

Main Explanation for Centrality Measures

1. **Degree Centrality:** This measures the number of links that are connected to a node. Because they are more linked to other nodes, nodes with a high degree centrality are thought to be more significant in the network.
2. **Betweenness Centrality:** This indicates the extent to which a node is on the shortest path between other nodes in the network. Nodes with high betweenness centrality are critical to the network's overall connectedness. For instance, in a transportation network, nodes having a high betweenness centrality might serve as hubs connecting various routes.
3. **Closeness Centrality:** This evaluates how easy a node may reach all other nodes in the network. It computes the average shortest path distance between a node and all other nodes, giving higher points to nodes that can reach other nodes faster. Nodes with a high closeness centrality are closer to other nodes in the network. For instance, in a communication network, nodes with a high closeness centrality are those that can transfer information quickly.
4. **Eigenvector Centrality:** It is a measure of the influence of a node in a network. Nodes with high eigenvector centrality scores are connected to other highly central nodes in the network. For example, in a social network, individuals with a high eigenvector centrality would be those who are connected to other influential people.

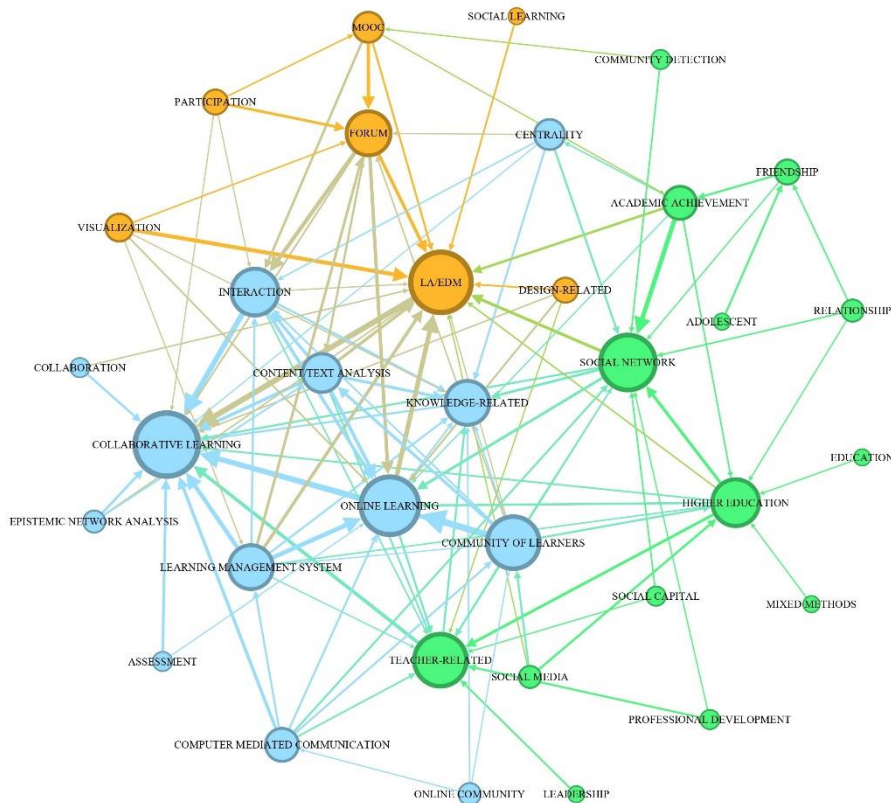
My Networks

- **Keywords:** The network represents the relationship between the keywords which are coming from one paper. If they are mentioned together in the same paper, they are connected with an edge.
- **Countries:** This network includes several countries as nodes. Countries are connected if they are working together.
- **Political books network (2004):** This network includes books about U.S. politics as nodes and the edges of books reflect frequent copurchasing.
- **Illinois high school students (1958):** This network is about friendships among male students in a high school.

For each network, I have calculated centrality measures on Gephi and plotted these four centralities.

To avoid repeating myself with the same definition, I presented the general meaning of centrality measures at the top of the paper.

Keyword Network

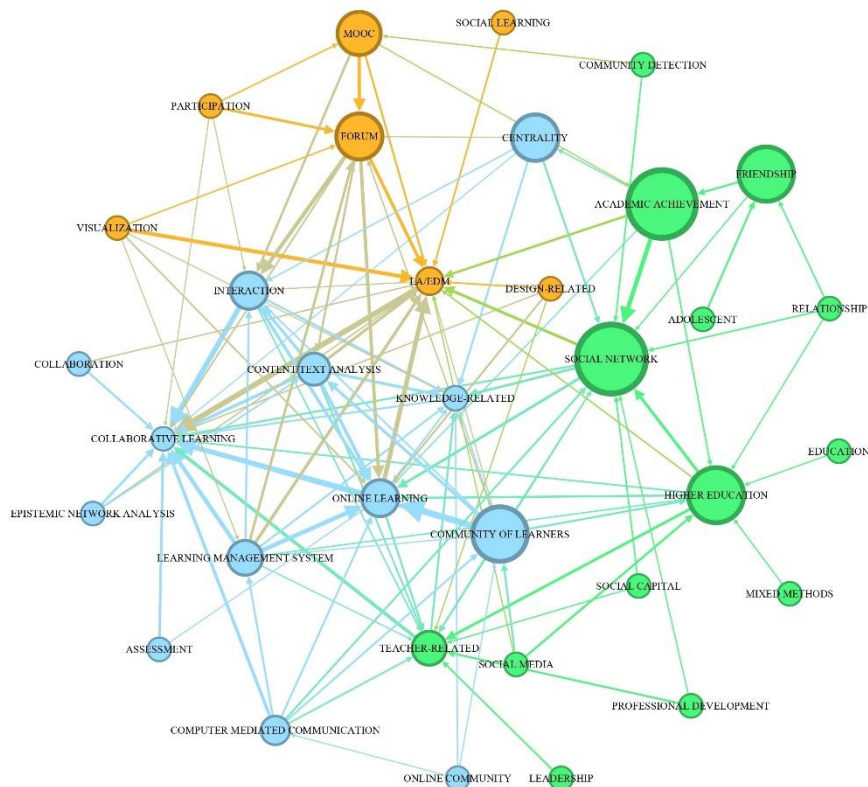


Degree Centrality

For this centrality, COLLABORATIVE LEARNING is most central.

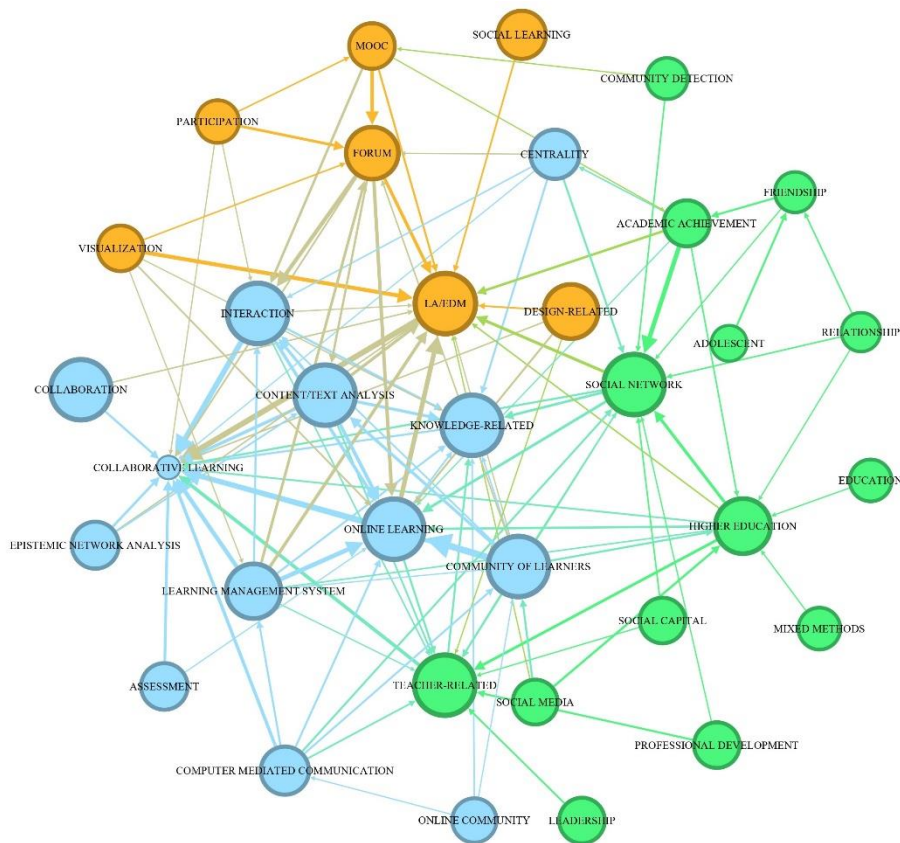
ONLINE LEARNING, LA/EDM, SOCIAL NETWORK follow that order after that.

Highest ones have more links with others so their importance for a text is higher.



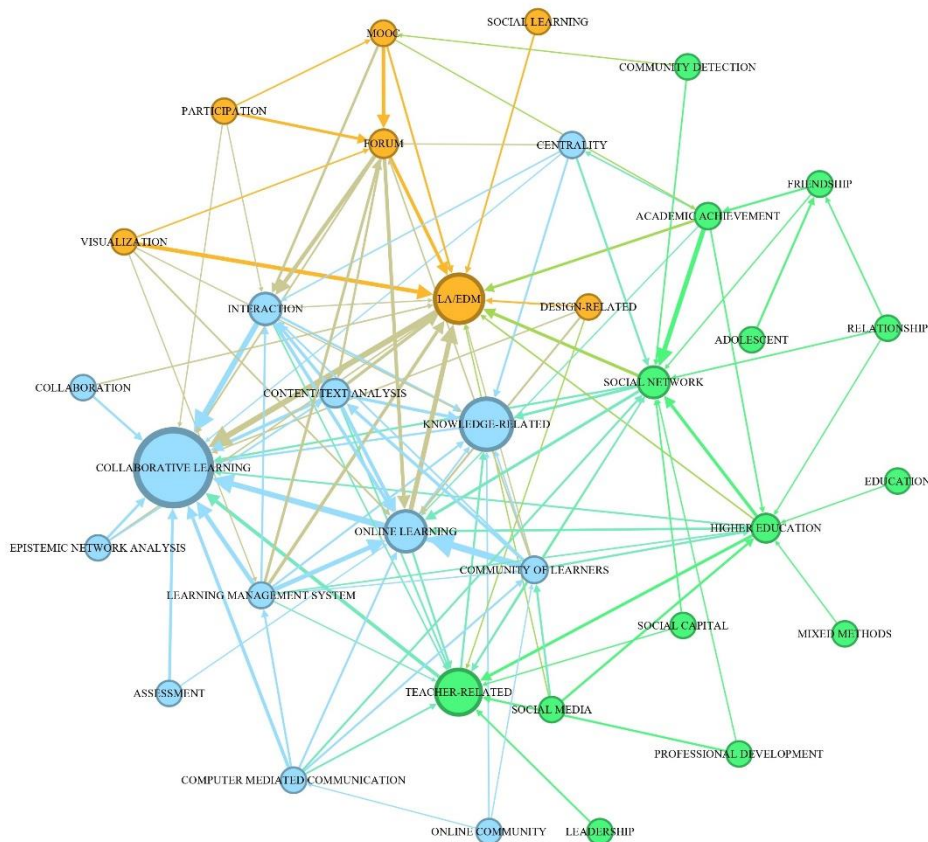
Betweenness Centrality

For this centrality ACADEMIC ACHIEVEMENT and SOCIAL NETWORK are high. They act as bridges for other keywords.



Closeness Centrality

For this centrality, most of their centrality is high except COLLABORATIVE LEARNING. Because it has no outgoing degree.



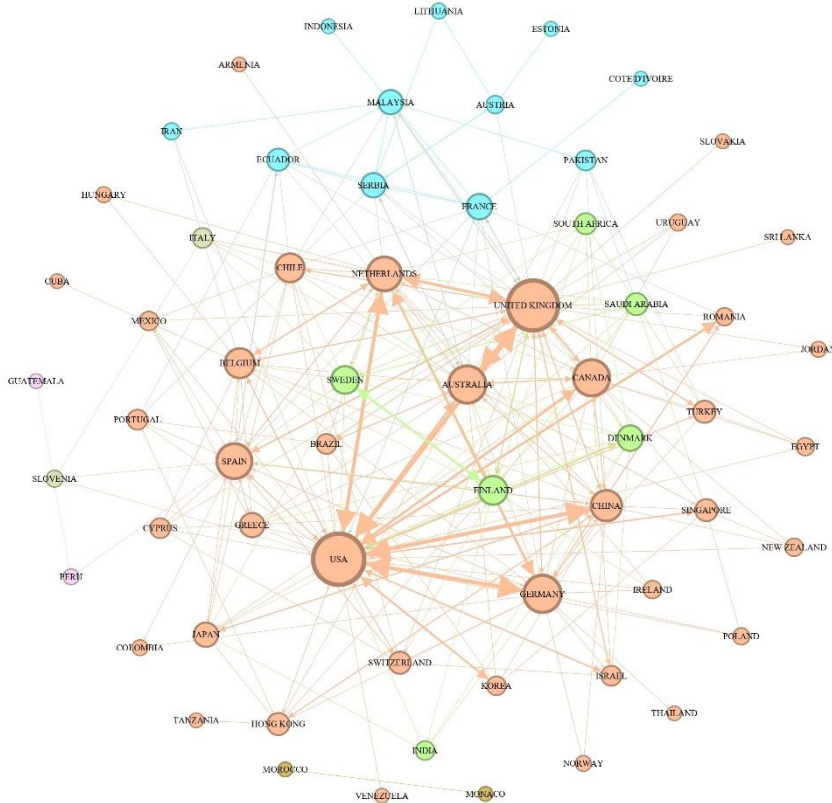
Eigenvector Centrality

For this centrality, COLLABORATIVE LEARNING is high. It means it has edges with nodes which have high scores.

Country Network

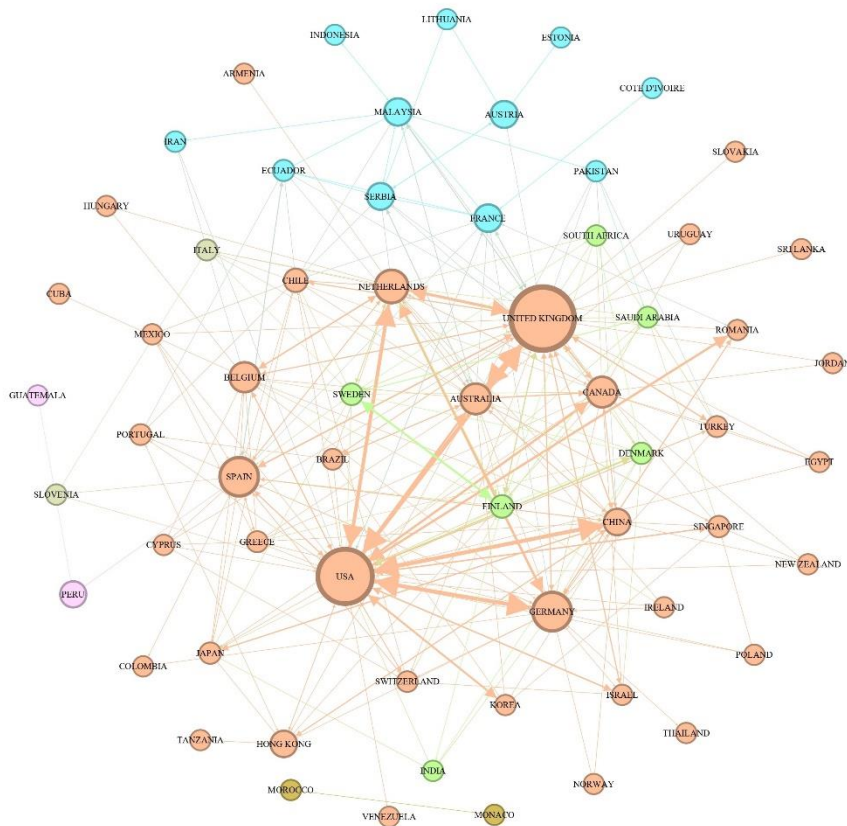
Degree Centrality

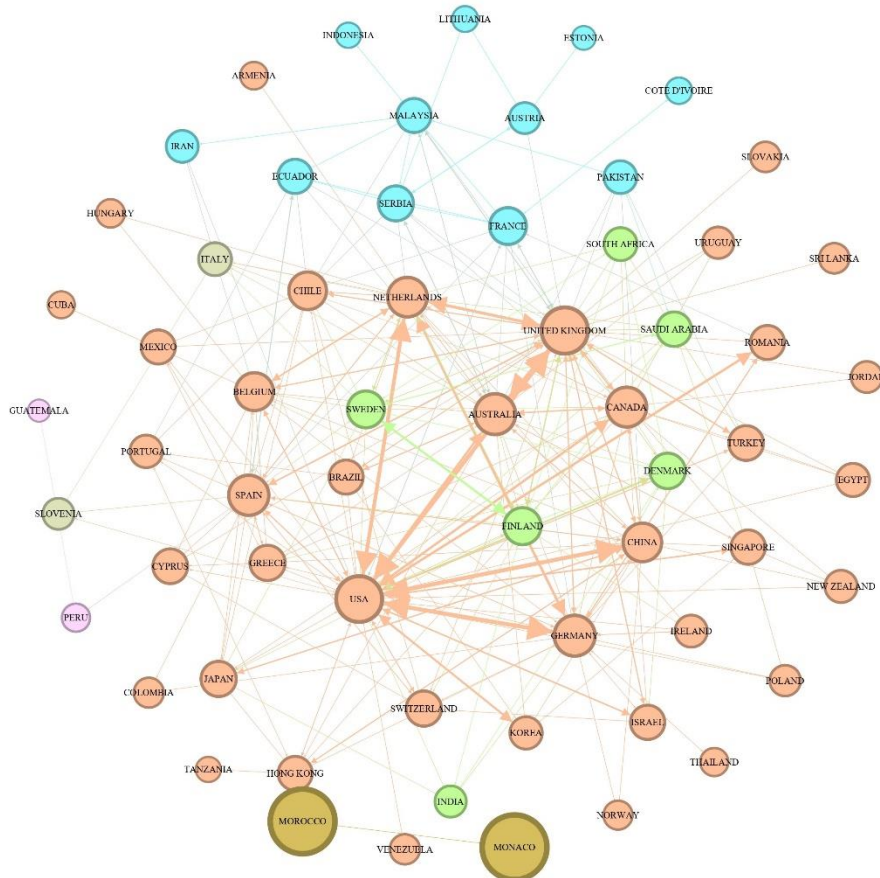
For this centrality, USA and UNITED KINGDOM are high. And it is not surprising at all. They have more connection with other countries.



Betweenness Centrality

For this centrality, USA and UNITED KINGDOM are high. These two nodes connect the majority of the countries.

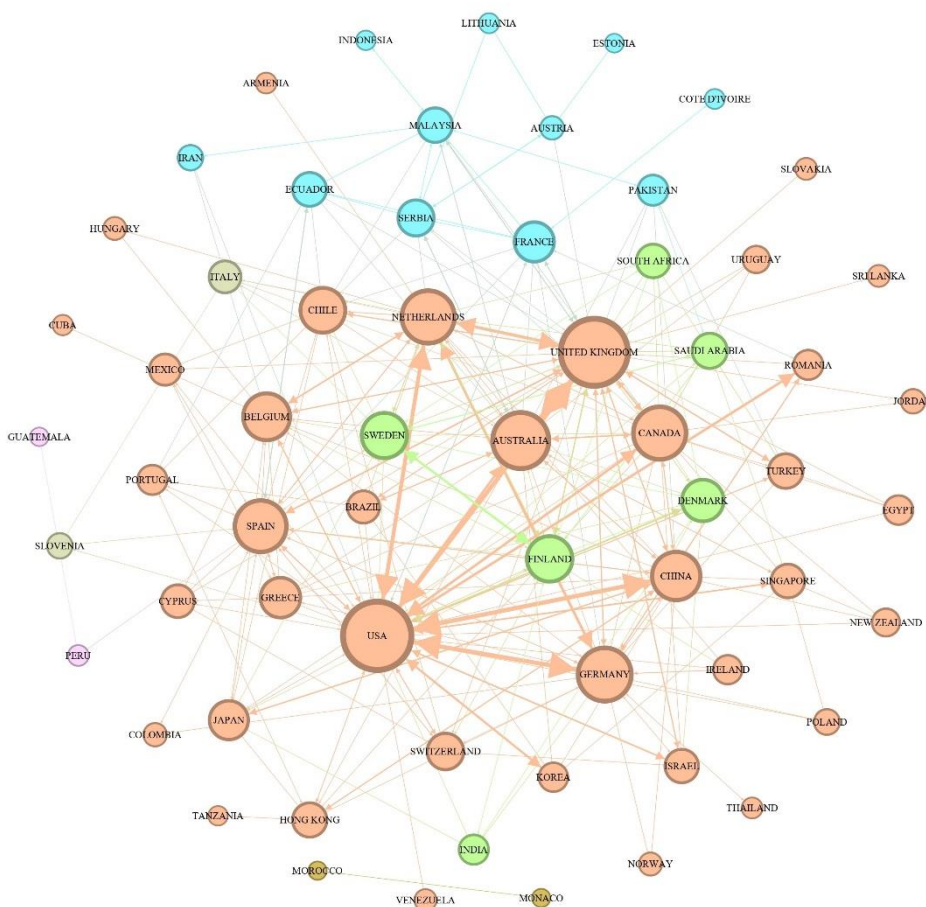




Closeness Centrality

For this centrality, MOROCCO and MONACO seems far away from the network so it would not be meaningful to say that they are the closest ones.

Most of the nodes seems similar for this metric.



Eigenvector Centrality

For this centrality, UNITED KINGDOM and USA are high. Since they have connections with countries which are connected with many country.

Political Books Network

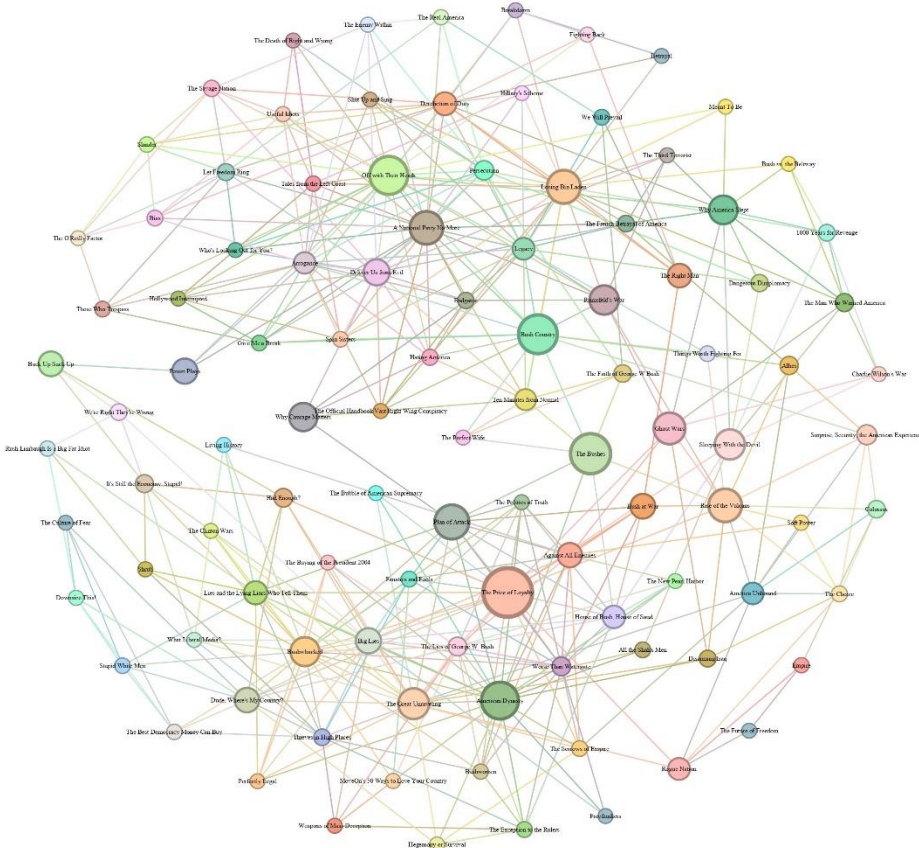
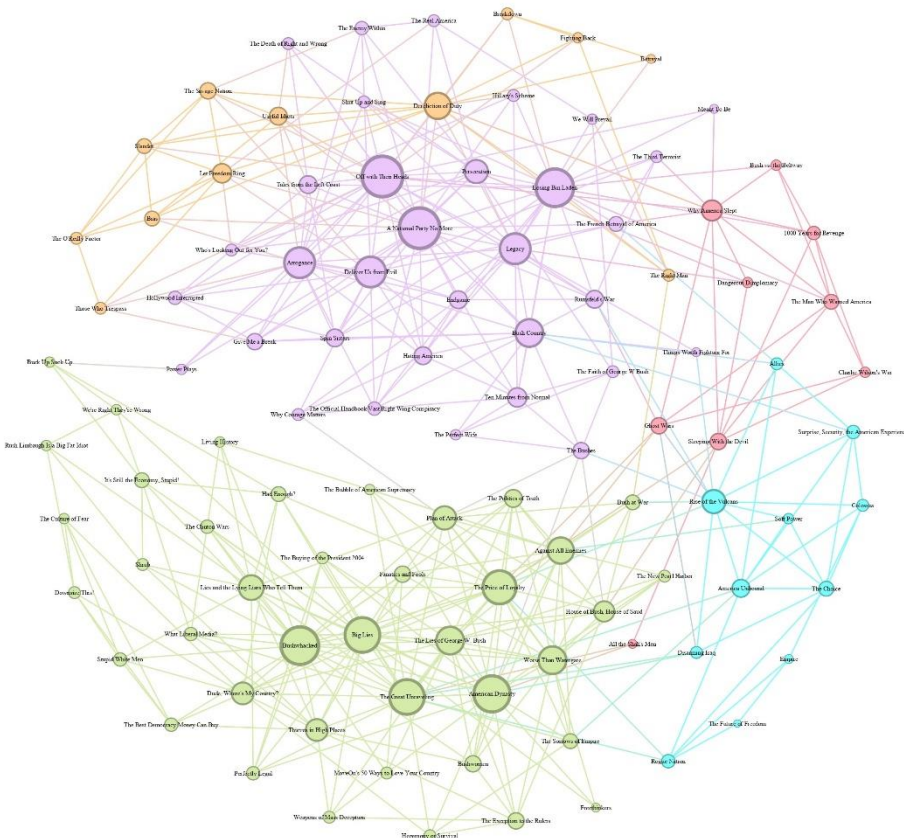
Degree Centrality

For this centrality, there are many books which has high value for degree centrality. For example: American Dynasty, A National Party No More, The Great Unraveling.

This network was about copurchasing U.S. politics. So edge represent purchasing by same buyer. So these books are most common books.

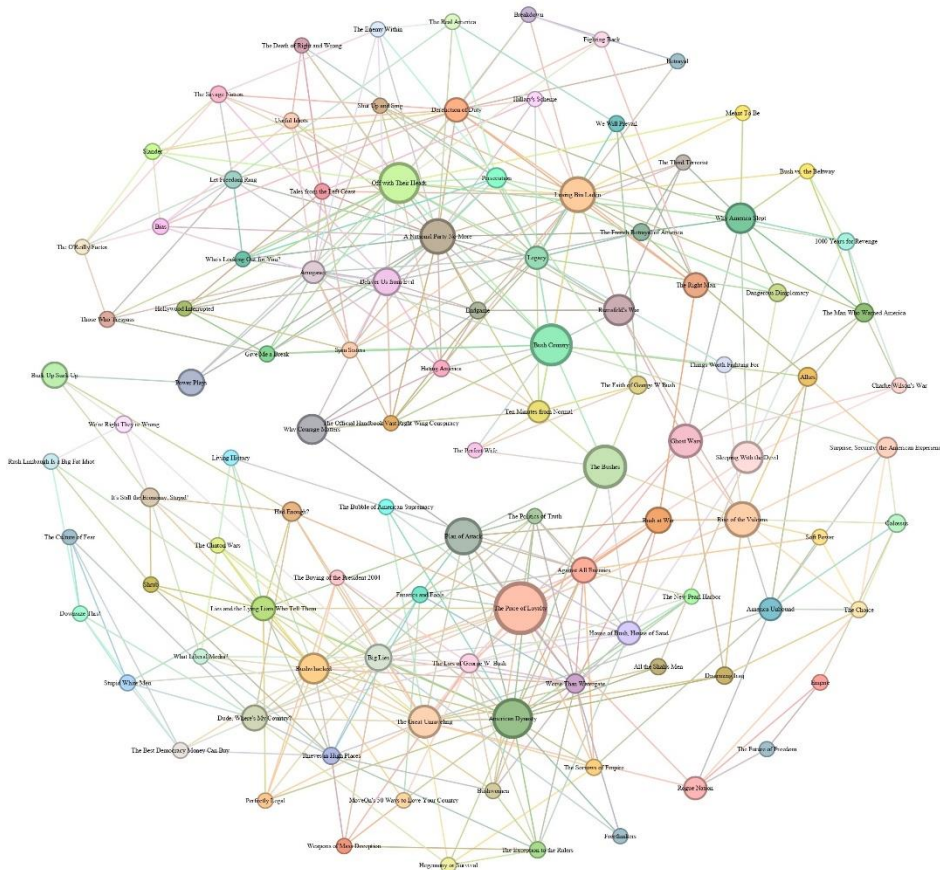
Betweenness Centrality

For this centrality, The Price of Loyalty seems like a bridge for other books. It is the highest one.



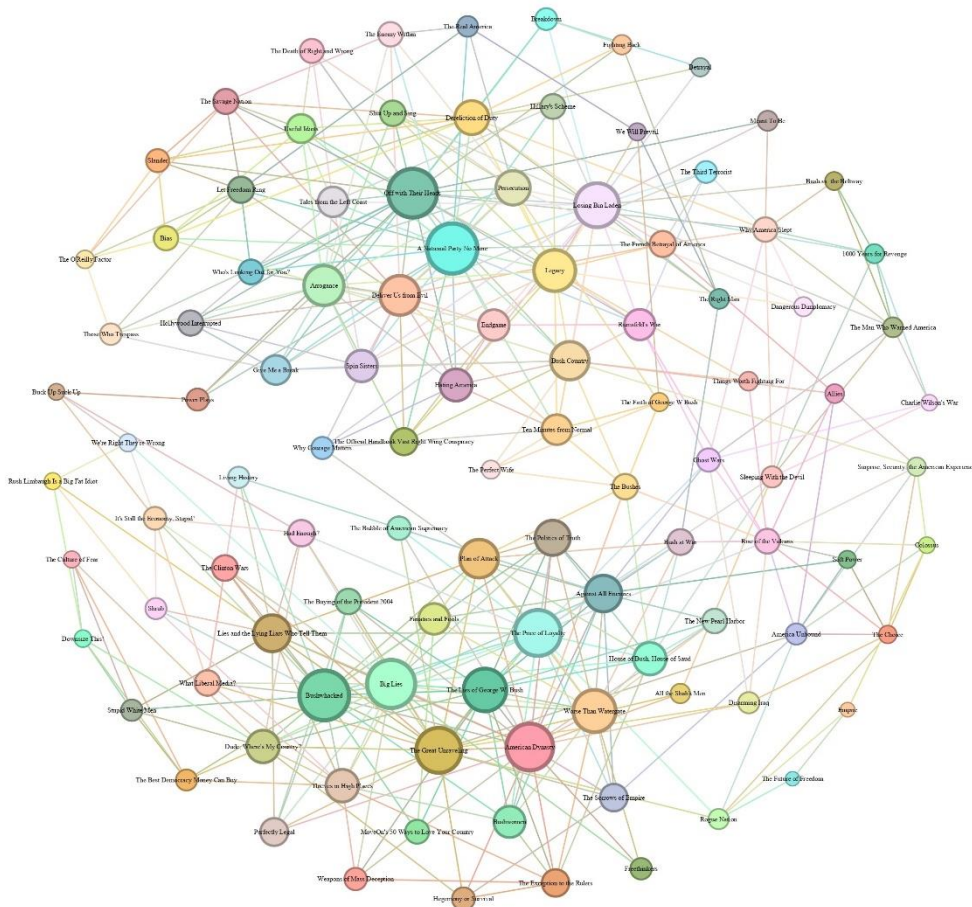
Closeness Centrality

For this centrality, some of the books have high closeness centrality. They are often bought with other books.

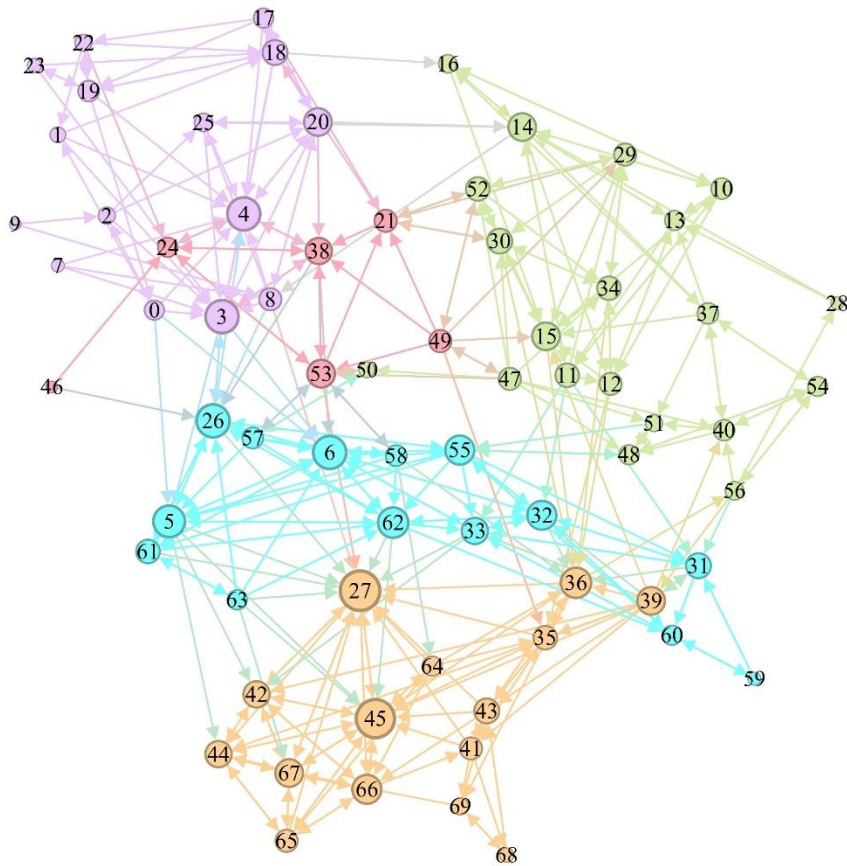


Eigenvector Centrality

For this centrality, high ones are the most purchased books and are linked to books with a high sale ratio.

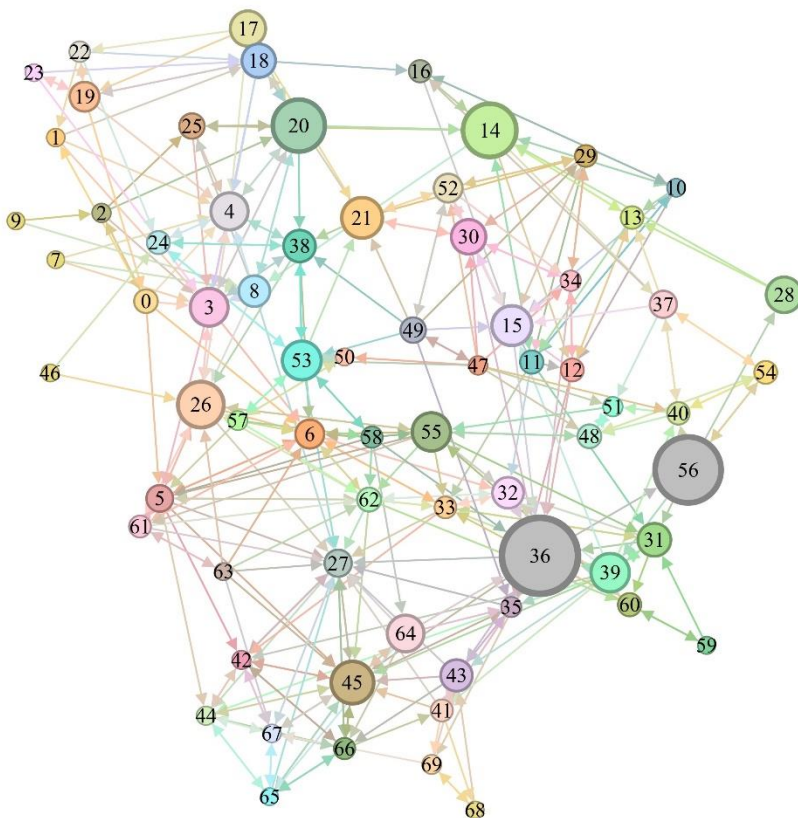


Illinois High School Students Network



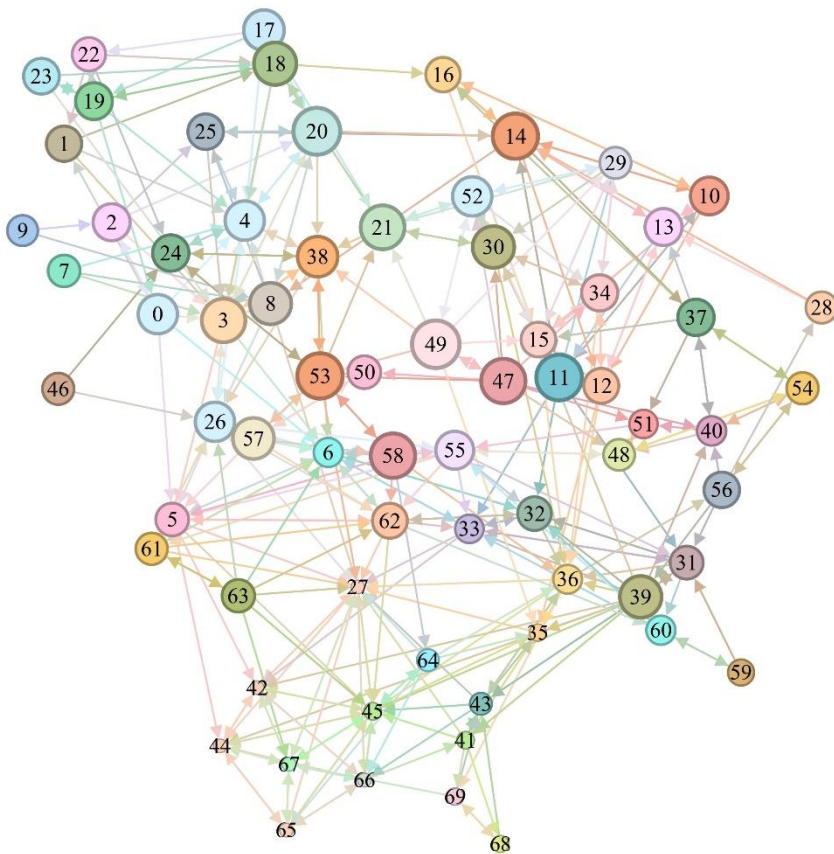
Degree Centrality

This network was about friendships among male students in a high school. So we can say number 27 has more friendship around these students.



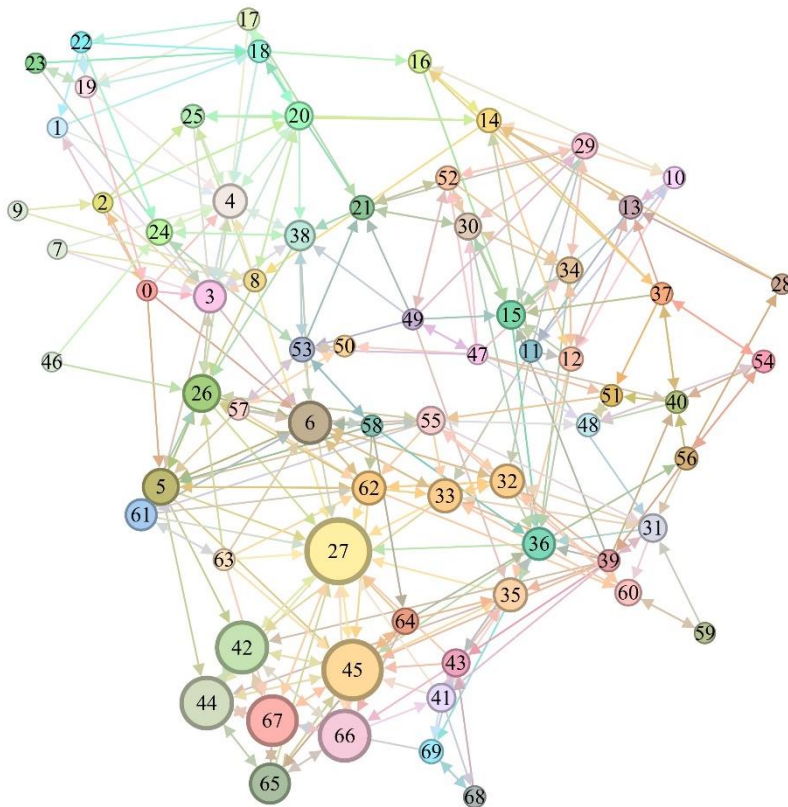
Betweenness Centrality

For this centrality, number 36 seems like a bridge for friendship relation. Number 56 follows after it.



Closeness Centrality

For this centrality, most of the students have high closeness centrality. And some part of students has low centrality compared to others. This is because, they are not close to other friend groups.



Eigenvector Centrality

For this centrality, number 27, 45, 42, 67, 44, 65, 66 are high. They are connected with important(influencer) persons.