Chapter 16
Learning Argumentation Practices in School with a Graphical Synchronous Discussion Tool

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EXECUTIVE SUMMARY

Several computerized representation tools have been developed to enhance collective argumentation in schools. The authors describe Digalo[1], a graphical synchronous e-discussion tool (Schwarz & Glassner, 2007). They focus on how Digalo was used in a program (the Kishurim program) dedicated to foster dialogic and dialectic thinking among students in lessons centered on scientific and social issues. The studies undertaken on the use of Digalo suggest important lessons that moderators of e-discussions should keep in mind while designing, moderating, and evaluating small-group e-discussions.

INTRODUCTION

Construction of Knowledge through Visual Representation of Arguments and Argumentation

Collaborative settings in which small groups of students argue with each other have been shown to be powerful tools for knowledge construction (Kuhn, Felton, & Shaw, 1997; Pontecorvo & Girardet, 1993; Andriessen and Schwarz 2009). However, students seldom argue with each other on scientific issues (e. g., De Vries, Lund & Baker, 2002). Andriessen and Schwarz (2009) identified design principles for insuring maintenance of argumentation towards eventual construction of knowledge. Among those design principles: pairing peers with different initial cognitions (Glachan & Light, 1982), providing hypothesis testing devices (Howe, Tolmie, Duchak-Tanner, & Rattay, 2000; Schwarz & Linchevski, 2007) and providing tasks that have the potentiality to engender diverse explanations (van Bruggen & Kirschner, 2003; Schwarz, Neuman, & Biezuner, 2000).

Other design principles concern structuring dialogue in verbal interaction. It has been recognized that this structuring is ineffective unless being practiced intensively (Webb, 2009). Consequently, long run programs were implemented according to different approaches: invoking ground rules for peer-to-peer talk (Mercer, Wegerif, & Dawes, 1999; Schwarz & De Groot, 2007), explicitly teaching basic elements of argumentation (Kuhn et al., 1997; Reznitskaya, Anderson, & Kuo, 2007), or developing communication skill to improve dialogue practices (Gillies & Khan, 2009; Resnick, Michaels, & O'Connor, 2010; Wells, 2007).

These design principles are sometimes successful but they demand economical and pedagogical resources for training and technological infrastructure. Another design effort has been invested to remedy this weakness: the elaboration of technological tools that structure student's representation of their own reasoning/argumentation.

The most productive educational setting will be operated among junior high school students. The school should have an adequate technological infrastructure, a culture of collaboration and practices of learning in small groups. The teachers should be available and motivated to learn and instruct with technology.

Technological Tools for Argument Representation

Bell (1997) has recognized two different types of representations of argumentation: a. representation of argumentation structures; b. representation of argumentative processes. The first type, *knowledge representation tools*, supports the construction of argumentation whose structure and content correspond to a *valid argument*. Examples of such environments are SenseMaker (Bell, 1997) and Belvedere