Sr. Personnel

Frank Moretti, Ph.D. (Principal Investigator), Co-Founder and Executive Director of the Columbia Center for New Media Teaching and Learning (CCNMTL), Columbia University; Professor of Communications at Teachers College, Columbia University.

Herbert P. Ginsburg, Ph.D. (Co–Principal Investigator), Jacob H. Schiff Professor of Psychology and Education at Teachers College, Columbia University.

Rochelle Goldberg Kaplan, Ph.D. (Investigator), Professor, Department of Elementary and Early Childhood Education at William Paterson University.

A. Maurice Matiz (Senior Personnel), Co-Founder and Director of Technology of the Columbia Center for New Media Teaching and Learning (CCNMTL), Columbia University.

Peter Sommer (Senior Personnel), Director of Education of the Columbia Center for New Media Teaching and Learning (CCNMTL), Columbia University.

Additional Personnel

Janet Eisenband (Graduate TA), Ph.D. Candidate, Teachers College

Susan Jang (Graduate TA), Ph.D. Candidate, Teachers College

Anita Kumar (Graduate TA), M.A. Candidate, William Paterson University

Michael Preston (Graduate TA), Ph.D. Candidate, Teachers College

Organizational Partners

Cornelia Brunner, Ph.D. (Formative and Summative Evaluator), Associate Director, Center for Children and Technology, Education Development Center, Inc.

Arthur Baroody, Ph.D. (External Reviewer), Professor of Mathematics Education at the University of Illinois at Urbana/Champaign.

Activities & Findings

Course Preparation

Professor Ginsburg and graduate TAs Janet Eisenband, Susan Jang, and Michael Preston at Teachers College, along with Professor Kaplan and her TA Anita Kumar at William

Patterson University, offered graduate courses at their respective institutions during the Fall 2004 semester. These courses focused on the development of mathematical thinking in early childhood and used the online prototype version of VITAL at Teachers College and CD-ROMs at William Patterson University to augment the instruction and measure students' learning gains. As part of offering the courses and incorporating video directly into the teaching and learning process, Professors Ginsburg and Kaplan developed detailed descriptions of the learning goals and expected outcomes of students enrolled in the course, and they have begun to develop specific assessment strategies to measure the stated goals.

The faculty and TAs examined a number of issues in developing the Fall 2004 course:

- How best to introduce students to the concepts presented in the course
- How many and which specific readings provide students a thorough and expansive review of the subject
- How many and which videos illustrate and inform students of the subject and its complexity
- What kinds of activities best promote student learning and what kinds of assessments elicit from students the breadth and depth of their understanding of the material, particularly as they use VITAL to support their arguments
- What activities best support students in the transfer of learned concepts to teaching practice?

Building from similar courses offered by Professor Ginsburg in past semesters, the team refined the course, choosing primary source materials from both Ginsburg's and Kaplan's extensive video libraries. Formative weekly assignments and a final summative assignment, all using VITAL, were devised to measure students' progress. Throughout the semester, the team reflected regularly and extensively on the design of the course and on students' progress, noting similarities and differences at each institution, and revising as necessary to help students achieve the desired learning goals.

Importantly, the faculty and TAs are using students' weekly essays, reflections, and final papers as part of the assessment of VITAL's impact on learning. The reflections and student assignments offer two different sources of data about student learning, and the team is examining how to use these data in a more rigorous way. Just recently, for example, the team began analyzing student final projects in order to determine the types of critical thinking associated with activities in VITAL.

As a result of the Fall 2004 courses, the faculty and TAs have identified key improvements to the course:

- Changes to assignments in VITAL
- New video segments to capture for use in VITAL in addition to existing material in the video library
- Revisions to make the course appropriate for undergraduates and in programs with mixed curricula and disciplines.

The team is already designing graduate and undergraduate courses to be offered in Fall 2006, including the development of new video, new pedagogical strategies, and new

assessment techniques.

Content Development

As mentioned, Professors Ginsburg and Kaplan have extensive video libraries of primary source material to illustrate complex concepts and processes to students. Over 300 video segments have been digitized, yet some video remains to be processed. Further, to date the team has identified 45 key learning situations and interactions with children to capture and the list is growing. 10 video shoots have been arranged thus far, and various activities are scheduled to be taped at three local NYC schools. In all, the team plans to record approximately 50 hours of video (containing 150 clinical interviews and 20 classroom observations) with the potential for more video to be captured. Having worked closely with school administrators and teachers to secure their support and parents' approval, and having shot over 16 hours of preliminary test footage (not part of the 50 hours), the team is prepared to gather the needed video. (See Attachment 1: VIDEO CONTENT.)

Augmenting the course is the selection of additional journal articles, the continued development of syllabi, and extensive lesson plans. Expert commentary will be paired with select video that students will view outside of class. The team will examine the usefulness of the commentary in future offerings of the course to determine whether commentary should accompany a greater number of video selections.

Software Development

An enhanced prototype was developed to introduce an administrative feature; this addition allows faculty and TAs to create new courses, assignments, and material in VITAL. This development greatly reduces support and enhances VITAL's usability, as it alleviates the need for oversight by skilled technical professionals. While not a "point-and-click" application, VITAL now allows greater flexibility to faculty in managing their own courses.

Over ten formal discussions and brainstorming sessions with the technical and educational teams, along with focus groups, interviews, and student feedback surveys have equipped VITAL designers and developers with an array of suggestions and improvements to the functionality and usability of the tool. The robust list of improvements and suggested new features has informed the developers of the technical specifications required to program the changes. As with the development of the curriculum and course material, the team continually reflects on the type and quality of the changes being made, revising their initial ideas when necessary to achieve the best solution. Specifically, the existing VITAL tool is undergoing changes to its core construction, database, and graphical user interface to provide a better experience for student and faculty users.

Importantly, the team is examining issues surrounding the implementation of VITAL at institutions outside of Columbia University and Teacher's College. The technical complexity of VITAL (namely, authenticating users via the institution's user identification system) requires careful consideration of how it will integrate with complex enterprise systems at partner institutions. For this reason, the CCNMTL programming team is investigating the potential integration of VITAL with the open-source collaboration and learning environment, Sakai. As part of the Open Knowledge Initiative (OKI), Sakai adopters will use standard methods for bridging Sakai with enterprise systems. Sakai is expected to have wide-spread appeal to institutions across the world in part because of the standards it follows, and CCNMTL anticipates many of our VITAL partners to adopt Sakai. Developing VITAL as part of Sakai may ease its installation and use at our partner institutions.

Quality Assurance and Content Review

Together with Cornelia Brunner, Associate Director, Center for Children and Technology, Education Development Center, Inc., Professor Ginsburg and the TAs are examining how best to evaluate VITAL's ability to deepen students' critical thinking. Although the evaluation will not be conducted until Fall 2006 and beyond, the team is analyzing a number of strategies to determine how best to approach and conduct the evaluation of VITAL.

In considering the evaluation methodology, the team must take into account the ways in which VITAL will be used in other institutions and by faculty in diverse but related fields, such as developmental, cognitive, and educational psychology, teacher professional development, and clinical practice. To understand how faculty in these departments would approach, use, and evaluate the course material and VITAL, the CCNMTL and Teachers College team convened our faculty partners from other universities on January 7, 2005 (See Attachment 2: VITAL PARTNERS). This day-long meeting at Columbia resulted in a wide range of tangible and intangible outcomes: eliciting ideas from faculty partners about how VITAL could augment their teaching, identifying the curricular approaches and needs of partner institutions, and building momentum and excitement about the project. Such strong beginnings to the long-term partnerships brought about by the grant will serve the partners and development team well.

To foster ongoing support and involvement of the institutional partnerships, CCNMTL is developing an online project workspace in which faculty can grapple with features, issues, and developments of the course and resources. As a first step, the faculty will submit the course goals and syllabi of their existing courses, will comment on video segments from Professors Ginsburg and Kaplan's libraries, and will discuss current research and professional literature they find relevant and thought-provoking to the project. It is hoped by the principle investigators that this forum will instill a sense of ownership and dedication to the project by the partners.

Finally, the faculty, TAs, and development team have made numerous presentations about VITAL to local and area audiences. Professor Ginsburg, Janet Eisenband, Susan Jang, and Michael Preston will present a paper about VITAL at the annual meeting of the American Educational Research Association (AERA) in April 2005. The team is awaiting approval of a proposed VITAL paper for ED-MEDIA in June.

Other Activities

A number of other activities related to the advancement of the project have occurred since the inception of the project. Namely, key staff have been hired and tasked to work on the project, including a project manager and a video production assistant. As the designers identify new features and improvements of the VITAL software, CCNMTL will hire and task programmers with implementing these enhancements.

Using the CCNTML project management tool, the project manager continually assesses the progress of the project, noting completed milestones and assigning new tasks to project personnel. Personnel report their progress using the tool, and the project manager verifies the completion of the task. In this way, the entire team – from senior personnel to staff – remain abreast of the completed, current, impending, and future tasks.

Summary of Key Milestones Reached

Course Preparation and Content Production
Designed curricular activities:
- Defined learning purposes and outcomes for graduate courses
- Selected primary source materials
- Devised assessment strategies

Identified and selected resources:
- Digitized video clips
- Identified and digitized journal articles
- Created and developed lesson plans
- Captured expert commentary

Developed new resources:
- Identified video content mapped to tasks and syllabus

Software Development
Defined technical specification to inform programming tasks
Modified functionality of student workspace
Constructed the administrative component
Constructed the user database

Quality Assurance and Content Review
Identified evaluation measures and methodology
Convened partner institutions

Presented progress and current findings

Publications (in journals, chapters in books, or entire books)

Ginsburg, H. P., Jang, S., Preston, M., Appel, A., & VanEsselstyn, D. (2004). Learning to Think about Early Childhood Mathematics Education: A course. In C. Greenes & J. Tsankova (Eds.), *Challenging Young Children Mathematically* (pp. 40-56). Boston, MA: Houghton Mifflin.