2004

NASA Capability Enhancement Roadmap White Paper

Hank R. Lehrer
*Embry-Riddle Aeronautical University Professor, retired*

Brent D. Bowen
*Embry-Riddle Aeronautical University*

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Background: One of the great inequalities in the educational as well as in the scheme for implementation of technology in school settings is that rural areas of most states have been left off the map. A recent issue of *USA Today* reported that a huge divide exists; in urban areas, 40.4% of households have access to high-speed internet while in rural areas, just 24.7% of households do. One in four white households uses high-speed internet where “only 1 in 7 blacks and fewer than 1 in 8 Hispanics lives in a household with fast internet service.” The status on internet service in Native American homes, most found in very rural areas, was not reported; one can only suppose though that the ratio might be greater.

The sad state of affairs in educational achievement by Nebraska Native American students attending rural reservation schools (Omaha Nation, Walthill, Santee Sioux, and Winnebago) can be seen in recent data from the Nebraska Department of Education. These data indicate that while approximately 65% of all Nebraska 4th and 8th grade students meet or exceed standard score on national mathematics tests, only 8.3% of 4th grade reservation school students and 18.96% of 8th grade students in the same schools achieve like results. The same dismal results are mirrored in the national reading test results. Obviously, something needs to be done. Considering that there is a significant Native American population residing on Indian reservations in rural Nebraska and keeping in mind the results stated above, the NASA Nebraska Space Grant and EPSCoR has, over the past 6 ½ years, aggressively pursued an educational outreach program focused on improving mathematics and science skills of Native American school children.

Activities: The Families United in the Discovery (FUN) of Science, Family Science, project that is currently operating at Indian reservations schools in Nebraska has involved selected students and their teachers as well as parents. The initial target group was originally upper elementary children approximately 11-12 years of age in these schools but the focus has recently expanded to included both junior high and lower elementary students as well.

Key activities included learning about basic aerodynamics, flight control systems, wing design, and flight operations; the curriculum has recently been expanded to include geospatial information systems with remote sensing. The paradigm is that students and teachers cover several appropriate parts of the units at school or as part of after-school activities; there are also bi-monthly Family Science
Nights at the school with parents. The science nights include an evening meal plus a combination of science demonstrations by secondary and college faculty members, directed group activities, visits by NASA researchers/educators, and fellowship. The underlying goal is the continued improvement of mathematics and science skills among these Native American youngsters through involvement of the family unit.

This endeavor will, in the long term, focus on systemic change for the entire Nebraska Native American reservation school network through the implementation of family science. Then programs can be exported to the non-Native American schools in subsequent years. It would be extremely difficult to make state-wide educational change in Nebraska due to the large area of the state and the small population density but a more reachable short term goal will be to focus on change within a minority population that is in desperate need of NASA assistance.

The benefits of involving parents in education are not confined solely to the early school years. Significant gains at all ages and grade levels can be achieved when parents share in their children’s education. Junior high and high school students whose parents remain involved make better transitions, maintain the quality of their work, and develop more realistic plans for their future. Children from diverse cultural backgrounds tend to do better when parents and professionals collaborate to bridge the gap between the culture at home and the learning institution.

What Should NASA Do? All too often, governmental agencies are seen as faceless bureaucracies that have no intimate of the problems and challenges that are faced by benefit recipients. This perspective is a well entrenched belief on this country’s Indian reservations. However, it is programs like the one described above that are slowly beginning to break down stereotypical views by Native Americans toward outreach efforts. NASA Nebraska Space Grant & EPSCoR has slowly but surely made significant progress in developing more meaningful relationships with not only the reservation school partners but with the state’s two tribal colleges, Little Priest Tribal College and Nebraska Indian Community College. In additional, researchers have been actively involved in numerous Tribal College and Universities (TCUs) activities through faculty development training, summer fellowships, and other educational outreach activities. Similar endeavors should be aggressively pursued by NASA in the Capability Enhancement Roadmap and could be included as a major part of any of the 52 NASA Space Grant as well as in any future NASA-funded education programs. The benefits of use such Models of Best Practice are significant.

Contact Information: Henry R. Lehrer, Ph.D.; University of Nebraska Omaha Aviation Institute, Omaha, NE 68182; 402-554-3424; hanklehrer@buckeye-express.com
Original Date: 12/8/2004