

Association of Math Attitude with Math Performance: A Preliminary Investigation

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Abstract Many students come to the math classroom lacking readiness in embracing and functioning within a learning environment oriented towards problem solving. Instead, many bear negative or unconstructive beliefs about themselves in relation to the learning of quantitative and mathematical issues, are anxious about math, and are apprehensive about taking quantitative tests. In this pilot study, we looked to see if there was any association between math enjoyment and math performance in a real math classroom. Our findings were that students did not always enjoy math when they performed well and secondly, that students did not always dislike math when their performance was poorer. Our data analysis suggests that math enjoyment ratings were indicative of students' effort, self-concept, affinity for the problem set theme, interestingness of problem sets, comprehension and competence in math skills. Further investigation is required to strengthen these findings.

Cre8ion of learning environments for critical tasks

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Abstract: Traditional training methods for people working in 24/7 organizations no longer suffice. These methods are too rigid in their approach and fail to incorporate new developments in time, thus hampering transfer of training. To overcome the problems of traditional training methods, four principles were identified for the development of learning environments for critical tasks. First, facilitating workplace learning will shorten the time required for training and instruction and provide better transfer to actual practice. Second, stimulating continuous learning will not only improve personnel readiness, but also make them last longer. Third, incorporating the real-life context aims at making better use of technical competences in practice. Fourth and last, a rapid development approach means saving development time and cost and making learning environments quickly available. To illustrate these four principles, three research projects will be described that aimed at the grounded development of a learning environment.

Enhancing Instruction in Virtual Training Systems by Explaining Character Behavior

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Abstract: Instructors play a major role in many of the current virtual training systems. For instance, they control the virtual environment, impersonate the roles of other characters, and provide feedback to the trainee. Consequently, either many instructors per trainee are needed, which is expensive, or single instructors perform highly demanding tasks, which might lead to suboptimal training. We propose to support the instructors by using self-explaining BDI (belief desire intention) agents in the virtual training systems. These agents are able to autonomously generate natural behavior of the virtual characters during a training session. Moreover, they are able to explain the underlying reasons for their behavior. As agents based on the BDI model reason with concepts such as beliefs, intentions, and goals, the explanations for their actions will also be in these 'human' terms. The explanations aim to provide insight in the perceived training situation, the agents' reasoning processes and the trainee's own role in it, and thus facilitate learning.

Spatial accountability as design factor for interactive reading

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Abstract: Unlike in computer games, readers tend to ignore spatial details in text. This study investigated whether accountability improves the spatial dimension of situation models readers create as they read text narratives. Embedded spatial queries (“Which room is the protagonist currently in?”) constituted accountability. Investigators distinguished between contingent (external rewards/punishments) and non-contingent (no rewards/punishments) accountability. Forty-six undergraduates read text narratives sentence by sentence on computer screens under all three conditions: 1) control (non-accountable) condition, 2) non-contingent accountability, and 3) contingent accountability. Accountable readers (both contingent and non-contingent accountable) took significantly longer reading spatial sentences than did non-accountable readers. Both contingent/accountable and non-contingent/accountable readers did significantly better, than those in the control condition, on a posttest involving questions about where events occurred. For the two accountable conditions, contingent and non-contingent, posttest results did not differ. In terms of spatial situation models created from reading narratives, accountability can make interactive reading work spatially.

The case of a principle-based study group: Integrating knowledge of technology, pedagogy, content and context

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Abstract: A case study examined teacher knowledge related to the implementation of the Knowledge Building Communities (KBC) approach (Scardamalia, 2002). Teachers participated in a principle-based study group composed of other local teachers along with a University Researcher (UR). It was found that these professional development meetings contributed to the development of teacher knowledge about the underlying components of the KBC approach. In addition, coding and analysis of meeting transcripts indicated that the group initially focused on technological and contextual knowledge but then over a series of meetings moved to a de-fragmented state where they were integrating knowledge of the context with their technological, pedagogical, content knowledge (TPACK - Mishra & Koehler, 2006). These results also point to the importance of including a UR in the group to bring the innovation's underlying principles into the conversations. Further research is required to ensure that these results can be generalized beyond this specific case.

A Needs Analysis for Instructional Support in LegSim

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Abstract: The research question we address is the extent to which participation within a well established game-based learning environment for Civics instruction called LegSim supports needed development of argumentation skills. We present an analysis of a semester's worth of discussion data from LegSim in order to identify the opportunities for argumentation and critical thinking skills development and how students may or may not have taken advantage of them. Our analysis was guided by two focal questions: (1) Where do we find opportunities for students to experience successes and failures in their argumentation? (2) To what extent do we find evidence that students gained competence in their argumentation ability over the course of the semester? Results suggest that although environments like LegSim offer great potential for providing students with valuable opportunities to develop important skills, active support during participation is needed to ensure that students take these opportunities when they are presented.

Students' Images of Science and Scientists: A Multi-Method Investigation of Four Cases

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Abstract: This study investigates how young people reconcile the prototypical image of a scientist with their own thoughts and experiences. Four case studies focus on 5th-grade students and university students (1 male and 1 female in each age group), and rely on multiple research methods, including observations, interviews, document analysis, photo elicitation, and self-documentation, to investigate how participants define and represent science and scientists as both real and imagined ideas. Results show that all participants were able to distinguish between the prototype image of a scientist and their own perceptions of who scientists are and what they do professionally.