

***Perspectives on Classroom-Based Research on the Teaching and Learning of Mathematics in the Context of Technology:
Overview of Content and Goal***

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Running head: Overview

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Purpose

The purpose of this collection of papers is to explore how different data sources can further our understanding of how students learn and do mathematics with technology.

Setting

We report recent classroom experiments using technology-intensive secondary mathematics curricula and connect these events to research experiences over the past decade. The session underscores what is learned through data from complementary studies with various teaching and learning perspectives. The common context for all of the work presented here is a grades 10-12 mathematics classroom at a medium-size U.S. public comprehensive high school. This fifth-year mathematics teacher was in her first year of implementing innovative curriculum materials. In the fall, she and her students used four modules from the CAS-Intensive Mathematics (CAS-IM) Project as a “geometry” class. In the spring, she and a different group of students used three modules as a “second-year algebra” class. Figure 1 lists the modules used during each semester.

<i>Fall 2000</i>	<i>Spring 2001</i>
I. Transformations and Triangles	II. Composition and Inverse
III. Area and Volume	IV. Families of Functions
V. Constraints in Geometry: Congruence and Similarity	IX. Symbolic Reasoning

Figure 1. CAS-IM modules used during each of the two semesters

Data Sources

This set of papers focuses on data gathered during the spring semester. The extended research team conducted three interviews with each of 11 students. We did two sets of small group observations, with each set spanning two consecutive days. We also did three sets of 2-consecutive-day whole-class observations. Figure 2 summarizes the number and timing of the sessions.

	<i>Interviews</i>	<i>Small Group</i>	<i>Class</i>
<i>February</i>	February 13-14		February 8-9
<i>March</i>	March 21-22	March 28-29	March 8-9
<i>April</i>	April 18-19		April 2-3
<i>May</i>		May 17-18	

Figure 2. Timing of Data Collection Sessions

These data gathering sessions were audiotaped and videotaped. Verbatim transcripts of the sessions were annotated with information from several sources of data gathered during the sessions: handouts used, researchers' written notes, computer work saved as files, and students' written work. In addition, the augmented transcripts as primary data were complemented by a variety of supporting materials: the teacher's daily log of content and activities, standardized test scores, copies of students' workbook notebooks, and student background information (gender, mathematics course grades).

Session Contents (and Papers)

Our set of papers addresses uses of representation, purposes of technology use, and nature of the tasks we introduced and they undertook. In addition to this overview, there are seven papers. The first three are theoretical pieces that provide our underlying perspective regarding uses of representation (Zbiek, 2002a), purposes of technology use (Zbiek, 2002b), and types of mathematics tasks (Heid, Blume, Hollebrands, & Piez, 2002). In the next three papers we examine the implications of these perspectives using data from individual interviews (Zbiek & Finken, 2002), from small-group work (Blume, Heid, Hollebrands, & Piez, 2002), and whole-class discussions (Foletta, 2002). The last paper (Zbiek & Glass, 2002) extends the use of these perspectives to examine reasoning, justification and proof.

References

- Foletta, G. M. (2002). High school teacher and her students' use of representations while using the CAS-Intensive Mathematics curriculum. Paper presented at the Research Pre-session at the 80th Annual Meeting of the National Council of Teachers of Mathematics, Las Vegas, Nevada, April 21, 2002.
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Zbiek, R. M., & Finken, T. (2002). Students' complex and nested uses of shared representations: An example with linear functions in a technological environment. Paper presented at the Research Pre-session at the 80th Annual Meeting of the National Council of Teachers of Mathematics, Las Vegas, Nevada, April 21, 2002.

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