Proceedings of the 30th International Cosmic Ray Conference
Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco,
Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.)
Universidad Nacional Autónoma de México,
Mexico City, Mexico, 2008

Vol. 4 (HE part 1), pages 471–472

30TH INTERNATIONAL COSMIC RAY CONFERENCE

The Astrophysics Project Integrating Research and Education (ASPIRE)

J. CALLAHAN[1], FOR THE ASPIRE GROUP AND THE HIRES COLLABORATION
[1]*Department of Physics, University of Utah, 115 S 1400 E JFB 201, Salt Lake City, UT 84112 U.S.A.*
Julie@cosmic.utah.edu

Abstract: ASPIRE is the Astrophysics Science Project Integrating Research and Education; funded by the National Science Foundation and the High Resolution Fly's Eye Cosmic Ray Research Group. Since 1997, ASPIRE has been creating some of the Web's most engaging and interactive science lessons and labs. In this poster, we will report on the most recent statistics from the website usage. In addition to creating and maintaining the website, ASPIRE provides direct outreach to local teachers and students. These direct outreach efforts include providing outreach to local groups underrepresented in the sciences, running summer workshop sessions for students and to the rural schools in Delta, UT where the new experiment is currently under construction.

The Astrophysics Project Integrating Research and Education (ASPIRE) has been the educational outreach program for the High Resolution Fly's Eye Cosmic Ray Research Group (HiRes) at the University of Utah. Most recently, it has evolved to become the outreach program for the new Telescope Array (TA) Experiment. The HiRes/TA research group operates at the University of Utah, and is funded by the National Science Foundation. In 1997, the NSF charged HiRes scientists with forming an educational outreach program. A committee of scientists, educators and administrators held a summit to determine how HiRes could best serve K-12 educators and administrators.

At the end of the meetings, it was determined that the greatest need for science education outreach was at the middle school level. According to studies by Project 2061, a national science education reform panel, textbooks for science teachers and students at the middle school level have been found to be unsatisfactory [1]. Re-creating textbook situations was neither the answer to this complex issue, nor are classroom visits practical or possible by research scientists to an area as large as the Utah. A consensus was reached to provide the 7th, 8th and 9th grade teachers with online activities, so that they can benefit from the outreach program, regardless of proximity to the University of Utah.

A team was assembled with teachers, scientists, programmers and artists to produce web-based activities. The first ASPIRE lessons were produced as applets written in JAVA. One unique feature to these lessons, that is still difficult to find on the web today, is that the curriculum is integrated into a web-page that serves both as a lesson, and a laboratory activity. Instead of having a lecture day and then a lab day, the student experiences both together on the web. These lessons have been well received, and continue to be used in schools in Utah as well as nationally and internationally.

The benefits of using Java were immediately obvious. Students could virtually interact with the computer in a simulation that could not be easily or affordably reproduced in a classroom. Computers have an appeal that engages students, even those who otherwise may not participate in the classroom. Teachers could spend valuable classroom time answering the students' questions about the lessons instead of lecturing. The lessons developed were designed to adhere to the standards and objectives set by national science education reforms, so that any teacher could feel comfortable utilizing these activities and know

that the students were exploring concepts and ideas that may be found on an end-of-level test.

Since 2001, ASPIRE has migrated to producing website content using Macromedia Flash. Macromedia estimates that over 98% of web users have the flash player already available on their personal computer now, making accessibility to the ASPIRE dynamic content easy and seamless. At this time, ASPIRE averages over 3000 unique IP visits daily. By producing online content that supports curricula and educators, the ASPIRE project reaches far more students than direct outreach efforts alone could hope to achieve.

In addition to providing this outreach to K-12 science educators and students, ASPIRE coordinates local outreach efforts. These activities include:

- Classroom visits
- Super Saturday, a day of educational presentations in Delta, UT (where the TA experiment is located).
- Arranging departmental tours for youth groups
- Visits to the research facilities in the new Delta, UT area
- Science fairs and students designing science fair projects
- Local summer science camp presentations at the University of Utah – Club U
- Presentations for the local Utah Federation for Youth – a group for minority students in Salt Lake City
- Summer workshops for the ACCESS Women in Science group at the U of U
- Partnering with WGBH to supply materials for Teacher's Domain, a PBS endeavor.
- Millard County Fair presentations by scientists and staff

The summer of 2007 is the inaugural year of a summer workshop to be held in Delta, UT. Teachers and students will work together to prepare installations for museums, schools and the Cosmic Ray center. These installations will be tables constructed with a topographical and LED display of the new Telescope Array experiment. Each table will have the ability to receive actual data from the array and display events as they occur, or previously recorded events. This workshop will occur over 2 weeks where students will learn not only about the Telescope Array project, but also learn about electronics in the construction of these tables. Each student will receive college-level credit from the University of Utah for their efforts. These installations will have a long-term impact in the communities where they are placed. This workshop will not only benefit the participants who create the tables, but also the areas in/around Delta, UT where the Telescope Array is located.

As an outreach program, ASPIRE has been able to effectively and affordably have a great impact for a number of students and educators both directly and indirectly with the website and local outreach efforts. The success of the ASPIRE program can be directly attributed to it's ability to reach a large audience with a relatively low overhead .

This work has supported by US NSF grants PHY-9974537, PHY-0140688, PHY-0307098, and PHY-0703893.

References

[1] Roseman, J., Kesidou, S., Stern, L., And Caldwell, A. 1999. Heavy Books Light On Learning, Aaas Project 2061 Evaluates Middle Grades Science Textbooks, Science Books & Films, November/December 1999 - Volume 35 - Number 6.