S1 Appendix

Table 1. Studies on networks and centrality, and centrality measures used.

|  |  |  |
| --- | --- | --- |
| Field | Reference | Centrality measures used |
| Management and organizational contexts | Mehra & al., 2001 | Betweenness centrality |
| Sparrowe & al., 2001 | *In*- degree centrality |
| Tsai, 2001 | *In*- degree centrality |
| Perry-Smith, 2006 | Closeness centrality (Freeman) |
| Zhang & Venkatesh, 2013 | *In*- degree centralityIndirect ties |
| Dhand & al., 2014 | Degree centralityBetweenness centralityEigenvector centrality |
| Song & al., 2015 | Degree centralityBetweenness centralityFlow betweenness centralityCloseness centrality (Freeman)Semi-local centralityEntropy centralityResidual closeness centrality |
| Zedan & Miller, 2017 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityCross-clique centrality |
| Economy and finance | Montgomery, 1991  | Connectedness |
| Calvo-Armengo & Jackson, 2004 | Degree centralityIndirect ties |
| Neal, 2008 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Clauset & al., 2014 | Closeness centrality (Freeman)Harmonic centrality |
| Ductor & al., 2014 | Degree centralitySecond order centrality degreeBetweenness centralityCloseness centrality (Freeman)Giant component |
| Marketing research | Iacobucci & al., 1996 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Kiss & Bichler, 2008 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityEdge-weighted degree centralityKleinberg's authority & hub centralitiesPage rankWeighted Page rankSender rankWeighted sender rank |
| Katona & al., 2011 | Degree centralityBetweenness centralityClustering coefficient |
| Benoit & Van den Poel, 2012 | Degree centralityBetweenness centrality |
| Kim & al., 2012 | Degree centralityDegree centralization |
| Field | Reference | Centrality measures used |
| Sociology and political sciences | Krackhardt, 1990 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Krebs, 2002 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Chen & al., 2004 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Burgess & Bruns, 2012 | Degree centralityBetweenness centrality |
| Mastrobuoni & Patacchini, 2012 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityTop rank (citation) |
| Faghani & Nguyen, 2013 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Page rankCross-clique centrality |
| Xu & al., 2014 | Betweenness centrality |
| Biological networks | Idowu & al., 2004 | HubsSecond order hubsBottleneck centrality |
| Joy & al., 2005 | Degree centralityBetweenness centrality |
| Yu & al., 2007 | Degree centralityBetweenness centrality |
| Koschützki & Schreiber, 2008 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Radiality centralityIntegration centralityKatz status index Page rankMotif-based centrality |
| Lin & al., 2008 | Degree centralityEdge percolated componentBottleneck centralityMaximum neighborhood componentDensity of maximum neighborhood componentSubgraph Centrality |
| Duran-Pinedo & al., 2011 | Degree centralityBetweenness centralityMaximum neighborhood componentDensity of maximum neighborhood component |
| Wang & al., 2011 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector CentralitySubgraph CentralityInformation CentralityEdge clustering coefficient |
| Field | Reference | Centrality measures used |
| Biological networks | Doncheva & al., 2012 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eccentricity centralityNumber of connected componentsAverage number of neighborsNeighborhood connectivity of a nodeClustering coefficientNumber of shared neighborsTopological coefficientStress centrality |
| Chin & al., 2014 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eccentricity centralityEdge percolated componentMaximum neighborhood componentDensity of maximum neighborhood componentMaximal clique centralityBottleneck centralityRadiality centralityStress centrality |
| Peng & al., 2015 | Localization-specific centrality score combined with 7 centrality measures :Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector CentralitySubgraph CentralityInformation CentralityEdge clustering coefficient |
| Ashtiani & al., 2018 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Closeness centrality (Latora) Average Distance Barycenter centralityResidual closeness centralityClusterRank Decay centralityDiffusion degree Maximum neighborhood componentDensity of maximum neighborhood componentGeodesic *k*-path centralityKatz status index Laplacian centralityLeverage centralityLin centralityLobby index (centrality)Markov centralityRadiality centralityEigenvector centralitySubgraph CentralityEccentricity centralityKleinberg's authority & hub centralitiesHarary centrality Information centrality |
| Field | Reference | Centrality measures used |
| Student networks : performance, achievement and learning | Thomas, 2000 | Degree centralityBonacich centrality |
| Yang and Tang, 2003 | *In*- degree centrality |
| Russo & Koesten, 2005 | Degree centrality |
| Cho & al., 2007 | Degree centralityCloseness centrality (Freeman) |
| De Laat & al., 2007 | Degree centrality |
| Zhang & al., 2008 | Closeness centrality (Freeman) |
| Obadi & al., 2010 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Hommes & al., 2012 | Degree centralityBetweenness centrality |
| Woolf & al., 2012 | Closeness centrality (Freeman) |
| Bruun & Brewe, 2013 | *In*- degree centrality*In*- strength centralityPage rankHide centralityTarget entropy |
| Gašević & al., 2013 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eccentricity centrality |
| Vaughan & al., 2015 | Degree centrality |
| de-Marcos & al., 2016 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eccentricity centralityEigenvector centralityKleinberg's authority & hub centralitiesPage rankClustering coefficient |
| Mushtaq & al., 2016 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Poldin & al., 2016 | Degree centrality |
| Zwolak & al., 2017 | *Out*-degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centrality |
| Liu & al., 2018 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Saqr & al., 2018a | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityEccentricity centralityInformation centralityClustering coefficient |
| Saqr & al., 2018b | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityEccentricity centralityInformation centralityClustering coefficientIndirect ties |
| Field | Reference | Centrality measures used |
| Student networks : performance, achievement and learning | Vargas & al., 2018 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Net out-strength *Out*- & *in*- disparitiesLocal clusteringHarmonic centrality |
| Vignery & Laurier, 2020 | Degree centrality |
| Student networks : delinquency | Baerveldt & al., 2004  | Degree centralityConnectedness |
| Cruz & al., 2012 | Closeness centrality (Freeman) |
| Student networks : sense of community | Ennett & al., 2006  | *In*- degree centralityBetweenness centralityReach centralityBonacich centrality |
| Dawson, 2008 | Degree centralityBetweenness centralityCloseness centrality (Freeman) |
| Student networks : dropout | Bayer & al., 2012 | Degree centralityBetweenness centrality |
| Yang & al., 2013 | Degree centralityBetweenness centralityCloseness centrality (Freeman)Eigenvector centralityAverage clustering coefficient Eccentricity centralityKleinberg's authority & hub centralities |

Table 2. Centrality indices used in all 63 studies on networks: number of uses and percentages

|  |  |  |
| --- | --- | --- |
| Indices (Total = 248 indices used in the 63 studies) | Number of uses(among the 63 studies) | % of uses(among the 63 studies) |
| Degree centrality (*in*- and/or *out*-) | 54 | 85.71% |
| Betweenness centrality (Freeman) | 40 | 63.49% |
| Closeness centrality (Freeman) | 34 | 53.97% |
| Eigenvector centrality | 12 | 19.05% |
| Eccentricity centrality | 8 | 12.70% |
| Clustering coefficient | 5 | 7.94% |
| Information Centrality | 5 | 7.94% |
| Page rank | 5 | 7.94% |
| Density of maximum neighborhood component | 4 | 6.35% |
| Kleinberg's authority & hub centralities | 4 | 6.35% |
| Maximum neighborhood component | 4 | 6.35% |
| Subgraph Centrality | 4 | 6.35% |
| Bottleneck centrality | 3 | 4.76% |
| Indirect ties | 3 | 4.76% |
| Radiality centrality | 3 | 4.76% |
| Bonacich centrality | 2 | 3.17% |
| Connectedness | 2 | 3.17% |
| Cross-clique centrality | 2 | 3.17% |
| Edge clustering coefficient | 2 | 3.17% |
| Edge percolated component | 2 | 3.17% |
| Harmonic centrality | 2 | 3.17% |
| Katz status index  | 2 | 3.17% |
| Residual closeness centrality | 2 | 3.17% |
| Stress centrality | 2 | 3.17% |
| Average clustering coefficient  | 1 | 1.59% |
| Average Distance  | 1 | 1.59% |
| Average number of neighbors | 1 | 1.59% |
| Barycenter centrality | 1 | 1.59% |
| Closeness centrality (Latora)  | 1 | 1.59% |
| ClusterRank  | 1 | 1.59% |
| Decay centrality | 1 | 1.59% |
| Degree centralization | 1 | 1.59% |
| Diffusion degree  | 1 | 1.59% |
| Edge-weighted degree centrality | 1 | 1.59% |
| Entropy centrality | 1 | 1.59% |
| Flow betweenness centrality | 1 | 1.59% |
| Geodesic *k*-path centrality | 1 | 1.59% |
| Giant component | 1 | 1.59% |
| Harary centrality  | 1 | 1.59% |
| Hide centrality | 1 | 1.59% |
| Hubs | 1 | 1.59% |
| *In*- strength centrality | 1 | 1.59% |
| Integration centrality | 1 | 1.59% |
| Laplacian centrality | 1 | 1.59% |
| Leverage centrality | 1 | 1.59% |
| Lin centrality | 1 | 1.59% |
| Lobby index (centrality) | 1 | 1.59% |
| Local clustering | 1 | 1.59% |
| Markov centrality | 1 | 1.59% |
| Maximal clique centrality | 1 | 1.59% |
| Motif-based centrality | 1 | 1.59% |
| Neighborhood connectivity of a node | 1 | 1.59% |
| Net *out*-strength  | 1 | 1.59% |
| Number of connected components | 1 | 1.59% |
| Number of shared neighbors | 1 | 1.59% |
| *Out*- & *in*- disparities | 1 | 1.59% |
| Indices (Total = 248 indices used in the 63 studies) | Number of uses(among the 63 studies) | % of uses(among the 63 studies) |
| Reach centrality | 1 | 1.59% |
| Second order centrality degree | 1 | 1.59% |
| Second order hubs | 1 | 1.59% |
| Semi-local centrality | 1 | 1.59% |
| Sender rank | 1 | 1.59% |
| Target entropy | 1 | 1.59% |
| Top rank (citation) | 1 | 1.59% |
| Topological coefficient | 1 | 1.59% |
| Weighted Page rank | 1 | 1.59% |
| Weighted sender rank | 1 | 1.59% |

Table 3. Centrality indices used in the 27 studies on student networks: number of uses and percentages

|  |  |  |
| --- | --- | --- |
| Indices (Total = 85 indices used in the 27 studies) | Number of uses(among the 27 studies) | % of uses(among the 27 studies) |
| Degree centrality (*in*- and/or *out*-) | 24 | 88.89% |
| Closeness centrality (Freeman) | 15 | 55.56% |
| Betweenness centrality (Freeman) | 14 | 51.85% |
| Eccentricity centrality | 5 | 18.52% |
| Eigenvector centrality | 5 | 18.52% |
| Clustering coefficient | 3 | 11.11% |
| Bonacich centrality | 2 | 7.41% |
| Information centrality | 2 | 7.41% |
| Kleinberg's authority & hub centralities | 2 | 7.41% |
| Page rank | 2 | 7.41% |
| Average clustering coefficient  | 1 | 3.70% |
| Connectedness | 1 | 3.70% |
| Harmonic centrality | 1 | 3.70% |
| Hide centrality | 1 | 3.70% |
| *In*- strength centrality | 1 | 3.70% |
| Indirect ties | 1 | 3.70% |
| Local clustering | 1 | 3.70% |
| Net out-strength  | 1 | 3.70% |
| *Out*- & *in*- disparities | 1 | 3.70% |
| Reach centrality | 1 | 3.70% |
| Target entropy | 1 | 3.70% |