Fostering Higher Knowledge Construction Levels in Online Discussion Forums: An Exploratory Case Study

Khe Foon Hew, National Institute of Education, Singapore
Wing Sum Cheung, National Institute of Education, Singapore

ABSTRACT

Prior research has suggested that higher levels of knowledge construction (e.g., where opinions are argued, challenged, or negotiated) have rarely been demonstrated in student online discussions. In this study, the authors replicate prior research on group size, discussion duration, and student facilitation techniques to examine the influence of these factors on the attainment of higher level knowledge construction. Data were collected from 12 online discussion forums involving undergraduate students and students’ reflection logs. Analysis of the data confirms a significant positive correlation between higher level knowledge construction occurrences and group size. No correlation is found between the discussion duration and the occurrences of higher level knowledge construction. Further analysis between the higher and lower performing forums suggests that a certain critical mass, which appears to be a group size of about 10 participants, may be required to direct the discussion to advanced levels of knowledge construction. In addition, results show that students in higher performing forums used the facilitation technique of pointing, highlighting unanswered or unresolved issues statistically significantly more than their counterparts in lower performing forums.

Keywords: Facilitation, Group Size, Higher Level Knowledge Construction, Knowledge Construction, Online Discussion Forums

INTRODUCTION

The education of students has traditionally involved the notion of teachers transmitting information and facts to the minds of the audience (Roehler & Cantlon, 1997). However, current trends in the field of learning sciences emphasize social constructivist learning environments that afford students the opportunity for collaborative learning (van Drie, van Boxtel, Jaspers, & Kanselaar, 2005). Collaborative learning has been defined as a social process by which individuals negotiate and share meanings pertaining to the specific task at hand (Roschelle & Teasley, 1995). One key factor that can determine the success of collaborative learning can be found in the quality of the knowledge constructions students engage in. Although there are many
different perspectives of what knowledge actually is, in this paper, we consider the definition of knowledge as espoused by Gunawardena et al. (2007) which is related to information, facts, opinions, or ideas. This definition emphasizes the applied perspective (rather than merely a philosophical orientation) of knowledge, where knowledge is seen as information possessed in the mind of individuals related to procedures, facts, concepts, ideas, judgments that can help an individual take effective action (i.e., solving problems) (Alavi & Leider, 1999, 2001).

The quality of knowledge construction can be assessed by examining the different levels it occurs, typically through the use of content analysis models. De Wever, Schellens, Valko, and Van Keer (2006), in their review of various content analysis models to analyze the transcripts of online discussion forums, listed several different models that examine the levels of knowledge construction. Of these various models, the interaction analysis model by Gunawardena et al. (1997) is considered to be the most appropriate scheme in analyzing student knowledge construction in social constructivist and collaborative learning environments (Koh, Herring, & Hew, 2010; Lally, 2001). It is considered a relatively straightforward scheme (Lally, 2001; Marra, Moore, & Klimczak, 2004), is reliable (Marra et al., 2004), and is adaptable to a range of teaching and learning settings (Lally, 2001).

Specifically, Gunawardena et al.’s (1997) model is based on grounded theory and uses the types of discussion activities to determine the amount of knowledge constructed within a discourse (De Wever et al., 2006). The types of discussion activities that individuals engage in may be represented by five levels: level I, II, III, IV, and V. The first level is sharing and comparing information, which consists of opinions, statements of agreement, and identifications of problems. The second level is challenging people’s ideas, discovering and exploring of dissonance among the ideas, concepts, or statements. This is followed by level three which includes negotiation, identification of areas of agreement, and suggesting new construction on issues where conflict exists. The fourth level is testing and modification of proposed synthesis or co-construction which includes testing statements against personal experiences, formal data collected, and literature. The fifth and final level refers to statements of agreement and application of newly constructed meaning, which may consist of summarizing agreements, applications of new knowledge, and students’ reflective statements that illustrate their knowledge have changed as a result of the online discussion interaction.

The core concept of Gunawardena et al.’s model results from social constructivist principles, more definitely the processes of negotiating meaning and coming to a shared agreement or understanding by discussing and contributing knowledge (in other words levels II to V), thus resulting in the shared construction of knowledge (Kanuka & Anderson, 1998). Some researchers (Chai & Tan, 2007) do not consider Gunawardena et al.’s (1997) level I as evidence that students have actually engaged in knowledge construction. Hew and Cheung (2010) likened level I to a mere question and answer session where students merely answered their course mates’ online queries, and defined higher levels of knowledge construction as consisting of levels II to V. Adopting the observations of other researchers (Chai & Tan, 2007; Hew & Cheung, 2010; Kanuka & Anderson, 1998), we define higher levels of knowledge construction, in this study, as the sum of the frequency of levels II, III, IV and V occurrences (Gunawardena et al., 1997).

Table 1 illustrates the various knowledge construction levels with some representative excerpts from the participants’ online discussion data found in our study.

### Problem Statement

The use of information and communication technology (ICT) tools may help facilitate the construction of knowledge by functioning as a social medium to support students’ discussion and representing students’ ideas and opinions in concrete forms (e.g., messages) so that ideas can
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