Education and the Environment by Gerald A. Lieberman

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Book Content Highlights

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An Urgent Matter

Tapping into Demand

New Modules for Studying the Environment

About This Book

Part One: Introducing Environment-Based Education

Chapter 1: Why the Environment Belongs in Today's Classroom

"The challenges faced by human civilization and the natural environment are deeply interwoven. And this complexity provides a myriad of opportunities for student learning." (p 11)

Even if we don't think we have natural spaces at our school, we all live in and depend on the environment – requiring uncontaminated soil and decomposers in the soil for food… p 11

Entire chapter summarized in table 2.1 pages 43-44

Thinking About Systems

"Earth's natural systems and human social systems are collections of interrelated parts and processes that interact with each other and function as a distinguishable whole." (p12)

Natural systems – "the interacting components, processes, and cycles within a 'natural' environment and the interactions among organisms and their environments." (p 12)

Human social systems – "encompasses individual humans and human societies, and their political, social, cultural, economic, and legal systems." (p 12)

Systems thinking – "an approach that can be used to investigate any complex system in a comprehensive manner – seeking to understand its structure, the interconnections among all its component parts, and how changes in any element can affect the whole system and its constituent parts over time." (p 13)

Systems include components parts *AND* processes and interactions

"Teaching students to identify and think in terms of systems is important to developing their understanding of how the world around them functions…learn how to look at the big picture rather than just the individual components and isolated processes found within a particular system." (p 13)

Population Growth and the Natural World

Humans have a direct impact on the world, and as human tools, skills and knowledge grew from prehistoric humans to today, so too their effects on the environment continued to increase. (p 14)

Human population increased:

- 1500 ~450 million people
- 1900 ~1.6 billion people

- 2010 ~7.1 billion people

“Increased demands for natural resources have accompanied the rapidly growing human population and, in many cases, have grown faster than the population.” (p 14)

Raw materials must be processed, and industries have expanded to meet community needs with innovations and more facilities. For example agriculture has developed:

- new agricultural approaches
- more sophisticated tools
- new equipment
- new processes for gathering/transporting resources

But these innovations come with a cost, the system has to be balanced. (p 15)

Human impacts on the natural environment is not due to just one of these factors, but all combined, and the effects are cumulative. (p 16)

Not all humans are affected by or aware of these problems evenly – location, affluence, culture, and so on determine our engagement. (p 16)

Adverse Impacts

Table 1.1 Environmental concerns in different settings p 16

Air Pollution

Contamination of the atmosphere with particulate and gas pollutants, tends to stay in lower atmosphere (where it has greater effects on human health), but in the higher atmosphere can be called “transboundary” and moves over great distances. (p 17)

Most air pollution is generated in urban and suburban areas, but mining or farming in rural areas can also contribute. (p 17)

Air pollution directly affects human health (eg causing large increases in asthma attacks, the leading health cause of school absenteeism), forests and agricultural crops, the health of wildlife, wildlife habitats, and raising acidity in bodies of water. (p 18)

Energy Production and Consumption

Energy production (extraction, collection, conversion, transportation, and consumption) pollutes air and water and affects the landscape.

- Extracting raw materials through mining, drilling, gathering, and collecting renewable energy (solar farms, giant wind turbines, hydroelectric reservoirs) significantly affect habitats.
- Transportation requires equipment that take energy to create and run, releases additional air and water pollutants, and uses swaths of land.
- Consumption (driving, shopping, cooking, heating and cooling) produces by-products. (p 18)

Energy production and consumption are the largest sources of greenhouse gasses in the United States and the principle cause of climate change. (p 19)

Global Climate Change

Climate refers to short – and long-term shifts in the Earth's climatic patterns {Climate is observed in patterns of 30 or more years}. Rising average temperatures over the last 100 years is causing reduced mountain snowpack (a key source of freshwater in places like California), melting glaciers, rising sea levels, and unstable weather patterns. p 19)

Loss of Biological Diversity

Biodiversity loss occurs when plant and animal species die out due to habitat modification, destruction, pollution, or overconsumption. Species loss diminishes the gene pool and the variety of species needed to maintain diverse and stable ecosystems – diversity needed for humans to develop everything from new farm crops to pharmaceutical products. (p 19-20)

Water Quality and Supply

Water quality and supply are directly affected by natural events and human activity, including climate change. An adequate supply of clean freshwater is vital for human health and survival (bodily functions and processes, as well as activities such as farming, manufacturing, generating electricity, preparing food, transportation, and recreation). (p 20)

Humans impact water quality in a variety of ways, including agricultural use of pesticides and fertilizers, soil erosion, resource extraction, production of human waste, etc. (p 20) Degradation of water quality affects humans and natural systems. (p 20)

Ocean Degradation

Over the past two decades, water pollution, acid rain, lowered oxygen levels, over fishing, expanding "dead zones," and the effects of climate change have become major threats to the ocean ecosystem. Destruction of 50% of coastal wetlands (ocean species nurseries) over the last 200 years and pollution that starts on land as agricultural runoff, industrial waste, and litter are contributing factors. (p21)

Overconsumption of Natural Resources

Natural resources (timber, soil, plants, animals, water, minerals, energy) are typically grouped into three major categories: inexhaustible (energy from the sun), renewable (trees and water), and nonrenewable (fossil fuels). (p21)

Growing human populations, particularly in industrialized societies, causes rapidly growing demand for resources. Maintaining the functions and health of Earth's natural systems in the context of the growing human population will require significant changes to some human practices. Resource consumption must be adjusted to allow natural replenishment. (p 22)

Table 1.2 Environmental issues and human demands.

Other Environmental Impacts

In addition to the "big 7" other problematic environmental conditions arise from interactions among natural and humans systems, including:

- noise pollution
- complications from genetic engineering
- introduction of non-native species
- pest management

- storm-water runoff
- clearcutting of forests
- soil erosion

Location of industry is often based on convenience, cost, and social factors instead of how to mitigate environmental impact. (p 23)

Environmental Issues and Systems Thinking

All the environmental problems described are the result of a wide variety of interactions between humans and the natural world. These concerns, whether large or small, are complex because they are the result of interactions among large number of living and nonliving "moving parts." Environmental issues can, therefore, only be understood if considered from a "big picture" perspective, so providing a platform for learning about systems thinking is another important benefit of bringing the environment into classroom – based education. (p 23)

Content related to natural systems (life sciences, earth sciences, biology) are taught separated from subject matter related to human social systems (history, cultures, politics, economics, laws, and geography). As a result, traditional classroom practices do not offer students opportunities to learn about the interactions between natural systems and human social systems. (p 25)

Example of integration between humans social and natural systems in Figures 1.2, 1.3, 1.4 (p 24-26)

Figures 1.2 Components, processes, and interactions in a coastal wetland

Figure 1.3 Components, processes, and interactions in coastal development

Figure 1.4 interactions between a coastal wetland and coastal development project

Developing an understanding of the interactions between natural systems and human social systems prepares students to become active participants in their communities and a civil society, capable of making well-informed decisions that take into account the potential impacts of human activities on the environment. Equally important, it helps students how humans and human culture can be affected by a changing physical world. (p 26)

Chapter 2: Standards and the Making of EBE

First approach to transferring knowledge and skills to subsequent generations was learning by watching and doing, working alongside adults. P 27

"During the last 150 years, most educational experience has been bounded by the walls of the classroom, with the gap between children and their environment growing…{but} diverse benefits can be achieved by well-conceived instruction that uses study of the environment as both content and a context for standards-based classroom instruction." P 28

A Formal Study of the Environment

History of environmental studies: (p 28 – 29)

- Thales of Miletus (ca. 620 – 546 BCE) founder of natural philosophy (now called science)
- Pliny the Elder (23-79 CE) recorded observations of the environment in 37 volumes of *Natural History*.

- Carl Linnaeus (1700s) developed the system of binomial nomenclature (scientific names)
- Charles, Darwin, Alfred Russel Wallace, and John James Audubon expanded upon and corrected earlier investigators' observations of the natural histories of living things.
- Late 19th century development of ecology and a shift from descriptive approaches to a study of ecosystems.

A Growing Need for Education about the Environment

increases in the complexity of human social systems led to the development of new approaches to teaching children how to survive in an ever-changing world. 29

- 5th century BCE ancient Greeks developed the concept of schools
- Several centuries later Chinese and Persians developed their own schools
- Industrial revolution shifted society from rural – agricultural to urban with larger school systems and greater disconnection between children and the environment
- Today there are almost 100,000 schools in the United States

Environment-Focused Programs for Schools

- Late 1800s the nature study movement, 1891 Wilbur S. Jackman presented the first known plan for nature study in *Nature Study for the Common Schools*
- 1901 Liberty Hyde Bailey wrote that nature study had as its goal "to open the pupil's mind by direct observation to a knowledge and love of the common things in the child's environment…to put the pupil in a sympathetic attitude toward nature for the purpose of increasing the joy of living."
- Early 20th century US Forest Service identified need for "conservation education" – engaging the public in the conservation and wise use of nation's natural resources.
- Other governmental and private organizations have developed conservation education programs for students, but use education as a tool to improve the management of natural resources, not necessarily improve education.
- 1920s "outdoor education" promoted as a way to educate students about the natural world and also to teach academic content
- Outdoor education has changed of the years, and now describes a wide array of outdoor experiences that mostly focus on teaching outdoor activities and skills, not academic content.
- Late 1960s rise of "environmental education" to engender sensitivity around changing consumption and wasteful behaviors, not academic achievement.
- Recently "place-based education" focuses environmental education programs on the local community
- Green Schools – appearing most recently, minimizes environmental impact of school buildings, improves student health and learning environment.
- Late 1990s, College Board established the Advance Placement Environmental Science course for high school students

Standards, But Not For the Environment

1983 – *A Nation at Risk: The Imperative for Educational Reform* set groundwork for standards-based education, by the mid 1990s professional educational associations and organizations, some with federal funding, had produced extensive standards in language arts, mathematics, science, and history/social

science. None included environmental content standards, and so when state department of education adapted national standards to their state, the environment was mostly excluded. P 32

Common Core State Standards

The processes of implementing or adapting the CCSS began in 2010. They do not include content or skills relate to the environment. P 32

Pennsylvania and California – Exceptions to the Rule

The Commonwealth of Pennsylvania developed academic content standards for "environment and ecology" that were approved in 2002 by the State Board of Education. This included a multi-year process to help with program development and implementation, and then development of assessment. P 33

California developed their "California's Education and the Environment Initiative" (EEI) between 2006 and 2010. This curriculum focuses on the principles and concepts representing "big ideas" about the environment – critical understandings that every student in the state should know. P 33

Origins of EBE

1995 Pew Charitable Trusts funded a study that examined opportunities for integrating the teaching of standards with education about the environment, the findings of which suggest it would be most effective to expand the integration of environmental content into other disciplines and areas of study. As a result, the Trusts funded the establishment of the State Education and Environment Roundtable (SEER), a consortium of 12 states departments of education seeking to infuse environmental content into K-12 education by integrating it with education standards and frameworks, student assessment, and professional development programs for teachers. P 34

SEER initiated a literature survey/ investigation, *The Educational Efficacy of Environmental Education*, which identified a need for research into integrated environmental and academic programs. As a result they undertook a study of schools using the environment to teach standards, focusing on the effects of environmental on student academic achievement. (Study covered in Chapter 3) P 34-35

SEER's study coined a new term, "environment-based education" (EBE): "a framework for instruction that focuses on standards-based educational results by using the environment and related issues as a context for instruction." EBE has 3 main goals:

- Helping students achieve success with academic content standards
- Developing their understanding of interactions between natural and human social systems
- Preparing students to be active members of a civil society with the skills they need to identify and resolve environmental challenges.

Since developing EBE, SEER has created to major programs using this approach: Environment as an Integrating Context for learning (EIC) which develops localized EBE instructional programs, and the Education and the Environment Initiative (EEI) utilized in California with a more text-book methodology. P 35

The Integrating Context Model

Developed in 1997, 1998 –onward an extensive professional development model of the six EIC pedagogies:

- Integrated interdisciplinary instruction that breaks traditional boundaries between disciplines

- Community-based investigations as learning experiences that offer both minds-on and hands-on experiences through service-learning opportunities
- Collaborative instruction so teachers, parents, students, and community members can together connect instruction and learning
- Learner-centered, constructivist approaches adapted to the needs and unique abilities of individual students
- Combinations of independent and cooperative learning
- Local natural and community surroundings as the "context" for connecting these proven pedagogies (p36)

This model was designed for school or district levels with grade-level teaching teams working together to design integrated instructional units.

Process:

1. Teachers and students undertake a preliminary analysis of the natural and human systems that affect and are affected by an environmental issue to be studied, eg. Mapping.
2. Teachers complete an instructional design centered around standards from multiple disciplines in the context of the community-based investigation.
3. As student investigate the causes and effect associated with the environmental problems under study, the develop the skills they need to communicate their discoveries and become active members of their communities.
4. Assessments, tradition or performance-based, are included in the instructional design.

California's Education and the Environment Initiative Curriculum

SEER collaborated with curriculum writers and environmental experts to develop 85 units designed to teach the standards by having students examine numerous environmental problems important to California and around the world. After extensive third-party editing and testing, in 2010 California's State Board of Education unanimously approved this curriculum. P 37

The design of the EEI curriculum is intended to:

- Help students achieve proficiency with selected California content standards
- Teach K-12 students the key understandings represented by California's Environmental Principles and Concepts (text Appendix A) as a means of preparing them to understand future environmental challenges
- Support students as they develop and apply: science investigation and experimentation skills; history/social science analysis skills; English language arts reading, writing, listening, and speaking skills; and mathematical skills
- Integrate well with textbooks and other instructional materials adopted by California's State Board of Education

Minor modifications of the EEI curriculum units can adapt them to the standards of other states. These units do NOT directly involve students in community-based investigations or service-learning activities. P38

Comparing EBE to Standards – Based Programs

Helping students achieve academic standards success is the goal of both tradition and EBE instruction, however the EBE approach doe so using a cohesive context that connects students' new knowledge and skills to their local environment and community. P 38

Systems-thinking is largely absent from state standards, to deeply incorporate systems and systems thinking into classroom instruction is to use these understandings as a context within which to teach academic content. P 39

This is changing. In 2013 the Next Generation Science Standards (NGSS) incorporate systems and systems thinking into academic standards (for specific examples, see page 39). EBE provides opportunities for students to apply the science to the world around them and to be successful in science and the NGSS. EBE is integrated into standards based academic programs, it is not a separate topic with its own discrete academic content. P 39

See pages 40-41 for "Examples of Opportunities for Using the Environment to Teach Standards"

The greatest value comes from using EBE as a means of interconnecting content across disciplines and demonstrating to students how what they are learning in school can be applied to a real-world setting. EBE provides students with the chance to develop many of the skills they will need for college and/or careers and to become active members of their civil society. P 41

Comparing EBE to Environment – Focused Programs

Table 2.1 summarizes the differences between environment-focused programs (week standards alignment) and environment-based education (using the environment to teach academic standards content). P 43

Chapter 3: The Benefits of EBE

Research indicates that students benefit from participating in Environment Based Education (EBE) in three key areas:

1. Increased academic achievement related to standards
2. Improved engagement in learning and classroom behavior
3. Better preparation for college and careers

Anecdotal evidence suggests other benefits including: learning about real-world issues, participating in solutions, developing a sense of stewardship, heightened teacher morale, improved school climate, increased parent/community involvement. p 45

Summary of the Research

For a description of how the State Education and Environment Roundtable's (SEER) research for the 1998 report *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning* was conducted, see pages 46 – 47

Since its publication, many other research projects have examined the effects on students and teachers of implementing EBE programs and have reproduced many of SEER's findings (e.g. better performance on standardized measures of academic achievement and fewer discipline problems). For a description of these studies and their limitations, see page 47

Academic Achievement Related to Standards

Examples of EBE benefits for each content area are excerpted in text boxes, and summaries of results from EBE research studies for each content area (indicated by bulleted lists as the close of each segment) can be found throughout the remainder of the chapter, p 48 – 55

English Language Arts

"When students read, write, and speak about topics that interest them, as they do in EBE programs, they are more likely to make an effort to strengthen these skills." P 48 Students are particularly interested in learning about "their" natural and human social systems. Print and online media provides easy sources of local content and the opportunity to evaluate sources. P 49

Students learn the power of written and spoken language, and are more engaged in writing when that writing may have a local effect, thus honing writing, presenting, and other communication skills. P 49

Mathematics

Through hands-on opportunities in EBE programs, math is no longer abstract or irrelevant, as students learn by applying these skills to real-world problems like developing budgets or using measurement to plan and implement building projects. P 50 Teaching real-world math in this manner also offers students a variety of ways though which they can help their communities – a further demonstration of the everyday value and application of math skills. Teachers involved in successful environment-based instructional programs state that when math is taught within the context of the environment and community, students become more invested in the accuracy of their work. P 52

Science

Students in EBE programs are mastering standards at the same time as they are building their scientific knowledge and learning how to apply scientific skills. P 52

The hands-on EBE approach make it easier for students, over a wide range of ability levels, to improve their performance, appreciate science more, and remember what they have learned. Examining the complex interactions between natural and human social systems allows teachers to review the concepts, skills, and ethics involved in conducting real scientific studies. Students have the opportunity to apply fresh approaches to problem solving, actively learning instead of passively. P 54

History/Social Science

Through EBE programs, students in history/social science begin to perceive the connections between history, politics, economics, and cultures, engaging them more deeply in their studies and helping to see the significance of history/social science in their lives. P 55

As a result, students become more interested in and capable of asking their own questions about the world around them, making them better prepared to be involved and active citizens. P 56

Student Engagement and Behavior

Increased student engagement and motivation in environment-based learning encourages a natural increase in personal responsibility, and corresponding decreases in absenteeism, tardiness, and classroom discipline problems. p 57

Ongoing opportunities (multi-year) increase engagement and give students a chance to build a sense of caring that can grow into a commitment to environmental stewardship. p 58

Wide Ranging Benefits

- Opportunity to develop and apply higher-level thinking and problem-solving skills
- Develop communication and leadership skills needed to work with community and local governments
- Wide range of opportunities to learn from and work closely with scientists, historians, local businesses, media, governmental agencies, community members, and leaders
- Observe and even try jobs and careers they might otherwise never see

P 60 – 61

A Final Benefit

Chapter 4: Implementing EBE in a School, District, or State

Case studies of three EBE programs

Arabia Mountain High School

Note text box "EIC Model Demonstration School Networks on p 65-66

Desert Sands Unified School District

Note text box "Desert Sands Unified School District's Organizing Questions" p 73

California's Education and the Environment Initiative

Note text box "Costs of Implementing EEI" p 76 and Figure 4.1 "Workflow of major EEI activities and key roles" p 79 - 80

Common Challenges

Involving all the decision makers and keeping them informed is a crucial element of the process. Stakeholders much achieve clarity about the educational purposes of the initiative in order to engage decision makers. Concerns must be adequately addressed for buy-in. Potential program supporters and partners must have clear understanding (and evidence of, see summaries of results at the end of each content segment in Chapter 3) of the expected benefits of implementing a new EBE program. P 81

Programs must pay attention to the perspectives the present and the language they use (avoid taking a political side, use credible and balanced sources) p 82

Challenges for Schoolwide EBE Program Implementation

Text box "Challenges to Implementing EBE Programs at the School Level p 83:

The primary concerns most often cited by teachers and administrators in relation to implementing an EBE program include:

- Understanding the diverse perspectives of parents, administrators, and community members regarding EBE programming
- Confidence about having the authority, from district administrators or school boards, to implement a new program
- Insecurity about the level of support from school leadership or, for administrators, commitment from the district office
- Availability of necessary program coordination and implementation support during program development
- Inadequate "technical" knowledge about environmental content or the community where the school is located
- Limited knowledge or time to get community partners involved in implementation
- Ambiguity about what they are getting into, and a desire to have multiple examples of successful programs from which they can learn.

Challenges for Districtwide EBE Program Implementation

Text box "Challenges to Implementing EBE Programs at a District Level p 86:

Some of the challenges of and concerns about implementing EBE programs at a district level include:

- Understanding the diverse perspectives of parents, administrators, and community members regarding EBE programming
- Obtaining assurances regarding the district's authority – from a county office of education or state department of education – to implement a new program
- Adequacy of funding and other resources from existing or potential partners to support the program
- Availability of mechanisms for monitoring the progress and challenges of a program and for resolving issues that may arise, either from the perspective of administration, program implementation, or effects on students
- Possible varying levels of commitment among school site administrators and teachers for implementing and supporting an innovative program, as well as the possibility of staff changes at schools
- Potential of the program to cause bad publicity or "political" problems in the community, region, or state
- Uncertainty about how any new program will affect the district's existing programs or be affected by changes in policy that may be made by their state department of education.

Challenges for Statewide EBE Program Implementation

Attempts to initiate a state-level environment-based education program confront potential obstructions that are both much larger and more complex than those at school or district levels. Influencing state policies and practices requires:

- Good lobbying skills and substantial political maneuvering
- Thorough understanding of the roles, jurisdictions, and responsibilities of each education agency and decision maker
- An in-depth understanding of the laws and policies that constrain key educational decisions

Part Two: Creating and Implementing an EBE Program

Chapter 5: Planning for Success

This chapter focuses on development of an implementation plan and other key activities that must be undertaken to get an EBE program started and sustainable. It examines the establishment of an implementation and planning team with a clear and specific statement of the program's vision, mission, and goals. P 95

Developing a program requires thoughtful planning that focuses on the most important work and establishes clear timelines and agreement on roles and responsibilities. Planning the tasks and work assignments for creating a small EBE program or instructional unit is usually straightforward, while larger projects are more complex systems. P 96

Scope	Partners	Timeframe
Grade-specific instructional unit	2-3 individuals	Days-weeks
School – district wide	Representatives from all grade levels, specialist teachers, and administrators, as well as parents, community members, or cooperating orgs.	Several months
Large scale/statewide	Hundreds of individuals who represent all stakeholder interest groups	years

The key to successfully designing and implementing anew EBE program involves first asking and answering some basic yet very critical questions (Questions from pages 96 – 97, other notes from pages cited):

- Who are our stakeholders and likely partners who can help us succeed? (Whom do we need to succeed?) NOTE: involving stakeholder groups in the *process* of developing a program plan increases buy-in and commitment. P 96
- What is our mission and vision for the program? (What is our purpose, and what values will drive our program?)
- What are our goals? (What do we want to accomplish?) NOTE: Success in planning an EBE program come only by clarifying what needs to be done, setting quality expectations, identifying agents responsible for each task, and establishing a timeline and budget for all major activities. P 96
- What should be the scope and scale of our program? (What should be the size of our program?)
- How do we get permission? (What baking, policies, or laws do we need to understand or develop so we can implement our program?

Building a Network of Stakeholders and Partners

Identifying and engaging a cadre of divers stakeholders and partners, and getting them actively involved in an EBE program, is often key to a program's long-term success and sustainability. It is equally important to realize that key stakeholders, like parents and school district administrators, can become impediments to success if they are not informed and kept up to date on the program's plans and goals. (Appendix C, p 221, provides examples of the rans of roles, activities, and support that various stakeholder groups and partners can provide) P 97

"Buy-in" comes when potential partners have a strong understanding of your program, how it can succeed, and who else supports it. P 97

Table 5.1 outlines potential partners at different EBE program levels (p 99)

Assembling an effective group of players requires time to identify, contact and engagement tactics, and to pursue agency diversity for program strength. Identification and solicitation examples are given on pages 98 – 99.

Roles of assistive agencies/partners may vary within and throughout the program. P 100

Envisioning Success

Discussing and reaching agreement on the vision and mission statements for a new EBE program is a process that is sometimes taken for granted. Because we often use common terminology, we assume a shared understanding of what we want to accomplish. Since this is not usually the case when multiple organizations are involved, in-depth, substantive discussions are an essential step toward ensuring that all participants have the same understanding of what they are trying to achieve by creating a new program. P 100

Examples of the four types of critical support: technical, financial, political, and instructional, can be found in the text box "Support from Team Members, Stakeholders, and Partners" on page 101.

Vision and Mission Statements

Vision statements, an idealized view of what an EBE program can and should be, present a long-term view of the values and future of the program, while mission statements present a pragmatic view of the program and describe the core purpose, primary objectives, and measures of success. P 102

Mission and vision statements are initially developed by the program's founders, while teachers usually adapt the overall vision and mission statements to their individual EBE instructional units. P 102 – 103

Developing vision and mission statement should represent the perspectives, needs, and underlying goals of all stakeholders. Not making this investment of time and effort can result in setbacks to program development. P 104

Setting Goals

"What are we trying to accomplish?" – answering this question requires time, because beneficial goals are specific, relevant, attainable, and measurable. Often in EBE, goals are focused on an educational concern such as increasing engagement, decreasing discipline problems, and developing career and life skills. Examples of goals can be found on pages 105 – 106. P 105

At whatever level – school, district, or state – EBE teams should work to define meaningful, achievable, **measurable** (to assess and adjust) goals that will guide their work. P 106

Determine the Size of Your Program

Match the scale and scope of plans to the project goals, understanding the level of demand and identifying the resources needed for implementation includes the key questions:

- How many students, teachers, classrooms, or schools will be involved?
- What type of resources? How much? From where?

Though not ideal, EBE can happen one teacher, one classroom, at a time. (Example, Loris Chen, p 107) An example of a school-wide EBE is on page 109. Statewide, page 109 – 110.

Project Implementation Costs – text box page 108

Determining program needs and matching them with realistic, sustainable levels of funding and resources is important to achieving EBE program success. Lack of funds can be just as dangerous as an excess that forces small programs to grow before they're ready. P 110

Getting Permission

Time and effort should be devoted to the process of seeking and securing "permission to implement" a new EBE program from appropriate decision makers. Having such support (or lacking it) can make or break any innovative education program. p 110

Unfortunately, policies and educational climate at the local, regional, state, and federal levels change rapidly, which is why permission (preferably written) is so crucial. p 111

Other benefits of investing the effort to gain appropriate levels of permission include:

- increasing the chances that a program will continue after changes of administration or staff
- enhancing the program's credibility, thereby expanding opportunities for funding, since many grant programs require indications of formal policy or legal standing
- enlarging the pool of potential agency, community, or business supporters
- deepening decision makers' understanding and the public's awareness of a program

Permission can range from an oral understanding with a principal, to a policy established by a school, district, or state department of education, all the way to getting a new law enacted. Lower level permissions are easier and less time consuming to obtain, but lack the staying power of higher-level permissions. p 111-112

The level at which permission should be sought depends on a program's specific goals and its intended scope and scale, as well as the knowledge and support available from the stakeholder and partner network. Some key decision makers and leaders at each of the levels include: p 113

- School: Teachers, school council, parent-teacher organizations, and principal
- School district: Director of curriculum and instruction, superintendent, and school board
- State: Senior staff members and administrators at state department of education, state superintendent, state board of education, state legislature, and governor's office