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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 22(22)

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Publication Date

2000

Peer reviewed

Knowledge Construction Links: Cues and Trajectories as Prior Experience and Knowledge

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Background and Purpose

The constructivist perspective asserts that new knowledge is based on individuals' prior experience and knowledge, and is, therefore, idiosyncratic. Although constructivist instructional strategies (e.g., problem based learning, cognitive apprenticeship, and anchored instruction) have shown promise in classrooms, little research is available on why these methods are helpful at a cognitive level (i.e., how and why learners construct their unique knowledge). This study begins to address this foundational omission using an emergent research methodology to identify the use of trajectories and cues in knowledge construction.

Methodology

This instrumental collective case study reports incidents of learners' use of prior knowledge and experience into their new learning opportunities as a component of describing knowledge from a constructivist perspective. Participants were students in three sixth-grade classrooms (N=74) that differed in learner-centeredness, a characteristic of constructivist classrooms. Learner-centeredness was determined by students' perceptions as measured through the Learner-Centered Battery. Data were gathered through observation, interviews, and a writing activity during subject units that spanned two to seven weeks. Knowledge was operationalized as links (verbally or in writing) through which learners included information that was often tangential to the current topic (i.e., prior experiences and knowledge). Interview participants were selected based on these comments or through random selection. In the open-ended independent writing activity, students were asked to begin their writing with the subject matter topic but also told that they could follow tangential connections.

Given the instrumental nature of the study, the knowledge construction links were first identified. Further analysis proceeded as in qualitative studies, seeking emergent trends in the data, i.e., characteristics of the knowledge construction links as well as the environment in which they were embedded.

Findings and Interpretation

Emerging in the data were cues, those stimuli that prompted learners' to link new information with their prior experience and knowledge. Cues were singular or multiple and often led to tangential comments or questions. For example, a student described the role of vitamin C (the focus of her independent science inquiry project) in a discussion of the Middle Ages and "citrus fruit" (the cue). Once a learner encounters a cue, a trajectory may follow. Trajectories were described by the features of the prior knowledge. Given the richness of an individual's reconstructions, trajectories often contained multiple types, in particular, the type of experience and the characters who were involved.

Ten cue types (sounds like, looks like, feels like, is a, same word but different concept, same concept but different context, same concept and same context but different content, same concept and same context with same content, different concept within same context, series, and complex relationships) and ten trajectory types (acting, general acting, future, and operative experiences, family, friends, school, society, media, and affect/emotion) were identified in this data set.

These constructs captured a view of knowledge that focused on the uniqueness of knowledge: the potential and necessity of considering knowledge within learning situations as unbounded and freely crossing domains and contexts, and dynamic by necessity given each learners' prior experience and knowledge. Further, these constructs, although occurring in all three classrooms, were fostered in the most learner-centered classroom, thus providing exploratory explanations of this fundamental learning process for constructivist instructional strategies (i.e., why these strategies foster learning).

These constructs within the construction process as it occurred in these classrooms provide a variety of opportunities for describing knowledge and knowing. In this poster session I seek opportunities for collaboration with other cognitive scientists to begin to explore how these constructs can be modeled.