

Linking Curriculum and Learning to Facilities: Arizona State University's GK-12 Sustainable Schools Program

By Monica M. Elser, Lynette Pollari, Erin Frisk and Mark Wood

“Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
World Commission on Environment and Development

“It is widely agreed that education is the most effective means that society possesses for confronting the challenges of the future. Indeed, education will shape the world of tomorrow.”
UNESCO

Arizona State University's *Sustainability Science for Sustainable Schools* program brings together graduate students, sustainability researchers, high school teachers and students, and school or district administrators in a project designed to address the challenge of becoming a “sustainable school.” Funded by the National Science Foundation and based on the ASU's commitment to engage with and support its community, this program was designed to incorporate the research and teaching that is being developed in the Global Institute of Sustainability into the K-12 setting.

Our central goal is to equip graduate fellows with the skills to bring their sustainability-science research into K-12 settings. Graduate fellows are supported in this endeavor by two teams of ASU specialists and researchers: one focused on sustainability concepts and indicators, the other on curriculum and instruction (see Figure 1). Thus, the core of our program centers on enhancing the professional development of graduate students while sup-

porting schools and districts in establishing sustainability projects and practices. This is expected to translate as a benefit not only to the K-12 schools and its members, but also to the community at large.

Our graduate fellows are currently working with six partner schools within the Metro-Phoenix area on a range of sustainability initiatives that includes:

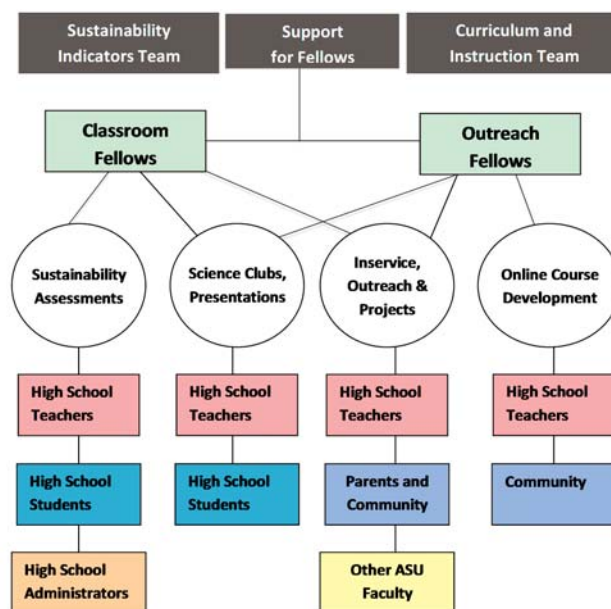


Figure 1. Conceptual Overview of the Project

- Supporting school administrators, teachers, and students in the development of site-specific sustainability projects and practices (for example: school gardens, sustainability competitions, science clubs, recycling and water-saving campaigns, etc.);
- Developing and teaching introductory sustainability lessons (for K-12 students, teachers, and/or staff); and
- Creating a set of focused sustainability science lessons that address the diverse “systems” that jointly constitute a school (Energy, Water, Food, Health and Well-Being, Waste, Outdoor Space and Landscape, and Supply Chain and Procurement).

While having particular components and implications, these systems interact with each other. This leads to the need for crossing disciplinary boundaries and for co-creating knowledge with diverse stakeholders –including students, teachers, administrators, scientists, policy makers and the community at large. In consequence, our sustainability science initiatives focus on this need and strive to engage K-12 students, teachers, administrators, and staff as active partners for sustainable development.

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Guiding Principles

As an emergent field of academic research, what has been called **sustainability science** is a discipline “defined by the problems it addresses rather than by the disciplines it employs” (Clark,

2007). Its objectives, broadly stated, are to harness scientific knowledge to support a transition towards a more sustainable future, to create solutions to environmental, economic, and social problems, and to facilitate the interaction and collaboration between diverse and relevant actors.

For Arizona State University’s GK-12 program, sustainability science is the driver behind each of our efforts. It is the source from which we have derived **five guiding principles** that – in our perspective – should guide students, teachers, administrators, and staff in a sustainable school. These principles are:

1. **Interconnectedness (Systems Thinking):** View the world as interconnected and human systems as a component of and dependent on ecological systems;
2. **Multiple Perspectives in Decision Making:** Acknowledge trade-offs, incorporate multiple perspectives, and strive to build consensus;
3. **Problem Solving for Well-Being:** Engage in problem-solving that improves student, school, community, and global well-being;
4. **Change Agents:** Assume an active role as promoters and executors of sustainability solutions;
5. **Future Thinking:** Understand that human action must look forward and consider the impact of our present actions on future generations.

Sustainable Schools Framework (Curriculum – Campus – Community)

Based on this set of principles from sustainability science, the Sustainable Schools program adapted diverse frameworks and ideas to establish a conceptual approach for intervention in K-12 schools. This resulted in a framework that explores and describes the necessary linkages that must exist between curriculum, campus and community if a successful K-12 sustainability effort is to be achieved.

As shown in Figure 2, the philosophical foundation for this framework is the “Three Pillar” concept

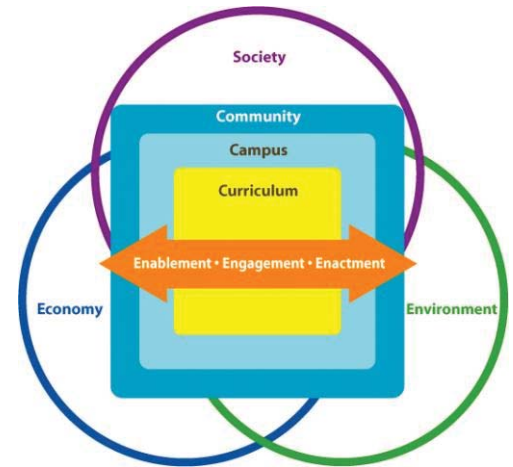


Figure 2. Conceptual Framework for intervention in schools

which is at the core of any understanding of sustainability and sustainability science. Indeed, as stated by ASU’s Global Institute of Sustainability, “a sustainable society considers the interconnectedness of the environmental, economic, and social systems” in order to reconcile the planet’s environmental needs with development needs over the long term. The pursuit of this challenging balance is, then, the central focus of all sustainability efforts.

On this foundation, it is our program’s conviction that K-12 sustainability education should integrate efforts at three distinct yet interrelated levels:

1. **Curriculum:** Focus on teaching and learning. Areas of action are classroom activities, teacher/ student interaction, content and class programming, professional development and training, etc.
2. **Campus:** Focus on school and school district operation, including institutional values and philosophy. Areas of action include staff and administration practices, physical facilities, school grounds and open space, system management (energy, water, waste, etc.), operation and maintenance, district-level decisions that affect a school, etc.
3. **Community:** Focus on a school’s wider influence and partnerships.



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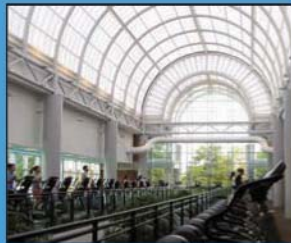
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Areas of action include parent participation and influence, support from and collaboration with the business community, interaction with government and non-profits or NGOs, mutual relations with neighboring communities, etc.

In addition to the three pillars and these three “Cs,” our program is also committed to designing activities and projects that promote sustainability while acknowledging the learning process of an individual. Thus, different activities are designed to address three necessary stages in the process by which a member of a learning community may become a sustainability change agent: **(1) Engagement:** Presenting a learner with activities and tools related to academic study, analysis, and understanding of the need for sustainability and of its most important concepts; **(2) Enablement:** Providing a learner with the values, attitudes and practical capacities that

are necessary to plan and implement sustainability solutions; and **(3) Enactment:** Allowing a learner to participate in project and system design and implementation, thus participating in an active manner in problem-solving for sustainability (these concepts were adopted from Sipos et al, 2008).

Sustainable Schools Outreach

Outreach to schools outside our six current academic partners and to the wider community is also an important function of the Sustainability Science for Sustainable Schools program. Our Outreach involves a wide variety of activities and interaction with a broad range of players within our educational community at different levels (K-12 to Higher Education) as well as with community groups, private groups and the general public. Our Outreach activities have included, among many others:

- Visiting schools to make presentations and conduct lessons or activities
- Participating in public events (for example, sustainability-themed fairs)
- Developing and presenting teacher workshops
- Presenting at education, sustainability, and other conferences
- Preparing and conducting sustainability summer camps for students
- Supporting and judging science fairs and competitions
- Supporting ASU’s collaborators and partners
- Supporting other institutions and organizations in research projects
- Providing a bridge between schools and specialists or researchers at ASU

CEFPI and the Sustainable Schools program

As part of a recent effort to find areas of collaboration between CEFPI and our program, we were invited to participate in the recent Symposium "Moving Sustainability Forward." Two of the graduate fellows of our *Sustainability Science for Sustainable Schools* program presented a summary of the operation and activities that have been developed in our program's first two years of activities. Our objectives in the session were to provide a vision, based on our experience, of the broad possibilities to link curriculum and learning to education facilities.

While presenting and explaining our experience with some of the most relevant activities and projects that have been developed by the GK-12 program (some of them described above), our objectives in this session were four:

- Understand sustainability education as applied within a K-12 context.
- Understand the linkages between curriculum, campus and community that are required for a successful K-12 Sustainability program.
- Illustrate the range of interdisciplinary sustainability projects that can become the platforms for linking "learning" with "facilities."

- Reflect on the important role that school facilities play as "learning environments" to support sustainability education through built form, operations and maintenance.

Focusing on this final objective and as a closing for our intervention in this event, our graduate fellows invited attendees to reflect on the role that CEFPI can continue to play in educating our youth for a more sustainable future. This reflection should include at least three elements:

- ... How might CEFPI and its members enhance their contribution to creating school facilities as "learning environments" for sustainability?
- ... How might interdisciplinary collaboration (between facility planners and educators, between academia and practice, between science, policy and community) be enhanced?
- ... How might this collaboration contribute to the creation places and spaces which – through built form, operations and maintenance – help prepare students for a future that is more sustainable?

With these open questions in mind, we invite you to continue your

efforts in creating high performing educational settings and to share our passion for incorporating sustainability science across the curriculum in every campus, and among all members of a school's extended community. ■

Monica M. Elser and Lynette Pollari – GK-12 Program Leaders

Erin Frisk and Mark W. Wood – Third Year PhD Students, ASU School of Sustainability

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For more information on our program, please refer to:

Global Institute of Sustainability at Arizona State University website = <http://sustainability.asu.edu>

Sustainability Science for Sustainable Schools program website = <http://sustainableschools.asu.edu/>