

Akimeka's Digital Bus: Industry Investment in K-12 Education

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Abstract:

Akimeka's "Digital Bus" is a mobile science and technology lab supporting K12 schools and community organizations throughout Maui County. This mobile learning platform offers field-based, engaging science projects at outdoor locations and at school sites.

One of the many technologies available on the Digital Bus is GIS. Students are exposed to the technology, and are introduced to a "sense of place", and encouraged to think spatially in their daily lives. This technology is a wonderful expansion for the buses mission to provide students with science, tech, engineering, and math exposure. Students enjoy the opportunity to map local species, watersheds, and their fragile environment utilizing GIS.

Akimeka utilizes GIS in their daily education activities and look forward to continued partnerships with students, teachers, schools, and high tech industry partners.

Alaka'ina is a fledgling organization that understands the need for innovative leadership and education programs that generate interest and participation for our rural communities throughout the State of Hawai'i.

Introduction:

The Alaka'ina Foundation Alaka'ina in Hawaiian translates to "leadership" and our mission is to build and promote leadership and education initiatives for our "Na pua o Hawai'i," the youth of Hawai'i.

One such example of an innovative program is the Hawai'i Source Education Outreach (HSEO) initiative, also known as the Maui Digital Bus, HSEO seeks to stimulate interest in science and technology among our public school students in Maui County. HSEO brings current technology in to the k-12 school system to educate teachers and students on the uses of modern technology to address environmental solutions.

Through an initial partnership including Maui Economic Opportunity (MEO), University of Hawai'i, Maui, and the Office of Naval Research at Pearl Harbor this program has developed into a capability and resource utilized by educators in our Maui public schools. Administered by Akimeka LLC, HSEO is in position to expand this capability to other rural areas in our State of Hawai'i.

Akimeka LLC is a native-Hawaiian-owned small business/8(a) concern that is also classified as a veteran-owned small business and a small disadvantaged business. The company, which currently employs more than fifty people, specializes in database application development, information assurance and network operations and support. One of the distinguishing characteristics of Akimeka is their focus on supporting the communities from which we come from. More specifically, Akimeka has provided significant investments in working to improve educational opportunities for youth by developing partnerships with local high schools and colleges; by providing mentoring opportunities and internships.

We plan to expand the Digital Bus HSEO program through a "hui" (group) of additional partners and organizations whose missions and goals align with our charter. Currently the HSEO program additional partners included Maui Economic Development Board's Women in Technology Program, Hawaiian Islands Humpback Whale National Marine Sanctuary, Maui Community College and the Hawaii Department of Education.

Science research has been transformed in recent years through the growing use of spatial and geographic technologies such as remote sensing, global positioning systems (GPS), GIS, Internet Mapping, and more. These technologies help students to understand spatial patterns, linkages, trends, and processes from local to regional to basin-wide scales. They are therefore critical to the spatial literacy of the nation (Downs et al. 2006). Educational activities that fail to incorporate learning *with* the latest innovations in these geographic technologies will fall severely short in their effectiveness.

Geospatial technologies have been identified by the US Department of Labor and US Department of Education as one of the top three emerging technology fields, along with biotechnology and nanotechnology (www.careervoyages.gov). Gewin (2004) documented in *Nature*, that the need for geospatially skilled workers will grow from a current worldwide market of US \$5 billion to \$30 billion. Despite growing opportunities, the participation of minorities and particularly indigenous groups in the science & technology workforce continues to disappoint. While limited improvements are evident in some trends during the past decade in the inclusion of minorities in such occupations, for many minorities, the gap between the share of all professional jobs and their share of employment has been widening over the past decade (Babco and Ellis 2006). For instance, Native Hawaiian males and females aged 16 and over are more likely to be unemployed than the average US population, with unemployment rates between 2.4 and 3.0 percentage points higher (US Census). Higher unemployment levels are likely not due to lack of opportunity, instead indicating a group of individuals who are actively seeking employment but lack the necessary education, skills and/or training (OHA 2006). For careers requiring advanced education, the statistics are particularly alarming as minorities earn only one-tenth as many science/technology doctoral degrees as their Caucasian counterparts (House Committee on Science 2003). The survey further indicated that both underrepresented students and women express greater desire to become agents of social change after completing their degree. For these reasons, career resources targeted toward science and technology fields of high growth, like GIS within ocean sciences, combined with a culturally relevant context are very much needed in Hawai'i and across the entire Pacific Region.

For these reasons HSEO has tried to focus on GIS related activities as we integrate these activities into all of our projects and teacher workshops. We hold several workshops each year where we bring over experts from ESRI and AAG to introduce Maui educators to the latest software and classroom uses. We are currently working with 8 intermediate level teachers on a year-long study of the Waihee Dunes, a protected Maui Coastal Land Trust area. These teachers are incorporating GIS technology into their activities with such projects as using ARC GIS to map the ancient fishpond area, as well as to map the marine debris trends as they conduct beach cleanups of the area throughout the year. Younger students are introduced to

the uses of GPS through activities such as scavenger hunts, and water quality data collection across the island.

The Maui Digital Bus has a long-standing relationship with the Women in Technology (WIT) program. We have worked closely with them, providing staff support and technology to numerous WIT events. For example, we have shown students how to map tsunami escape routes, taught students how to use GPS units for navigation, and had students participate in GPS scavenger hunts. We have also had students from the WIT program work as interns with our program. They have helped us install GIS software, create Powerpoint presentations, create iMovies of our workshops, generate GIS maps, work with students out in the field, compile GIS field data and assist in maintaining our network system.

Alaka'ina and HSEO will continue to foster innovative leadership and educational opportunities with such outstanding partners as ESRI and WIT, and we hope to build on these wonderful partnerships which will enable us to expand to other islands.

References:

Downs, R., S.W. Bednarz, R.A. Bjork, P.B. Dow, K.E. Foote, J.F. Gilbert, R.G. Golledge, K.A. Kastens, G. Leinhardt, L.S. Liben, M.C. Linn, J.J. Rieser, G.M. Stokes, and B. Tversky. 2006. Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum. National Academies Press: Washington, DC. 332 pp.

Gewin, V. 2004. Mapping opportunities. *Nature* 427 (22): 376-377.

Babco, Eleanor and Ellis Richard 2006. "Sisyphus Revisited: Participation by Minorities in STEM Occupations, 1994-2004." STEM Workforce Data Project Report No. 3. Commission on Professionals in Science and Technology (CPST): Washington DC.

Office of Hawaiian Affairs 2006, "2006 Native Hawaiian Data Book: Economic Development." Office of Hawaiian Affairs Report: Honolulu, HI.

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ELLEN FEDEROFF: Ellen is HSEO's Outreach Coordinator, with responsibility for providing educational support for the Wireless Bus project. Prior to joining Akimeka, Mrs. Federoff taught 6th grade in an elementary school located in a low income area in Los Angeles, California. A major focus of her teaching was to incorporate project -based learning through the use of technology. She co-authored the school's technology plan, as well as mentored both beginning and veteran teachers in their daily class routines, as well as in the implementation of technology in the classroom. In addition she worked closely with Loyola Marymount University in aiding elementary teachers in empowering learners through technology. Here at HSEO, She is focusing on facilitating a project-based science and technology curriculum for the students and teachers of Maui Nui. She is assisting in developing new curricula as well as working with school and community partners with existing projects.

LESLIE WILKINS: Ms. Wilkins is Vice President of the Maui Economic Development Board and is Program Director of its Women Technology Project. An experienced advocate for workplace equity, served as National President of the Business & Professional Women's organization in 2001. Appointed by the Hawaii governor to two terms on the Hawaii State Commission on the Status of Women, she was Commission Chair from 1996 - 2003. Email: leslie@medb.org.

ISLA L. Young: Ms. Young joined the MEDB Women in Technology Project in December 2003. She serves as a Program Manager working with students, educators, industry leaders, and the community. She holds a baccalaureate degree in Business and Information Systems from the University of Phoenix. She resides in Kahului, Maui. Email: isla@medb.org.