Grant Proposal: Collaborative Teaching in Math & Science through Technology

SED 610

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Project Summary

Rosemont Middle School teachers will collaboratively integrate technology in teaching math and science to 7th and 8th grade students. The initiative will achieve the following results:

- Purchase equipments for each teacher and each student in class.
- Provide technical training for teachers at the site and throughout the district.
- Develop technology-assisted curriculum in math and science.
- Accommodate universal access for learners with special needs.
- Motivate all students in learning and in class participation.
- Increase student performance on state standardized tests.
- Implement researched-based teaching practices in daily instruction.

What is the intellectual merit of the project?

This project will integrate technology in standards-based instruction in middle school math and science. Each teacher in the math and science departments will collaborate with the department grade-level teachers to develop the curriculum, to deliver the content through the use of digital multimedia technology, and to assess student performance. Participating teachers will evaluate how the technology addresses students’ learning needs and teachers’ instructional needs. Rigor of the content presented will be measured by the Bloom’s Taxonomy and should be aligned to the state content standards. Assignments will give students opportunities to develop technical knowledge, critical thinking and problem solving skills. Feedbacks will guide the instruction for the following year.

What are the broader impacts of the proposed activity?

This project will broaden the participation of all teachers in the science and math departments in technology training at the site and throughout the district. At the site-level, the increased number of teachers using technology in the classroom will enrich the technical expertise and support for the staff. As participating teachers are trained, then they will go and train other teachers at the school and at other middle schools in the district. More teachers can then take part in instructional leadership and ownership. The multimedia presentation will motivate and engage students in learning math and science. Consequent increase in student performance will better prepare students in high school courses and beyond. Renewed interests will encourage them to continue in advanced courses in high school and possibly inspire them to later pursue career in science, technology, engineering, and math. The increased number of students proficiently trained in math and science will impact the economy and the national defense in the near future as technological advances lead to commercial innovation and cutting edge defense systems. Overall, the general public will become more aware of the basic math and science knowledge and be able to...
apply the concepts in such as to critically analyze statistics or vote for the legislative measure that efficiently converts renewable sources of energy. Citizens can make well-informed political decisions and make productive contributions to the society as a whole.

**Project Description**

Rosemont Middle School respectfully requests support from Hewlett-Packard Development Company, L.P. for an integrated technology initiative for secondary math and science education.

*Introduction:*

Rosemont Middle School
Located in La Crescenta, CA in the Glendale Unified School District, Rosemont Middle School is a high performing school with an API of 889 and has been recognized as a National Blue Ribbon and California Distinguished school several times in the past. Three out of every four students (77.1%) are proficient or advanced in English language arts on the California Standardized Test. Eight of every ten students (80.4%) are proficient in math. There are approximately 1400 students currently enrolled. The school has 7th and 8th grades only. All 7th graders are enrolled in life science and all 8th graders in physical science. All students are enrolled in math, and the courses offered are key math concepts, pre-algebra, introduction to algebra, algebra I, and geometry. There are nine science teachers and ten math teachers on staff. The neighborhood consists primarily of middle class socioeconomic status. Parents and guardians are actively involved in the children's education.

*Motivating Rationale:*

The motivating rationale behind this project is due to overall recent decline in the American students' academic performance, especially in math and science. According to the National Center for Education Statistics (2006), only the 4th graders have made a progress on the 2005 National Assessment of Educational Progress (NAEP) science exam. The eighth graders remained stagnant, while the 12th graders actually declined. Progress and status quo are not exactly safe, either, since the scores are significantly low to begin with. In Los Angeles County, only 28% of 5th graders, 33% of 8th graders, and 29% of 10th graders scored proficient or above in the 2006 California Standardized Tests in science. The rest failed to meet their grade level proficiency. Scores are still low in high school biology, chemistry, physics, and earth science tests where majority of the students are below the expected grade level.

American students seem to lack motivation in learning, especially in math and science. High school graduation and college entrance requirements expect only two years of science whereas English is expected for all four years. Not much
attention is paid to the field of math and science. Not only that, the delivery of the content is far outdated. Although the new generation of students is exposed to advanced multimedia outside the classroom on a daily basis, not much has changed in how the instruction is delivered in the classroom in the past decade. Day to day instruction still relies heavily on black and white handouts, two-dimensional figures in the textbook, and overheads. Students’ learning needs are not always met through this traditional pedagogy. With the availability of instructional technology, it is only logical to implement technology in instruction such as virtual labs and high-resolution graphics. However, without the adequate funds, schools are not able to afford the technology, and teachers are not trained in its appropriate use. This grant will bring innovative technology in math and science classrooms to engage more students in learning and to aid teachers in teaching more effectively and relevantly to the students’ needs.

Goals

Design standards-based curriculum in math and science with the use of multimedia technology.

Train teachers and students on the use and the maintenance of the technology.

Motivate students in learning math and science.

Increase student performance in standardized tests and district benchmarks.

Collaborate with colleagues within the department grade-level to plan and design lessons.

The project will focus on two areas: technology professional development for teachers and students and curriculum development and integration of technology in the classroom.

Participating teachers are math and science teachers at Rosemont Middle School and participating students are 7th and 8th grade students at the site. The project will have three cohorts beginning in the summer 2008 with the incoming 7th (Cohort 1) and 8th graders (Cohort 2). The school is 7th and 8th grades only. Therefore, the Cohort 2 will participate in the program for only one year (2008-2009). However, the Cohort 1 will continue the program in the following 2009-2010 school year. Concurrently, the new 7th grade class (Cohort 3) will then join the program in the summer 2009. The project will last three years and will be completed in the summer 2011.

In Year One, the program coordinator will first conduct survey to assess the prior technical knowledge of the teachers and the students. Based on the responses, professional development will be designed for the teachers. The first training will be provided before the beginning of the new school year for the teachers to learn
to use the equipments and to collaboratively develop the curriculum for the first quarter. Follow-up trainings will be scheduled every ten weeks thereafter. During the quarter, the teachers will meet weekly to discuss the student progress and to adjust or develop the curriculum accordingly.

In Year Two, the participating teachers will go and further train the other teachers at the site. The quarterly training will continue for the participating teachers where they will continue to refine the curriculum and the instruction. In addition, new educational software will be reviewed and tried out in the classroom to evaluate its instructional effectiveness. The progress of the Cohort 1 will be tracked as this is now their second year. Their performance can be compared to the first year’s 8th graders (Cohort 2). Also, the performance of the new 7th graders (Cohort 3) can be compared to the past year’s 7th graders (Cohort 1). Whether or not the technology improved the teaching and learning will be discussed.

In Year Three, the participating teachers will begin to collect evidences of student progress from the all three years and begin to analyze the data. Standardized test scores and grades will be used to measure the student performance. Survey and field notes will be used to gauge the student motivation and interest in the subjects.

Goal 1: In each of the three years, the project will include nine science teachers and ten math teachers to collaborate.

Objective 1: In the beginning of each school year, the project coordinator will design and schedule professional development for the teachers.

Objective 2: Teachers will participate in six in-service days (August, September, November, February, April, and June) during the school year.

Objective 3: The project will offer compensation and incentives to the participating teachers for their time and commitment to the professional development.

Goal 2: In the summer of 2008, before the project launches, the project coordinator will conduct workshops for the teachers.

Objective 1: By the end of Year Three, the project will have trained 19 teachers and impacted about 9,975 students.

Objective 2: Teachers will become proficient with the use and the basic maintenance/troubleshooting of the multimedia equipments.

Objective 3: Teachers will develop state standards-based curriculum for the students using technology.
Objective 4: Students will become familiar with the latest instructional technology resources.

Objective 5: Teachers will collaborate in developing lesson plans.

Objective 6: As a result, all students will receive equal access to the content and the delivery.

Goal 3: The project coordinator will conduct quarterly follow-up workshops for the teachers throughout the school year.

Objective 1: New educational software/widgets and equipments will be introduced to the teachers.

Objective 2: Teachers will have the opportunity to exchange professional conversations on student progress and technology-based instruction.

Objective 3: Teachers will inform each other of the curriculum materials, instructional strategies, and technical skills to support each other in the project.

Goal 4: Students will become more motivated and more proficient in math and science.

Objective 1: Students will have access to the course website and an online forum.

Objective 2: Each student will have access to a laptop computer and at least one educational software in the classroom.

Objective 3: Each classroom will have access to a multimedia projector and a printer/scanner/copier.

Deliverables

Teacher Professional Development

Curriculum and Instruction through Technology

Budget

The following equipments will be purchased: laptop computers for each teacher and a class set, an LCD projector and a printer/scanner/copier for each classroom.
The following is the estimated budget:

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<tr>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
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<tbody>
<tr>
<td>Teacher Notebook/Tablet PC</td>
<td>19</td>
<td>$38,000</td>
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<tr>
<td>Student Laptop Computers</td>
<td>630</td>
<td>$315,00</td>
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<tr>
<td>LCD Projector</td>
<td>18</td>
<td>$3,600</td>
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<tr>
<td>Printer/Scanner/Copier</td>
<td>18</td>
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<td>Project Coordinator (full-time)</td>
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<td>Program Evaluator (part-time)</td>
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<td>Professional Development</td>
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<tr>
<td>Substitute Teachers</td>
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Each of the 19 teachers in the math and science departments will receive a Notebook/Tablet PC along with a class set of laptop computers for the students. In each classroom, there will be a multimedia projector and a printer/scanner/copier. One full-time project coordinator will be hired and one part-time program evaluator. Teachers will be provided with six all-day professional development trainings—one in the summer before the school year begins, one each quarter, and one in the following summer at the end of the school year. Substitute teachers will be provided for each teacher for the in-service. A stipend of $1,000 will be granted to each teacher to use at his/her discretion and another $1,000 for supplies. Fifteen percent will go towards the school district for facility and administrative costs.

Resume

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OBJECTIVE: teaching 8th grade math and science

QUALIFICATION:
  • Clear Multiple Subject Credential with Science Authorization
  • Preliminary Single Subject in Math Fundamentals

TEACHING RELATED WORK EXPERIENCE:
  • Middle School Math/Science—Rosemont Middle School (current)
  • Middle School Science/ESL—Pilgrim School (2004-2005)
Grant Proposal

- Science Camp Instructor—California Science Center (Summer 2006 and 2005)
- Teaching Assistant—Camino Nuevo Charter Academy (Spring 2004)
- Academic Tutor/Advisor—Project GEAR UP at Garfield High School (Fall 2003)
- Adult Computer Technology Instructor—Korean American Coalition (Fall 2003)
OBJECTIVE: Teaching in K-8 multiple subjects or middle school science

QUALIFICATIONS:
- Passed CBEST (June 2002)
- Passed CSET Multiple Subject (March and November 2003)
- Multiple Subject Credential with Science Authorization (expected in June)

TEACHING RELATED WORK EXPERIENCE:
- Middle School Science/CST-Pilgrim School (current)
- Teaching Assistant Camino Nuevo Charter Academy (Spring 2004)
- Project GEAR UP-Academic Advisor/Tutor at Garfield High School (Fall 2003)
- Korean American Coalition-Adult Computer Technology Instructor (Fall 2003)
- Private Tutor Reading/Language Arts, Math and Science (Fall 2002-Now)
- Student Teacher-Jefferson Elementary School, Howland Heights (Spring 2003)
- University English Summer Camp Teacher, Professional and Educational Services International, China (Summer 2001 and 2002)
- 6th Grade English Tutor-Crawford High School, San Diego (Spring 2002)
- 3rd Grade Literacy Tutor-Kate Sessions Elementary, San Diego (Spring 2001)
- Lab Research Assistant University of California, San Diego (1999-2000)

RELATED COURSES:
- Child Developmental Psychology
- Cultural Diversity in the Classroom
- Specially Designed Academic Instruction in English
- Language Development and Acquisition

OTHERS:
- Experience working with a diverse range of students
- Sensitivity to language learners and cultural differences
- Basic computer technology knowledge and administrative skills
- Fluent in Korean-speaking, reading, and writing
- Inner-city community involvement in downtown LA
- Strong background in math and science

EDUCATION:
- University of California, San Diego (2002)
  General Biology, B.S.
- University of California, Los Angeles Extension (2003)
  Teaching English to Speakers of Other Languages Certificate