Social Network Analysis in Online Discussion

Minkyung Lee

ABSTRACT

Social network analysis (SNA) provides a lens to explore and understand the dynamics of relationships, roles, and patterns within online educational spaces. This exploratory study delves into online discussion forums, aiming to shed light on the nuanced interactions among participants. By visualizing and analyzing these forums, we discerned patterns based on key metrics such as directionality, centrality, and density. Our findings offer insights into how online networks form, evolve, and influence collaborative learning processes.

BACKGROUND

Social Network Analysis
Social Network Analysis (SNA) uses quantitative methodologies to enhance the social learning environment. SNA examines the interplay of structures, tools, and philosophies to gain a deep understanding of the intricacies of online interaction. A network comprises nodes (participants) and the connections between them. Key insights from Wassermann & Faust (1994) highlight the importance of examining the development and support mechanisms in social learning through network analysis.

Social Capital Theory
Introduced by thinkers like Bourdieu, Coleman, and Lin in the 1980s, Social Capital Theory posits social capital as both a means of maintaining societal hierarchies and a resource for individual and collective action. They emphasize the pivotal role of networks, highlighting the depth and breadth of relationships within and between diverse entities, such as families and communities, that contribute to academic success.

METHODS

The aim of this study is to unravel the intricacies of interaction networks in two distinct online courses. We place a particular emphasis on individuals who serve as communication bridges and mediators.

Data Collection

	Course 1	Course 2
# of Participants	15	28
Course details	Online Undergraduate courses in week 7	
Procedure	‹Participants upload their opinions about a designated theme and reply to more than two students	

Data Analysis
Discussions were analyzed, and Gephi software was employed to visualize the resultant social network maps. Central to our analysis were concepts such as centredness, directionality, density, and bridge.

RESULTS
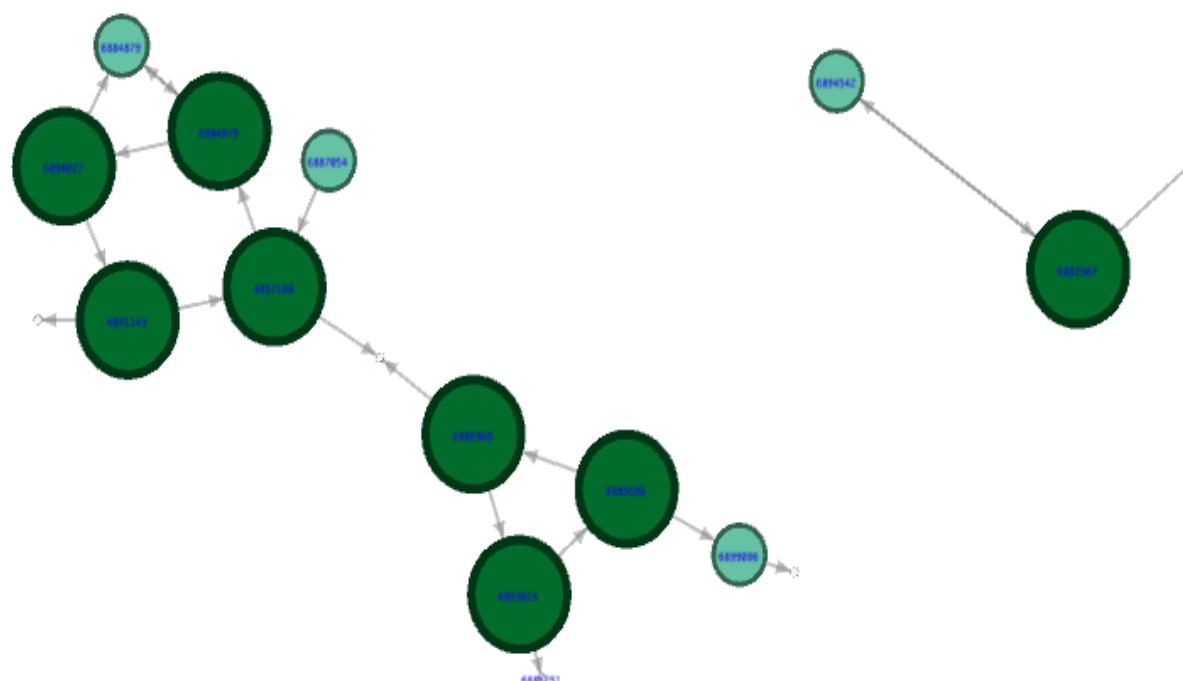
Our analysis illuminated the characteristics and patterns of learners' social network maps in the online discussion forums. Several key findings emerged:

1.**Directionality & Centredness**: The study revealed the prominence of certain students in driving conversations, as evidenced by the directionality and centredness of their interactions. Such students frequently initiated discussions and often became central figures in the communication network.
2.**Density & Bridge**: These metrics provided insights into the cohesiveness and connectedness of the online discussion. High-density values indicated closely-knit networks where participants actively engaged with one another. Bridging roles were crucial in connecting disparate groups or individuals, facilitating a more inclusive and comprehensive discussion environment.
3.**Knowledge Transfer & Problem Solving**: Strong connections within the network often correlated with advanced cognitive engagements, such as problem-solving (as highlighted by Reagans & McEvily, 2003). This suggests that robust networking can elevate the depth and quality of online discussions.
4.**Influence of Prior Experiences**: Research by Schuwirth & Scherpbier (2010) supported our findings that prior learning experiences could significantly enhance student engagement in online discussions. Their study, focusing on structural equation modeling, aligns with our observations on the positive impact of prior experiences on current online interactions.
5.**Overall Network & Student Performance**: A compelling revelation from our study was the strong correlation between well-structured online social networks and enhanced student learning outcomes. The findings align with the work of Rienties, Tempelaar, Pinckaers, Giesbers, and Lichel (2010), emphasizing the potential of healthy online networks in fostering information exchange and collaborative learning.