

PROJECT SUMMARY

Title: *Video Interactions for Teaching and Learning (VITAL): A Learning Environment for Courses in Early Mathematics Education*

Submitting Institution: *Columbia University, Columbia Center for New Media Teaching and Learning (CCNMTL)*

Principal Investigator: *Frank A. Moretti, Ph.D., Executive Director, CCNMTL; and Professor of Communications and Education, Teachers College*

Project Category: *Category III, Professional Resources Development, Teacher Professional Continuum (NSF 03-534)*

Abstract: A consortium led by the Columbia Center for New Media Teaching and Learning (CCNMTL) and Teachers College, with William Paterson University as a partner, proposes to develop a new resource for preparing teachers of early childhood mathematics (K–3). Video Interactions for Teaching and Learning (VITAL) is a structured environment comprising college- and graduate-level curricula, a digital library of primary source materials, and an online community workspace. Based on design research and the prototype developed by CCNMTL during the 2002–2003 academic year, the new learning environment will combine a theoretical grounding in cognitive psychology research with the purposeful use of digital technology. By building a space in which teachers can analyze video footage of clinical interviews and classroom interactions, VITAL will improve their understanding of children’s mathematical thinking, and hence their classroom performance.

The consortium intends to develop a resource that can be deployed in teacher-education courses nationwide, and therefore seeks support for VITAL within Track III of TPC. The project will contribute to the research base on the professional development of STM teachers, eventually addressing the needs of grade levels and disciplines other than K–3 mathematics, and will help scholars and policymakers devise new settings, methods, and standards for STM education research.

Intellectual Merit: VITAL’s design is based on research in three major areas: the developmental and cognitive psychology of children’s mathematical thinking, successful practices for adult learning (particularly as it relates to teacher education), and the principles of instructional design and interactive media. Studies indicate that children already employ mathematical ideas and methods before the onset of formal education and that they filter what they learn in the classroom through their prior and informal understandings of mathematical concepts. VITAL introduces prospective and practicing teachers to this body of research to improve their understanding of how young children learn mathematics, with the anticipation that this will improve teacher performance. In the area of adult learning, research indicates that students who study video cases demonstrate an increased ability to apply relevant theoretical concepts about teaching and learning to their understanding of classroom practices, especially when they are given extended time and multiple opportunities to analyze and interpret the cases. Digital technologies provide such opportunities by allowing students, among other things, to instantly access segments of a video clip, annotate those segments, incorporate them into their analytical work, and share their essays with peers and instructors. Digital analytic and communication tools thus facilitate sophisticated reflection and discourse on video cases.

Broader Impacts: The project will transform early and elementary mathematics education in the United States by developing a research-based model and Web-based learning environment for improved professional development. VITAL is used in courses at two levels, graduate (including both pre-service and practicing teachers) and undergraduate, and will be disseminated nationally after initial testing in private and state universities. Its influence on a diverse body of teachers, in turn serving a diverse range of students, will lead to its replication nationwide and to greater understanding of effective teaching strategies throughout the profession. Benefits in children’s mathematical development will also extend to their later work through the full range of STM disciplines. The VITAL project’s findings will be broadly disseminated to the academic community through scholarly publications, conferences, and workshops.