

Title: Social Network Analysis

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Presenters: Tracy Sweet (with 2 grad student teaching assistants)

Proposed length of time: 3-4 hours

Description

The proposed Social Network Analysis workshop will introduce participants to both exploratory and inferential network analysis; in particular, we will cover methods for analyzing and modeling social network data using the open source software R, focusing on network data common in education. We will provide a brief introduction to network analysis, review common descriptive statistics and plotting methods, and conclude with an introduction to social network models and how to fit models in R.

Course content includes several short lectures mixed with practice with R code: an introduction to social network analysis, practice analyzing and graphing networks using the `igraph` package in R, an introduction to social network models, and practice fitting social network models to networks in R. Participants will leave the workshop with an understanding of quantitative methods available for analyzing social networks as well as the current state of model capabilities, R code for analyzing their own networks and fitting network models.

Significance

Although we often think of social network data as friendship connections among a group of individuals, the methods used to analyze networks can be applied to a variety of different types of networks that are important for education effectiveness research. Networks such as teacher collaboration or support are relevant for understanding how the school organization operates as a whole. Similarly, these networks may also impact how an intervention is employed in schools as well as the mechanisms through which the intervention “works”. Given the use of online surveys for data collection, network data are easy to collect and research involving networks has become more common among education researchers.

For example, school districts are interested in having teachers collaborate with each other to share instructional ideas, advice and other resources in efforts to improve instructional quality and student outcomes. In recent years, a body of research has emerged studying how teachers interact with one another, which factors bring teachers together, how information is shared within a school building and how teacher outcomes are then impacted (e.g., Coburn and Russell, 2008; Daly, Moolenaar, Bolivar, and Burke, 2010; Frank, Zhao, and Borman, 2004; Penuel, Riel, Krause, and Frank, 2009; Spillane, Kim, and Frank, 2012; Spillane, Hopkins, and Sweet, 2015, 2018). Much of this work has relied on social network analysis, both exploratory methods to understand how teachers interact but also inferential methods to test hypotheses about why certain teachers connect and how these connections foster changes in instructional quality.

Target Audience

This workshop is targeted for participants interested in learning about social network analysis and modeling. The material is appropriate for researchers at any stage in their career, students included. We recommend that participants be familiar with R and fitting statistical models although previous experience with social network analysis is not needed.

References

- Coburn, C. E. and Russell, J. L. (2008), “District Policy and Teachers’ Social Networks,” *Educational Evaluation and Policy Analysis*, 30, 203–235.
- Daly, A. J., Moolenaar, N. M., Bolivar, J. M., and Burke, P. (2010), “Relationships in reform: The role of teachers’ social networks,” *Journal of Educational Administration*, 48, 359–391.
- Frank, K. A., Zhao, Y., and Borman, K. (2004), “Social capital and the diffusion of innovations within organizations: The case of computer technology in schools,” *Sociology of Education*, 77, 148–171.
- Penuel, W., Riel, M., Krause, A., and Frank, K. (2009), “Analyzing teachers’ professional interactions in a school as social capital: A social network approach,” *The Teachers College Record*, 111, 124–163.
- Spillane, J., Hopkins, M., and Sweet, T. (2015), “Intra- and Inter-school Instructional Interactions: Exploring Conditions for Instructional Knowledge Production Within and Between Schools,” *American Journal of Education*, 122, 71–110.
- Spillane, J. P., Hopkins, M., and Sweet, T. M. (2018), “School District Educational Infrastructure and Change at Scale: Teacher Peer Interactions and Their Beliefs About Mathematics Instruction,” *American Educational Research Journal*, 55, 532–571, doi: 10.3102/0002831217743928.
- Spillane, J. P., Kim, C. M., and Frank, K. A. (2012), “Instructional Advice and Information Providing and Receiving Behavior in Elementary Schools Exploring Tie Formation as a Building Block in Social Capital Development,” *American Educational Research Journal*, 119, 72–102.