

# What's the Difference? A Closer Look at Idea-Centric Analysis of Online Discourse in K12 and Higher Education Settings

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**Abstract:** This study investigated the differences between two online discourses in the eighth grade and post-graduate settings, in an initial effort to understand how students deepen their understanding by improving their ideas through knowledge building discourse. Using an idea-centric approach for discourse analysis, preliminary findings show a diverse and larger number of ideas in the eighth-grade discourse when compared to a smaller variety but more promising ideas in the post-graduate discourse. The findings provided information about strategies to guide and scaffold students of different levels in their improvement of ideas and understanding through knowledge building discourse.

**Keywords:** Discourse analysis, idea analysis, knowledge building, K12, higher education

## Introduction

The approach of framing and co-constructing knowledge through technology (Scardamalia & Bereiter, 1994; Cohen & Scardamalia, 1998) has been established for some time, with discourse increasingly taking place in online spaces. Knowledge building (Scardamalia & Bereiter, 2003) was developed as a pedagogical approach to leverage learners' natural capability of idea generation for collaborative improvement of ideas through discourse. For students to achieve a deeper approach to learning (Biggs, 1987) and use the most appropriate cognitive activities for handling learning tasks, there is a need for analyzing ideas in the discourse so that users are able to recognize ideas that are potentially interesting to the community and continue improving these ideas to enhance their learning and understanding. The productive use of the "improvable ideas" principle (Scardamalia, 2002) through inquiries and productive discourse could encourage students to value every contribution and idea in discourse as being potentially improvable. K12 students are assumed to be still developing their knowledge-building capacity, whereas higher education students are considered to be more mature in such an approach, but is this assumption always valid? The findings in this study could shed some light on this assumption and provide valuable information about strategies to guide and scaffold students at different levels, to improve their ideas and understanding through knowledge building discourse.

## Method and plan of analysis

### Dataset

The dataset contains a week of discourse data selected from two discourse communities, namely a middle school class in the K12 setting and a graduate course in the higher education setting. There were 20 eighth-graders in the middle school class discussing the scientific topic of "Human Transport System", with 101 notes being contributed and shared among the community on the Knowledge Forum – a knowledge building environment built specifically to support collaborative production and refinement of communal knowledge. Similarly, a total of 13 in-service teacher participants discussed the "basic principles of Computer-Supported Collaborative Learning (CSCL)" and contributed 162 notes to the Knowledge Forum.

### Method and analysis

This study employed the methodology Idea Identification and Analysis (I<sup>2</sup>A; Lee, Tan, & Chee, 2016) to conduct an idea analysis and compare the knowledge building discourses from K12 and higher education settings. This methodology was primarily developed and used as a tool to identify ideas promising to the students or the teachers. I<sup>2</sup>A aided in the analysis of knowledge building discourse using network measures such as betweenness centrality to identify ideas that have a subsequent impact on community discourse. As a result, *promising* and *potential* ideas from discourse were classified as part of the process that measured the progress of idea development in knowledge building discourse. *Promising ideas* are defined to be of great relevance to the community and are able to sustain the community's interests and therefore, are worth pursuing and likely to affect the communal discourse. *Potential ideas* exhibit lesser communal relevance to some extent and the community's interest in these ideas are difficult to be triggered or sustained. Therefore, in order for these ideas to have some form of impact or

influence on communal discourse, scaffolds and interventions are required to elevate and maintain the community's interests in the ideas within the discourse. The discovery of promising ideas and their effects through network analysis were subsequently validated using a qualitative analysis.

## Preliminary results

Preliminary results computed from the network analysis in the I<sup>2</sup>A methodology show that a total of 10 ideas (including both promising and potential ideas) were identified from the eighth-grade discourse, but only one idea was considered promising; whereas 8 ideas were identified in the post-graduate discourse, of which half were considered promising to the discourse community. The categorization of ideas was qualitatively assessed and 88.9% of the identified ideas were recognized to be correctly classified by two raters, consisting of teachers and instructors participating in the discourses. Together with a visualization of notes that were created on the Knowledge Forum, these results offered a new perspective on the development of ideas in knowledge building discourse from different settings. The post-graduate students were able to produce an equal split of potential and promising ideas from their communal discourse, signifying the focus on idea quality and promisingness. Comparatively, the student community from the K12 setting was keen to contribute more ideas, with a majority of them being potential rather than promising ideas. The students in the eighth grade were generally able to contribute notes with ideas that were potentially promising and broadly interesting to the discourse community, but these ideas lack a convincing attribute to encourage uptake by other students or impact subsequent discourse. Contrarily, from the post-graduate discourse, the group of promising and potential ideas acted as key mediators between different groups of students and became triggers that stimulated student interests in relevant and supplementary content.

## Conclusion and future work

In conclusion, the differences of knowledge building discourse from a K12 and higher education setting were investigated, in an effort to understand how students in different settings deepen their understanding using ideas in knowledge building discourse. Based on an idea analysis and comparison of two discourses, more ideas were generated but were less promising in the eighth-grade discourse, while fewer ideas were generated but were more promising to the post-graduate community. K12 students had difficulty in harmonizing with the community's goals, while students in higher education were able to organize their ideas and thoughts to improve the coherence of ideas and their level of understanding, with the contrast possibly attributed to the different cognitive ability of students. For future work, this preliminary study presented the possible role of a computational-based methodology for idea analysis in discourse. The technological affordance of Knowledge Forum and findings from this study were instrumental in aiding the construction of strategies to guide and scaffold students in their improvement of ideas and maintaining the support and interest of the community in generating more promising ideas, deeper understanding, and attainment of knowledge creation goals.

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