

A Framework for Environmental Education Strategies

Martha C. Monroe, *School of Forest Resources and Conservation, University of Florida, Gainesville, Florida, USA*

Elaine Andrews, *University of Wisconsin, Madison, Wisconsin, USA*

Kelly Biedenweg, *School of Forest Resources and Conservation, University of Florida, Gainesville, Florida, USA*

Environmental education (EE) includes a broad range of teaching methods, topics, audiences, and educators. EE professionals have worked over the last 30 years to provide distinct definitions, guides, objectives, and standards that will help educators know how to differentiate environmental education from other educational efforts and how to deliver it effectively. This article incorporates several recent frameworks of educational strategies into one that has usefulness to formal and nonformal educators as well as communicators. Our purpose is not to redefine EE, but to provide a framework that can help practitioners consider a suite of possible purposes and interventions that can belong under the umbrella of EE. We define four categories of EE according to their purpose: Convey Information, Build Understanding, Improve Skills, and Enable Sustainable Actions.

Environmental education (EE) is an approach, a philosophy, a tool, and a profession. As a discipline, it is applied in many ways for many purposes. This article organizes a variety of EE strategies into a model according to the educator's purpose. We recognize there are many different ways to categorize these strategies and believe this version has value for practitioners in both education and communication fields.

In its most basic form, EE implies learning about the environment. Lucas (1972) suggested

that EE is education *in, about, and for* the environment. This simple description reinforces the different purposes that EE often serves: programs provide opportunities to explore nature in the outdoors, information about conservation and environmental issues, and opportunities to gain knowledge and skills that can be used to defend, protect, conserve, or restore the environment.

This multidimensional definition was confirmed by the delegates at the Tbilisi Intergovernmental Conference in Georgia, USSR in 1977 (UNESCO, 1980) in their three goals for EE:

Address correspondence to **Martha C. Monroe**, SFRC, University of Florida, P.O. Box 110410, Gainesville, FL 32611-0410, USA.
E-mail: mcmonroe@ufl.edu

- To foster clear awareness of, and concern about, economic, social, political, and

ecological interdependence in urban and rural areas;

- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment;
- To create new patterns of behavior of individuals, groups, and society as a whole toward the environment.

The delegates provided additional information about the role of environmental education in creating these new patterns of behavior: "Environmental education must look outward to the community. It should involve the individual in an active problem-solving process within the context of specific realities, and it should encourage initiative, a sense of responsibility and commitment to build a better tomorrow" (UNESCO, 1980, 12).

By focusing on the essential concepts of environmental awareness, knowledge, attitudes, skills, and participation, the Tbilisi framework has been useful to both formal and nonformal environmental educators and trainers for designing a host of different resources, such as Hungerford et al. (1980) curriculum framework and NAAEE's Guidelines for Excellence (NAAEE, 2000). These EE sources guide educators to create opportunities for learners to gain knowledge; explore values; develop skills such as questioning, analysis, issue investigation, and problem solving; and develop personal responsibility or ownership for becoming responsible environmental citizens.

The multi-purpose aspect of EE can be perplexing for practitioners wishing to differentiate environmental education from other educational efforts. Its encompassing definition enables a variety of programs and opportunities to fall under the banner of EE, while it risks limiting high quality EE programs to those which accommodate all aspects. Meanwhile, educators tend to gravitate toward those aspects of the definition that are more familiar or better defined.

Interestingly, some natural resource professionals might develop materials and programs that conform to all the aspects of the Tbilisi def-

inition, yet not believe they conduct EE or are environmental educators. These professionals might have titles such as information specialist, outreach coordinator, communications specialist, community organizer, public relations specialist, facilitator, trainer, or business consultant. Particularly difficult to distinguish is the difference between the two fields that most predominantly engage in EE: Education and Communication. Educators often maintain a definitional divide by regarding education as a process that has extensive contact with learners, behavioral objectives, and unbiased or bias-neutral information that does not seek to change behavior, but prepares learners to make decisions. In contrast, communication activities that advocate a particular behavior, such as with mass media, persuasion, and social marketing, are considered a different discipline. The confusion appears to lie in differentiating between the **purpose** of the initiative and the **strategies** used to achieve the objectives. Applying critical thinking skills, for example, may be seen as an education objective, but could be practiced with obviously biased information; a social marketing campaign is seen as a communication effort to create new patterns of behavior, but often serves to provide information that people want to help them make a change they have chosen.

Environmental education is not only multifaceted, it is also continually evolving. More recent approaches seek to focus on the social dimension of environmental challenges, to more actively address behavior change, and to facilitate rather than lead learning. Mappin and Johnson (2005) trace the evolution of the perceived purpose, place, and practice of environmental education from a focus on natural science and conservation to a more social and political perspective. Authors writing for their book, *Environmental Education and Advocacy* (Johnson & Mappin, 2005), consider questions about the link between training, education, and problem solving; what environmentally responsible behavior is and who decides; and the challenge of expressing personal values while teaching the importance of evaluating different perspectives (Disinger, 2005; Jickling,

2005; McClaren & Hammond, 2005; Simmons, 2005).

Other evidence of change evolves from an increased interest in environmentally responsible behavior. Educators and researchers have focused on the psychological and sociological foundations of behavior. Behavior change theories appear to fall into “two avenues” for encouraging conservation behaviors (Monroe, 2003). The avenue most akin to education (e.g., building knowledge and skills) results in increased environmental literacy, which can be demonstrated through environmentally appropriate decisions. The other avenue applies communication strategies such as social marketing concepts to lead more predictably to specific behavior change.

With growing awareness of the complexity of current environmental crises, we find that the boundaries between education and communication are blurred and strategies from multiple fields are called on to improve public involvement and solve complex problems. New and old terms encompass slightly different meanings and suggest alternative ways of designing environmental education programs: adaptive management, civil society, collaborative learning, public deliberation, environmental justice, social capital, service learning, sustainable development, education for sustainability, environmental citizenship, stewardship education, environmental literacy, and public engagement are but a few that intersect with the work of educating about and for the environment. Environmental education methods can form the foundation for addressing each of these concepts.

FRAMING THE WORK OF ENVIRONMENTAL EDUCATION

In this context, the basic categories of education and communication are not sufficient to differentiate programs or practitioners, or encompass everything that is EE. Fortunately, two recent

frameworks rely on four categories to clarify and distinguish EE interventions.

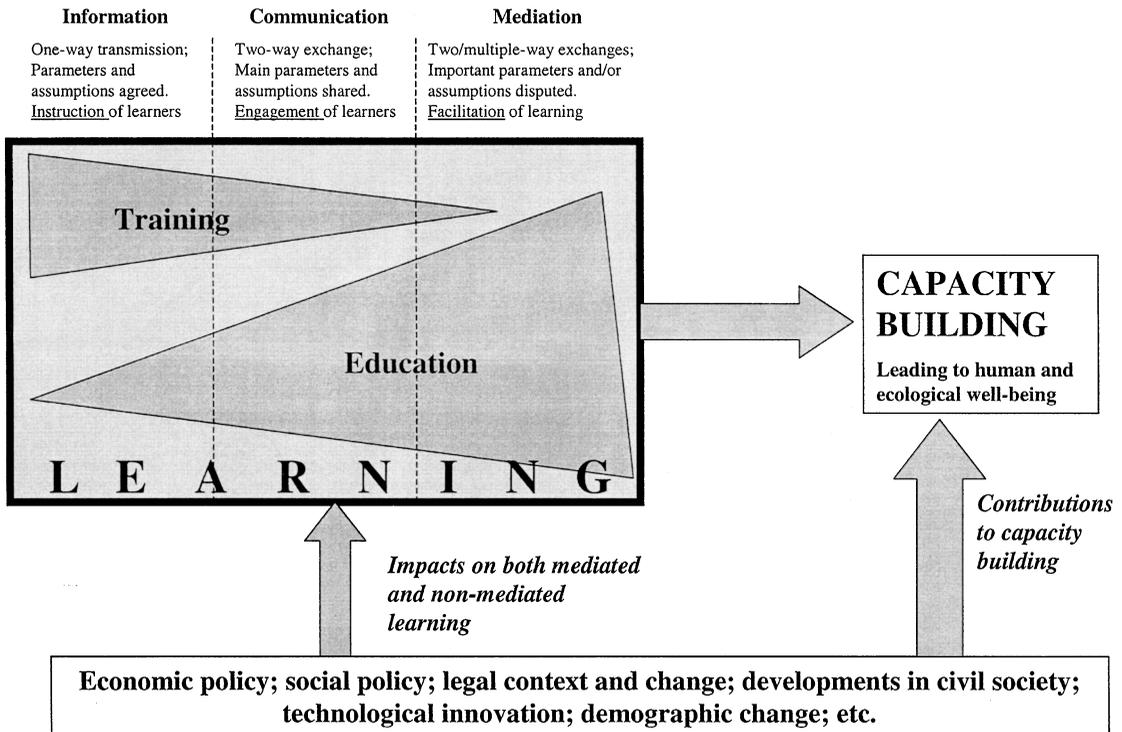
Following an evaluation of World-wide Fund for Nature (WWF) educational programs, Fien and others (2001, 2002) developed a framework of four nested categories to describe WWF's diverse projects: *information*, *communication*, *education*, and *capacity building* (see Table 1). They propose using objectives, processes, audience settings, and tools to illustrate the application of each type of “social strategy of conservation” (Fien et al., 2001, 389). *Information* activities generally aim to increase awareness and understanding and are defined as “informal” education. *Communication* activities aim to establish a dialogue between audiences and WWF in order to share experiences, priorities, and planning, and are delivered in informal and nonformal settings. *Education* activities aim to promote knowledge, understanding, an attitude of concern, and motivation and capacity to work with others in achieving goals, and are delivered in formal and nonformal settings. *Capacity building* aims to increase the capacity of civil society to support and work for conservation and is delivered primarily in nonformal settings.

By differentiating among these four purposes for conservation programs, the authors succeeded in demonstrating how various types of outreach contribute to an overall EE effort. Their framework encompasses activities as diverse as coloring books and brochures, semester-long service learning courses, TV programs, community workshops, and grant-writing seminars. One shortcoming of the framework, however, is that the categories are defined by the audience. This poses artificial limits on where formal education strategies can be used, for example. Although this might be the best way to structure the WWF conservation programs, it may limit the way other institutions describe their programs. Nevertheless, this summary generated lively discussion of whether these categories provide a useful framework for environmental educators.

Scott and Gough (2003) continued the conversation with a model that more actively

Table 1
A Continuum of Social Strategies for Conservation

Strategy	Information	Communication	Education	Capacity Building
Objective	To increase awareness and understanding of conservation issues and the work of WWF	To establish a dialogue between sectors of the community and WWF in order to: Increase understanding of the conservation issues that are of most concern, and Share experiences and priorities and plan collaborative projects to promote conservation.	To promote: Knowledge and understanding of conservation principles, an attitude of concern for the environment, and the motivation and capacity to work co-operatively with others in achieving conservation goals.	To increase the capacity of civil society to support and work for conservation through training, policy development, and institutional strengthening within and outside WWF.
Processes	Dissemination of information in a variety of media.	Facilitation of dialogue or two-way communication both within WWF and between WWF and outside groups.	Facilitation of learning experiences through the use of information, communication, and pedagogical processes that develop individual and group motivation and skills for living sustainably.	Development and enhancement of policy and institutional structures and skills. Training of WWF staff and key stakeholders in society.
Audience Settings	Generally informal education	Generally informal and non-formal settings	Generally formal and non-formal settings	Generally non-formal settings
Tools	Public relations and advertising. Information campaigns via a variety of in-person, paper, audio-visual, and electronic media.	Information campaigns with feedback processes to establish dialogue between WWF and groups Environmental interpretation. Participatory social marketing.	Formal education from preschool to university. Vocational and professional education courses. Non-formal education through youth, religious, farmer, and business associations. Participatory social marketing.	Professional development and training. Community development via Participatory Learning and Action (PLA/PRA) approaches. Organizational development. Policy review and development. Strategic planning. Network development.
Examples	Book publishing. Public service announcements. TV programs. Posters. Stickers. Public displays and/or exhibitions.	Newsletters to members. Town meetings. Telephone/mail call back associated with an information campaign. Interactive exhibitions.	Integrated curriculum and professional development project. Local school–community water action project. TV programs integrated with related community workshops.	Participatory Learning and Action (PLA) projects. Public involvement in Local Agenda 21 planning. Workplace training for ISO 14001 accreditation.



NB. Information, communication and pedagogy do not contribute to learning or capacity building if they are false, useless to the recipient, domineering or exploitative. Some learning occurs without any deliberate third party intervention.

Fig. 1. Information, communication, mediation: Contributions to capacity building.

acknowledges the dynamic of society and community when describing outreach and education options (see Figure 1). In their framework, the first three categories—information, communication, and mediation—represent various strategies of training and education that lead to learning. Application of these three categories varies based on the nature of the interaction between the learner and the educator and whether significant facts and values are disputed as opposed to the more static distinctions. This revision provides significant contributions by focusing on the importance of learners and learning in defining the result of education and training, and by acknowledging that all learning is embedded within socioeconomic contexts and can happen with or without planned activities.

Scott and Gough's first category, *information*, is described as instruction with one-way

information flow and agreement on facts and values. The second category, *communication*, is described as engagement of learners in a two-way flow of information where there is agreement of facts and values. The third category is termed *mediation*, where educators facilitate learning through a two-way exchange of information that questions and explores disputed facts, values, and other assumptions. All of these strategies and a few others (e.g., self-directed learning, coaching, mentoring) contribute to *capacity building*.

The Scott and Gough framework does not use formal and nonformal education settings as defining characteristics for interventions. Their model emphasizes an active role for learners and it assumes that mediated learning is the outcome of outreach, training, and formal and informal education efforts. Categories are distinguished by the level of audience participation:

from providing information (*information*) to actively engaging the learners (*communication* and *mediation*). This shift in focus facilitates a more universal application of the EE framework, yet still may not fully encompass the existing strategies of formal and nonformal EE and communication. Nonetheless, it succeeded in introducing significant concepts for modern environmental education.

A NEW FRAMEWORK

Whether we are school teachers explaining the water cycle, naturalists engaging citizens in outdoor enjoyment, or agency representatives instructing residents about compost bin construction, we have a challenging job. We must clearly identify the problem or opportunity, assess needs, and choose an intervention that addresses defined needs and is most likely to lead to the desired result. A framework can help professionals determine an appropriate goal, recognize strategies most effective for that goal, and evaluate why an intervention may or may not have been effective. In addition to Scott and Gough's version that defines the processes by which learners engage in understanding, we believe EE practitioners will find helpful a framework that describes the strategies they have available to them to design EE programs.

We propose a modification of the Fien and others (2001) and Scott and Gough (2003) frameworks that could be useful to a larger variety of educators and communicators and demonstrate how it can be applied. Our purpose is to summarize and organize a suite of possible interventions that can be used under accepted definitions of environmental education. We define four categories of interventions based on their objectives:

- Convey information
- Build understanding
- Improve skills
- Enable Sustainable Actions

These categories are based on the educator's **purpose** for the educational initiative, thus a variety of practitioners can find them relevant. For simplicity, we use the terms education, educators, and learners in the broadest sense; thus, the term education includes formalized learning, nonformal education, training, outreach, peer-to-peer, and free-choice learning. We refer to educators as the people who design and deliver opportunities for and often in collaboration with their target audience (Stevens & Andrews, 2006). They may work for natural resource agencies, nongovernmental organizations (NGOs), schools, or county extension offices. Learners are the people who take advantage of opportunities created by professionals or who engage in their own learner-created experiences by accessing widely available information and opportunities available from multiple providers who are not necessarily working together.

As in the original model (Fien et al., 2001), the new framework proposes nested categories such that subsequent categories may include previous ones. In this framework, however, *audience participation* is a variable that describes a variety of ways educators and learners might interact. The more an educator uses participatory strategies in any one category, the more likely that category is to morph into another (see Figure 2).

The extent to which the educator consults with, surveys, engages, and collaborates with the audience will improve the educational methods in every category and, if the educator addresses their needs, will increase the likelihood of achieving the educator's objectives. Although this is easier to do in the categories that involve two-way communication, we believe that opportunities exist for educators to learn about and attend to learners' needs even in one-way communication strategies. One category (enable sustainable actions) may only be possible by using participatory strategies, thus giving a home to "bottom-up" learning.

The success of the strategies listed in these categories also depends on the quality of interaction. Skilled practitioners should be able to

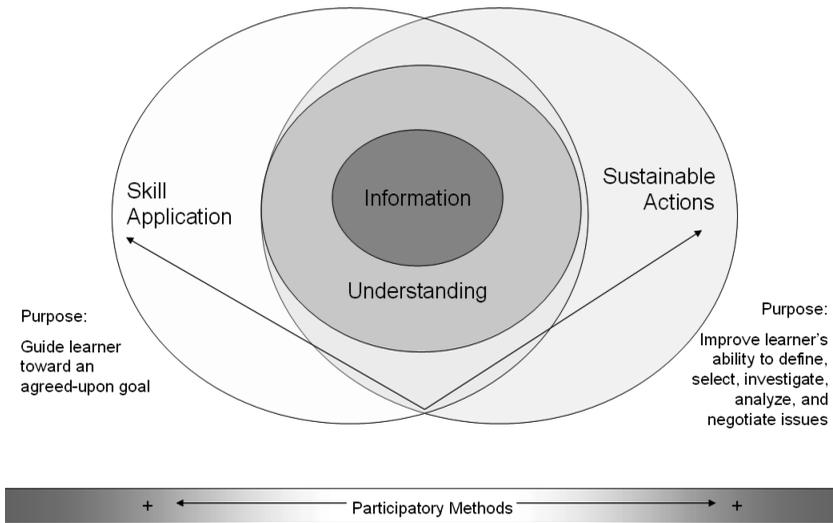


Fig. 2. A framework for environmental education strategies.

inspire and motivate learners with techniques from each category. In what follows, we provide a description of each category to further define what we mean. We provide sample techniques for each category in Table 2. We also provide a brief case study to illustrate how practitioners might apply each category as they address a specific situation.

Convey Information

As originally described, work in this category presents **one-way** transmission of information in order to provide missing facts or data, to increase access to “how to do it” instructions, or to build awareness about a specific topic. By *information* we refer to factual, conceptual, or procedural knowledge (see Anderson & Krathwohl, 2001). School teachers convey information using lectures, textbooks, and videos; agencies use news articles, presentations, brochures, websites, and kiosks. Providing details that people want or information to clarify issues and increase awareness is essential to environmental education programs (for techniques, see Jacobson, 1999). Emphasis on this category is most appropriate when the facts are not dis-

puted, when the issue is urgent, or when people are simply missing information they request. Although *conveying information* forms the core of what many programs include, the nature of one-way information flow often excludes participation, especially when the learners are not involved in selecting content or distribution mechanisms (and therefore it is a relatively small shape in Figure 2). It can be improved, however, with elements of the next strategy.

Build Understanding

This is a two-way transmission of information that aims to engage audiences in developing their own mental models to understand a concept, values, or attitudes. *Understanding* implies multiple thinking skills such as remembering, recognizing, interpreting, summarizing, and explaining (Anderson & Krathwohl, 2001). Educational strategies include guided nature walks, workshops and charettes for adults, and inquiry learning activities for youth. It also implies use of audience assessment and formative and summative evaluation to better understand how the learners perceive information. With the addition of such communication analysis procedures, the effectiveness of information sharing

Table 2
Formal and Nonformal Education Strategies Across the EE Framework

Category	Purpose	Some formal learning strategies	Some nonformal and free-choice learning strategies
Convey Information	To disseminate information, raise awareness, to inform	Textbook, lecture, video, film, and Internet resources	Information campaign, electronic media, Internet resource or website, poster, brochure, sign, Public Service Announcement, news article, exhibit
Build Understanding	To exchange ideas and provide dialogue, to build a sense of place, to clarify and enhance the understanding of information and issues, and to generate concern	Discussion, role play, simulation, case study, experiment, game, constructivist methods, experiential learning, field study	Workshop, presentation with discussion, charette, interactive website, simulation, case study, survey, focus group, interview, peer to peer training, action research, issue investigation, environmental monitoring, guided tour, guided nature walk
Improve Skills	To build and practice skills	Cooperative learning, issue investigation, inquiry learning, citizen science programs, volunteer service, some types of project-based education	Coaching, mentoring, demonstrations, technical training, environmental monitoring; providing a chance to practice a specific skill or work on a task, persuasion and social marketing strategies that modify social norms, including: modeling, commitment, incentives, and prompts to encourage skills building and behavior change
Enable Sustainable Actions	To build transformative capacity for leadership, creative problem solving, monitoring	Inquiry-based education, some types of service learning, Environment as an Integrating Concept, and other opportunities for learners to define problems, design and select action projects, identify facts, and build skills in problem solving	Adaptive collaborative management, action research, training for organizational effectiveness, facilitating partnerships and networks, joint fact finding, mediation, alternative dispute resolution, negotiated rulemaking, learning networks

is improved by allowing modification for the specific needs of learners. Strategies in this category are helpful to uncover misconceptions in novel or complex issues. The audience may help to identify the focus for the intervention and of-

fer feedback, but the process and objectives are most often driven by the educator. (For techniques see Jacobson et al., 2006; for theories see Horton & Hutchinson, 1997 and Merriam & Caffarella, 1999).

Improve Skills

Some education and communication programs aim to do more than develop knowledge and understanding. They seek to build skills that enhance or change practice, performance, and behavior.¹ In this category, learners apply or implement a skill, or organize and critique information (Anderson & Krathwohl, 2001). Like the previous two categories, educators purposefully facilitate learning toward a particular goal. Unlike the previous two categories, the educator may more actively incorporate theories of diffusion (Rogers, 1995), persuasion (Petty & Priester, 1994), social marketing (McKenzie-Mohr & Smith, 1999), and behavior change (Ajzen, 1985) to improve the adoption of behaviors. School programs can enable youth to practice citizenship, critical thinking, and group communication skills through activities such as service learning and issue investigation (Ernst & Monroe, 2004). Employers can increase staff effectiveness by providing hands-on training of new techniques and tools. Community-focused initiatives may provide instruction for a new activity, such as planting a rain garden, or use social marketing techniques to encourage adults to adopt a behavior that has been identified as a priority by the affected community. In all cases, information is an essential core of the effort. In all cases the ultimate outcome is not disputed. The community and learners agree that clean water, resource conservation, or effective waste utilization are important goals; they just need targeted assistance to practice the desired behavior (McKenzie-Mohr & Smith, 1999; Booth, 1996; Reilly & Andrews, 2004). The effectiveness of strategies in this category is enhanced by using instructional materials created through interactive communication between learner and educator and by focusing efforts on issues that are more relevant to the learner.

¹Several education authorities identify practice and application as an essential component of effective learning (American Psychological Association Board of Educational Affairs, 2003; Trowbridge & Bybee, 1986).

The greater the involvement of the audience in defining these skills and skill-building strategies, the more closely they resemble those in the next category.

Enable Sustainable Actions

The purpose of educational strategies in this category is to transform the learner, the issue, the educator, and perhaps the organization through the process of critically addressing problems. These processes allow the educator and learner to work together to define both goals and/or methods of the intervention. More than activities that promote understanding or skill building, these strategies are building capacity for effective citizenship in a complex world. More than previous strategies that could conceivably be limited to environmental information, these strategies tend to include economic and equity concerns. Grappling with different dimensions of the same problem, and redefining the problem as a result, can help bring about new solutions. When youth develop a community service learning project and participate in the selection and design of their activity, for example, they are likely to become more efficacious, empowered, and committed as they improve their community (Andrews, 1996; Zint et al., 2002). When communities and managers acknowledge the limitations of their facts and seek new information, they are redefining and transforming the issue and their understanding of it. When agencies and NGOs work collaboratively with audiences to understand stakeholder interests and preferences, to determine what stakeholders know, where the uncertainties lie, what additional information will be useful, what they can monitor, and how to use the information revealed from monitoring, they are transforming themselves, their understanding of the issue, and their ability to work together. Of great importance in this category is the recognition that the educator is not directing the process. The educator may facilitate and support, but the outcome is a unique product of those who

are involved. Agencies who wish to use interventions of this type must be willing to accept direction from the stakeholders. Community-based environmental education programs (Andrews et al., 2002), collaborative learning (Daniels & Walker, 2001) and adaptive collaborative management (Colfer, 2005) provide excellent models of social learning² that fit this category.

These community examples are often not considered part of the traditional environmental education methods. We believe, however, that they should be. Environmental educators have much to contribute to those working with conflict resolution, community-based education, collaborative learning, and adaptive management. We can design programs that incorporate processes for building trust, sharing information, seeking clarity, identifying indicators, working toward understanding, mediating, and negotiating new outcomes. Such interventions require tools for providing information, building understanding, and practicing skills. Taken together, and used in the context of agencies and coordinators who express an honest interest in seeking creative solutions by empowering the stakeholder group, these strategies create opportunities for deliberation, transformation, empowerment, and long-term problem solving. Interventions of this type clearly meet the goals of the Tbilisi recommendations as well as education for sustainable development.

AN EXAMPLE

Many agencies and extension educators are in the business of public information and edu-

cation to change behavior around urgent issues, such as reducing the risk of wildland fire. An educator can use strategies in all four of these categories to achieve a variety of goals. When an urgent message needs to be communicated to a large population, perhaps about an outdoor burn ban or evacuation route, the educator at the fire department is providing information through mass media channels (Convey Information). When there is more time to build understanding, an educator might lead a workshop or develop a detailed pamphlet; either could address homeowner concerns and help them understand how to reduce their risk by creating defensible space (Build Understanding). In most cases, making sure that the audience understands is not enough, and the educator will be interested in creating a series of community workshops, programs, demonstration areas, and even a contest between neighborhoods to make defensible space fun and popular (Build Understanding) and enable residents to practice skills such as chain saw maintenance, identification of trees to trim and shrubs to plant, and screening crawlspace (Improve Skills). If the community identifies this problem as a priority, the educator might be able to work with community leaders to identify innovative solutions or to develop a wildfire mitigation portion of the county comprehensive plan that builds mitigation activity into future development, for example. The process of community leaders and agency educators working together to redefine the problem and suggest novel solutions is the essence of Enable Sustainable Actions.

There is of course, great overlap among these four categories (see Fig. 2). Although it is easiest to explain the categories in order, an educator could easily conduct programs in only one of these areas, or all of these areas. Strategies in categories Improve Skills and Enable Sustainable Actions probably always include aspects of categories Convey Information and Build Understanding. Not only are the categories nested (as opposed to hierarchical), they can be implemented through multiple strategies in a variety of settings. We provide several examples of

²Social learning platforms create strong interpersonal relationships, a more universal definition of the task and objectives, better and more management options to achieve these objectives, and broad support for these options. These opportunities enable people to learn from each other. Social learning can be spontaneous but can also be encouraged in the interest of designing more sustainable interventions (Keen et al., 2005).

methods for each category (Table 2), but it is important to remember that the categories are defined by their purpose, not the intervention. In order for a strategy such as inquiry-based education to engage learners in Enable Sustainable Actions, educators must facilitate genuinely participatory processes.

SUMMARY

Our purpose was to design a framework that would organize the many EE activities and strategies commonly used in a variety of situations. Such a framework can remind program designers of opportunities and at the same time provide guidance in designing appropriate evaluation strategies. By linking the purpose to the strategy, as this framework does, program developers can better select interventions and evaluate success.

This new framework suggests that the categories are nested and vary by purpose, giving environmental educators and communicators a common language by which to discuss and compare their work.

Key points that underlie our proposed model:

1. Education and communication have traditionally differed by definition, but may not be so separate in practice.
2. Formal and nonformal education are often unnecessarily segregated and use similar but not identical methods to accomplish the same goal.
3. EE is a complex and broad umbrella that incorporates a variety of strategies and content from natural science to social science and top-down to bottom-up with little to great audience participation.
4. To help people function and engage in decisions in an uncertain world, EE must include collaborative strategies of community education, mediation, social learning, and adaptive management.
5. The degree to which the educator builds learners' needs into the design of the intervention affects the degree to which the educational methods from any of the four categories achieve the desired goal.
6. Our framework applies to communication, education, formal and nonformal initiatives, and bases its categories on the general purpose of intervention.

The original model arose from an evaluation of one NGOs' conservation activities and was modified after additional work with other NGOs. We are pleased to see a conservation education framework that easily applies and includes environmental education; many strategies and purposes are similar. We suggest that the new modifications create a framework that can apply equally well to formal and nonformal educators in schools and agencies, and incorporates the often disparate activities of information, outreach, social marketing, social change, and education.

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