Developing a STEM Program at the Elementary School Level

by Lynette Charlie

Every child deserves a high quality education and opportunities to learn. For the past 10 years, my passion and goal, for students who have walked through my life and classroom, has been to foster a love for learning. I have been blessed with some amazing educators throughout my educational journey. Mr. Mabrito, at Crownpoint Elementary school; Mr. Nesbit, at Tuba City High School and Dr. Byler, at the collegiate level, are among the educators who clearly had a positive impact on me. The commonality among these educators is their passion for teaching, a quality I most definitely want to exude. Finding a bridge between theory and practice is a delicate endeavor and, for American Indian education, data often paints a dreary portrait of the educational challenges faced by Native students.

My name is Lynette Charlie, Navajo/Dine’ Nation, originally from Tuba City, Arizona. I am an educator and the Science, Technology, Engineering and Math (STEM) coordinator for Salt River Elementary School, on the Salt River Pima-Maricopa Indian Community in Scottsdale, Arizona. Fueled by my own educational experiences and opportunities, I take education seriously. My parents set high standards and expectations for me when I was an elementary school student and I, in turn, have set high standards and expectations for students in my classroom. As a Native teacher, my role in helping transform lives is critical. Time often stands still in Native communities, but the global needs of the future continue to move forward rather quickly. Careers in science, technology, engineering and math (STEM) are rapidly increasing and communities all across Native Nations must ask, “How are we preparing our young tribal members to take the helm in these STEM fields?”

The school where I teach has been selected to be one of seven pilot schools, through a grant from Helios and Science Foundation Arizona, that focuses on integrating science, technology, engineering and math into the school curriculum. Being a pilot school has allowed the selected schools to develop effective STEM education systems by providing them ongoing support that directly impacts educational outcomes for Arizona students.

With no experience in grant writing, I didn’t let my fear of tackling this project deter me from attempting to secure this STEM grant. The process to acquire this generous award was a significant learning experience for me. From writing a successful grant proposal, to putting together and making a successful presentation to the Helios Foundation and Science Foundation members was, at times, overwhelming. This leap of faith, so to speak, has paid off and benefited our school community.

Native students continue to be under-represented in the STEM fields. Although efforts to support students in these fields exist, most often, at the high school and post-secondary level, it is uncommon to find support at the elementary school level. Planting the STEM identity seed can be a crucial factor in helping students plan for their future at the collegiate level and, eventually, their careers. Exposing them to hands-on experiences and opportunities in STEM fields, at a time when they are developing an understanding of their place in a global society, is necessary if the inequalities of STEM representation are to change among Native people.

For the past 2 years, I have worked hard to develop the STEM program and make it available, not only for the students in the Salt River Indian Community, but also for colleagues. Moving forward with a STEM focus has been an exciting and rewarding journey for me. With humble beginnings, STEM began as a teacher led initiative, but it has developed into a much greater endeavor. It is deeply rooted in preparing the young O’Odham and Pipaash students to be part of a competitive global society and is preparing them to be ready to engage in being tomorrow’s problem solvers.
Creating a STEM identity has benefited the school community and is instrumental to the success of this project. To integrate STEM concepts across all academic areas has been an advantage to students, as they are seeing the connections throughout their academic day. Science materials were examined with a STEM lens and then connected and integrated into all academic areas. The teachers were guided and coached in a manner that allowed them to enhance their science units with STEM extensions that reached into reading, math and social studies. In addition, teachers rewrote curriculum maps to document their STEM initiatives, thus creating unified curricular units. They participated in many hours of professional development that focused on the grounding principles of STEM; critical thinking, observation, exploration and questioning. No longer was science taught in isolation. As a result, our school went from low attendance rates at our science events, to over 300 parents and children at our first STEM night, and the numbers keep increasing at each of the events.

An additional benefit has been that students now have a tablet lab at their disposal. This has enhanced the research and exploration activities in the classrooms. The grant has also provided opportunities for students to attend science and engineering camps at Arizona State University and the Arizona Science Center and, in spring 2015, a Young Women in Engineering Initiative was started.

The STEM initiative has also provided opportunities to create community partnerships. For example, our teachers worked with the Salt River Tribal Environmental Department to learn how they can connect outdoor learning experiences that are relevant to tribal issues in the classroom. This spring, the Young Women in Engineering Initiative, in collaboration with the Quarter Project, allowed us to award three, all-expense paid scholarships for girls to attend an engineering camp. Most notable, has been the collaboration with the 21st Century program, in which students continue to have the opportunity to attend after-school programs with a STEM focus. This summer, the first STEM summer day-camp opened at Salt River Elementary. The camp has been a wonderful addition to the STEM project. For 16 days, students are engulfed in STEM projects with presentations about STEM careers from local tribal departments, scientists, engineers and health programs.

By focusing on strategic integration, shifting current beliefs about science education to a more student-centered STEM approach, I continue to work on providing a quality STEM education program and opportunities to students. It is imperative that Native communities establish a consistent STEM framework where students can engage in authentic, hands-on, inquiry-based, scientific learning opportunities so that they can build stronger societies. Leveling the playing field for Native American students, by focusing on the inequalities in opportunities, resources and support they receive, can have positive long-term effects.

Planting the STEM identity seed can be a crucial factor in helping students plan for their future at the collegiate level and, eventually, their careers.

My start in the field of education has an interesting beginning. I was not expecting to become an educator, but stumbled into it because of family responsibilities. I credit motherhood for directing me into education and helping me find my passion. Nearly twenty years ago, when I was faced with raising a child on my own, I started looking for a new career. I thought education was a good choice because everyone knows teachers “get summers off.” With my little baby in tow, I changed my career and have never looked back. With the financial help of the Gates Millennium Scholarship (inaugural class, 2000), I was able to focus not only on being a mother, but my college studies as well. I graduated Summa Cum Laude, with a degree in Elementary Education from Arizona State University and a Master’s degree in Education and Teaching from Grand Canyon University. I am currently enrolled in a doctoral program in Organizational Management and anticipate completing the doctoral degree. I reside in Arizona, with my daughter, who will begin her college freshman journey this fall.

I’ve been blessed to work with some of the most amazing administrators, teachers, families and students. They have supported my effort and my vision, one in which students can continue to discover the simplicity and beauty of the science and engineering world and understand they have the ability to change that world, by deepening their understanding of the STEM content. The STEM project is a way to prepare students for college and future careers. This will be a way to meet the needs of their Native communities and for them to become the next generation of scientists, engineers, mathematicians and technology specialists. ✦