

Importance of open source

Overview

This script creates bar plots from question 2 on the survey, which is about the perceived importance of open source for different job categories and different tasks.

Import packages and utilities

```
project_root <- here::here() # requires that you be somewhere in the
# project directory (not above it)
# packages
suppressMessages(source(file.path(project_root, "scripts/packages.R")))
# functions and objects used across scripts
suppressMessages(source(file.path(project_root, "scripts/utils.R")))
```

Load data

```
data <- load_qualtrics_data("deidentified_no_qual.tsv")
```

Wrangle data

Let's extract the columns we care about.

```
importance_and_job <- data %>%
  select(
    starts_with("importance_opensrc") | starts_with("job_category")
  )
head(importance_and_job)
```

	importance_opensrc_1	importance_opensrc_2	importance_opensrc_3	
1	Very important	Very important	Very important	
2	Very important	Moderately important	Important	
3	Very important	Very important	Very important	
4	Very important	Slightly important	Important	
5	Very important	Important	Very important	
6	Very important	Non-applicable	Important	
	importance_opensrc_4	importance_opensrc_5		
1	Very important	Very important		
2	Important	Non-applicable		
3	Very important	Non-applicable		
4	Important	Non-applicable		
5	Very important	Non-applicable		
6	Important	Non-applicable		
				job_category
1				Faculty
2				Post-Doc
3	Other research staff (e.g., research scientist, research software engineer)			
4				Faculty
5				Faculty
6	Other research staff (e.g., research scientist, research software engineer)			

Let's reshape the data from wide to long format.

```
long_data <- importance_and_job %>%
  pivot_longer(
    cols = starts_with("importance_opensrc"),
    names_to = "importance_area",
    values_to = "importance_level"
  )

long_data <- long_data %>%
  mutate(
    importance_area = recode(
      importance_area,
```

```

      "importance_opensrc_1" = "Research",
      "importance_opensrc_2" = "Teaching",
      "importance_opensrc_3" = "Learning",
      "importance_opensrc_4" = "Professional Development",
      "importance_opensrc_5" = "Job"
    )
  )
long_data

```

```

# A tibble: 1,660 x 3
  job_category importance_area importance_level
  <chr>         <chr>         <chr>
1 Faculty      Research      Very important
2 Faculty      Teaching      Very important
3 Faculty      Learning      Very important
4 Faculty      Professional Development Very important
5 Faculty      Job          Very important
6 Post-Doc     Research      Very important
7 Post-Doc     Teaching      Moderately important
8 Post-Doc     Learning      Important
9 Post-Doc     Professional Development Important
10 Post-Doc     Job          Non-applicable
# i 1,650 more rows

```

STOP!!! At this point, I manually compared this data frame to the results table in Qualtrics to make sure the columns (e.g. `importance_opensrc_1`) correspond to the options I expect (e.g. “Research”). I had to use peoples’ email addresses to make sure I was comparing the same rows in each table. I assumed that the variables were ordered by their order on the survey, but you never know. In this case, my assumption was correct. I’ve commented out the code for this because it only needed to be done once.

```

# pii <- load_qualtrics_data("pii.tsv")
# emails <- pii %>%
#   select(starts_with("stay_in_touch_email"))

# t <- cbind(emails, importance_and_job)
# subset(t, startsWith(stay_in_touch_email, "PERSONNAMEHERE"))

```

Back to data wrangling.

Here, I removed all rows that contain an empty string in any column. Since both questions were mandatory, I’m actually only removing people who never saw the demographic questions:

people who are not affiliated with UC (2) + people who are neither past nor future open source contributors (36). $(2+36)*5$ importance areas = 190 rows removed.

```
dim(long_data)
```

```
[1] 1660    3
```

```
long_data <- long_data %>%  
  filter(!if_any(everything(), ~ . == ""))
```

```
dim(long_data)
```

```
[1] 1470    3
```

Shorten this one long category name. (Other research staff (e.g., research scientist, research software engineer) becomes simply Other.)

```
long_data$job_category <- gsub(  
  "^Other.*",  
  "Research Staff",  
  long_data$job_category  
)
```

Reorder factor levels for plotting.

```
long_data$importance_level <- factor(  
  long_data$importance_level,  
  levels = c(  
    "Very important",  
    "Important",  
    "Moderately important",  
    "Slightly important",  
    "Not at all important",  
    "Non-applicable"  
  ),  
  ordered = TRUE  
)  
long_data
```

```
# A tibble: 1,470 x 3
  job_category importance_area importance_level
  <chr>         <chr>         <ord>
1 Faculty      Research      Very important
2 Faculty      Teaching      Very important
3 Faculty      Learning      Very important
4 Faculty      Professional Development Very important
5 Faculty      Job          Very important
6 Post-Doc     Research      Very important
7 Post-Doc     Teaching      Moderately important
8 Post-Doc     Learning      Important
9 Post-Doc     Professional Development Important
10 Post-Doc     Job          Non-applicable
# i 1,460 more rows
```

Bar plots

Simple bar plot for teachers

Now let's start making some bar plots. Let's start by making a bar plot showing how teachers rate the importance of open source for their teaching. Since we didn't ask people "Do you teach?", and since there was a "Non-applicable" option, we will simply assume that if they gave an answer for the "Teaching" option, they must be a teacher.

```
teaching <- long_data %>%
  filter(
    importance_area == "Teaching"
  ) %>%
  filter(
    importance_level != "Non-applicable"
  )

# Remove the "importance_area" column because it's "Teaching" for every row.
teaching <- teaching %>% select(-c(job_category, importance_area))

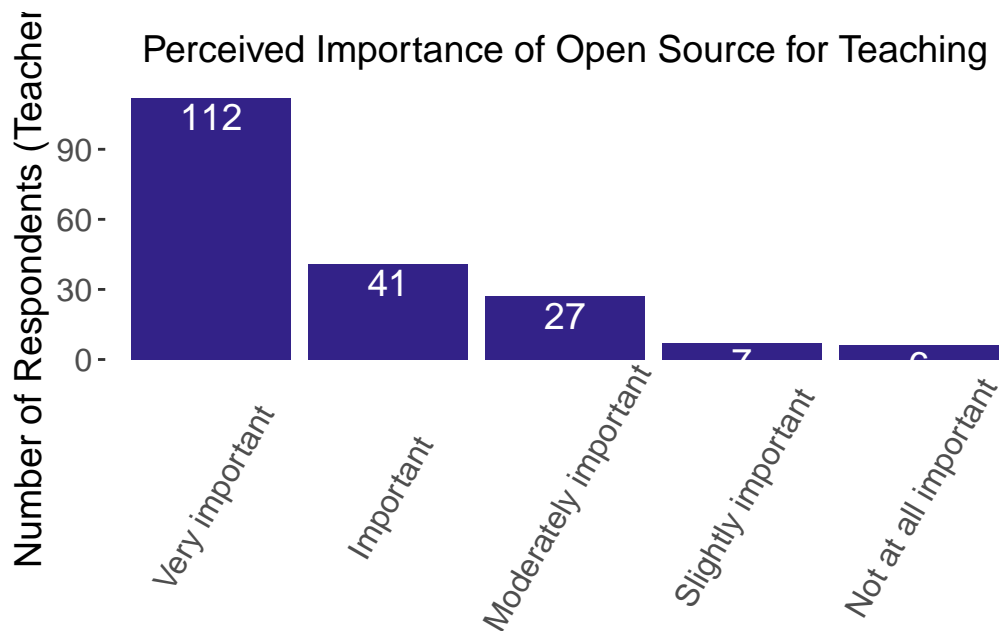
teaching <- teaching %>%
  count(importance_level, name = "Counts")

# By sheer luck, the columns are already ordered by response rates.
teaching
```

```
# A tibble: 5 x 2
  importance_level Counts
  <ord>           <int>
1 Very important    112
2 Important         41
3 Moderately important 27
4 Slightly important  7
5 Not at all important 6
```

Now let's make that bar chart using a function that lives in my utilities script (scripts/utlis.R).

```
basic_bar_chart(
  teaching,
  x_var = "importance_level",
  y_var = "Counts",
  title = "Perceived Importance of Open Source for Teaching",
  ylabel = "Number of Respondents (Teachers Only)",
  show_bar_labels = TRUE
)
```



Save the plot using a function that lives in my utilities script (scripts/utlis.R).

```
#save_plot("importance_teachers.tiff", 8, 5)
```

Grouped bar plot for researchers

Now let's look at researchers, and the importance categories that apply to all researchers. The importance categories again are:

Research

Teaching → Does not apply

Learning

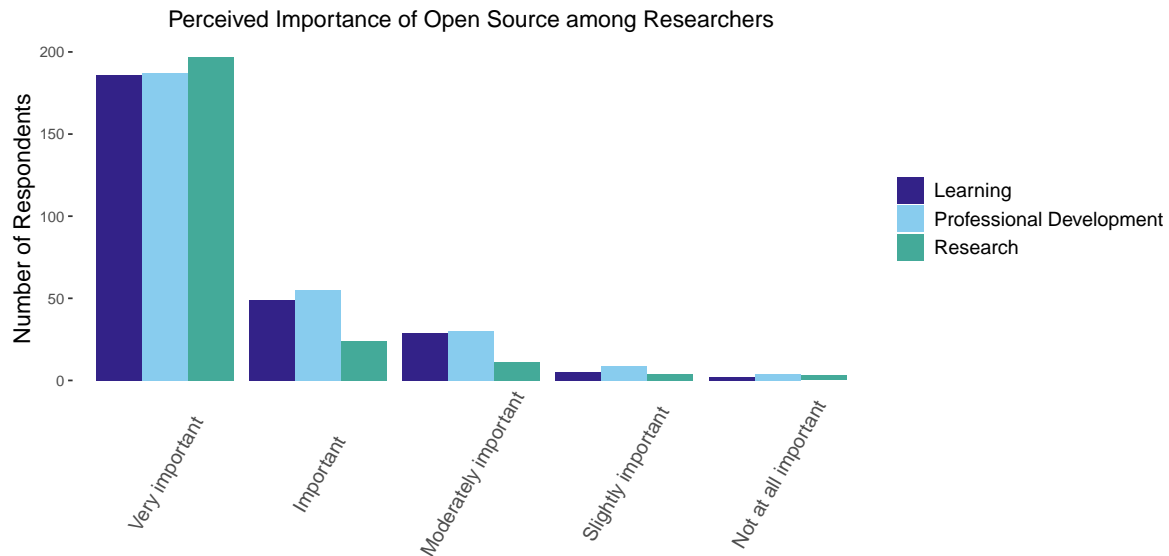
Professional Development

Job (For non-research staff) → Does not apply

So we'll make a bar plot with just those three categories that apply to all researchers. As with teachers above, we will assume that if they didn't select "Non-applicable", they must be a researcher.

The `grouped_bar_chart` function, like the `basic_bar_chart` function, lives in my utility script.

```
research_learning_pd <- long_data %>%  
  filter(  
    importance_area == "Research" |  
    importance_area == "Learning" |  
    importance_area == "Professional Development"  
  ) %>%  
  filter(importance_level != "Non-applicable")  
  
grouped_bar_chart(  
  df = research_learning_pd,  
  x_var = "importance_level",  
  fill_var = "importance_area",  
  title = "Perceived Importance of Open Source among Researchers"  
)
```



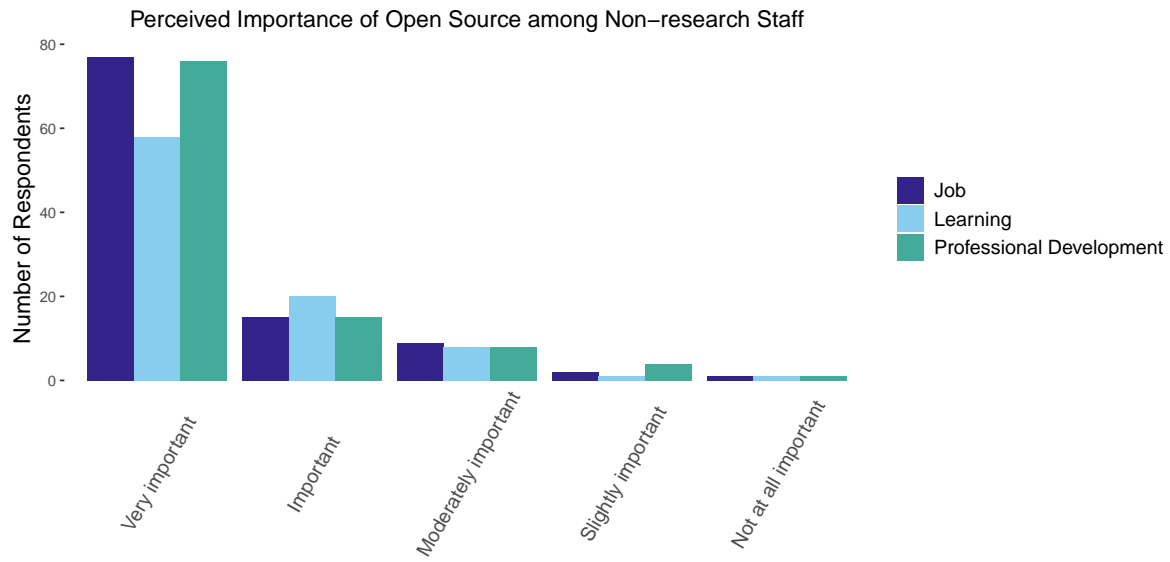
```
#save_plot("importance_researchers.tiff", 10, 5)
```

Grouped bar plot for non-research staff

This is very similar to what I did above, except the three applicable categories have changed.

```
job_learning_pd <- long_data %>%
  filter(
    importance_area == "Job" |
    importance_area == "Learning" |
    importance_area == "Professional Development"
  ) %>%
  filter(job_category == "Non-research Staff") %>%
  filter(importance_level != "Non-applicable")

grouped_bar_chart(
  df = job_learning_pd,
  x_var = "importance_level",
  fill_var = "importance_area",
  title = "Perceived Importance of Open Source among Non-research Staff"
)
```

```
#save_plot("importance_nrstaff.tiff", 10, 5)
```