Chapter 2 CUPID

Introduction / Literature Review

Methods

As discussed in the literature review, the presence of clustering and fragmentation within our network could signify disciplinary grouping (Vacca et al. 2015; Mali et al. 2012; Newman 2001; Moody 2004; Norton et al. 2017). The small-world network structure suggests that our network may comprise numerous tightly-knit clusters connected by a few inter-cluster links. In contrast, a scale-free structure could indicate a hierarchical network dominated by a few highly connected individuals or "hubs."

By focusing on connecting researchers across diverse modules, such as spanning structural holes and counterbalancing preferential attachment, Vacca et al. showcase the potential of network interventions to overcome inherent biases in collaboration patterns and to bridge gaps between disparate scientific communities. This approach offers a pragmatic pathway for fostering cross-disciplinary team science and enhancing the cohesion and diversity of scientific research networks.

The concept of "gatekeepers" and "invisible colleges": Gatekeepers, with their control over resources and opportunities, play a crucial role in shaping the network's topology, while invisible colleges may drive the intellectual and creative output of the scientific community (Mali et al. 2012, p 236).

The degree distribution could reveal a cumulative advantage, or mentorship activity (Norton et al. 2017). Norton et al. (2017) offer a comprehensive examination of the field of dissemination and implementation (D&I) science in health research, integrating network mapping (SNA) and bibliometric methods, similar to our approach, to analyze the evolution and dynamics of D&I as a scientific discipline. Using an online survey, they gather data about participant demographics, engagement with D&I resources, and network dynamics (Norton et al. 2017). Participants rate the frequency of engagement with D&I resources, providing insights into preferred communication channels in the D&I field (Norton et al. 2017). They used a roster-nomination method, collecting data on advice and collaboration networks, allowing participants to report their D&I-related advice-seeking behaviors and collaborations (Norton et al. 2017). The study uses actor-specific measures (e.g., in-degree, betweenness centrality) and broader network metrics (e.g., size, density, clustering coefficients) (Norton et al. 2017). Regression analysis is applied to individual and network-level data to identify predictors of scientific performance (Norton et al. 2017). The advice network in D&I is dominated by a few influential individuals, which is evident from the high centrality scores (Norton et al. 2017). These networks show small-world characteristics, indicating a close-knit but sparsely connected community (Norton et al. 2017). The collaboration network shows trends like the advice network with a few central actors (Norton et al. 2017). Despite its sparse structure, it retains small-world characteristics. Advanced or intermediate expertise in D&I correlates with a higher likelihood of funded grants (Norton et al. 2017). The status in the advice network also plays a significant role in securing grants (Norton et al. 2017). The results highlight the significance of central individuals in the D&I community, essential for connectivity and information flow (Norton et al. 2017). Norton et al.’s approach to network analysis, particularly in understanding the role of central actors and the dynamics of advice and collaboration networks, guides the investigation into the characteristics and dynamics of interdisciplinary collaborations at BSU.