

# Teaching science, mathematics and language arts through an interactive technology-based strategy

## Project Description

### **I. Project Summary: Include the key components of teacher and student activities and use of technology (200 words)**

A team of five (5) teachers from the UPR Elementary School will participate in a collaborative professional development program to design, implement and evaluate instructional activities to improve student learning of science, mathematics and language arts (Spanish and English) through the integration of wireless Tablet pc, multimedia projector, and digital camera technology in their in their 1<sup>st</sup> to 3<sup>rd</sup> grade classrooms. The focus of the team's instructional activities is to enhance active and collaborative learning through increased interactions among students, teachers and curricular resources. Through ongoing professional development and support, teachers will plan and implement innovative instructional activities that meet their students' learning needs. Activities such as multimedia presentations of concepts will be designed to allow student interaction with concepts through the input panel and ink annotations to give immediate feedback, bring examples, contribute information, and debate points of views. Technology will be used by teachers and students to produce collaborative artifacts that convey their understanding of science and math concepts such as electronic books, and representations of data, patterns and models. The team will research their experiences in this project, both in terms of gains in professional development, as well the impact on student learning, and will disseminate their findings.

### **II. Grade level(s) of students impacted by your project**

First through third.

### **III. How many students will be impacted in the first year of your project implementation?**

60 students: First (20), Second (20) and Third grade (20)

### **IV. What subject area(s) does your project include?**

Science, Math, Language Arts and English as a second language

### **V. What will your students know and be able to do by the end of this project? (300 words)**

Our project will focus on developing the following standards-based knowledge and skills in each of the disciplines included in the project.

#### **Science**

1. Make observations without inference (Nature of Science)
2. Classify objects or events by characteristics (Nature of science)
3. Use observations to predict (Nature of science)
4. Describe matter by characteristics (Matter)
5. Identify different systems and their components (Systems and Models)
6. Describe physical and biological changes. (Conservation and Change)
8. Use technology to do research. (Science, Technology and Society)
9. Become better readers and writers.
10. Represent and manipulate data.
11. Recognize patterns and understand data.

#### **Math**

1. Read stories with math problems and learn different solution strategies.
2. Write and illustrate mathematics problems.

3. Create stories to share real math problems.
4. Solve math problems.
5. Demonstrate motivation in the solving process.
6. Share their original math problems with the multimedia projector.

### **Language arts**

1. Demonstrate comprehension and different levels of interpretations at central idea, cause and effect.
2. State connection between what they read and their experiences.
3. Distinguish between a fact and opinions.
4. Develop writing skills to organize ideas, write drafts, revise and edit content, and publication.
5. Present information using graphics organizer, semantic maps and Venn diagrams.

### **Technology**

1. Know some functions and how to use various technological tools (Tablet PC, digital camera, multimedia projector).
2. Use web browsers and search engines to locate and analyze information on the Internet
3. Use of wireless Tablet pc, multimedia projector, and digital camera technology enhance learning for themselves as well as others.

## **VI. How will you use the granted technology to support the teaching process (rather than teaching students to use technology)? Please give at least 3 examples. (300 words)**

The following examples illustrate the emphasis of our efforts towards strengthening the teaching and learning of standards-based curricular content, thinking skills, and problem-solving through a collaborative learning approach that integrates technology as a tool:

1. The teacher creates a presentation of the mammals theme. In small groups, students share their prior knowledge and experiences. Then, the teacher asks each group to include in the presentation the characteristics they mentioned using ink annotations or windows journal. As each group presents their collective annotations enabled through technology, the teachers leads a discussion to promotes cognitive conflict, divergent thinking, and reflection about their answers, and realize the need for further research.
2. Students are working in small groups, visiting different learning centers (stations that provide diverse hands-on and collaborative learning experiences) to learn about the concept of ecosystems. At the technology-learning center, the students will observe and analyze a video to identify and describe the ecosystem components and its interactions. They discuss their descriptions of the ecosystem and its components. From this discussion, each will select three components, and construct a web using Inspiration to demonstrate the interaction. Their product serves as a text artifact to show their understanding of the scientific concepts.
3. The teacher introduces the theme of numeration to the students with a video of problem solving through the multimedia projector. The teacher explains what a census is and what kind of information it gives us. After that, the students go to the technology learning center and visit the Internet census web page to find the population of different countries. They will select six populations and ordering them using Word sort tool. Then, the teacher shows students how to create an integrated list of the information. In constructing their lists, students compare the

numbers, identify positional value, and make mathematical operations comparing the different populations.

**VII. How does the project promote collaboration amongst all team members? (150 words)**

Our team includes two 1<sup>st</sup> and 2<sup>nd</sup> (multigrade) teachers who teach Science, one English teacher who integrates science themes in their first grade class, and two third grade teachers who teach Math and Science for the same group. Our team defines itself as a community of learners with a common goal: to learn how to use the Tablet PC, and other TICS technology, to enhance interactive instructional activities for our students. All members understand their roles as active collaborators who are jointly responsible for the achievement of a collective product. As designers of collaborative learning activities, collaboration is the cornerstone of all aspects of the project development and implementation, from participation in the professional development component, to the design of instructional activities, to sharing the use the equipment with the students. Our teamwork will be a model of synergy and collaboration, facilitated by a weekly meeting schedule and electronic communications.

**VIII. If applicable, please be specific about how math and/or science will be a part of the project (150 words)**

The enrichment of both science and mathematics classes is the main focus of this project. The activities to be developed will specifically promote student learning of science and math concepts. The language arts classes will integrate science and mathematics themes. These classes will be enriched with material that can be found in different formats over the Internet. Examples: animations, data, graphics, satellites, videos and programs for Tablet PC with free download from the Internet. The uses of this technology also provide the opportunity to the student to use, research, and produce works according to their interest and abilities.

In addition, this technology fit into the whole language philosophy that is part of our k-3 program. This philosophy allows the students to participate in the curriculum development. Through the years we evidence the student interest in science themes. These themes also integrate the language arts; Spanish and English.

**Project Impact, Measurement, and Alignment**

**IX. What specific school goals does this project address, and how does it address them? (200 words)**

The main goal of the EEUPR is to offer its students the opportunity to fully develop their intellectual, physical, artistic capabilities, to be independent, to have individual criteria, to make decisions, to have dignity and to respect and have empathy towards others: as well as to interrelate with individual who are different intellectually, socially, physically and culturally. We believe that this goal is best reached by creating a community of learners among all school members, and in each classroom. A community of learners requires the ability of its participants to engage effectively in collaborative learning hence the educational process must be designed to promote this type of learning. Our school has been working on the use of technology especially with the 4-6 th grade technology project (PTIC) in which each kid has their own Tablet PC to use daily in classroom. The school recognizes that technology is a powerful tool to enhance the teaching-learning process, particularly in the development of interactive processes that promote collaborative learning among learners with diverse needs and abilities. The EEUPR is also an

educational laboratory and professional development school which has the mission of developing model teaching and learning strategies that are used to prepare future teachers, and provide in-service training. It is particularly important to develop technology-based teaching strategies that are demonstrated to be effective in the enhancement students mastery of knowledge and skills. The project will prepare 1-3<sup>rd</sup> grade students to participate in our 4-6th grade technology project in which they will have their own Tablet PC to use daily in classroom.

**X. How will you measure the impact of this project on student learning in the classroom? (150 words)**

The team will develop an action research component that will include the development of assessment instruments to collect and analyze a series of evidence on what students participating in the project are learning in terms of curricular objectives for each subject, focusing on the specific learning objectives pertaining to the technology-based interactive strategy. These will include observation instrument to analyze student participation and interaction, attitudes questionnaire toward the technology integration, as well as rubrics to assess student performance in learning tasks in which they must implement the knowledge and skills acquired. Videos will be produced on exemplary activities to demonstrate the teaching strategies.

**XI. How will you measure the impact of this project on the teaching process? (150words)**

A classroom observation protocol that focuses on the teaching component will be developed with criteria that measure the effective use of technology as an instrument to enhance interactive learning. Each team member will observe another team member at three moments of the project, at the beginning of the project before innovations are developed, midway through the project, as the innovations are being implemented for the first time, and towards the end of the project, when teachers are expected to be fully using the new instructional activities in their classroom. The three moments will be compared through a systematic analysis to determine the presence of significant differences. Each team members will also document all their activities related to the development of this project to evidence the extent to which the technology is integrated effectively in the learning center strategy, and will carry a reflexive diary on the process.

**Project Team**

**XII. How will your team ensure that successful collaboration takes place? This could include plans for meeting regularly, designing project activities together, ongoing communication, ways of evaluating progress, etc. (150 words)**

During the weekly activities/meetings to be held by the team, they will work together on their professional development, to promote collaborative learning, will design the instructional activities based on a common set of criteria resulting from the professional development, and will share what they are doing in their classrooms through a process of reflexive discussion. The Principal will designate a teacher to serve as the team coordinator and consultant, to provide them ongoing support in their collaborative effort. A Yahoo discussion group will be created and led by the Team Coordinator to facilitate continuous communication and share information. A page at Blackboard platform will be developed to document all the project process including a reflective forum to share our reflections. Professor Frances Figarella, who is the school's leader in the integration of technology at the 4<sup>th</sup> to 6<sup>th</sup> grade level, has been appointed Project Leader by our school principal, Grace Carro. She will facilitate, support and oversee the team's work in this

project. Professor Figarella has extensive experience in school learning communities and collaborative professional development models.

**In this question, you will be asked for information about each of the five teachers on your proposed project team, including:**

a. contact information (name, title, e-mail address[es], and telephone and fax numbers)

i. Aura González-elementary teacher

[auraenid@yahoo.com](mailto:auraenid@yahoo.com)

(787) 272-4938

ii. Elizabeth Cuevas- elementary teacher

[isaelipr@yahoo.com](mailto:isaelipr@yahoo.com)

(787) 466-5980

iii. Patricia -elementary teacher

[pcastrudad@hotmail.com](mailto:pcastrudad@hotmail.com)

(787) 383-8861

iv. Maribel Rodríguez elementary teacher

[mari123@prtc.net](mailto:mari123@prtc.net)

(787) 406-4056

v. Hilda Alicea- elementary teacher

[halicea03@centennialpr.net](mailto:halicea03@centennialpr.net)

(787) 349-6361

**b. percentage of time each teacher spends instructing students directly**

i. Aura González (100 %)

ii. Elizabeth Cuevas (100 %)

iii. Patricia (100 %)

iv. Maribel Rodríguez (100 %)

v. Hilda Alicea (100 %)

**c. role when instructing students (lead teacher, teacher's aide, specialist, etc)**

i. Aura González-lead teacher

ii. Elizabeth Cuevas-lead teacher

iii. Patricia -lead teacher

iv. Maribel Rodríguez-lead teacher

v. Hilda Alicea lead-teacher

**d. the subjects and/or grade levels taught by each teacher**

i. Aura González-Science, language arts and social studies/

3<sup>rd</sup> grade

- ii. Elizabeth Cuevas- Science, language arts and social studies/ 1<sup>st</sup> and 2<sup>nd</sup> multiage grade
- iii. Patricia - Science, language arts and social studies /1<sup>st</sup> and 2<sup>nd</sup> multiage grade
- iv. Maribel Rodríguez- Mathematics 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> grade
- v. Hilda Alicea- English as a second language 2<sup>nd</sup> grade

**e. prior experience with technology – specifying the hardware, operating systems and software (100 words)**

The five K-3 elementary teachers have experience with regular laptops but not with Tablet PCs. They master Windows and Office (Word, Power Point, Excel and Publisher). Other software that they use in the classroom are: Kids Inspiration and Story Book Weaver. They know how to send and receive email and use Internet search engines. The professional development they need is related to the Tablet PC tools and the Blackboard System. But, we already has two teacher that could train them in Tablet PC, how to use Blackboard and how to participate in chats and forums in Blackboard.

**State whether each teacher understands the parameters and time commitment required by the professional development associated with the grant.**

The team members are fully aware of these parameters, as well as the school principal, which is committed to provide the team with time required to carry out the project successfully. In the development of the proposal, the team has become thoroughly familiar with the requirements, and are committed to fulfill them with excellence. Meetings, workshops, visit the page of professional development and observation visit

- f. Identify the teacher who will serve as the Project Lead who will be responsible for coordinating all communication with and reporting to HP and ISTE

Frances Figarella García- francesv @caribe.net, who is a fourth and fifth grade science teacher, and the coordinator Tablet PC technology project (PTIC) in the 4-6<sup>th</sup> grade level.

**School Information**

**School name, address, telephone and fax numbers, and web address (if applicable)**

Escuela Elemental de la Universidad de Puerto Rico  
PO Box 23334 UPR Station, San Juan Puerto Rico 00936  
(787) 764-0000 x 3297, x 4488 Fax \_\_\_\_\_

**School district name** San Juan II

**Number of schools in the district**

15 elementary school, 20 middle school and 8 high schools

**Equipment delivery address including a name, telephone and fax numbers, and e-mail address for a delivery contact**

Maribel Monroig-Asistant administrator  
Te. 787-764-0000  
X 3297  
Cel. 787-627-9015  
Fax 787-758-4535  
Email: maribelmonroig@yahoo.com

**Grade levels served by the school (choosing between elementary, middle, high, combined elementary and middle, combined middle and high, K-12, and other)**

Elementary K-6

**XIV. School's Mission Statement (100/88 words)**

The mission of the "Escuela Elemental de la Universidad de Puerto Rico" (EEUPR) is double- to provide a high quality education to all our students and to serve as a laboratory for the Faculty of Education and as a model of effective and innovative educative practice in elementary school to other schools and educational institutions. The school is committed to preparing future teachers through the modeling and implementation of innovative ideas and projects. Our faculty provides enriching experiences to the educational community through curricular development, training and research.

**XV. Provide a brief description of your school, including the type(s) of school it is neighborhood, amgnet, chartes, rural, etc. (100 words)**

The UPR Elementary School is a public school, since it is part of the Faculty of Education of the University of Puerto Rico in Rio Piedras Campus. The University of Puerto Rico is the states high education institution, and is funded through state funds. Located in a highly urban area, our students are admitted through a lottery method from among the community at large and University of Puerto Rico employees. As a laboratory school, it is a member of the National Association of Laboratory Schools (NALS). It is accredited by the Middle State Association Colleges and Schools.

**School total enrolment**

200 students

**Indicate the percentage of students at your school by ethnicity (percentages must total 100%).**

African 0.5%

Hispanic 95%

Categories are: African American, Asian/Pacific Islander, Caucasian/White, Hispanic, Native American, Other.

Provide the percentage of students who qualify for free and reduced price lunch at your school and the average for your district. 100%

School's EIN number, also known as a Federal Tax Payer ID number. This is a 9-digit number formatted . 66-0483760

The expected dates of the last day of your school 2004-2005 academic year, and the first day of your school's 2005-06 academic year? May 15, 2005 and August 15, 2005.

As part of the grant application process, you will be asked to assess your school relative to statements adapted from the Education Technology Essential Conditions self-assessment developed by ISTE. Your answers to these questions about access, professional development, technical assistance, assessment, community support and support policies will provide background information for grant reviewers. Please answer honestly, as HP is interested in teams that are at various stages along the continuum. If you are awarded a grant, this information also helps us understand how to best support you with professional development. To see these questions prior to beginning the application process, please visit the K-12 section of the HP Technology for Teaching website at [www.hp.com/go/hpteach](http://www.hp.com/go/hpteach) copied on e-mail messages associated with the grant, provide their contact information (up to two individuals).

Rafael Ortiz-Associate Decane of University of PR laboratory schools  
[ramiepr@caribe.net](mailto:ramiepr@caribe.net)

Igneris Casado-Technology support teacher  
[ignerisc1@prtc.net](mailto:ignerisc1@prtc.net)

#### **Administrative and Technical Support**

To ensure that the team will be able to take advantage of the technology and professional development associated with this grant, administrative support is critical. Each team is required to have an administrative sponsor for their project. Please select an administrator at the school who will ensure that the support for project implementation, technical support, and infrastructure are in place to be your administrative sponsor. This could be the school's principal, head of a department in a large school, district technology coordinator, or superintendent of a small district. This administrator should be someone with responsibility that includes all the areas described above, and who is officially authorized to accept the grant from HP on behalf of the school. He or she should also be able facilitate the distribution of the \$500 stipend to each team member.

*The administrative sponsor must answer questions 29 through 33.*

Contact information (address, telephone and fax numbers, and e-mail address)

Grace Carro

School director

(787) 764-0000 x 4486

**As the administrative sponsor, please certify your agreement to the Grant Recipient Commitments shown on page 4.**

**Have you read the grant proposal?**

**XVI. If your school receives the grant award, what will you do to ensure the success of the project? (100 words/91)**

The school recognizes the changing world in which we live and the need to modify the curriculum to incorporate technological innovations. The school compromiso se reflejará al asignar A sixth teacher will be assigned to work on the project as its leader, Frances Figarella, our fourth grade science teacher, who has a doctorate in Technology Innovations, and has successfully developed the integration of technology into 4-6<sup>th</sup> grades. She will provide ongoing support to the team and facilitate its collaboration. The team members will be assigned a formal schedule for them to meet on a regular basis to carry out the project. As Principal, I will be in constant communication with the team, and follow-up on its progress and needs.

**XVII. How does the proposed project relate to your school's mission, vision and goals, and to its larger technology integration efforts? (150 words)**

As a learning community, the EEUPR recognizes the changing world in which we live and the need to modify the curriculum to incorporate technological innovations and new application in educational research. In the search for better educational alternatives, so that students receive the best education, we consider the use of technology as a powerful tool to enhance the teaching-learning process. With the design of interactive and problem-solving oriented activities that integrated technology we expect to fulfill our commitment to offer opportunities to bring holistic education to our students. Our goal is to empower the student to be capable and responsible of construct their own knowledge using the technological tools to doing research, communicate and solve real-word problems. Also, the project will prepare 1-3<sup>rd</sup> grade students to participate in our 4-6 th grade technology project in which they have their own Tablet and will develop communication and information technology skills.