Northwest Arkansas Education Service Cooperative

ARRA case studies

Background

The *American Recovery and Reinvestment Act of 2009* (ARRA) included a $650 million allocation in ESEA Title II, Part D, commonly referred to as the *Enhancing Education Through Technology* program(EETT). This case study was prepared by the State Educational Technology Directors Association (SETDA) – the principal association representing the technology leadership of state and territorial departments of education – to provide an example of ARRA funds working at the district and classroom level that creates effective, viable, and robust reform in education, and improves the way teachers teach and students learn.

Arkansas's EETT Competitive Grants

In Arkansas, the focus of ARRA EETT funding was to create 21st century learning environments, develop higher level thinking skills and increase student engagement. Through the use of digital content, teachers developed interactive lessons, and students were exposed to a variety of technology rich learning activities, including interactive resources and model simulations.

ExploreLearning: Math and Science Gizmos
Statewide Initiative
July 2009-September 2011

Northwest Arkansas Education Cooperative managed the statewide grant, which provided professional development and online math and science simulations for Arkansas's sixth, seventh, and eighth grade teachers and students. Professional development included workshops, one-on-one training, and coaching. The cooperative contracted with ExploreLearning to provide a library of online simulations for the math and science curriculum.

Demographics

Approximately 480,000 students are enrolled in Arkansas's 1,145 public schools. Of those schools, 67.6% are Title I schools and 59.6% of students are eligible for free or reduced lunch. Arkansas is divided into 16 educational cooperative units to help serve the districts. The cooperatives support the school districts by providing professional development and technical support.

Project Description

ARRA EETT Grant Details	
Grant Focus	Digital Content and High-Quality Assessments
Beginning/End Date of Grant	July 2009-September 2011
Locale	Statewide
Funding	$500,000
Grade Level (s)	6-8
Number of Teachers Impacted	3,226
Number of Administrators Impacted	600
Number of Students Impacted	113,746

At the time of the grant, 46% of Arkansas students entering college had to take remedial math courses. In science, 59% of students taking the state End of Course (EOC) biology exam were not proficient. This data suggested a lack of understanding of key math and science concepts. This project's intent was to assist teachers in creating21st century learning environments by providing access to digital content in math and science. In addition, the program assisted teachers in using technology as a tool for translating abstract ideas into concrete representations, resulting in deeper understanding for students.

Grant funds were used to purchase a one-year subscription to ExploreLearning's Gizmos, the world's largest and most advanced library of online math and science simulations. All of Arkansas' sixth, seventh, and eighth grade math and science teachers and their students were given access to the content so they could explore, experiment with, and visualize math and science topics. The simulations were accompanied by customizable inquiry-based lessons, which included real-time assessment, reporting, and instructional background for teachers. Gizmos could be presented to students using a projector and/or interactive whiteboard as well as on individual laptops or desktop computers. Most importantly, funding was also used for professional development, including the position of a project manager. The project manager provided train-the-trainer sessions, workshops and coaching across the state. With training and access to the content, teachers better utilized existing technologies, such as interactive whiteboards and laptop computers. The grant funds did not include the purchase of any devices and therefore implementation varied based on the available technologies.

Project Implementation

In the fall of 2010, all Arkansas districts received the Commissioner of Education's memo announcing the new program. Awareness sessions regarding the project and its benefits to middle grade students and teachers were held in the 16 regional service cooperatives. Two-day initial train-the-trainer sessions were given in various regions of the state so "Gizmo trainers" could begin training teachers in their respective areas on the setup and use of the digital content. Teachers, curriculum specialists, and media specialists

volunteered to be Gizmo trainers. Over 120 training sessions were subsequently held throughout the state, led by the Gizmos project manager. ExploreLearning also provided an online training course. The initial course included demonstration, guided instruction, and hands-on practice with the tools. Approximately 1,627 teachers received formal training though it was not a requirement for access to the content. Teachers simply needed to request login information to access the program, which was available online. Teachers then registered their students who were provided full access to the content for both classroom and home use. Parents were also provided access through their child's student login. To assist teachers in using the simulations to content and learning standards, the ExploreLearning website provided the correlations to the Arkansas Frameworks for math and science, and the Gizmos project manager created a spreadsheet of correlations to the most frequently tested Student Learning Expectations (SLEs) in sixth, seventh, and eighth grade math, and EOC algebra.

Presentations were made at multiple state conferences during the year to continue promoting the integration of Gizmos in the math and science classrooms. An electronic newsletter produced by the project manager, the *Arkansas Gizmo Gazette*, was sent out across the state to highlight upcoming training sessions, communicate support available, and spotlight Arkansas teachers and districts that were using Gizmos to enhance learning.

Classroom Examples

- In seventh grade, students learn about plant growth. Before using Gizmos, students would have learned about plants through the textbook, teacher lectures, and growing plants in the classroom. Using the *Growing Plants* Gizmo, students simulated the growth of plants and manipulated four variables: seed type, soil additives, amount of water, and amount of light. Students used the Gizmo to grow the biggest plant while investigating the effects of each variable. At the beginning of the lesson, students completed Prior Knowledge Questions and discussed as a class key terms, such as compost, fertilizer, mass, seed, soil, and variable. Students then worked in small groups to complete the *Growing Plants* Gizmo. As students worked, the teacher and students discussed the effects of the variables, controlling an experiment, and the results. Students then grew their own plants with better knowledge of how to control the variables.
- In Algebra I, students used the *Distance-Time Graphs* Gizmo to learn what the slope and y-intercept represent, and how distance and time are displayed on a graph. The *Distance-Time Graphs* Gizmo shows a runner on a track along with a graph that represents the runner's position over time. By changing the graph, students

> I have used Gizmos as a full lesson on a specific standard, like spring and neap tides. It was wonderful to see the students have an "ah-hah" moment when the moon and sun lined up during full and new moon. The students were able to manipulate the time and the moon phases to watch the tides change from spring to neap. They had a full understanding of the gravity of the sun and moon and their effect on the tides.
>
> – Kelly Allison, Science Teacher

manipulated the runner. The students were better able to visualize a graph's representations, time versus distance. Students explored how the graph displayed the speed of a runner and interpreted a graph when two runners were displayed. Finally, they solved problems using the graph. In the past, students may have just worked on graph paper, plotting points without the benefit of a corresponding model to provide context to the graphical representation.

Evaluating Effectiveness

With the support provided, teachers increasingly integrated the digital content and simulations over the course of the project. Teachers noted the ease of using the tools and particularly the ability to differentiate the content with students. For example, some students needed to run a simulation multiple times for better understanding while other students were able to move on to the next simulation. Students could also access the content at home to reinforce concepts. Many teachers noted that Gizmos provided content and concepts that were often difficult to put in words, and the models and simulations led to great moments of understanding for students. Over the course of the project, 3,226 teachers requested logins for 113,746 students. While it is too early to make the correlation between student achievement and the use of these digital tools, teachers reported increased student understanding and engagement.

> The simulations allowed the students to actually be a part of the experiment or activity as they manipulated variables and control data input. This makes it much, much easier for students to make the leap from simply memorizing definitions to actually understanding science and mathematics as part of their daily lives.
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> –Dr. Curtis Varnell, Science Specialist

Moving Forward

The Gizmos subscription provided by this program expired in January of 2011; however, state funds were used to extend the subscription through the end of the school year. Many districts found local funds to renew the subscription for the 2011-2012 school year. Regardless of current access to the Gizmos, teachers gained experience with the power of digital content and are now able to integrate a variety of digital content resources into their daily lessons.

Resources

Explore Learning in Arkansas
http://explorelearning.blogs.com/Arkansas/

Arkansas Department of Education
http://arkansased.org/

SETDA ARRA Information and Resources
http://setda.org/web/guest/ARRAresources