

**Stephanie Whitehead**  
Burnet Middle School  
1000 Caldwell Ave.  
Union, NJ 07083

November 8, 2012

**Dr. Noreen Lishak**  
*Assistant Superintendent*  
2369 Morris Ave.  
Union, NJ 07083

Dear Dr. Noreen Lishak:

I am currently enrolled in a Collaboration and Dynamic Mathematics course at Rutgers University. Part of this course will involve students communicating with each other via Virtual Math Team. Students will learn how to speak and communicate using proper mathematics discourse while using cutting edge dynamic software. Since this is a new idea being implemented in the district, I am proposing to be the facilitator of this research project. Below is a description of the course and its purpose provided by Rutgers and Drexel University.

OBJECTIVE:

**THE eMATH PROJECT:**

Computer-Supported Math Discourse Among Teachers and Students

***Purpose and Goals***

The eMath Project is an NSF-funded research study and a pedagogical intervention, directed by Arthur B. Powell, Department of Urban Education, Rutgers University-Newark (see Bairral, Powell, and dos Santos, 2007; Powell and Dicker, 2011; Powell and Lai, 2009). As a pedagogical project, eMath involves diverse middle and high school students in developing their mathematical reasoning and discourse through online collaboration. As a research project, eMath aims to understand the following:

Over time, as students engage with online technology to collaborate synchronously to solve open-ended but well-designed mathematical problems that are cognitively demanding,

1. What increase in the quality of significant mathematical discourse occurs?
2. What mathematical ideas and reasoning develop?

To accomplish these aims, our research design has the following five objectives: (1) create online conditions in an informal learning environment that elicits mathematical reasoning and the building of convincing arguments; (2) trace the development of that reasoning by studying patterns of discourse that emerge as students work online on

mathematical tasks; (3) document and study the nature of student-to-student online communication as they make sense of each other's ideas and reasoning; (4) understand and evaluate the affordances and constraints that the computer and Internet tools we provide have on students' use of different representations; and (5) create social, intellectual networks among students in urban, suburban, and rural communities, here and abroad.

Students in the study will be racially and ethnically diverse middle and high school students from urban and suburban communities in the United States and Brazil with a mix of school districts with high- and low-socioeconomic status. In the US, schools with which eMath has partnered include those Newark, NJ; Somerset, NJ; and Long Branch, NJ.

The tasks on which students are invited to work come from three areas of mathematics: (1) algebra—sequences and patterns, (2) combinatorics and probability, and (3) geometry. The tasks are challenging in the sense that students initially are not aware of procedural or algorithmic tools to solve the problems but are invited to develop tools in collaboration with their teammates through an online, problem-solving context. In addition, the tasks invite students within their teams to negotiate interpretations of the tasks, analyze heuristic options, and debate other aspects of their work as they coalesce toward a solution. Furthermore, by collaborating on the tasks, students engage in important cognitive and discursive aspects of mathematical problem solving such as employing heuristics, making connections, specializing, generalizing, explaining, reflecting, conjecturing, justifying, and posing new problems. Students work on the tasks in teams of four, sometimes all teammates are within their school and at other times half of their teammates are located at a remote school site. To support their collaboration, students have available a variety of computer tools to search for information, represent their ideas, and present their reasoning, particularly a multi-modal, online tool—Virtual Math Teams with GeoGebra (VMTwG)—developed by researchers of The Math Forum at Drexel University and of the Department of Urban Education at Rutgers University.

Thank you in advance for your time and consideration of this proposal.

Sincerely,

**Stephanie Whitehead**  
*8<sup>th</sup> grade Mathematics Teacher*

Dr. Noreen Lishak

[Pick the Date]

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**RESPONSE**

[This letter correctly sets forth the understanding of the neighborhood group.]

*Accepted by:*

*Title:*

*Date: [Pick the date]*

Dr. Noreen Lishak  
[Pick the Date]  
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**Burnet Middle School**  
1000 Caldwell Ave.  
Union, NJ 07083

**[PROPOSAL TITLE]**

Dr. Noreen Lishak  
[Pick the Date]

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**SOFTWARE: MODEL 60**

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**SOFTWARE COST**

Library Multi-Record Including Report Master	\$1255
General Ledger	\$850
Accounts Payable	\$850
Import Master	\$645
<b>Total Software Cost</b>	<b>\$3600</b>

**PROFESSIONAL SERVICES COSTS**

Hourly Fee	\$90
Total Estimated Hours	77
<b>Total Professional Services Cost</b>	<b>\$6930.00</b>

**ITEMIZED TASK LIST AND ASSOCIATED HOURS**

<b>Task</b>	<b>Hours</b>
Installation Plan	9
1. Identify responsibilities	
2. Establish schedule	
3. Select conversion date	
Installation of Software	5
1. Install Model 60 modules on network	
2. Set terminal ID's and preferences	
3. Set printers and defaults	
4. Establish security	

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Implementation of Modules	9
1. Establish parameter and master files	
2. GL, AP, and custom financial statements	
Training: All Modules and Backup	9
1. Document Procedures	
2. Demonstrate hands-on entry reporting	
Conversion	9
1. Define conversion tasks and methods	
Build Import from Trey Research and Contoso, Ltd.	18
Coordinate Bridge to/from Trey Research and Contoso, Ltd. Software.	18
1. Meet with neighborhood group to establish coordination specifications.	
2. Meet with representatives from Trey Research and Contoso, Ltd. to establish responsibilities.	
<b>Total Hours</b>	<b>77</b>

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# Attachment 4a

## Parental Consent Form for Student Participants

Your child has been invited to participate in a research project, called "eMath: Computer-Supported Math Discourse Among Teachers and Students". Up to 200 middle and high school students in New Jersey are expected to participate for the duration of the project, which will include up to ten forty- to eighty-minute sessions per year for one school year. The purpose of this initiative is to gather and analyze data on the mathematical thinking of high school students in an in-class, computer-supported environment. Group sessions in a computer environment and a focus group interview with your child will be recorded online as well as videotaped and his or her written work will be collected. Both the online and video recordings will be used in this and future, related research projects and may be disseminated in research reports.

Participation by your son or daughter is voluntary and she or he may withdraw at any time without penalty. Confidentiality will be maintained by releasing only the student's first name.

Participating in this project does not entail risk to your son or daughter but rather incurs benefits. Such benefits include the opportunity to work with experts in the fields of mathematics and mathematics education, and to enrich his or her study of mathematics in the hope of increased preparation in advanced mathematics courses.

Your signature in the space below indicates that you agree to have your child participate in the eMath: Computer-Supported Math Discourse Among Teachers and Students.

Name of student: \_\_\_\_\_

Signature of parent or guardian: \_\_\_\_\_

Your signature in the space below authorizes Rutgers University's Department of Urban Education and the Robert B. Davis Institute for Learning to record, audio or video tape, photograph, or otherwise preserve in permanent form the first name, likeness, image, biographical material, written work, drawings, voice or performance, or computer-generated work of your child as named above. Any such recordings, images, and written work may be used and reused in whole or in part for broadcast, cablecast, the Internet, audio-visual productions (including but not limited to CD-ROM), closed circuit exhibition, illustration, and/or educational distribution as deemed fit by the Department of Urban Education and the Robert B. Davis Institute for Learning of Rutgers University-Newark.

If you have any questions regarding this research project, you may call its principal investigator, Dr. Arthur B. Powell at (973) 353-3528. *If you have any questions regarding your child's rights as a research subject, you may contact the IRB Administrator at Rutgers University at the following address:* Rutgers University Institutional Review Board for the Protection of Human Subjects; Office of Research and Sponsored Programs; 3 Rutgers Plaza, New Brunswick, NJ 08901-8559; Tel: 848-932-0150; Email: [humansubjects@orsp.rutgers.edu](mailto:humansubjects@orsp.rutgers.edu).

Signature of principal investigator:  \_\_\_\_\_

Print name of parent or guardian: \_\_\_\_\_

Signature of parent or guardian: \_\_\_\_\_ Date: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Zip Code: \_\_\_\_\_ Telephone: (\_\_\_\_) \_\_\_\_\_

EXPIRES

APPROVED

Date: 11/12/012

DEC 31 2012

Approved by the  
Rutgers IRB