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Tracing the change in discourse in a collaborative dynamic geometry environment: from visual to more mathematical.

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Summary: This case study investigated the development of group cognition by tracing the change in mathematical discourse of a team of three middle-school students as they worked on a construction problem within a virtual collaborative dynamic geometry environment. Sfard's commognitive framework was employed to examine how the student team's word choice, use of visual mediators, and adoption of geometric construction routines changed character during an hour-long collaborative problem-solving session. The findings indicated that the team gradually moved from a visual discourse toward a more formal discourse – one that is primarily characterized by a routine of constructing geometric dependencies. This significant shift in mathematical discourse was accomplished in a CSCL setting where tools to support peer collaboration and pedagogy are developed through cycles of design-based research. The analysis of how this discourse development took place at the group level has implications for the theory and practice of computer-supported collaborative mathematical learning. Discussion of which features of the specific setting proved effective and which were problematic suggests revisions in the design of the setting.

Classification: U73 C33 G43
Keywords: mathematical discourse development; mathematical routines; group cognition; collaborative dynamic geometry; dependencies
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