SECONDARY SCHOOL TECHNOLOGY MENTORS

Reference Code FC13

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Elmhurst College and several Chicago area secondary schools are in the second year of a three year technology project supported by a $700,000 grant from the National Science Foundation. The project supports summer technology workshops at Elmhurst College together with on-site work during the academic year at the participating high schools. The project's goal is the development of systematic use of appropriate technological tools in the mathematics curriculum at each participating school.

Project personnel include three faculty from Elmhurst College, six mentor teachers, and approximately 60 participating teachers. The mentor teachers have extensive experience using technology in their secondary school classrooms. The participating teachers are chosen from schools which have made commitments to support integration of technology into their mathematics curriculum. A total of twelve schools, public and private, from the city of Chicago and the surrounding suburbs are participating in the project.

The project's mentor teachers receive significant release time, funded by the grant, to work with participating teachers in their schools during normal class hours. During the summer, all project personnel meet for two to three weeks of intensive workshops. These workshops provide training on the use of calculators and software, examples of effective ways to use technology in the curriculum, and opportunities for participants to investigate specific ways to coordinate use of technology in their own classes.

Elmhurst College faculty participating in the project have primary responsibility for coordinating project activities and gathering project resources. Elmhurst College provides internet access for all participating teachers and training on use of the internet. Elmhurst College maintains a library of software and printed materials for the use of all project personnel. The printed materials include published and unpublished texts, worksheets, classroom demonstrations, and student projects on technology use throughout the secondary school mathematics curriculum. Many of these materials were written by Chicago area mathematics teachers.

The first series of workshops, held at Elmhurst College in the summer of 1994, focused on activities designed to build relationships between mentors and participants, to give participants hands-on experience with a wide variety of hardware and software tools, to allow participants opportunities to examine effective ways for implementing these tools in the classroom, and to begin the process of curricular change for both individual participants and participating departments as a whole. A variety of workshop sessions were offered to meet as best as possible the needs of participants with varied backgrounds and equipment.

Participants in the 1994 workshops completed a course project. Participants selected one particular topic from their 1994-95 teaching schedules which might be better taught using some form of technology. Projects were developed around these topics and presented to the entire group. In many cases, teachers from the same school coordinated their projects. This helped departments begin the process of focusing their efforts for grant-related work during the upcoming academic year. Elmhurst College is currently constructing a gopher on the internet which will contain lists of projects and resources. A list of projects from the 1994 workshops is attached. We hope to have more detailed information on these projects available electronically during the next year.

Evaluation of the project is occurring at various levels. External evaluators participated in some of the summer activities and provided detailed feedback. The mentors provide reports of their on-going experiences in the schools. Initially, these reports indicate varied levels of progress. Some schools, particularly those with better equipment, have begun to focus in coordinated ways on specific curricular topics. For example, Glenbard East High School is focusing on geometry, with a goal of incorporating the Geometer's Sketchpad into all geometry courses taught at the school. Faculty participating in the grant project will work with mentors to develop approaches to geometry using this software which can be used by all geometry teachers at the school. Schools which are not as well equipped are moving more slowly. Elmhurst College is working with these schools to help with equipment acquisition, especially in writing equipment grant proposals.

Technology use in mathematics is now moving into its mature phase. Many good ideas for using technology in the curriculum exist. The challenge is to coordinate these ideas and apply them in systematic ways which improve the teaching of mathematics throughout the curriculum. Our NSF-funded project hopes to facilitate these developments at the participating schools.

Expectations of Mentors
(PS = participant school)

1) Conduct formal training session at Hub school and on-site for PS faculty.

2) Weekly, moving to bi-weekly visits and contacts with PS to establish an on-going relationship with the PS faculty.

3) Field test technology related materials in Hub school classroom.

4) Supervise the development/adaptation of three to five multi-day units of study by PS teachers

5) Make classroom observation of PS teachers in order to give peer feedback on the integration of technology.

6) Assist PS teachers in the integration of technologies into all phases of the classroom instruction: planning, delivery and assessment.

7) Assist in the development & adaptation of technology related curriculum in the participant & hub schools.

8) Assist in the development of technology related in-service strategies in the Hub school that can be transferred to the PS.

9) Assist the PS in selection of technology related materials.

10) Co-lead summer workshop for PS group network.

11) Attend summer seminars to design own materials / share ideas with others.

12) Attend quarterly meetings at Elmurst College.

13) Present findings at Regional and national meetings and conventions.

Participant School Expectations/Requirements:

1) **Must have a desire to participate in the program as evidenced by:**

   a) Commitment to providing teacher release time (4 release days, Grant 4 days per year)

   b) Partial funding for minimum hardware (e.g. 1 classroom set of graphing calculators)

   c) Submission of a needs assessment of present use of technology with possible technology goals identified.

   d) Commitment to participate in the second year of the program.

2) **Technical support and equipment for accessing computer bulletin board / network/ E-mail of the project.**

3) **Faculty desire to improve teaching through the use of technology.**

4) **Faculty commitment to develop curricular material during the summers.**

5) **Complete the National Science Foundation requirements of receiving formal approval for participation from the appropriate governing body of the school.**

In addition, it is expected that a sufficient number of teachers from each school will be participating to guarantee the possibility of two teachers from each participant school becoming mentor teachers by the end of the program. The chairperson may be one of the participants, as well as part-time individuals. Further possibilities would include "feeder" school faculty.

Project List Summer 1994

I hope that these projects will be available through the internet gopher server at Elmhurst College in the "near" future. The projects will be in ASCII text as well as a MAC (and/or) PC/Windows format.

Geometry

Name	Tech.	Class	Title	
S. Urbain	GSP	Reg.	Geometer's Sketchpad: Circles	M W
V. Donohue	GSP	Reg.	Similar Polygons	P W
M Radek & F. Pettersen	Geo Sup	Reg.	Exploring Properties of Quadrilaterals	M W
J. Thoma	GSP	Reg.	Using GSP for Teacher /Class Demos (Six Demos)	R B
S.Hoogerheide & B. Baird	GSP	Reg.	Introduction to Basic Geometric Concepts	G E
J. O'Brien & B. Vavilis	GSP	Reg.	Introduction to Trigonometric Functions	W A
V. Highstone	GSP & SS	Modified	Perimeters and Areas of Squares and Rectangles	Y
A. Beckman, D. Brown, & M. Dobner	Geo Sup	Reg.	Exploring an Inscribed Quadrilateral of a Rectangle	S P W
K. Boer & M. Volenec	Geo exp & SS(Excel)	All	Sums of Interior Angles of Polygons	L

ALGEBRA

Author	Tech.	Class	Title	
P. Bickel	81/82	Algebra	Graphing Linear Equations Through Experimentation	P W
D. Bade, G. Hill, J.Corwin	81	Algebra	Graphing Linear Equations	L
J. Repplinger	Excel	Prealg/ Alg I	Applied Math/ Ratios & Proportions	L
G. McClure	81/82	Algebra	Introducing the TI-81 & 82 Graphing Calculators to Algebra Students	P W
L. Lamp	SS:MS Works	Alg. II	Explicit and Recursive formulas for sequences	L
H. Dillon	82	Alg I	Graphing Linear Equations into Capital Letters	R B
R. Petit & J. Blew	82	Alg II	Evaluating Expressions	R B
M. Taylor & B. Keefe	SS:MS Works	Pre-Alg	Simple Algebraic Properties Using a Spreadsheet	R B
B. Beiersdorf & M. Donnelly	82	Int & Col Alg	Exploring Inverse Functions with TI-82 Tables	G E
C. Schliem & S. Erickson	82	Alg - Calc.	Setting the Proper Window: Domains and Ranges	M W
D. Wallace & K. Dawson	Derive	Alg II	Discovering the relationship between functions and their inverses	W A
J. Kollar	SS	Algebra	Making a Table of Function Values Using a Spreadsheet	Y
S. Brown	SS: Claris	Alg. I	Three Lessons: 1) Solving ax+b = cx+d, 2) Consecutive Integer Problems, 3) Investment & Area	Y
B. Baird & C. Tobin	SS: Claris	Alg I	Writing exponential equations to fit experimental data	G E

Pre-Calculus & Calculus

Name	Tech.	Class	Title	
J. Tye, R.J. Hurley, L. Gilmore	82 & CBL	Adv alg/trig & Physics	Motion on a Plane and Related Mathematics (Linear & Quadratics)	P W
L. Pope	81/82	Trig/precalc	Graphing Sinusoids	G E
B. James & M. Rieke	81/82 etc	Col Alg (Precalc)	Graphing Sinusoidal Functions	W A
P. Butler	Derive	Calc AB	Riemann sums, Taylor Polynomials	W A
J. Timpe	81/82 etc	Calculus AB	3rd & 4th Degree Polynomials	P W
G. Eide	81/82/ 85	Calculus	Introduction to the Chain Rule	Y
L. TeVault	Claris: SS	Adv. Alg with Trig	Using Spreadsheets to Explore Sequences	Y