

Faculty Dashboard

Raven Mott

DSPG(Data science for the
public good)



Project Objective

The objective of the faculty dashboard is to present data in a user friendly, interactive form to:

Foster Interdisciplinary Research: Identify potential interdisciplinary collaboration opportunities by finding faculty members who are connected to multiple departments or research areas.

Identify Funding Opportunities: Network analysis can help identify external collaborators or institutions with which to apply for joint funding opportunities.

Enhance Productivity: Identify effective collaboration patterns that lead to higher productivity and academic success.

Social Support Networks: Foster a supportive community by identifying social support networks within the faculty, helping to improve job satisfaction and retention.

Tools and Techniques for analysis

WE USED **R CODE** AND **R STUDIO**
AS THE IDE.

IGRAPH: FOR CREATING AND
ANALYZING NETWORK GRAPHS.

TIDYVERSE: A COLLECTION OF R
PACKAGES FOR DATA
MANIPULATION AND
VISUALIZATION. IT INCLUDES
DPLYR FOR DATA MANIPULATION
AND GGPLOT2 FOR PLOTTING,
WHICH CAN HELP PREPARE AND
VISUALIZE YOUR NETWORK DATA.

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SHINY: USED TO CREATE INTERACTIVE WEB APPLICATIONS IN R. IT ALLOWS YOU TO BUILD A USER INTERFACE AND SERVER LOGIC TO DISPLAY AND INTERACT WITH YOUR NETWORK DATA.

SHINYDASHBOARD: PROVIDES A FRAMEWORK FOR BUILDING DASHBOARDS IN SHINY APPS. IT HELPS ORGANIZE THE LAYOUT AND APPEARANCE OF THE APP, MAKING IT EASIER TO NAVIGATE AND INTERACT WITH.

NETWORKTOOLS: OFFERS ADDITIONAL TOOLS FOR NETWORK ANALYSIS, INCLUDING METHODS FOR IDENTIFYING CENTRAL NODES, COMMUNITIES, AND OTHER NETWORK PROPERTIES.

Data Source

Data was collected in 2021, of VSU faculty that applied for grants. This information was given to us as a data frame that contains column headings Fac1, Fac2, Dept, title, etc.



Interpretation

What does the data mean?

- title:** The title of the research project.
- purpose:** The purpose of the project (some entries indicate "Not entered yet").
- pi:** Principal Investigator of the project.
- agency:** The funding agency.
- requested:** The amount of funding requested.
- idc:** Indirect costs associated with the project.
- inkind:** In-kind contributions (if any).
- submitted:** Date the project was submitted.

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- submitted:** Date the project was submitted.
- status:** The status of the project (e.g., P for pending).
- collab_code:** A numerical code indicating the type of collaboration.
- collab_type:** Description of the collaboration type.
- external:** External collaborators and their affiliations.
- team:** Team members involved in the project.
- fac1:** Faculty member 1 involved in the project.
- dept1:** Department of faculty member 1.
- fac2:** Faculty member 2 involved in the project.
- dept2:** Department of faculty member 2.

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The grant application process involves several key steps. First, you identify funding opportunities that align with your research interests and ensure you meet the eligibility requirements. Next, you develop a research proposal, which includes a clear research question, a literature review, a detailed methodology, a budget, and a project timeline. You can find the data used in this project throughout the application process..

Implications

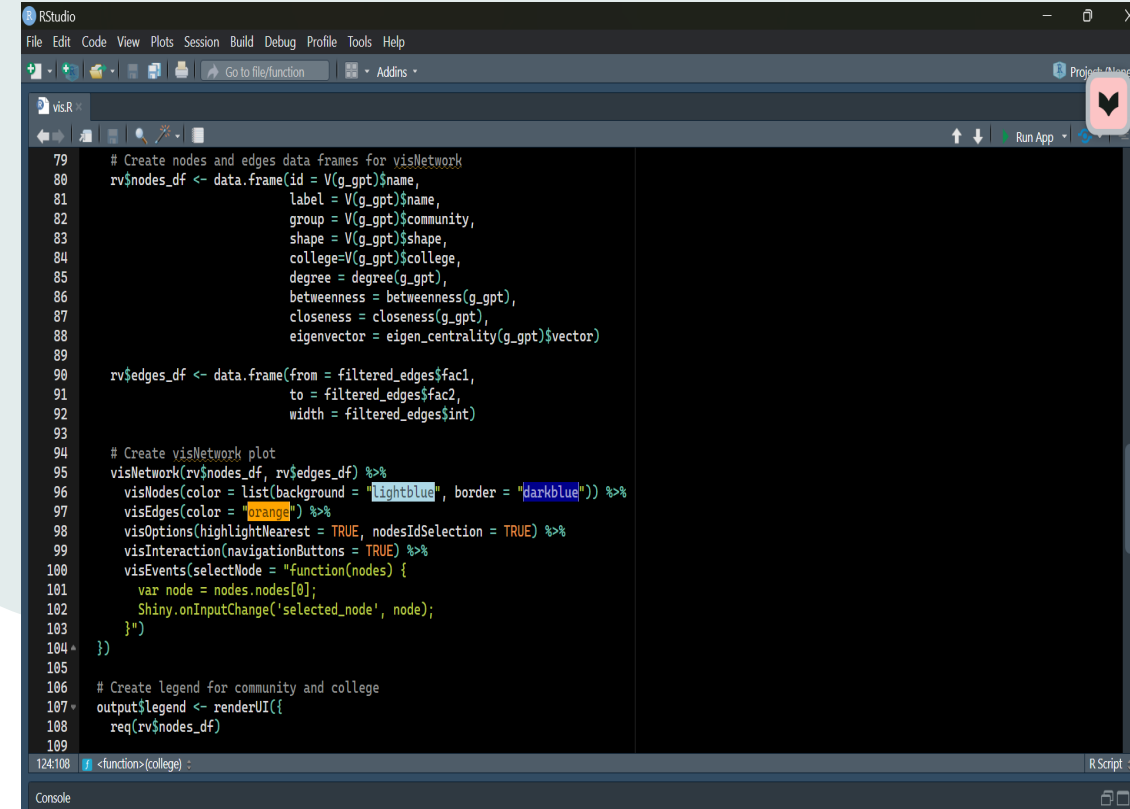
- Collaboration Networks:** In academic research, Social Network Analyse(SNA) is used to analyze collaboration patterns among researchers, helping to understand the dynamics of knowledge production and dissemination.
- Interdisciplinary Studies:** SNA fosters interdisciplinary research by linking researchers across different fields through shared interests or collaboration.
- Community Development:** SNA can help in identifying key community leaders or groups who can drive social change, making it easier to implement effective community-based policies.
- Collaboration and Communication:** In organizations, SNA can identify how teams interact, pinpoint communication bottlenecks, and highlight opportunities to improve collaboration.
- Innovation and Knowledge Sharing:** By analyzing networks, organizations can foster environments that promote the sharing of knowledge and innovative ideas

Shiny App Overview

Interactive Network Graph: Visualization of faculty collaborations.

Node Attributes: Degree, betweenness, closeness, eigenvector centrality.

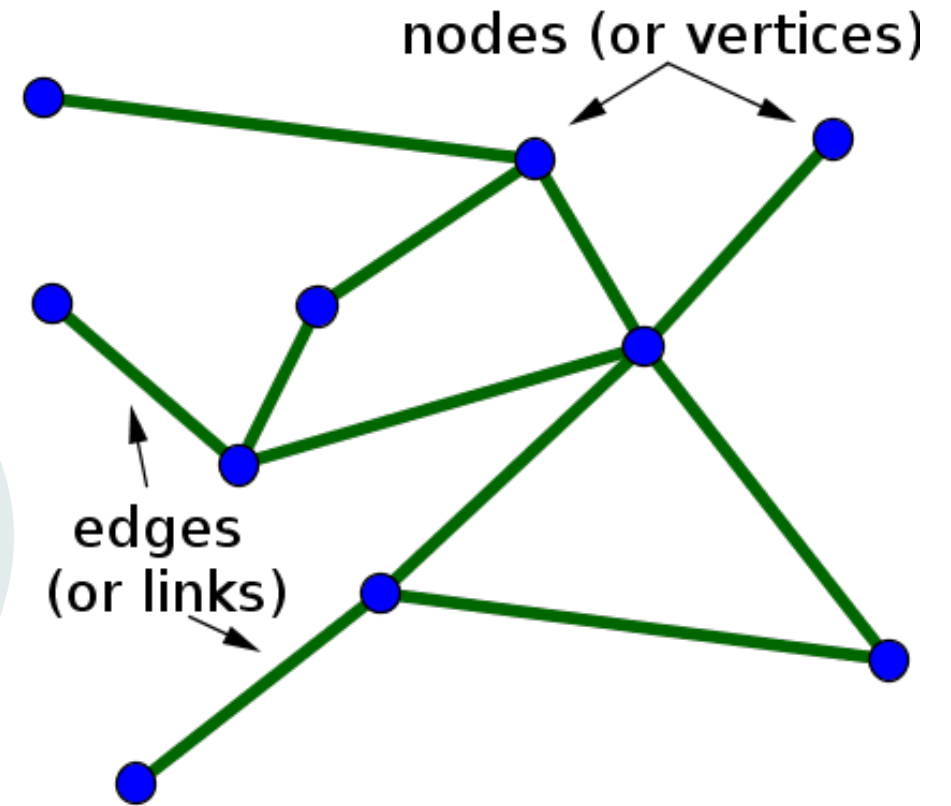
Legend and Node Information: Community and college legends, detailed node information.



```
79 # Create nodes and edges data frames for visNetwork
80 rv$nodes_df <- data.frame(id = V(g_gpt)$name,
81                           label = V(g_gpt)$name,
82                           group = V(g_gpt)$community,
83                           shape = V(g_gpt)$shape,
84                           college = V(g_gpt)$college,
85                           degree = degree(g_gpt),
86                           betweenness = betweenness(g_gpt),
87                           closeness = closeness(g_gpt),
88                           eigenvector = eigen_centrality(g_gpt)$vector)
89
90 rv$edges_df <- data.frame(from = filtered_edges$fac1,
91                           to = filtered_edges$fac2,
92                           width = filtered_edges$int)
93
94 # Create visNetwork plot
95 visNetwork(rv$nodes_df, rv$edges_df) %>%
96   visNodes(color = list(background = "lightblue", border = "darkblue")) %>%
97   visEdges(color = "orange") %>%
98   visOptions(highlightNearest = TRUE, nodeIdSelection = TRUE) %>%
99   visInteraction(navigationButtons = TRUE) %>%
100   visEvents(selectNode = "function(nodes) {
101     var node = nodes.nodes[0];
102     Shiny.onInputChange('selected_node', node);
103   }")
104 }
105
106 # Create legend for community and college
107 output$legend <- renderUI({
108   req(rv$nodes_df)
109 })
124:108 <function>(college) :
```

Networks

A network is simply a collection of connected objects. We refer to the objects as **nodes or vertices**, and usually draw them as points. We refer to the connections between the nodes as **edges**, and usually draw them as lines between points. We define **a community as a subset of nodes** within the graph where the connections between the nodes are denser than the connections with the rest of the network.

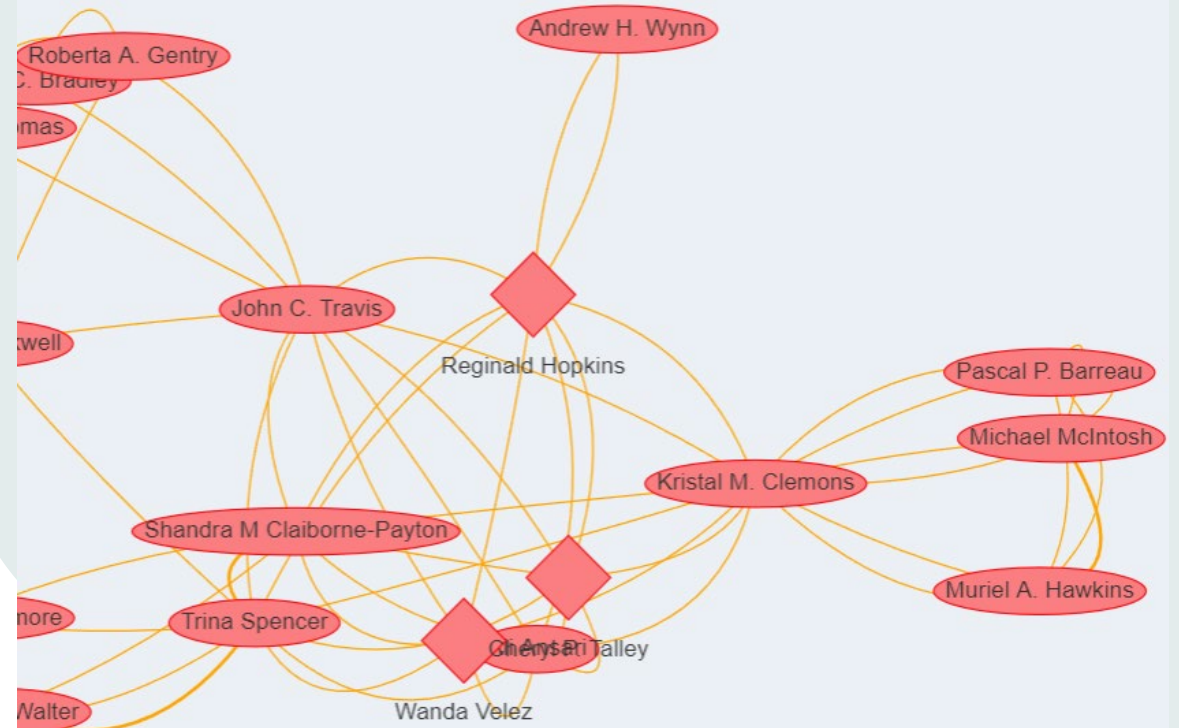


Vertices

The shape of the vertices relates to the college in which each instructor is in.

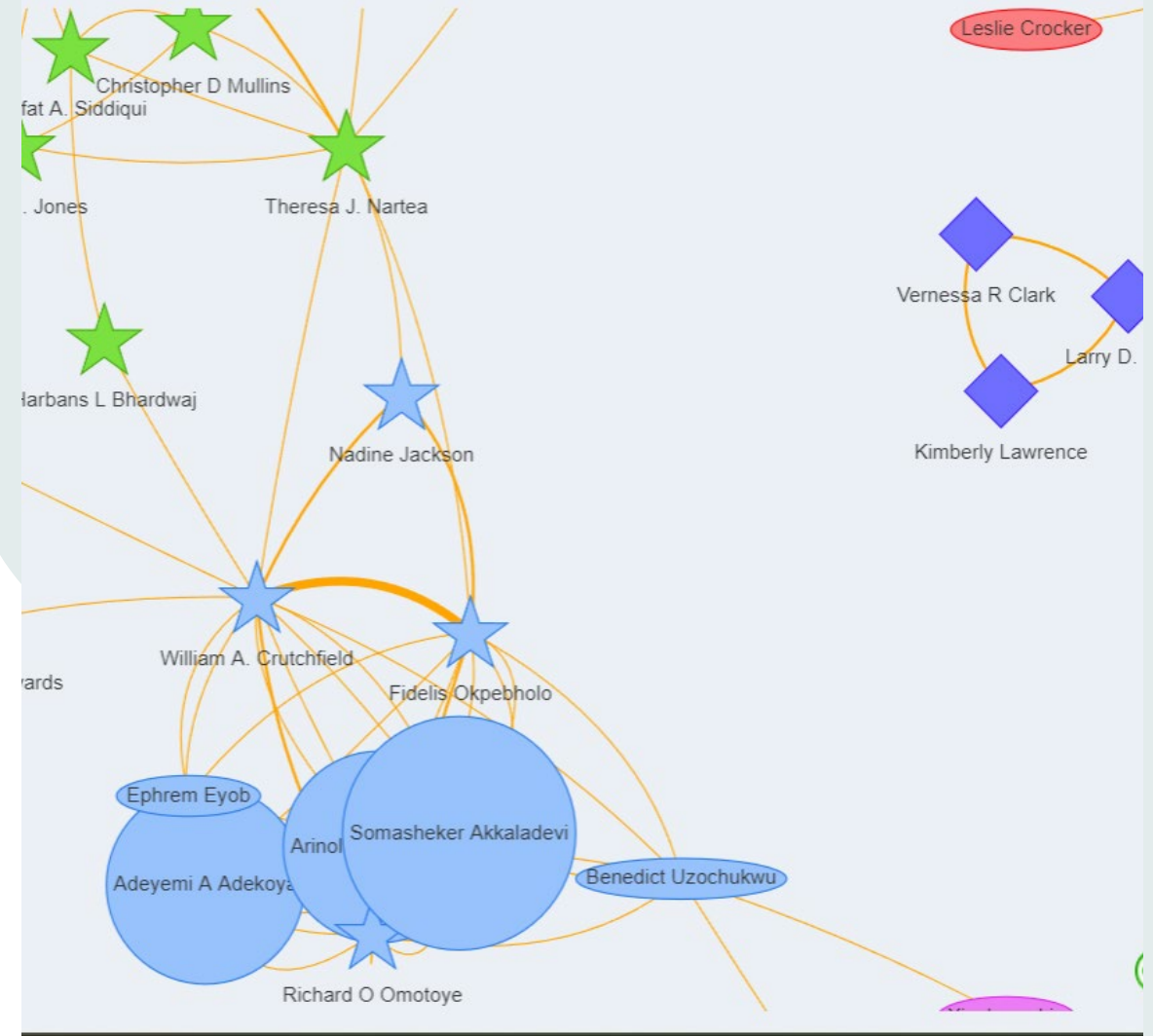
The size of the vertices correlate to the number of interactions an instructor has with other instructors.

The color of the vertices represents the community.



Edges

The network is undirected, and the edge thickness represents the number of interaction between two professors.





Key findings

Social Support Networks: Role in improving academic success and job satisfaction.

Case Studies: Examples from a Singaporean Higher Education Institution.

Challenges and Impact

- **Challenges:** Data interpretation issues, but the project provides valuable insights for future research and development.
- **Impact:** Offers a comprehensive understanding of research collaboration patterns and dynamics, contributing to institutional management and research themes in higher education.



The background of the slide is a blurred image of a library with tall wooden bookshelves filled with books. A person's silhouette is visible in the foreground, looking at the shelves. The right side of the slide has a light blue background with white text boxes.

Summary of the Faculty Dashboard Project

The **Faculty Dashboard project**, by Raven Mott under the Data Science for the Public Good (DSPG) , aims to present faculty data in an interactive and user-friendly format. The primary objectives are to foster interdisciplinary research, identify funding opportunities, enhance productivity, and identify support social networks within the faculty.

Work Cited

Contributions

Dr. M. Omar Faison, Associate Vice Provost,
Research & Economic Development

Dr. Samuel J. West, Assistant Professor

Manuela Deigh

References

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