



ARIZONA ASSOCIATION FOR **ENVIRONMENTAL** EDUCATION
Promoting Environmental Literacy in Arizona

The State of Environmental Education in Arizona **July, 2012**

Background and Purpose

Arizona is a beautiful land, and historically her people have appreciated the diverse landscapes, wildlife, and natural resources that abound. Recent generations, however, seem to have lost some of the reverence necessary to promote knowledgeable and responsible stewardship of her gifts. Understanding the interface between human systems and environmental systems, referred to as *environmental literacy*, seems to be lacking in our current citizenry.

Why Environmental Education?

Understanding our place as citizens in a natural world requires learning about that world and learning various options for interaction, both with that world and with each other. We must prepare Arizona's children to critically and knowledgeably address issues of the natural environment. Our current education system often does not provide students with all the knowledge, skills, and perspectives needed to consider whole systems, to develop a sense of place, or to pursue our responsibility to shared resources and each other. Environmental education cultivates responsible and engaged citizens, preparing students to address the challenges, adjustments, and opportunities that will be present in their lives.

While environmental education helps develop the knowledge and skills necessary to make decisions about complex environmental issues, it also contributes to student academic achievement. Quantitative and qualitative studies highlight the immense benefits of an integrative environmental education framework. In one study, 92% of comparisons indicated that students who were taught using an environmental framework "academically outperform their peers in traditional programs."¹

¹ Gerald A. Lieberman and Linda L. Hoody, "Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning: Results of a Nationwide Study", 1998

Additionally studies show that time spent outdoors for learning during the school day is critical to the intellectual, emotional and physical health of students and that providing students with quality opportunities to directly experience the natural world can improve students' overall academic performance, self-esteem, personal responsibility, community involvement, personal health, and understanding of nature.²

History of Environmental Education In Arizona

The Arizona Association for Environmental Education began its work in 1980 to advance environmental literacy throughout this state, recognizing that education generates awareness and appreciation, which in turn guides decisions. To that end, in 1992, our organization authored the first statewide environmental literacy plan in the nation, promoting understanding of our unique natural surroundings and the abundance of life supported by these ecosystems. As the first document of its kind, the Arizona plan was modeled in the development of the Guidelines for Excellence in Environmental Education, now used worldwide. Sadly, our legacy has held more ardently across our planet than within our own state, as the political winds turned dramatically in 1994 and the state legislation that had supported our plan was repealed.

Continuing to believe that education is the ultimate means to create a responsible citizenry, AAEE has worked diligently to support activities and projects across the state that provide teachers with the training, curricula, and tools to further student learning about our environment. While this is important we also believe building up Arizona's classrooms one by one will be a painfully slow pursuit.

On April 18, 2006, AAEE brought together a unique group of leaders from business, industry, government, and environmental education. They gathered to discuss strategies that would enable environmental literacy to progress more quickly in Arizona. Funded in part through a grant from the Nina Mason Pulliam Charitable Trust and dubbed 'The Crossroads Summit', this meeting changed the course of thought from the individual approach to a united effort. Seemingly disparate sectors of Arizona's society came together under the belief that furthering environmental literacy within our citizenry will foster more responsible, sustainable lifestyle choices.

In April of 2009, AAEE commenced conversations with various stakeholder groups from across the state to establish most effective strategies to promote environmental literacy in Arizona's students. The identified areas of focus were:

- Identifying and Supporting Positive Impacts on Improved Environmental Literacy
- Supporting Statewide Teacher Access to Quality Environmental Education Resources

² Adapted from North American Association for Environmental Education. (2008) *Developing a State Environmental Literacy Plan*. Washington, DC.

- Identifying and Supporting Environmentally Friendly School Facilities Statewide

While regions differ in school governance, political climate, and place-based issues, it has become increasingly apparent that ultimate success lies in a comprehensive, statewide approach.

Strategies for Understanding the Current State of EE in Arizona



Assessing Student Environmental Literacy and Impacts on Improvement

The assessment of environmental literacy was conducted using survey research of a convenience sample. In this case, the purpose of this study was to describe environmental literacy characteristics of targeted middle school students by collecting survey data pre/post within one academic year (2010-2011). Student participation was sought initially through request for interested teachers, then through parental consent. While 44 teachers from 18 different districts initially responded, the final participant total was 569 students, grades 5th through 9th, from 8 districts across the state.

The *Middle School Environmental Literacy Survey (MSELS)* used in this study was developed and refined by Hungerford, Volk, Bluhm, McBeth, Meyers, and Marcinkowski (2009). The *MSELS* includes several demographic items and measures of the following environmental literacy components: (a) ecological knowledge; (b) verbal commitment; (c) actual commitment, or environmental behavior; (d) environmental sensitivity; (e) issue identification and issue analysis skills; and (f) action planning. It includes measures in each of the four domains that are critical to environmental literacy: Knowledge, Affect, Cognitive Skills, and Behavior.

In addition to the *MSELS*, each cooperating teacher was asked to complete a program/teacher information survey. The survey gathered information on teacher demographics, educational background, type and duration of environmental programs used, and their thoughts/feelings about EE activities.

Piloting Teacher Support and Access to Environmental Education Resources

A team of environmental education experts from across the state worked together with input from our stakeholders to identify key aspects of environmental literacy for Arizona, and create a construct for framing these features. The resulting ***Arizona Framework for Environmental Concepts and Themes***, while treated as a fluid, living document, has remained as written since 2010.

Our ***EE Partners Project*** was piloted in both the spring of 2011 and 2012. Teacher teams from eight schools were selected for participation, based on teacher interest, student grade level needs for assessment, and geographic proximity to intended partners. Non-formal partner educators were selected from the Riparian Institute, Arizona Game and Fish, SRP, Arizona Project WET, and the Phoenix Zoo, based on

demonstration of best practices for environmental education. Classroom teachers attended training in responsible environmental education with their non-formal partner educators, then worked as partner teams to design strategies for integrating EE into their existing curricula. Teachers were surveyed pre and post project, and asked to present short reports on their experience to an audience of peers.

Two forms of online support were developed for environmental educators. Our **'Day in the Sun'** webinar series shared presentations created by classroom teachers, demonstrating successful strategies for integrating environmental education in many different kinds of school situations across the state. The new **AAEE Website, arizonaee.org**, was created to provide a variety of networking opportunities, access to many valuable EE resources, and easy interaction and engagement with AAEE and its work.

In an effort to ensure quality, comprehensive professional development offerings for environmental educators throughout the state, AAEE has developed a set of demonstrable learning objectives, the **Core Competence for Arizona's Environmental Educators**. These are based on the National Project for Excellence in Environmental Education and input from Arizona stakeholders. This set of objectives can now serve as the foundation for future programming efforts directed towards both classroom teachers and non-formal educators, as well as a means for evaluating competency of program participants.

Survey of Environmentally Supportive School Facilities in Arizona

This research project followed three major lines of work as a methodological approach: (A) a review of existing frameworks and efforts; (B) a survey of public school districts; and (C) a series of interviews and site visits to selected case studies. Research focused on references for physical facility and operational projects and practices related to four specific school systems: (a) energy, (b) water, (c) waste, and (d) outdoor spaces that support environmental learning.

This project reviewed abundant information regarding "green schools" and "environmentally supportive" or "sustainable" practices and projects in school facilities. To allow for decision makers and advocates to sort through all this material, a selection was made and used to guide our own analysis and proposal. The insight from this review framed the work in two additional activities executed to assess the current state of projects and practices in public school districts and schools.

To assess the current state of sustainability efforts in school facilities across Arizona, a statewide online survey of public school districts was conducted. Respondents were asked about specific projects and practices in each of four studied school systems. Questions about organizational issues, process, funding and motivations were also included. An invitation to participate and a link to our

survey were individually e-mailed to specific persons at 111 selected districts. In total, 29 of the contacted districts started the survey and 19 completed it fully.

In order to more deeply understand and witness the implementation of projects and practices in schools and districts, we conducted a series of interviews and visits to selected district and/or school officials and sites. Interviews were open-ended, semi-structured conversations with identified key individuals. The site-visits were conducted to selected districts and schools, for documentation and confirmation of findings. Selection of interviewees and sites was based on multiple factors, including the relevance of the case, recommendations from contacts, and/or existing contact with key districts and individuals.

Summary of Findings



Student Environmental Literacy in Arizona

The score patterns of lower versus upper grades for the Arizona students sampled in this study closely resemble that of the national MSELs 6th and 8th grade student sample. That is, higher for the lower grades in effect and higher for the upper grades in knowledge and skills. The 8th grade Arizona group's post scores on ecological knowledge and actual commitment were higher than the national sample. However, both lower and upper grade group's general feeling about the environment was much lower than the national sample's scores.

In this sample, students engaged in Environmental Education programming during the school year showed significant increase in knowledge and in how they think about the environment.

Unfortunately, a significant number of inconsistencies were found throughout the test results, raising some skepticism about test validity. These findings indicate a need for better tools and instrumentation for measuring environmental literacy in students.

Results from Pilot Projects Supporting Teachers

The AFECT document continues to be actively utilized as the foundation for a variety of environmental education efforts throughout the state, and across the globe. Positive comments have been received from experts in the EE field as well as from those new to the field.

Participant input from the EE Partner project provided insights into future needs for improved partnering projects, but also illustrated the great benefits for both teachers and their students in employing the expertise available in our pool of non-formal environmental educators in this state. Results also indicated that while non-formal educators can be well utilized as classroom instructors with positive impact on environmental literacy, a more efficient use of time is directed towards engaging directly with the classroom teachers, fostering greater understanding of best practices for environmental education and supporting long-term integration of EE throughout the curriculum.

Over the course of 2010-2012, five AAEE webinars were viewed by approximately 75 viewers, both through active participation and download of content from our

website. Survey responses from webinar participants were 100% positive, citing the learning of specific, feasible strategies as the primary benefit. Overall, the website has had over 8000 visitors, participating in all featured activities, including 720 hits to access EE resources. While input from website participants often includes suggestions for improvement, overall response has been positive.

Use of the Core Competencies for Environmental Educators in Arizona has already begun to extend to professional development providers across the state, with at least three organizations specifically basing programming on the specified objectives. Survey responses of participants in one such program indicated a greater sense of comprehensive understanding of environmental education. A pilot for assessing these competencies will be piloted by AEE in late 2012.

Survey of Environmentally Supportive School Facilities in Arizona

With respect to interventions concerning the use of energy and water in schools, the survey sample shows evidence of important strides in positive directions, though focus on water seemed regionally-based, and less financially motivated. Many relatively obvious and easy to implement projects and practices have been addressed, such as basic use reduction, but in some cases, more sophisticated interventions have been implemented and/or tested as well, such as installation of energy efficient cooling systems or reclaimed water landscape projects. In an effort to assess an issue that spans energy and water use, the survey asked whether school districts had in place cooling tower water management practices and 55.6% of respondents reported in the affirmative.

Perhaps contrary to expectations, the issue of waste seems to be one of the trickiest systems for school districts to grasp and incorporate as a relevant environmentally supportive practice for facilities, operations and maintenance. While 100% of districts in the survey report having a 3 R's program in place, going down the list of other waste-related practices and projects, positive responses fall below 50% in all categories. Local waste management schemes, and confusion about impact to cost-savings and sustainability seem to play a role in lack of further waste management. 'Upstream' waste reduction was also generally overlooked.

Many of the school districts (92.3%) report some form of programmed and periodic learning activity that is held outdoors in their schools, while more than half (69.2%) report dedicated outdoor space that is used for environmental or natural science learning activities. In addition, of those responding, 84.6% report the existence of school gardens and/or orchards, with many reporting linking such spaces to academic activity.

Overall, it was evident that the primary objective in implementation of conservation strategies is cost reduction, and these practices are only secondarily seen as supporting the environmental stewardships and/or academic performance goals. It

is also important to note that health concerns were cited as prohibitive to various strategies, such as reclaimed water use, rainwater harvesting, composting, and outdoor time on days of poor air quality. Education of administrators and facilities managers should be implemented to address all areas of understanding.

Recommendations for Support of Arizona Environmental Literacy



Preparing students as critical thinkers and informed decision-makers about the environment must involve a collaborative effort as environmental education is woven through what we do as teachers, administrators, parents, community members, business owners and governmental leaders. Opportunities exist in rural, urban and suburban locales, and within all cultural contexts—Arizona has a vast array of environmental education providers, resources and opportunities. Highly trained educators and award-winning programs work in every corner of our state, however, there is no coordinated strategy to ensure that all students can access these opportunities and build their knowledge and skills over time.

AAEE recommends a coordinated strategy to ensure that all stakeholders are working together to create access and equity to the wealth of resources that already exist. Because the quest for an environmentally literate citizenry impacts and affects so many industries and people, a task force of committed environmental education providers, policymakers, teachers and parents should be created to tackle the following recommendations:

- Continue work to identify better options for assessing environmental literacy
- Align **AFECT** to common core and NGSS and disseminate for use in both formal and informal education
- Promote and utilize **AAEE Website and Resource Database**
- Promote and support a full range of EE professional development offerings, based on **AAEE's Core Competencies for Environmental Educators in Arizona.**
- Promote **EE Certification** for both formal and informal educators
- Disseminate Recommendations for **School EE Integration and Sustainable Practices**
- Work to fund and support **School EE Integration and Sustainable Practices**, including education for school administrators and facilities managers
- Disseminate updated list of funding resources for teachers
- Continue to share successes through **Day in the Sun Webinar Series**
- Continue to work with national network
- Continue to cultivate and grow identified stakeholder group

Recommendations Specific to School EE Integration and Sustainable Practices

- School water audit, resulting in water saving practices
- Energy audit of some kind, resulting in energy saving practices
- School implements waste management practices with measurable results
- Encourages alternative transportation amongst school community
- Monitors potentially hazardous chemical usage, both indoors and out
- Is recognized by ADEQ as an Environmentally Healthy School
- Sustainable outdoor learning space(s) (Garden, Designated Habitat, Quest, Outdoor Classroom)
- Outdoor learning time encouraged by administration
- Curriculum regularly integrates understandings as described in the Arizona Framework for Environmental Concepts and Themes
- All Environmental Education meets the Guidelines for Excellence in Environmental Education, supports state standards, and supports school mission
- Environmental education based field trips and presentations incorporated into curriculum
- Utilizes an EE Coach
- Has demonstrated at least one model of Best Practices through AAEE webinar series
- Monitors student environmental literacy through assessment
- High School
 - Offers Environmental Science courses for all student levels
 - Offers workforce development opportunities in environmental fields
- Involves community and all possible stakeholders
- Emphasizes behavioral change over physical change
- Integrates sustainable practices with environmental education
- Regularly monitors various indicators of effectiveness and responds as necessary
- Communicates regularly with all stakeholders, both internal and external
- Celebrates successes

List of Appendices

Supporting Reports and Collected Data

1. 2010-2011 Study of Environmental Literacy in Targeted Middle Grades Students Final Research Report, 2010-2011
2. Arizona Association for Environmental Education, 2010-2011 Partnership Project Research Report, Spring 2011
3. Arizona Association for Environmental Education, 2012 Partnership Project Research Report, Spring 2012
4. Willowbend EE Certification Preparation Course Evaluations, 2011
5. Arizonaee.org Usage Report
6. 'Day In the Sun' Webinar Series, 2010-2012 Compilation of Survey Responses
7. Environmentally Supportive School Facilities in Arizona: Current State Analysis and Future Guidelines, Fall, 2011

Developed Documents

1. Arizona Framework of Environmental Concepts and Themes
2. Core Competencies for Environmental Educators in Arizona