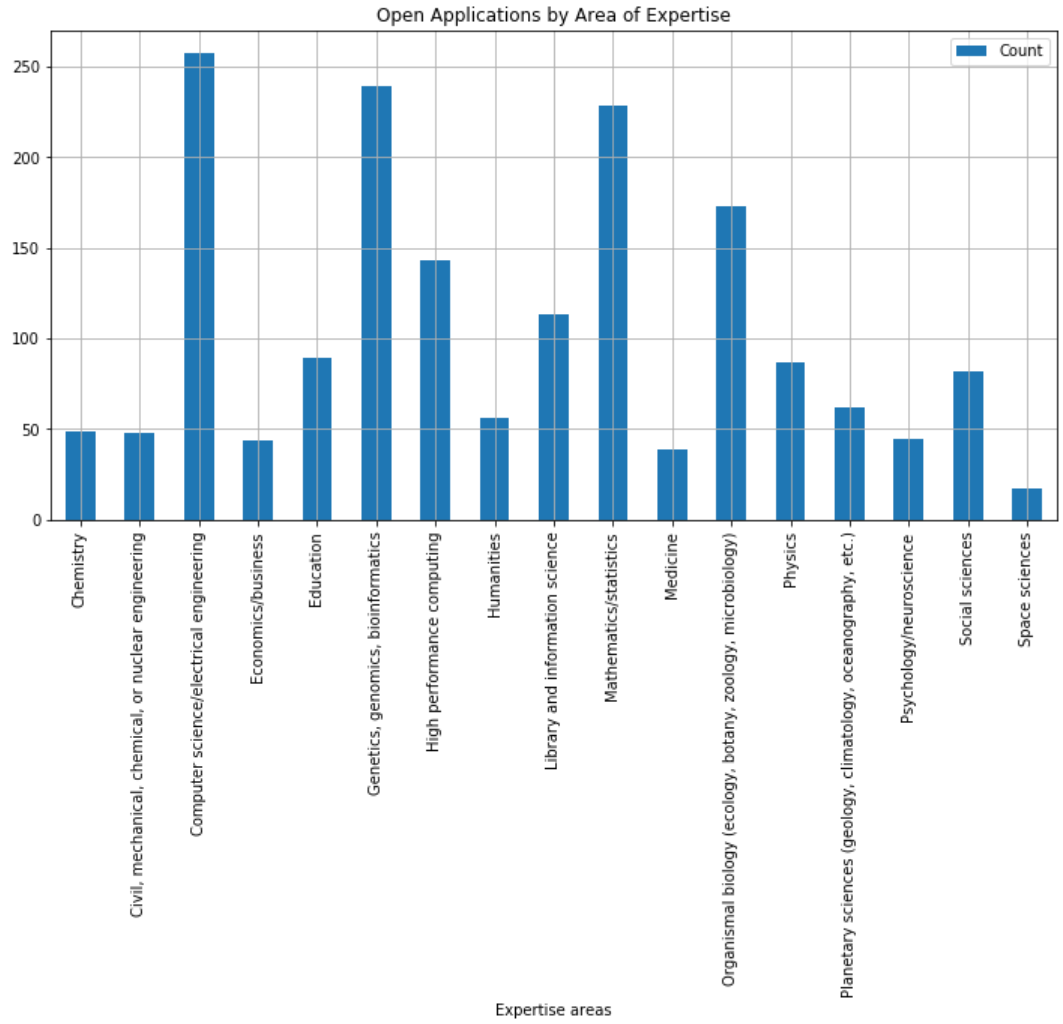
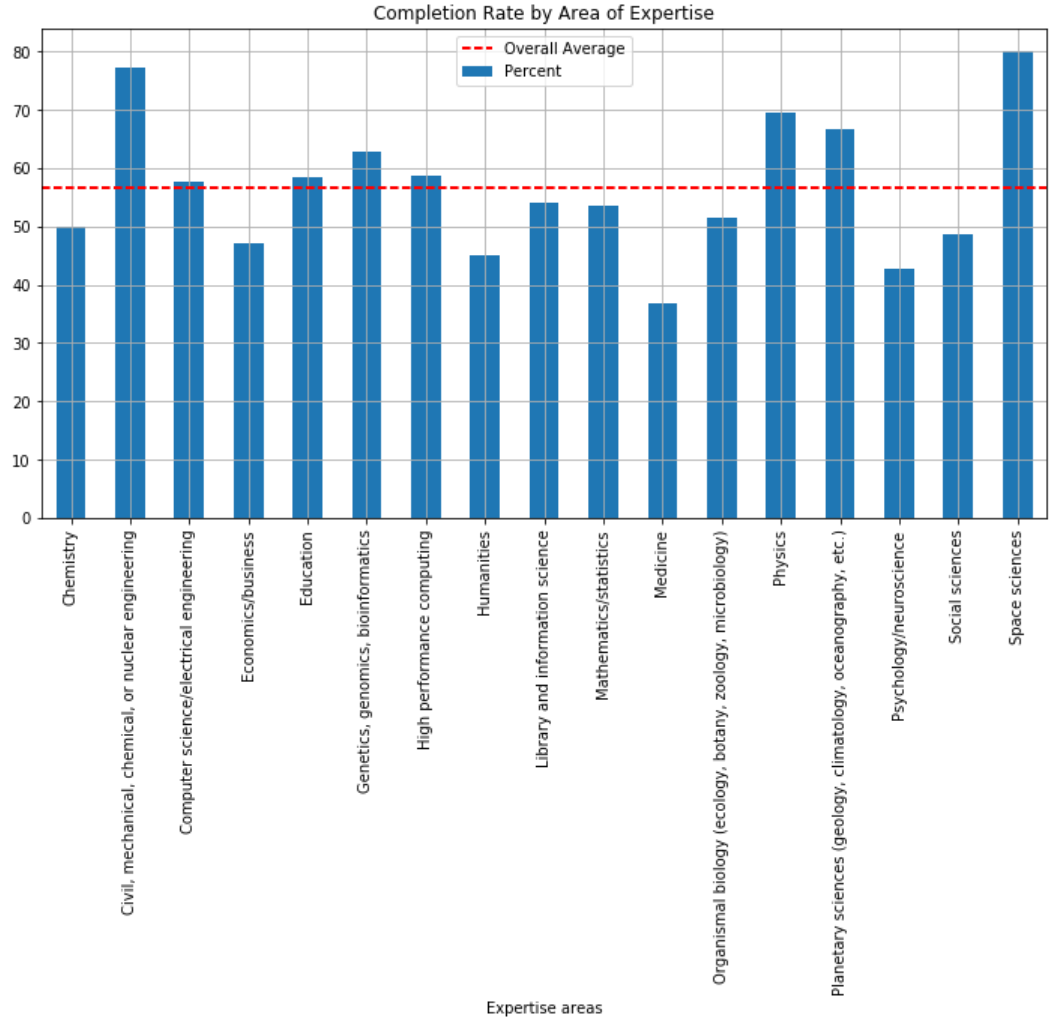


Figure 11: Completion Rates by Area of Expertise

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by their areas of expertise. The overall average of 56.6% is represented by the red line. Source data can be found in Table 7 in the appendix.



Open Applications by Programming Language Usage

The majority of our applications come from people who use a programming language frequently -- daily or several times a week. Certification rates are also lower among those who use a programming language infrequent. In presenting our Instructor Training program to member sites and to the broader community, we emphasize that our training is about pedagogy, cognitive psychology, and how to teach. We note that techinical skills are not taught. However, the aim of our Instructor Training program is to prepare people to teach our curriculum, which includes programming languages like R and Python, as well as other computational programming skills like version control in Git. We may be seeing a subset of our applicant pool who are looking to improve their teaching skills, but do not badge because they do not feel prepared to teach the tools we teach in our workshops. To this end, we have implemented a mentoring program (https://docs.carpentries.org/topic_folders/mentoring/index.html) where experienced instructors can support new instructors in being more prepared to teach, and would like to see more new instructors take advantage of this.

Figure 12: Open Applications by Programming Language Usage

This bar chart shows the number of applications received by people by frequency of programming language usage between July 1, 2016 and June 30, 2018. Source data can be found in Table 8 in the appendix.

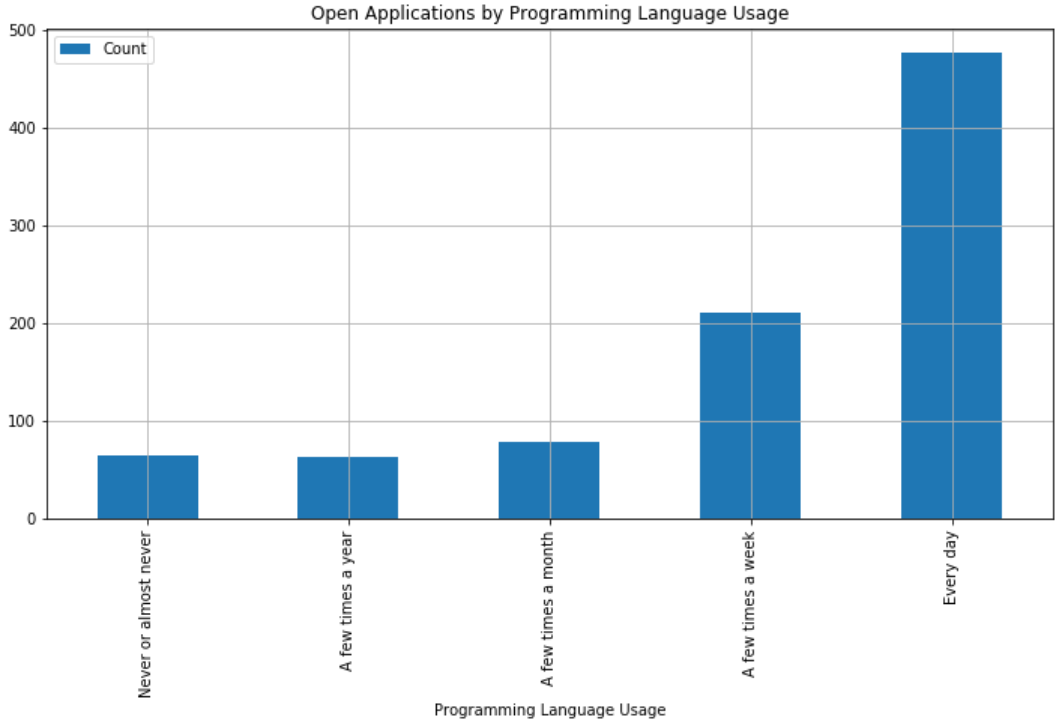
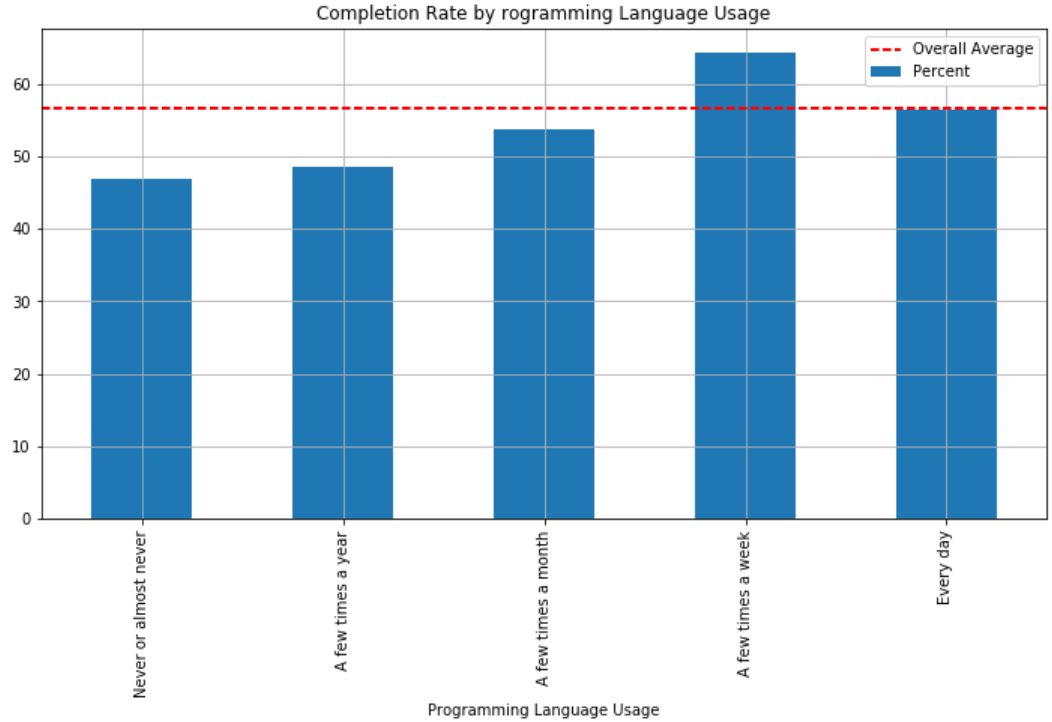


Figure 13: Completion Rates by Programming Language Usage

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by their frequency of programming language usage. The overall average of 56.6% is represented by the red line. Source data can be found in Table 8 in the appendix.



Open Applications by Occupation

We looked at the occupation or career stage of our applicants. We found the majority of applications to be from graduate students. They also completed at lower rates than our overall average. Teaching faculty also completed at lower than average rates. This may be because as active teachers, they are interested in developing their teaching skills but not necessarily in teaching specifically with The Carpentries. Completion rates are lowest for those who did not share their occupation. These may be people who are transitioning career stages and are not ready to commit to the certification process and teaching; rather they may see this as an opportunity for something to do while in transition.

We see high completion rates for researchers and librarians, perhaps demonstrating these are the people using the technology skills we teach regularly and are in a position to share these tools with others. While undergraduates also have high completion rates, this may be skewed by the fact that they represent a small percentage of our overall applications.

Figure 14: Open Applications by Occupation

This bar chart shows the number of applications received by people from each occupation between July 1, 2016 and June 30, 2018. Source data can be found in Table 9 in the appendix.

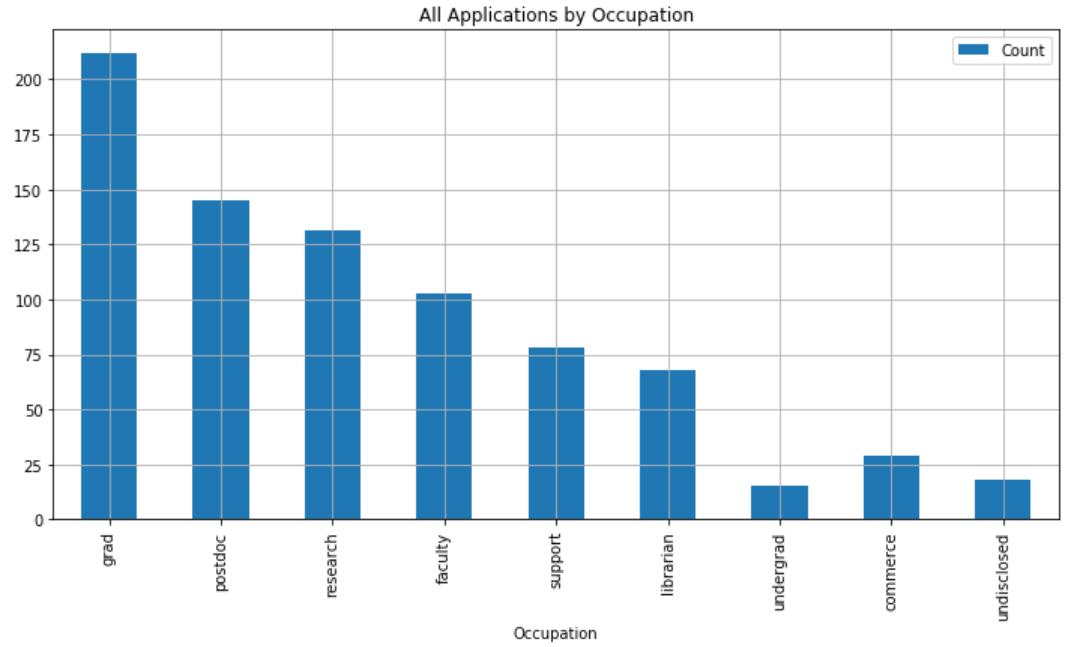
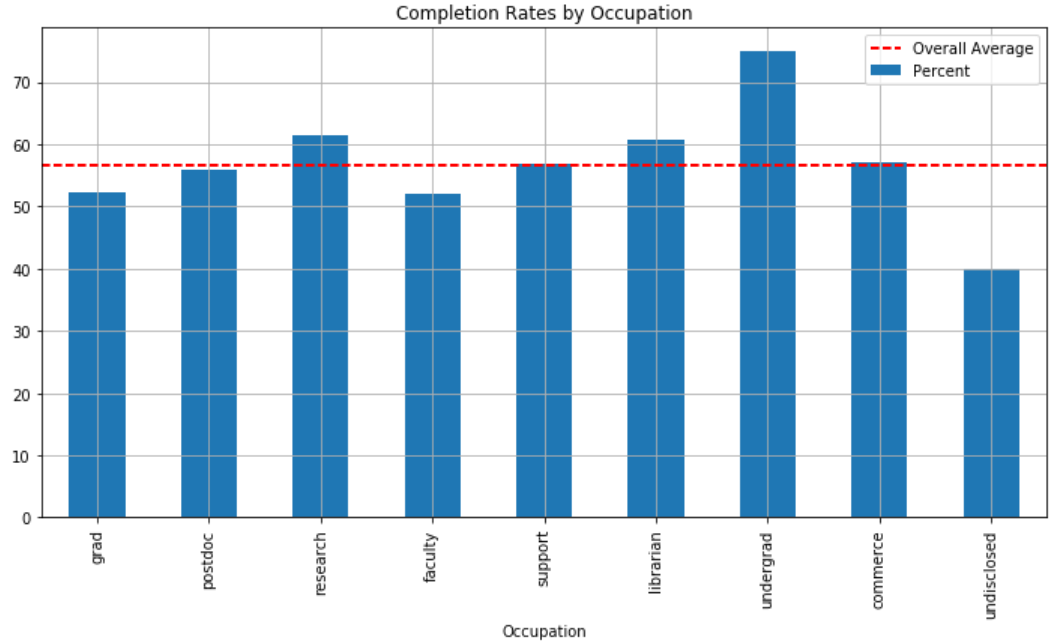


Figure 15: Completion Rates by Occupation

This chart shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018, by occupation. The overall average of 56.6% is represented by the red line. Source data can be found in Table 9 in the appendix.



Open Applications by Country

We looked at the number of applications that came in by country. The United States accounts for half of all applications (50.7%). Outside of the US, most applications come from Australia, Canada, South Africa, and the United Kingdom.

We also looked at the completion rate by country. Countries with 100% completion rates are those with only one trainee in that country. Countries with 0% completion rates have 1-5 trainees, and are often in places where we don't yet have a strong presence. Trainees may not feel support or motivation from a larger community. If we are bringing on new instructors it is incumbent on us develop and implement methods to support them even though they may be geographically isolated from the larger Carpentries community.

We see both high applcation rates and high completion rates in Australia and United Kingdom. It is worthwhile to investigate what is happening with Instructors and Trainers in those regions to to learn how we can apply these successes to other communities.

Figure 16: Applications by Country (bar chart)

This bar chart shows the number of applications received from each country. The United States, with 453 applications, is not included in the chart to avoid skewing the remaining data. Source data can be found in Table 10 in the appendix.

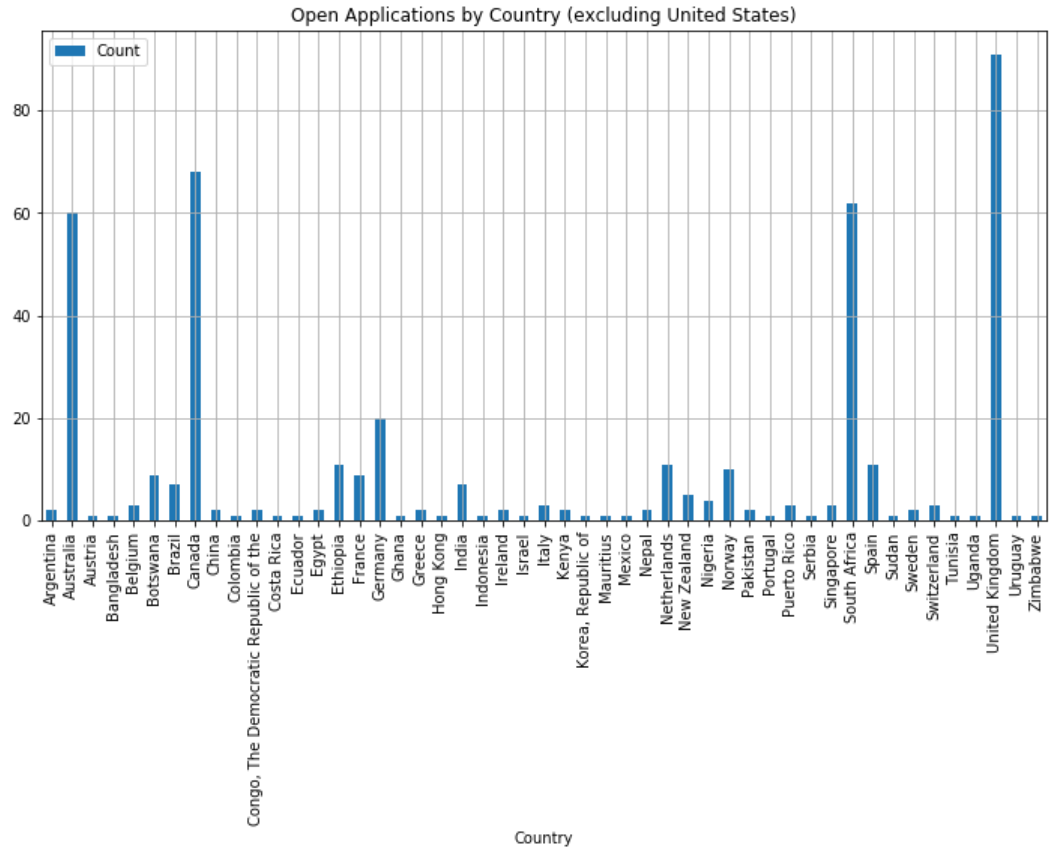


Figure 17: Completion Rates by Country (bar chart)

This bar chart shows the percent completion rates for each country. Not all countries with applications are represented here as some may have applied but not yet attended an event. Source data can be found in Table 10 in the appendix.

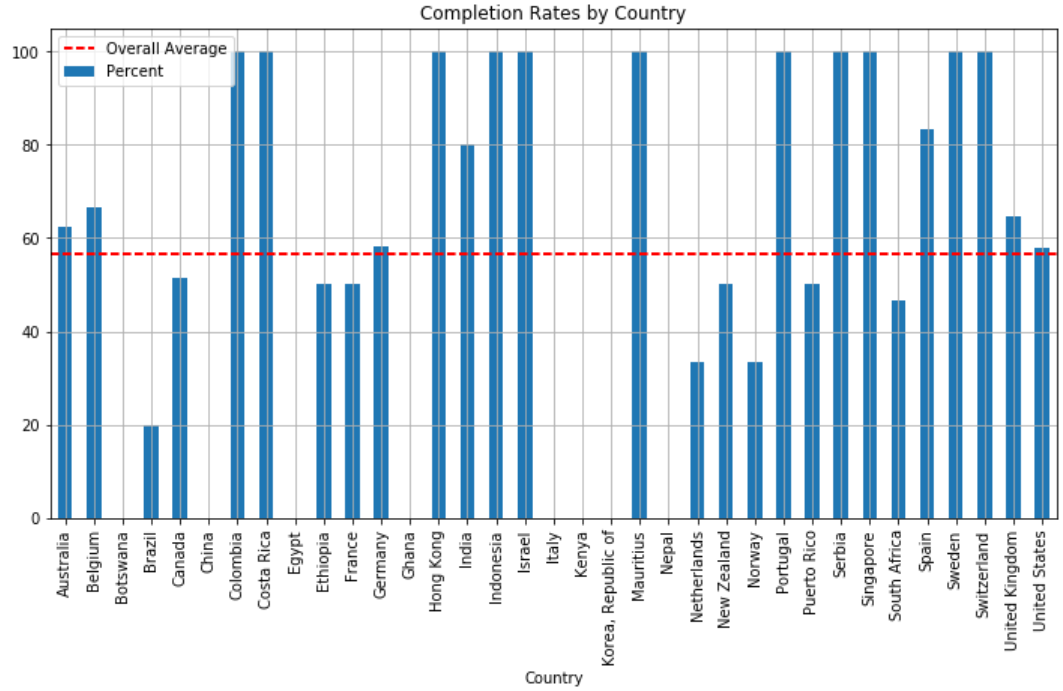


Figure 18: Applications by country (map)

This map shows the number of applications received from each country between July 1, 2016 and June 30, 2018. Countries in darker shades had higher application counts. Source data can be found in Table 10 in the appendix.

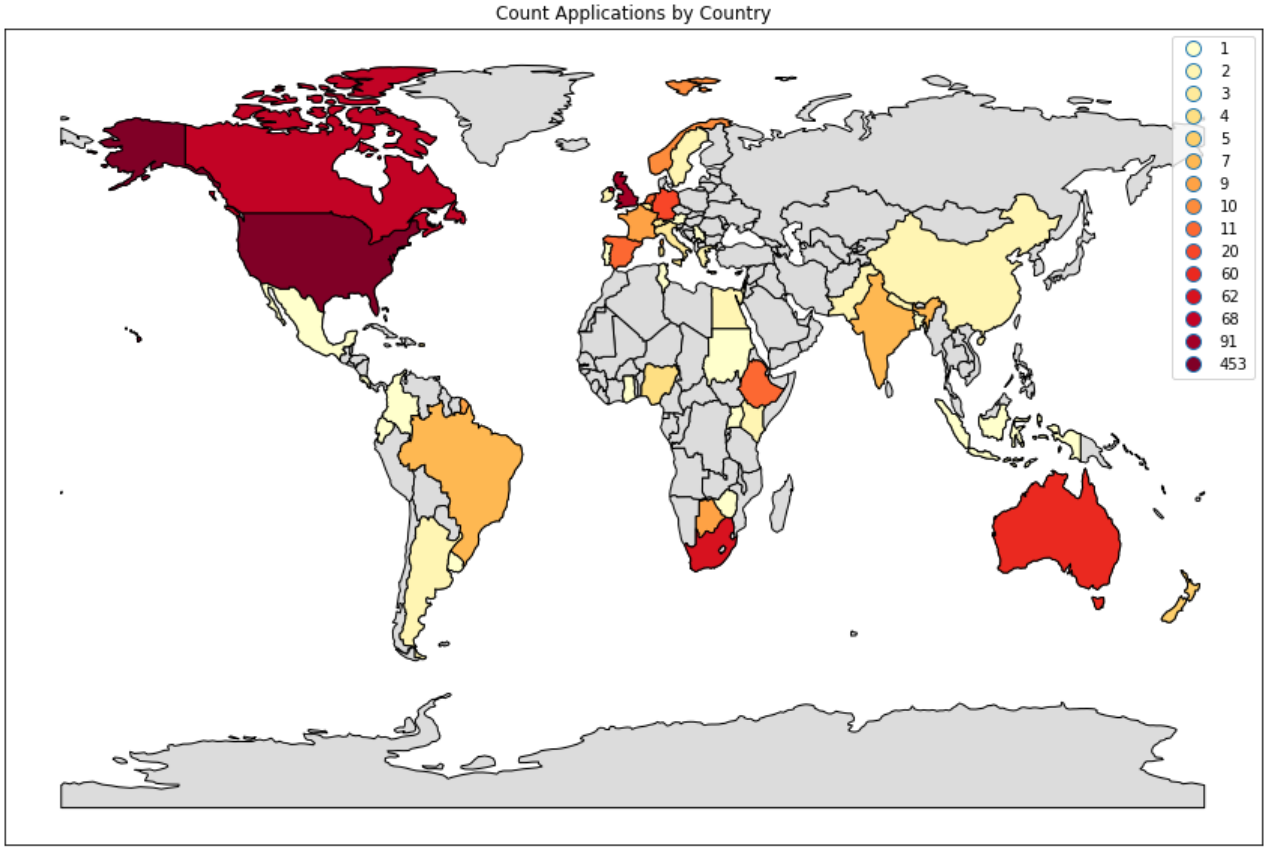
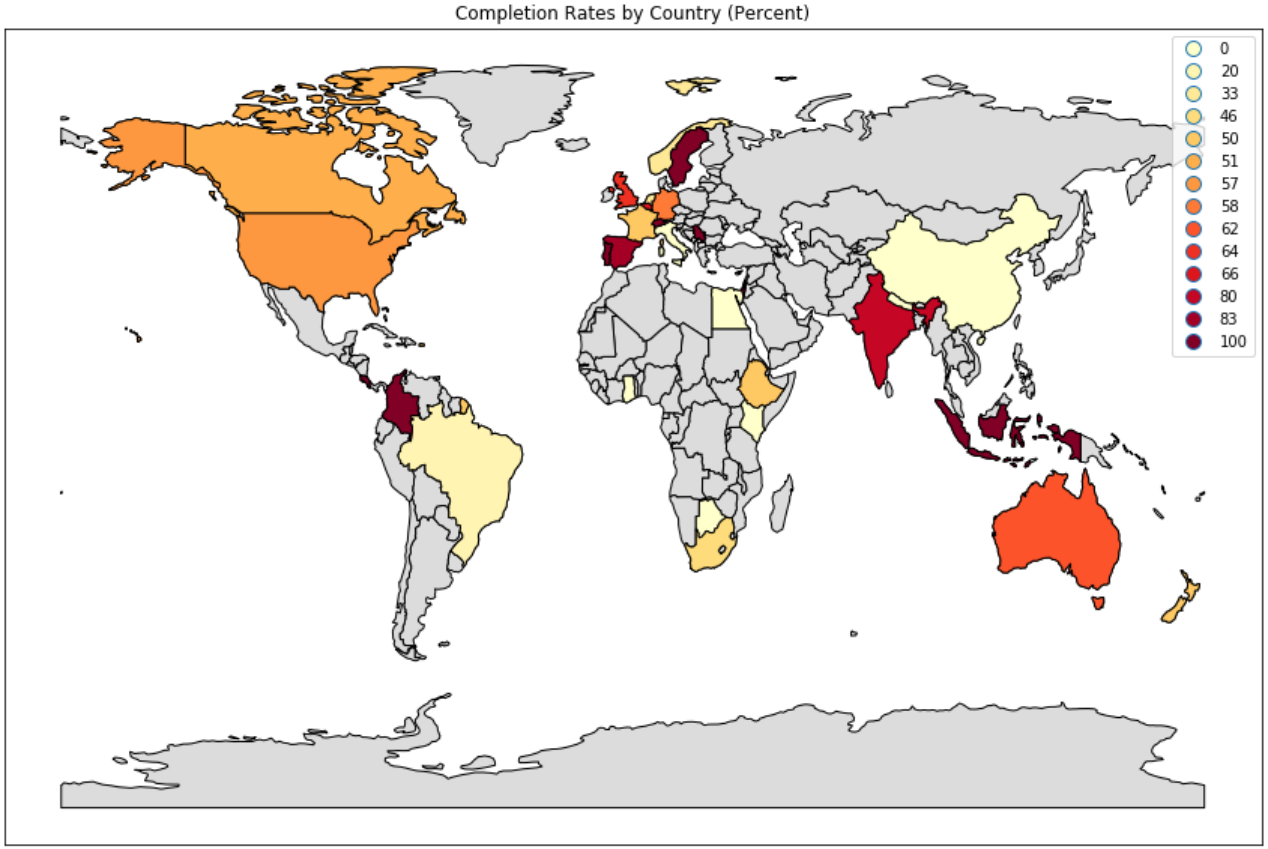


Figure 19: Completion rates by country (map)

This map shows the percent of applicants who attended instructor training events before March 31, 2018 and completed their Instructor certification by June 30, 2018. The global average is 56.6%. Countries in darker shades had higher rates of completion. Source data can be found in Table 10 in the appendix.



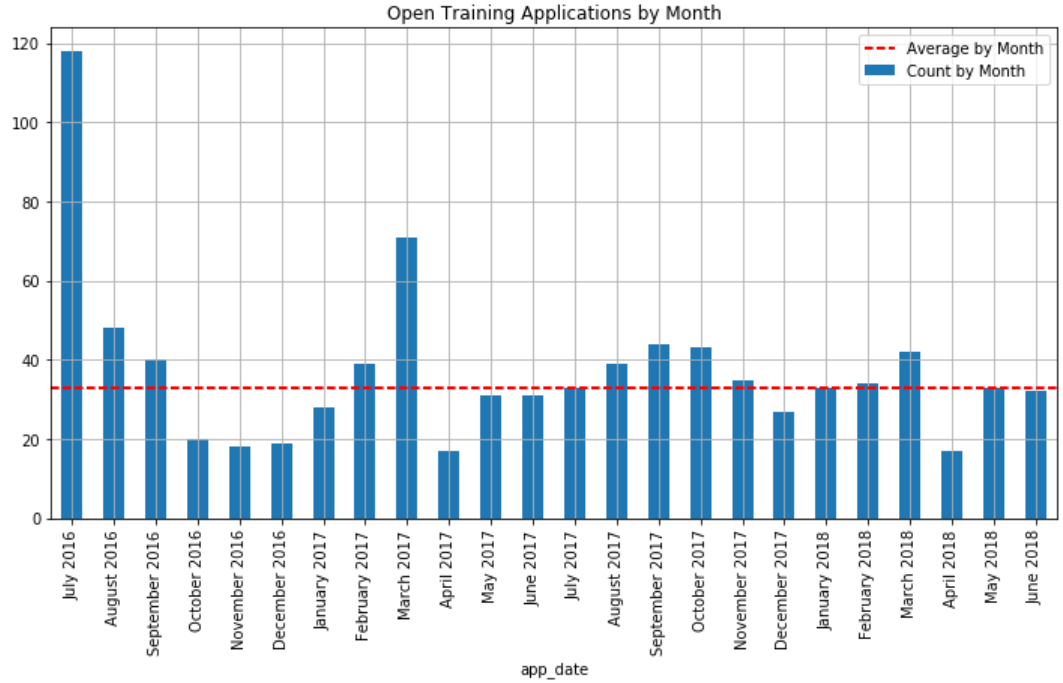
Open Applications by Month

Lastly, we looked at the frequency of open applications. This was important to help get a sense of overall demand for the training we offer.

July 2016 is likely an anomoly as that is when we introduced this application process and may show a surge in applications because of people who were waiting on new process to apply. Excluding this outlier, we saw an average of 33 applications per month, or approximately one a day. This demonstrates a strong demand for our instructor training from people who may not be affiliated with a member site.

Figure 20: Open Applications by Month

The bar chart below shows the number of applications received each month from July 2016 through June 2018. The red line shows the overall average of 33. Source data can be found in Table 11 in the appendix.



Summary

This data demonstrates the strong and ongoing demand for The Carpentries Instructor Training program.

We see that most of our applicants have little to no training in teaching, yet most are also the primary instructor for a full course. Software Carpentry and Data Carpentry workshops are motivated by recognizing that universities are not teaching computational programming skills, even though scientists and researchers need them. In the same light, our Instructor Training events may be motivated by people recognizing the need for a skill they otherwise do not have access to.

Our overall completion rate is just over half (56.6%), which means almost half of our trainees may be looking at this not as a means to teach with The Carpentries but also as a way to become better teachers themselves. This training can be seen not only as a pathway into The Carpentries community but also as a general professional development opportunity, especially for teaching faculty. This suggests that The Carpentries should explore our own motivations for offering instructor training. Our original reason for offering instructor training is to grow our community of instructors who can run Carpentries workshops at sites around the world, increasing the impact of Software and Data Carpentry workshops. Another reason may also be to fill a need that teaching faculty and other professionals have to improve their own skills. This would mean that badge rate is not necessarily a measure of success, and that we should look to other measures to demonstrate our impact.

Looking at those who do complete the badging process, we see that previous experience is a strong indicator of certification. Those with previous experience as helpers, instructors, or contributors badge at higher rates than the average. Community is an important value of The Carpentries, and we see the impact of this when people who already know our community members and are familiar with our curricula and teaching practices are more likely to become badged instructors.

We also see that demand is constant, with about one application coming in each day. Knowing that not all applicants will be accepted or will enroll, this still means that The Carpentries needs to examine our capacity to offer instructor training to the open applicant pool, especially in relation to the obligations to member sites.

Appendix

Table 1: Workshops by Carpentry By Year

This table shows the number of Data Carpentry (DC) and Software Carpentry (SWC) workshops each year. Data for 2018 is a projection. The proportion of workshops in the first two quarters of 2017 relative to the full year was applied to actual first two quarters data from 2018.

Workshop Type	DC	SWC	row total
Year			
2012	0	38	38
2013	0	93	93
2014	2	137	139
2015	31	243	274
2016	72	273	345
2017	81	257	338
2018	122	304	426
column total	308	1345	1653

Table 2: List of countries that held their first workshop each year

This table the first year each country held its first workshop. Countries are sorted alphabetically within each year, not by when in the year the workshop occured.

	name
year	
2012	Canada
2012	France
2012	Italy
2012	Norway
2012	United Kingdom
2012	United States
2013	Australia
2013	China
2013	Germany
2013	Lebanon
2013	Netherlands
2013	New Zealand
2013	Poland
2013	Saudi Arabia
2013	South Africa
2014	Brazil
2014	Cyprus
2014	Denmark
2014	Ghana
2014	Jordan
2014	Spain
2014	Sweden
2014	Switzerland
2015	Belgium
2015	Finland
2015	India
2015	Indonesia
2015	Kenya
2015	Korea, Republic of
2015	Slovenia
2015	Thailand

	name
year	
2015	Venezuela, Bolivarian Republic of
2015	other
2016	Colombia
2016	Greece
2016	Mexico
2016	Namibia
2016	Philippines
2016	Puerto Rico
2017	Botswana
2017	Ethiopia
2017	Gabon
2017	Mauritius
2018	Antarctica
2018	Ireland
2018	Pakistan
2018	Sudan

Table 3: Total workshops by country by year

This table lists the number of workshop each country has run each year.

start_date	2012	2013	2014	2015	2016	2017	2018	row total
country								
Antarctica	0	0	0	0	0	0	1	1
Australia	0	6	10	32	41	33	14	136
Belgium	0	0	0	1	0	1	1	3
Botswana	0	0	0	0	0	1	0	1
Brazil	0	0	6	5	5	0	1	17
Canada	8	11	22	25	41	29	13	149
China	0	1	0	0	0	0	0	1
Colombia	0	0	0	0	1	0	0	1
Cyprus	0	0	1	0	0	0	0	1
Denmark	0	0	1	0	2	3	1	7
Ethiopia	0	0	0	0	0	4	7	11
Finland	0	0	0	2	0	0	1	3
France	1	2	0	1	3	0	2	9
Gabon	0	0	0	0	0	1	0	1
Germany	0	3	3	4	4	9	7	30
Ghana	0	0	1	0	0	1	0	2
Greece	0	0	0	0	1	0	0	1
India	0	0	0	1	0	0	0	1
Indonesia	0	0	0	1	0	0	0	1
Ireland	0	0	0	0	0	0	2	2
Italy	1	0	1	0	2	0	1	5
Jordan	0	0	1	0	0	0	0	1
Kenya	0	0	0	1	1	0	0	2
Korea, Republic of	0	0	0	4	1	0	0	5
Lebanon	0	1	0	0	0	0	0	1
Mauritius	0	0	0	0	0	1	0	1
Mexico	0	0	0	0	1	1	1	3
Namibia	0	0	0	0	1	1	0	2
Netherlands	0	1	0	3	2	2	1	9
New Zealand	0	1	0	7	14	9	2	33
Norway	1	1	1	4	5	1	2	15

start_date	2012	2013	2014	2015	2016	2017	2018	row total
country								
Pakistan	0	0	0	0	0	0	1	1
Philippines	0	0	0	0	1	0	0	1
Poland	0	1	1	2	4	1	0	9
Puerto Rico	0	0	0	0	1	0	0	1
Saudi Arabia	0	1	0	0	0	0	0	1
Slovenia	0	0	0	1	0	0	0	1
South Africa	0	1	1	5	6	11	7	31
Spain	0	0	1	1	1	2	1	6
Sudan	0	0	0	0	0	0	1	1
Sweden	0	0	1	1	1	1	3	7
Switzerland	0	0	2	4	5	2	2	15
Thailand	0	0	0	1	0	1	0	2
United Kingdom	7	14	21	27	37	44	23	173
United States	20	49	65	140	164	179	109	726
Venezuela, Bolivarian Republic of	0	0	0	1	0	0	0	1
other	0	0	0	1	0	0	1	2
column total	38	93	139	275	345	338	205	1433

Table 4: Open Applications by Previous Training in Teaching

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate their previous training in teaching.

	Previous Training in Teaching	Applications	Count Attended	Count Badged	Percent
0	None	354	174	94	54
1	A certification or short course	152	82	40	48
2	A few hours	92	45	30	66
3	A workshop	150	85	50	58
4	A full degree	47	24	16	66
5	Other	97	44	27	61

Table 5: Open Applications by Previous Experience in Teaching

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate their previous experience in teaching.

	Previous Experience in Teaching	Applications	Count Attended	Count Badged	Percent
0	None	96	40	23	57
1	A few hours	223	114	60	52
2	A workshop (full day or longer)	5	0	0	0
3	Teaching assistant for a full course	20	0	0	0
4	Primary instructor for a full course	440	240	142	59
5	Other:	108	60	32	53

Table 6: Open Applications by Previous Involvement with The Carpentries

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate by previous involvement with The Carpentries. Applicants could choose multiple roles so the totals will add up to more than the total number applications.

	Previous Involvement	Applications	Count Attended	Count Badged	Percent
0	No Experience	397	189	104	55
1	helper	203	117	81	69
2	instructor	50	29	22	75
3	host	38	25	16	64
4	learner	343	184	96	52
5	organizer	48	31	16	51
6	contributor	37	25	19	76

Table 7: Open Applications by Areas of Expertise

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate by areas of expertise. Applicants could choose multiple domains so the totals will add up to more than the total number applications.

	Expertise areas	Applications	Count Attended	Count Badged	Percent
0	Chemistry	49	24	12	50
1	Civil, mechanical, chemical, or nuclear engineering	48	22	17	77
2	Computer science/electrical engineering	257	139	80	57
3	Economics/business	44	17	8	47
4	Education	89	48	28	58
5	Genetics, genomics, bioinformatics	239	129	81	62
6	High performance computing	143	80	47	58
7	Humanities	56	31	14	45
8	Library and information science	113	50	27	54
9	Mathematics/statistics	228	123	66	53
10	Medicine	39	19	7	36
11	Organismal biology (ecology, botany, zoology, microbiology)	173	99	51	51
12	Physics	87	46	32	69
13	Planetary sciences (geology, climatology, oceanography, etc.)	62	27	18	66
14	Psychology/neuroscience	45	14	6	42
15	Social sciences	82	41	20	48
16	Space sciences	17	10	8	80

Table 8: Open Applications by Programming Language Usage

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate by their frequency of programming language usage.

	Programming Language Usage	Applications	Count Attended	Count Badged	Percent
0	Never or almost never	64	32	15	46
1	A few times a year	63	35	17	48
2	A few times a month	78	41	22	53
3	A few times a week	210	101	65	64
4	Every day	477	245	138	56

Table 9: Applications by Occupation

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate by occupation.

	Occupation	Applications	Count Attended	Count Badged	Percent
0	grad	212	109	57	52
1	postdoc	145	77	43	55
2	research	131	78	48	61
3	faculty	103	48	25	52
4	support	78	51	29	56
5	librarian	68	28	17	60
6	undergrad	15	8	6	75
7	commerce	29	7	4	57
8	undisclosed	18	5	2	40

Table 10: Applications by Country

This table lists the number of applications, number attending, number of trainees completing badging, and percent completion rate by country.

	Country	Applications	Count Attended	Count Badged	Percent
0	Argentina	2	0	0	0
1	Australia	60	32	20	62
2	Austria	1	0	0	0
3	Bangladesh	1	0	0	0
4	Belgium	3	3	2	66
5	Botswana	9	3	0	0
6	Brazil	7	5	1	20
7	Canada	68	33	17	51
8	China	2	1	0	0
9	Colombia	1	1	1	100
10	Congo, The Democratic Republic of the	2	0	0	0
11	Costa Rica	1	1	1	100
12	Ecuador	1	0	0	0
13	Egypt	2	2	0	0
14	Ethiopia	11	4	2	50
15	France	9	6	3	50
16	Germany	20	12	7	58
17	Ghana	1	1	0	0
18	Greece	2	0	0	0
19	Hong Kong	1	1	1	100
20	India	7	5	4	80
21	Indonesia	1	1	1	100
22	Ireland	2	0	0	0
23	Israel	1	1	1	100
24	Italy	3	2	0	0
25	Kenya	2	1	0	0
26	Korea, Republic of	1	1	0	0
27	Mauritius	1	1	1	100
28	Mexico	1	0	0	0
29	Nepal	2	1	0	0
30	Netherlands	11	6	2	33
31	New Zealand	5	4	2	50

	Country	Applications	Count Attended	Count Badged	Percent
32	Nigeria	4	0	0	0
33	Norway	10	3	1	33
34	Pakistan	2	0	0	0
35	Portugal	1	1	1	100
36	Puerto Rico	3	2	1	50
37	Serbia	1	1	1	100
38	Singapore	3	1	1	100
39	South Africa	62	45	21	46
40	Spain	11	6	5	83
41	Sudan	1	0	0	0
42	Sweden	2	1	1	100
43	Switzerland	3	2	2	100
44	Tunisia	1	0	0	0
45	Uganda	1	0	0	0
46	United Kingdom	91	62	40	64
47	United States	453	202	117	57
48	Uruguay	1	0	0	0
49	Zimbabwe	1	0	0	0

Table 11: Open Applications by month

This table shows the number of applications we received each month for our open training seats.

	app_date	count
0	July 2016	118
1	August 2016	48
2	September 2016	40
3	October 2016	20
4	November 2016	18
5	December 2016	19
6	January 2017	28
7	February 2017	39
8	March 2017	71
9	April 2017	17
10	May 2017	31
11	June 2017	31
12	July 2017	33
13	August 2017	39
14	September 2017	44
15	October 2017	43
16	November 2017	35
17	December 2017	27
18	January 2018	33
19	February 2018	34
20	March 2018	42
21	April 2018	17
22	May 2018	33
23	June 2018	32