

```
library(dplyr)
library(taRifx)
library(reshape2)
library(igraph)
```

## Function for reading survey responses and building graph

```
LE.items.plot <- function(file, scale = 1){
  # read Lab Epistemology file with student responses and construct networks of student
  # responses

  df <- read.csv(file)
  df$Student_ID <- 1:nrow(df)
  # first column has intervention variable, which we don't need
  df_bipartite <- melt(df[, c(2:ncol(df))], id = c('Student_ID')) %>%
    filter(!is.na(value)) %>%
    select(Student_ID, variable)

  colnames(df_bipartite) <- c('Student_ID', 'Item')

  graph_bipartite <- graph_from_data_frame(df_bipartite)
  V(graph_bipartite)$type <- V(graph_bipartite)$name %in% df_bipartite$Student_ID

  projected_graph <- bipartite_projection(graph_bipartite)
  graph_items <- projected_graph$proj1
  graph_students <- projected_graph$proj2

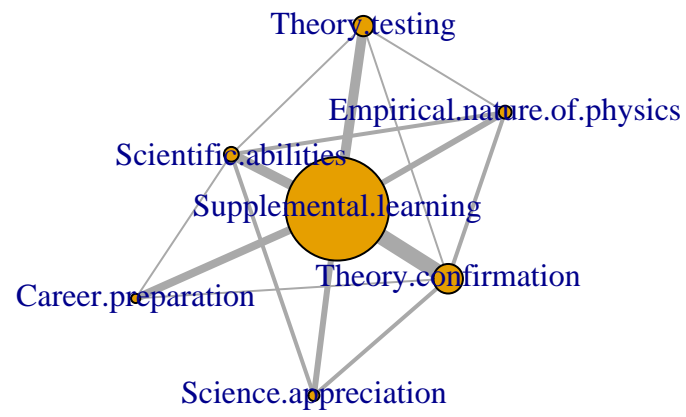
  Item_NStudents <- df_bipartite %>%
    group_by(Item) %>%
    summarize(N = n()) # get number of students that picked each item for vertex size

  V(graph_items)$size <- Item_NStudents$N / scale

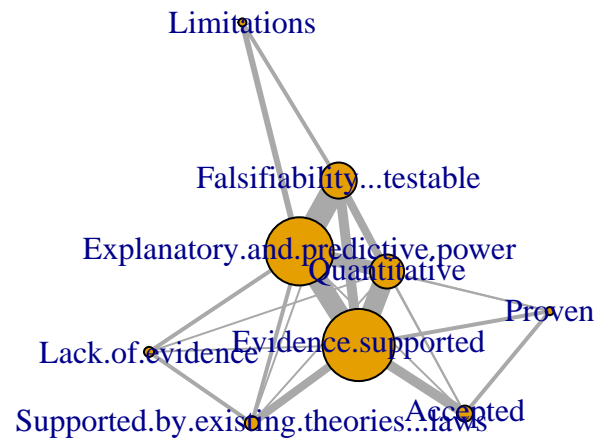
  graph_items %>%
    plot(vertex.size = unlist(V(.)$size), edge.width = E(.)$weight / scale)
}
```

## Construct plots of student responses to three questions from the LES

```
LE.items.plot('C:/Users/Cole/Documents/DATA/LabEpistemology_DATA/Q1.csv')
```



```
LE.items.plot('C:/Users/Cole/Documents/DATA/LabEpistemology_DATA/Q3.csv')
```



```
LE.items.plot('C:/Users/Cole/Documents/DATA/LabEpistemology_DATA/Q5.csv')
```

