Examining Productive Discourse and Knowledge Advancement in a Knowledge Building Community

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Abstract: This study examined an explicit reflection enriched knowledge building community on students' productive discourse and knowledge advancement. Knowledge advancement was analyzed using a social network analysis tool, called Knowledge Building Discourse Explorer (KBDeX) (Oshima, Oshima, & Matsuzawa, 2012). KBDeX analysis on keywords network indicated that students in the intervention class had engaged in a more cohesive discussion. Further discourse analysis clarified that students in the intervention class engaged in a more productive progressive discourse.

Introduction

This study investigated a computer-supported knowledge building (KB) community (Scardamalia & Bereiter, 2014) on students' collective knowledge advancement in the online discourse using a social network analysis tool in identifying students' progressive discourse. Substantial researches indicated that the importance of sustained inquiry and collective knowledge advancement, however, students would not spontaneously engage in a progressive discourse to advance their community knowledge (Yang, van Aalst, Chan, & Tian 2016). A challenge arises pertaining to how can we scaffold students' collective knowledge advancement in their collaborative inquiry, and more researches needed to investigate the learning environment design in fostering students' collective knowledge advancement. To address this challenge, we designed and evaluated an enriched KB environment with explicit reflection to scaffold students' progressive inquiry and collective knowledge advancement. Therefore, this study examined how students engage in collective knowledge advancement in a designed KB environment, using a social network analysis, followed by an in-depth discourse analysis.

Methods

Participants were two classes of 9th Grade students in a secondary school, among which one class was engaged in a designed discourse reflection and principle emphasized KB environment, for comparison, the other class was engaged in a regular KB environment. The key design in the enriched KB class is focusing on discourse reflection. In this paper, we focused on examining whether students engage in the productive discourse, and advanced community knowledge using their KF discourse as input data to KBDeX for social network analysis. Students notes in online discussion platform (Knowledge Forum®) were exported into KBDeX and a list of conceptual words were selected based on the curriculum guide and students' discussion. We conducted the keywords network analysis which shows how ideas are connected as indicators for detecting collective knowledge advancement (Oshima et al., 2012; Oshima, et al., 2017). The first stage of analysis focused on exploration of keywords network changed over time. Then, we conducted in-depth discourse analysis to investigate how students engaged in the productive discourse.

Results

Collective knowledge advancement between intervention and comparison class

To investigate students' collective knowledge advancement, we examined keywords network change over time. As shown in Figure 1, the network of keywords was changed from phase 1 (note 1 to 22) to 2 (note 1 to 100) to 3 (note 1 to 181). Figure 1a showed an integrated cluster of keywords which indicated that students started their KF discussion in a more cohesive way in the intervention class while the network of keywords was fragmented for the comparison class (Figure 1b), suggesting that students did not relate their ideas together in the discussion (The reason for the difference between the two classes at the initial KF discussion stage is due to the explicit reflection on ideas, students in the intervention class have a discussion and reflection on their ideas developing in the classroom before starting inquiry in KF while the comparison class start inquiry in KF directly without ideas reflection). Moreover, through the discussion, in phase 2 and 3, the keywords network also stayed fragmented for the comparison class (Figure 1d and 1f) while the keywords network continued to integrate for the intervention class (Figure 1c and 1e). Overall, the transition of keywords network change indicated that

students in the intervention class integrated their ideas with a consistently discussion and the collective knowledge was advanced through the discussion than the comparison class.
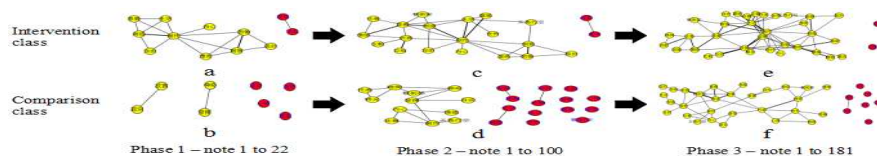

Figure 1. Keywords network change over time between intervention and comparison class.

Progressive inquiry and discourse in KF

In addition to the keywords network analysis, we also analyzed students' KF discourse to identify and explain how students engaged in productive discourse and knowledge advancement. The following excerpt is a cluster of KF discourse (under a topic on *what is art*) for the intervention class (keywords is in bold). Student A proposed a theory that arts can represent people's emotions, followed by student B's explanation that art works can be different depending on people's emotions and also proposed a new theory that art is creative, however, student C did not agree with student B's idea, followed by student B's continued build-on in explaining the various types of arts. Later, student D asked a sustained question based on previous idea on why art relate to life, followed by student E's response. Moreover, student F also asked a sustained question on the function of art to move forward the discussion. Overall, within this discourse example, different students made contributions and fully engaged in the productive discourse with ideas improvement through new questions emerged and sustained inquiry, and integrating various conceptual words to advance knowledge on *what is art*.

Student A	[My theory] … art can be a representation of **emotions**, people can **design** an artifact to represent the emotion…what kind of arts can represent emotions?
Student B	[My theory] I think art is different based on different people's ideas and **emotions**, but the common thing is the **creativity**.
Student C	[My theory] I think art works only need to be **beautiful.**
Student B	[My theory] I think art not only refers to the **drawing**…also relation to **life**…
Student D	Why do you think art works are relating to **life**?
Student E	Art can relate to **life**…art **design** can also be **unrestrained**…
Student F	…[I need to understand] what kind of social **functions** that arts have?

Conclusion and significance

In conclusion, analysis indicated the differences in the collective knowledge advancement between the intervention and comparison class. The study has theoretical value that extends the insights into scaffolding students' productive discourse and knowledge advancement focusing on explicit reflection of ideas and discourse, and for teachers, they can try to design this reflection-enriched KB environment to help students involved in progressive discourse and community knowledge advancement.

References

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