Using Network Analysis and Content Analysis to Analyze Participants’ Interaction Structures and Inquiry Patterns in an Online Course

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INTRODUCTION

The whole data set include all text-based asynchronous discussions in the ring forum, the transcript of an online synchronous meeting, as well as transcripts of the instructor’s instructional audios, videos, and class agendas. The first phase of this study is using SNA method to analyze the structure and attributes of the student-instructor interaction network in the online course. The data set are manually transcribed into a set of participant- participant data. Buults’ network measures (2008) and R package (2008, 2014) are utilized to analyze the student-instructor interaction network. Based on Col presence coding scheme, quantitative content analysis (QCA) is used to analyze students’ inquiry patterns in the online discussions (Riff, Lacy, & Fico, 2014).

RESULTS AND DISCUSSIONS

SNA results: Data is analyzed through the node level and the network level using the SNA method. Table 1 represents the node-level analysis results of the students’ and the instructor’s indegree, outdegree, betweenness, and closeness centrality. This analysis demonstrates that the instructor, and students E and R have the largest outdegree centrality, indicating that they reply and mention most frequently to others in the discussion activities during the whole semester. The instructor and student I have the largest indegree in the network, indicating that they are replied and mentioned most frequently by others in discussions. Student P has both the lowest indegree and the lowest outdegree in the network, indicating that comparing to other participants, P does not actively participate in the discussions. Figure 1 visually demonstrates the sociogram based on the participant’s degree, including indegree and outdegree. The node’s size and color, as well as the edge width represent the interaction between the participants in the degree. The instructor, student R, and student C are relatively central in the interaction network. Except for student P, the instructor and other students form a relatively evenly distributed subgroup; P locates far away from the subgroup and D locates slightly far away from the subgroup. In additional, Table 1, the student R has the largest betweenness centrality, indicating that student R has the largest influence over the interactions of other individuals in the network. Student E, student R, and the instructor have the largest closeness centrality, indicating they have the best efficiency in spreading information to other participants in the network. Student P has the lowest betweenness and closeness centrality in the network.

REFERENCES


De Laat, Lally, Lipponen, & Simons, (2007). Further, the community of inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000) is adopted to analyze the instructor’s and students’ inquiry pattern in the online discussions. The three essential elements of the CoI framework are cognitive presence (CP); the extent to which online learners are able to construct meaning and critical thinking through communication, social presence (SP); the ability of individuals to project their personal characteristics into the community, and teaching presence (TP); the instructor designs, plans, and prepares the course, facilitates the discourse and provides direct instruction in the learning process. Recently, Shea et al. have proposed a new CoI construct - learning presence (LP), which refers to ‘students’ proactive use of specific processes, such as setting goals, selecting and deploying strategies, and self-monitoring one’s effectiveness to improve their academic achievement’ (Shea, et al., 2013). In this study, coding scheme for these four processes are used to identify participants’ presence in the online discussions.

RESEARCH PURPOSE, CONTEXT, AND QUESTIONS

The primary purpose of this study is to explore online students’ learning interaction structures and inquiry patterns within a completely online grade-level course offered at a midwestern research university. This online course is focused on exploring the theories of online learning communities and practices of building online learning community, and is part of a certificate program focused on online teaching. Twenty graduate students enrolled in this online course; one of the researchers was enrolled as a doctoral student within this course during a 15-week semester in spring 2014. The online course instructor, who has over ten years of online teaching experiences, has put paramount emphasis on improving students’ online interaction, participation, and collaboration in online learning environments.