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TEACHER PERCEPTIONS OF ENVIRONMENTAL EDUCATION: AN EXPLORATORY ASSESSMENT

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education:

Environmental Education

---

by

Joye Charlotte Marika Cantrell

September 2009

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Approved by:

[redacted]

Dr. Herbert Brunkhorst, First Reader

8-5-09

Date

[redacted]

Dr. Joseph Jesunathadas, Second Reader

ABSTRACT

Concern over the increasing consumption of resources, loss of wildlife habitat, and the growing disconnect between humans and the natural environment, has motivated several states to institute mandatory environmental education programs for their students. Unlike these states, California does not mandate the learning of environmental education, however this may change as the state faces several ecological challenges that will require an educated populace to be part of the solution.

It has been acknowledged that the study of the environment is an important subject for students to learn and teachers can be a key influence to its dissemination. This study conducted an exploratory assessment of teacher knowledge of current environmental concerns and issues, teacher perceptions about teaching environmental education and the current practices of teachers that include environmental education within their disciplines.

Teachers at an urban high school in California were administered a survey which addressed these three areas of concern. Results showed that although overall teacher knowledge in environmental concepts was poor, the teachers perceived a need for environmental education to be offered at the high school. Key findings from this report

indicated that teachers would be interested in receiving EE training and the majority specified that they would integrate EE concepts into their current curriculums if it supported their standards.

ACKNOWLEDGMENTS

This study could not have been possible without the help and support from many people. First of all I would like to thank Omar Safie for his commitment and dedication to the remaining Environmental Education cohort at the university. He has been the consistent link throughout the teacher education program that has given me the necessary confidence to complete this study. Next I would like to thank Dr. Herbert Brunkhorst for his input on my paper as well as keeping me on schedule. I also want to thank Dr. Darlene Stoner who provided the initial rudder for directing my enthusiasm in environmental education. From you I gained knowledge and insight in how to become an ethical and effective environmental educator. I hope that you are enjoying a much-deserved retirement.

This study and its completion would have been an incomprehensible challenge if it weren't for the camaraderie and support from the remaining environmental education cohort. Thank you for the encouragement and advice. Participation from the teachers at Rialto High School made this study a reality. Lastly, I want to acknowledge my family, who has been a constant support and encouragement throughout this two-year process of my

growth as an educator. You are amazing. My strength comes from you and my faith in God. Thank you.

DEDICATION

I want to dedicate this paper to my warrior husband, Steven, who has encouraged me to follow my dreams. Thank you for your unconditional love and support.

> And let us not be weary in well doing: for in due season we shall reap, if we faint not.
>
> Galatians 6:9

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CHAPTER ONE

INTRODUCTION

Acts of conservation without
the requisite desires and
skill are futile.
Aldo Leopold, 1944
(Meine & Knight, 1999)

Background of Study

Our natural environment plays a direct and significant role in determining human quality of life (Cortese & Armoudian, 1991). Our youth therefore need to learn the values, skills and actions of becoming responsible environmentally literate citizens. In order to properly educate our youth in this manner, we need to provide our students with a curriculum that proficiently develops their knowledge about the effects of human interactions within the total environment while fostering critical thinking skills to resolve environmental issues. Such a curriculum will need to be successfully infused throughout all disciplines in order for students to fully understand the connection that the environment plays in all aspects of their life. These concerns are currently

being addressed at the state level through the development of a standardized environ-mental education curriculum.

Any dissemination of a state wide adopted environmental education curriculum will require teachers that have adequate training in environmental education (EE) and the pedagogical skills necessary to facilitate the learning of information within their curriculum. The question then becomes whether teachers are ready and willing to embrace another mandated agenda within secondary education. The researcher of this study will examine this question at a local urban high school, located in the Inland Empire of California.

For this study, the researcher administered a survey to teachers in order to gain insight concerning what teachers at the researcher's high school knew about environmental concerns, their attitudes about utilizing EE concepts, and what they currently do relative to teaching about the environment. The data gathered from the study provided the researcher with information on how to make the onsite desert habitat and meditation labyrinth more available and user friendly for educators to teach EE concepts. The information may also prove useful in the future as our high school has been attempting to provide more career pathway choices that can be readily adopted by

the core subjects. Environmental education is naturally a multidisciplinary subject that has been proven to strengthen the learning of all subjects while benefiting the individual learner and their surrounding community (Disinger, 1993; Lieberman & Hoody, 1998).

Significance of the Project

Unlike some states, California does not mandate the learning of EE, however this may change as the state faces several ecological challenges that will require an educated populace to be part of the solution. The state has developed and is currently implementing the Education and the Environment Initiative (EEI) to meet this need. As of the date of this thesis, they are in phase four of a seven-phase process of EEI implementation.

Phase one was concerned with the development of the draft set of Environmental Principals and Concepts (EP&C) through the collaborative efforts of state and federal agencies, universities, non-governmental organizations and educators. Phase two was focused on the alignment of the EP&C to the California's Academic Content Standards. Phase three involved the initial development of the Model Curriculum Plan and the formation of the California Environmental Education Interagency Network (CEEIN). The

draft of the standards based lesson plans and units and subsequent field-testing is scheduled to occur during phase four. Revision of the curriculum is scheduled to occur during this period. The anticipated activities of phase five involve the dissemination of the Model Curriculum and professional development. School districts will be recruited to participate in EEI. Assessment of Model Curriculum and the continued operation and outreach of EEI is anticipated to occur during phase six and seven respectively (CA Environmental Protection Agency, 2009)

It is therefore critical that schools in California begin to assess their level of readiness for adopting a fully integrated environmental education curriculum that blends with the California content state standards. This exploratory assessment provides a preliminary view of current teacher knowledge, attitudes and actions regarding EE implementation. It also provides a model for other districts to assess their readiness to integrate EE concepts across the curriculum. As schools continue to confront the requirements of No Child Left Behind with goals of academic rigor and use of technology, how will they effectively integrate the emerging mandates of state adopted EE standards and foreseeable teacher training?

This study addresses this question as it concerns the staff at the urban regional high school in this study.

Statement of Needs

Research shows that levels of environmental literacy in America are still inadequate to meet the environmental challenges facing the nation (Coyle, 2005). Findings such as these have spurred the California legislature to make a commitment to EE implementation within the public K-12 school system. The Education and the Environment Initiative (EEI) is a direct result of the passing of legislation pursuant AB 1548 (Pavley, Chapter 665, Statutes of 2003) and AB 1721 (Pavley, Chapter 581, Statutes of 2005). These laws mandate the development of a unified education strategy that integrates the environment into California's primary and secondary schools. A goal of the EEI is to align California's Environmental Principles and Concepts, (EP & Cs) with California's Academic Content Standards (California Environmental Protection Agency, 2009).

Pending federal legislation that has been approved by the house but has not been accepted by the senate, is the No Child Left Inside Act, H.R. 3036. It is considered important legislation, as recent research has shown that

environmental education and outdoor activities improve standardized test scores in reading, science, writing, social studies, and math, and they help to increase student engagement with their schoolwork and reduce juvenile symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) (Lieberman & Hoody, 1998; Kuo & Taylor, 2004; Coyle, 2005). No Child Left Inside will provide new resources and incentives to states to enhance environmental education, train teachers, develop statewide environmental literacy plans and provide educators with a relevant set of standards to best instruct their students on their complex interconnection with the environment (Chesapeake Bay Foundation, 2009).

To date, most studies on teacher knowledge, attitudes and practices of EE have focused only on environmental educators or the core teachers of English, Math, Science and Social Sciences (Ernst, 2007; Lane, 1994; Lane & Wilke, 1996; May, 2000; Salmon, 2000). It is the belief of this educator that the cross-curricular integration of environmental education is as important and as feasible as the past integration and adoption of instructional technology across the curriculum. This study will therefore attempt to assess a representative sample of all

educators at a local high school on their current level of environmental knowledge, attitudes and practices.

Limitations of Study

The questions that led to this study on teacher perceptions of environmental education stemmed from a desire to create cross-curricular support and use of the onsite outdoor workspace being developed by the high school environmental club. While an assessment of teacher knowledge, attitudes and practices of EE at the local high school can provide valuable information in regards to how the staff might support and implement an integrative EE curriculum, this assessment and analysis was not designed for generalizability to other high schools. However, it could serve as a tool to assess teacher readiness within other districts provided it is modified for individual differences.

An additional factor impacting this study was the lack of current literature pertaining to the degree of teacher competency in environmental literacy and their support and implementation of environmental education across all of the teaching disciplines. To date only the Wisconsin Center for Environmental Education (WCEE) has conducted a comprehensive K-12 teacher assessment of

knowledge, attitudes and practices as they relate to teaching about the environment (WCEE, 1997). This survey was conducted after the 1985 mandate that environmental education in Wisconsin be a prerequisite for teacher certification. Additional studies would have provided a means of comparison with other high school staff in regards to readiness of adoption of the state environmental education standards.

Key Definitions

Several definitions are fundamental to this study including: constructivist approach; environmental education; environmental literacy; environmentally responsible behavior; nature deficit disorder; place based education and environment as an integrating context (EIC).

1. Constructivist approach to teaching is a method whereby the teacher facilitates the students' learning so that the student creates a personal understanding of the concepts being taught.
2. Environmental Education

   is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and

motivated to work toward their solution. (Stapp, 1969, p. 30)

3. Environmental literacy

> is the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems...It should be defined...in terms of observable behaviors. That is, people should be able to demonstrate in some observable form what they have learned--their knowledge of key concepts, skills acquired, disposition toward issues, and the like. (Roth, 1992, ¶ 11)

Under Roth's definition there are six components of environmental literacy including: environmental sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement (Roth, 1992).

4. Environmentally responsible behavior (ERB) can be defined as "observable behavior aimed at or intended to contribute to the solution of environmental problems" (Marcinkowski, 2001, p. 248).

5. Nature deficit disorder is a term coined by Richard Louv (2005, p. 34) to describe "the human costs of

alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses."

6. Place based education is

> the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' commitment to serving as active, contributing citizens. (Sobel, 2004, p. 7)

7. Environment as an Integrating Context (EIC) is a term first used by the State Education and Environment Roundtable to define a curricular framework which integrates the best educational practices for an effective environmental-based education program (Lieberman & Hoody, 1998). It is very similar to place-based education in that the school's surroundings and community create the framework within which students can construct their own

learning, guided by teachers and administrators using proven educational practices. There is an emphasis on making the learning interdisciplinary, student-directed, collaborative, hands-on and inquiry based (State Education & Environment Roundtable, 2005).

CHAPTER TWO

LITERATURE REVIEW

Introduction

This literature review includes research on the need for environmental literacy for urban youth; national level of environmental literacy; local, state and national support of environmental education; teacher beliefs and environmental education; curriculum guides for environmental education; best practices in teaching environmental education and current assessments on interdisciplinary teacher perceptions of knowledge, attitudes and practices. All of these topics and concepts are relevant to the understanding of this assessment study and analysis of current teacher knowledge, attitudes and implementation of EE at the selected urban high school.

Urban Youth and Environmental Literacy

There is an emerging concern amongst researchers that children today are growing up detached from their local environment, and as a result, are less likely to feel protective of the natural world (Orr, 2004; Barnett & Lord, 2006). David Orr argues that this is a crisis that requires action on the part of all educational institutions. He promotes an education which develops the

appropriate skills, aptitudes and attitudes necessary to heal the earth and create a more sustainable economy suitable to our biosphere.

There are further ramifications generated by the disconnect with nature developing in youth. According to Richard Louv, author of "Last Child in the Woods: Saving Our Children from Nature Deficit Disorder," children's disconnect from nature is evident in the rise in childhood obesity, attention deficit disorder, and depression (Louv, 2005). From his research, Louv (2005) suggests that an environment based education can dramatically improve standardized test scores and grade-point averages while developing skills in problem solving, critical thinking, and decision making. Louv promotes urban wild land revitalization and "greening school areas" (Louv, 2005, p. 305).

Louv's commentary on the benefits of providing young people with natural settings in which to explore, nurture and conduct field studies, provided part of the rational for constructing the onsite desert wildlife habitat for students to engage in experiential learning. Through this present exploratory assessment of teacher knowledge, attitudes and practicing behaviors of EE, the researcher

hopes to garner cross-curricular support for this proven resource.

Current National Level of Environmental Literacy

For the purpose of this study, the researcher compared the national level of environmental literacy to the sample study at the selected urban high school. With the renewed interest in ecological issues, it would be expected that there would be some correlating connection to an increase in environmental literacy. Research and nationally funded studies indicate otherwise (Coyle, 2005; Volk & McBeth, 1996). The latest National Environmental Education & Training Foundation (NEEFT) report on the status of America's environmental IQ found that most Americans believe they know more about the environment than they actually do. After taking the survey, only a third of American adults could pass a simple test on environmental knowledge with a grade equivalent to A, B, or C. This comes after 30 years of school-based environmental education programs.

As more schools are reducing or eliminating environmental programs fewer students are able to take part in related ecological instruction and field investigations, however effective or popular. State and

local administrators and teachers point to two factors behind this recent and disturbing shift: the unintended consequences of the No Child Left Behind Act (NCLB), and a lack of funding for these critical programs (Chesapeake Bay Foundation, 2009).

Current Support for Environmental Education

After pondering the profundity of research which promotes the efficacy of an environmentally based education, the question becomes how are we currently supporting it? World summits, international conservation agencies, national and state think tanks, grassroots organizations and even celebrities are demanding a more environmentally literate citizenry that are both caring and competent enough to meet the challenges of the environmental crisis. According to the 2005 NEETF report, 95% of the American public support environmental education in the schools. Over 85% agree that government agencies should support environmental education programs (Coyle, 2005).

Yet with all of this outside support, "the environment has yet to achieve core subject status within our schools" (Coyle, 2005, p. x). Environmental education, like most electives, is considered an extra.

Teacher Beliefs and Environmental Education

In order to successfully implement the new state standards for environmental education into the public school system, it is important to assess teachers' ecological beliefs (Moroye, 2007). Past research has studied the effect of teacher beliefs upon their practices in the classroom (Cotton, 2006; Love & Kruger, 2005). What teachers value and find important will ultimately emanate throughout their classroom environment.

A teacher's ecological philosophy is therefore critical to the students' development of environmental beliefs and environmental sensitivity as teachers constitute the greatest percentage of role models (Peterson, 1998). Time spent outdoors as youth and continuous exposure to environmental concerns through education and contact with environmentally concerned and active role models are considered to be the greatest influences in the development of a person's environmental sensitivity (Peterson, 1998).

Curriculum Guides for Environmental Education

In 1977, the First Intergovernmental Conference on Environmental Education was hosted by UNESCO. From this series of international conferences and workshops, the

landmark, Tbilisi Declaration was crafted. It has become the standard from which effective environmental education curriculums have been shaped and evaluated. The Conference composed and endorsed the goals, objectives and guiding principles for environmental education. Since these have become the hallmark of a quality program, the researcher has used them as a guide for creating the survey for this study. The goals, objectives and principles of the Tbilisi Conference are available for reference in Appendix A of this study.

In a study to bring greater focus and definition to what was previously established by the *Tbilisi Declaration*, Hungerford et al. synthesized the *Goals for Curriculum Development in Environmental Education*. These goals which are consistent with the principles established at Tbilisi, have been instrumental in providing a framework for curriculum that strives to educate a populace towards responsible citizenship behavior. The researcher of this study focused upon four of the assumptions formed by Hungerford et al.

> ...that ecological foundations are critical to any EE program as prerequisite or co-requisite cognitive knowledge; that the process of valuing, values clarification, and moral

> reasoning are implicit in the goals; that an educator should provide mechanisms whereby action can be taken if desired; and that EE is an interdisciplinary pursuit. (Hungerford et al., 1980, p. 109)

A complete listing of the *Goals for Curriculum Development in Environment Education* can be found in Appendix B.

This referencing of curriculum guides for environmental education would not be complete without the inclusion of the recently approved California's Environmental Principles and Concepts (EP & C's). The primary goal of the Education and the Environment Initiative (EEI) curriculum will be to help students achieve mastery of California's Academic Content Standards in the context of the EP & C's (CalEPA, 2009). Since these will be the guiding force behind the state approved model environmental education curriculum for grades K-12, they will be the researcher's primary evaluation tool for the participant's environmental knowledge. A complete listing of California's approved Environmental Principles and Concepts can be found in Appendix C.

Best Practices in Teaching Environmental Education

True environmental education supports a deep understanding of the ecology and develops the learner's ability to apply that knowledge to solve complex problems. The NEETF report found that though most educational efforts supported the learning of environmental information few exemplified the effect of creating true environmental literacy, application skills or a sense of stewardship in young people (Coyle, 2005). Both the Tbilisi Declaration and the Goals for Curriculum Development in Environmental Education stress the importance of first developing a strong ecological knowledge foundation from which to foster the necessary skills that will advance the resolution of various environmental problems.

Two similar educational frameworks for environmental education emphasize this philosophy with a learning approach that is interdisciplinary, collaborative, experiential and student-centered. These research approved paradigms of EE are Place-Based education and using the Environment as an Integrating Context (Chawla, 2007; Falco, 2004). Both models are often used interchangeably as they share similar strategies. It is these approved

practices that the researcher of this study has referenced in evaluating the participants' currently elected methods for teaching EE within their curriculums. Best teaching strategies include the following:

> integrated interdisciplinary instruction; collaborative teaching methods; community based investigations; learner-centered, constructivist approaches; cooperative and individual learning; and use of local community and natural settings as the context for learning and instruction. (Falco, 2004, ¶ 1)

Current Assessments on Interdisciplinary Teacher Perceptions of Knowledge, Attitudes and Practices

The state of Wisconsin mandates the support and implementation of EE programs in grades K-12. All teachers preparing to teach in the areas of early childhood, elementary education, agriculture, science or social studies must achieve EE competencies prior to receiving certification. California's Environmental Education Initiative will undoubtedly be the precursor to similar legislation. Fortunately, due to Wisconsin's teacher and curriculum requirements, there are studies of value that

can prepare other states for similar educational improvements.

The Wisconsin Center for Environmental Education (WCEE) with the help of the Wisconsin Environmental Education Board and the Wisconsin department of Public Instruction conducted a comprehensive state-wide survey of students, teachers, curriculum coordinators and principals for the purpose of determining their perceived competencies and needs related to environmental education (WCEE, 1997). The assessment instrument used in the study asked questions relating to what teachers know, feel, and do relative to teaching about the environment. It is the only study that asks these questions across all curriculums and is for this reason, the one that was used as a comparison model for this study. Over 900 teachers participated in the study.

Of the group, 163 had received pre-service teacher education in environmental education (EE) while 274 had received in-service education or had taken post-graduate courses relating to EE. Support of teacher school districts was noted by whether or not a school district written EE curriculum plan existed. Approximately 30% of the teachers reported that their district had one.

Of the 915 surveyed, 69% currently infused education about the environment into their class curriculum. Major reasons listed for not integrating EE into their curriculum included: environmental concepts were unrelated to the teacher's subject area (25%); lack of EE knowledge (24%) and not enough time (15%). Major factors that would influence a teacher to infuse EE concepts into their teaching included: more in-service classes on EE teaching methods (31%); better access to resources and aids for teaching about the environment (26%); and more preparation time (18%).

The Wisconsin teachers of the survey overall believe that EE is important and should be a priority in the schools (80%). Furthermore, 68% believed that mandating EE curriculum plans in school was a good idea and 64% thought that pre-service teachers should be required to take an EE methods class. Of the teachers, 71% believed they were effective at infusing the study of EE concepts and issues into their subject. However, 77% of the teachers surveyed (N = 608) spent less than 14% of their instructional time on the infusion of EE concepts.

Teachers were given a list of 18 cognitive education methods for teaching environmental concepts. The researcher of this study incorporated a similar list into

the assessment instrument. In the WCEE assessment, 84% of those surveyed noted that more than half of the methods were valuable. The methods most often used by teachers included: observations (81%); audiovisuals (69%); lectures (68%); problem solving (66%); cooperative learning (62%); writing, art, music (60%); and outdoor education (60%). Ninety perecnt of the teachers felt that increasing their students' level of environmental responsibility was a goal. Similarly 88% of teachers believed that students should be provided with opportunities to gain actual experiences in resolving environmental issues. Of those teachers that infuse EE concepts into their curriculum, 96% believed that teachers should help students develop a set of values and feelings of concern for the environment (WCEE, 1997).

The overall findings of the WCEE indicated that teachers were very supportive of EE integration across the curriculum. The majority of the teachers that currently infused EE concepts into their classroom believed that they were effective and competent in teaching students about the environment. Survey results further indicated that "the amount of EE offered by a teacher increased relative to the availability of an EE plan in their

district and was relative to the amount of personal EE training that they had received" (WCEE, 1997).

CHAPTER THREE

DESIGN AND METHODOLOGY

Introduction

In spring 2009, a survey to a group of high school teachers was conducted at an urban high school site located in the Inland Empire in southern California. The selected school supports an ethnically diverse population of approximately 3,493 students. Students grouped by ethnicity include 3% Asian; 75% Hispanic; 15% Black and 7% White. Fifty-one percent of the student population is eligible for free or reduced lunches. During the time of the study there was 133 certificated personnel on the staff. In this study, 31% (n = 41) of the teaching staff completed the survey.

The survey was a combination of multiple choice and likert style questions used to determine teacher knowledge, attitudes and current teaching practices as related to environmental education. Surveys were distributed via the staff email or to personal mailboxes. Teachers gave their consent to participate in the survey by volunteering to complete the questionnaire. The Institutional Review Board of California State University, San Bernardino approved this study.

Participants and Data Collection Method

One hundred and thirty-three teachers were sent the survey via electronic mail. Typed copies were also made available to teachers that had difficulty accessing the surveys. These were placed into their mailboxes. An adjoining letter explained the purpose of the survey as well as informing the staff of anonymity and confidentiality standards. They were instructed to return the completed survey via e-mail or to leave the survey in a provided manila envelope with their academy secretary for later collection by the researcher.

Of the selected population of teachers, 19 males and 22 females responded within the specified time period. This represents a response rate of 31%. The survey asked the respondents to provide information on years of service with the high school as well as total years teaching. This information was requested by the researcher as previous research from a similar study in Wisconsin concluded that there is a "positive relationship between the amount of time teachers devote to EE and how frequently they refer to their district's EE curriculum plan" (Lane & Wilke, 1996, p. 37). If the teacher had taught in school districts outside of the one selected, their focus on EE might differ. Teachers were also asked to indicate whether

they had received any teacher education or training in EE. The data analysis from the Wisconsin study "strongly suggested that pre-service preparation in EE contribute to teachers' effective classroom teaching practices and EE concepts" (Lane & Wilke, 1996, p. 37).

Method Instrument Design

This study is based on the researcher's belief that in order for students to receive an education that develops their environmental literacy, they will require a teaching staff that is able to adhere to the goals, objectives and guiding principles for environmental education as set out by the Tbilisi Conference of 1977. The teacher survey was therefore developed to ascertain teacher knowledge, attitudes and current teaching practices in regards to environmental education across the curriculum. The sections of the survey on teacher attitudes and teacher practices was partially modeled after the questionnaire developed by the Wisconsin Center for Environmental Education (WCEE, 1997).

The 41 questions asked on the survey were divided into four sections. The first section included questions regarding teacher knowledge about environmental issues and general ecological concepts. This adheres to the first

goal of environmental education as listed in the Tbilisi Conference. It is "to foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas" (Tbilisi, 1977, p. 26). Nine of the 12 questions were specifically related to concepts linked to the onsite wildlife habitat which uses xeriscaping and provides habitat to pollinators; local and national environmental concerns; and impending legislation. All of the twelve questions within this section were multiple-choice.

The second section assessed general teacher attitudes and concerns regarding the instruction of environmental education. The selection of questions was developed based upon the environmental education objective of developing student attitudes of "...concern for the environment and the motivation for actively participating in environmental improvement and protection" (Tbilisi, 1977, p. 26). A teacher that does not value environmental education might be challenged to help others to meet this objective (Ernst, 2009; Simmons, 1998). A Likert type scale was used to gauge teacher responses to 15 statements about environmental education. Two statements were created in direct correlation to teacher use and support of the outdoor workspace.

The third section assessed current teacher practices of using environmentally based concepts within their curriculum. This section of the survey correlated with the Tbilisi goal of creating new patterns of behavior and the environmental education objectives of skills and participation (Tbilisi, 1977). In order for environmental literacy to be developed, students need to develop the skills for identifying and solving environmental problems and be provided the opportunity to be actively involved at all levels in working toward resolution of environmental problems (Volk & McBeth, 1996). A Likert based scale was also implemented for this section of seven of the nine items. Teachers were asked if they taught EE concepts, their comfort level in teaching EE, frequency of teaching EE, and teaching methodology practiced for EE.

The final section posed five demographic based questions in regards to gender, years teaching, EE training, and the discipline that they are currently teaching or aligned with at the local high school. These questions were created to identify any differences in responses based on demographics characteristics.

Data Analysis

Raw data from the surveys was entered into the SPSS program. Survey results were analyzed using the descriptive statistics function in order to determine the frequency and percentage of responses to both the multiple choice and likert style questions. Information was categorized in terms of environmental knowledge, environmental education attitudes, current teacher practices in environmental education and demographic variables of the teacher participants. All data were tallied and recounted by the researcher to reduce possible data entry errors. Results are reported in Chapter Four.

CHAPTER FOUR

FINDINGS AND RESULTS

Introduction

This study was conducted to ascertain teacher knowledge, attitudes and practices of EE at a local urban high school in order to gain information in regards to how the staff might support and implement an integrative EE curriculum. Data was also collected for the purpose of assessing cross-curricular support for using an onsite outdoor workspace. Descriptive analysis of the quantitative survey was used to analyze responses from participants within the categories of teacher knowledge, attitudes and practice. Teacher variables of gender, subject taught, years of teaching service and listing of EE training or education were used to better describe the representative high school sample. Teacher responses were evaluated based on how they might determine the successful dissemination of knowledge, attitudes and skills attained by students in regards to the curriculum guides referenced in the literature review. These data will be discussed and compared with other research studies where possible.

Findings

The demographics of the staff participants are as follows:

41 total participants: 19 male (46.3%) and 22 female (53.7%) The subjects taught by the participants are reported in Table 1. This helps to validate the usefulness of these data as a means of assessing the knowledge, attitudes and practices of educators across the curriculum.

Table 1. Subjects Currently Taught by Participants

Core Courses	Sample Number	Percent of Sample	Number at School	Percent Represented
English	6	15%	24	25%
Social Sciences	7	17%	15	47%
Math	7	17%	23	30%
Science	6	15%	16	38%
Non-Core Courses				
Career Technical Education & ROP	4	10%	12	33%
Visual & Performing Arts	3	7%	8	38%
PE & Health	4	10%	10	40%
Foreign Language	1	2%	10	10%
Special Education	3	7%	11	27%

Table 2. Years of Teaching Service

Years	Years at Current School	Percent	Total Years Teaching[a]	Percent
1 to 5	11	26.8%	6	14.6%
6 to 10	12	29.3%	14	34.1%
11 to 15	9	22%	10	24.4%
16 to 20	4	9.8%	4	9.8%
21 to 25	3	7.3%	1	2.4%
Over 25	2	4.9%	6	14.6%

[a] Total years teaching at all schools

Table 3. Teachers Receiving Environmental Education Training or Education

Response	Participant Number	Participant Percent
Yes	2	4.9%
No	39	95.1%

Discussion of Participant Demographics

The teacher sample is fairly representative of the certificated staff at the selected site. There is a near balance of male and female staff, though the majority of teachers at the school have six to seven years teaching experience. The greater number of veteran teachers is

possibly due to the fact that the researcher is also a veteran teacher of 20+ years. According to the district site fact sheet, the average teacher has nine years teaching experience with 25% of the certificated staff having only one to two years teaching experience (Rialto High School, 2006).

It was not a great surprise based upon the literature review to see that only two staff members had received training in environmental education, as this is not a teaching prerequisite to work in the state of California or the selected district. The focus at this district is on receiving training in classroom management, technology and working with a diverse population of students. That 95% of the staff has not taken a class in EE or participated in related training does indicate a strong need for an educator program that focuses on their development of environmental literacy and teaching methods should the state mandate EE integration within the core classes. If the staff is to effectively utilize the outdoor work space, some training in EE methods would strengthen their level of confidence and thus reduce a known barrier to teaching EE (Ernst, 2009; Lane & Wilke, 1996; Simmons, 1998).

Results of Environmental Knowledge of Participants

The results for the environmental knowledge of participants can be found in Table 4. The correct answers for this part of the survey have been highlighted. As some of the responses have been abbreviated due to space constraints, the reader can view the complete survey in Appendix E.

Table 4. Environmental Knowledge of Participants

Question 1: Which plants are not dependent on pollination from animals?			
A) fruits	B) Vegetables	***C) Cereals***	D) stimulants like coffee and tea
2 4.9%	6 14.6%	**19 46.3%**	14 34.1%

Question 2: Insects, birds and mammals pollinate...			
A) ¼ of our food crops	**B) ⅓**	C) ⅔	D) all of our food crops
0 0.0%	**2 4.9%**	28 68.3%	11 26.8%

Question 3: To carry the USDA organic label, produce cannot be subject to:			
A) synthetic pesticides	B) genetic engineering	C) irradiation	**D) all of the above**
5 12.2%	1 2.4%	6 14.6%	**29 70.7%**

Question 4: Which of the following is not an endangered species of California?			
A) CA condor	B) Catalina Island Fox	C) Delhi Sands Fly	**D) CA Quail**
3 7.3%	3 7.3%	9 22%	**26 63.4%**

Question 5: Rialto's aquifer was polluted by per chlorates from...			
A) rocket fuel	B) cement plant waste	C) agricultural run-off	d) pesticides
18 43.9%	8 19.5%	6 14.6%	9 22%

Question 6: Studies have shown that high levels of per chlorate can Cause health effects with conditions like...			
A) ADD	B) learning disabilities	C) decreased IQ	**D) all of the above**
18 43.9%	8 19.5%	6 14.6%	**9 22%**

Question 7: What percentage of the world's fresh water supply comes from groundwater?			
A) 30%	B) 55%	C) 70%	**D) 90%**
8 19.5%	6 14.6%	15 36.6%	**12 29.3%**

Question 8: What is not an example of drought-tolerant landscaping?			
A) using fertilizer	B) using native plants	C) using mulch	D) thinning plant beds
25 61%	4 9.8%	0 0.0%	12 29.3%

Question 9: A lack of safe open spaces in parks and schools, particularly in communities of color and low income is considered a social justice issue that...			
A) leads to reduced drop outs	**B) increases childhood obesity**	C) reduces crime	D) none of the above
1 2.4%	**26 63.4%**	1 2.4%	13 31.4%

Question 10: An invasive exotic plant is considered to be a plant that...			
A) did not exist prior to European contact	B) does not grow locally	C) uses too much water	D) is a weed
24 58.5%	5 12.2%	4 9.8%	8 19.5%

Question 11: What is the proper ranking of renewable energy sources in USA by order of their use from greatest to least?			
A) wind, solar, geothermal Hydropower, biomass	B) solar, hydropower, biomass, wind, geothermal	C) coal, oil gas, nuclear	**D) biomass, H. G., W., S.**
14 34.1%	11 26.8%	10 24.4%	**6 14.6%**

Question 12: 'No Child Left Inside' is legislation that seeks to...			
A) take standardized testing Outdoors	B) increase playgrounds	**C) strengthen and expand EE programs**	D) cure childhood obesity
1 2.4%	2 4.9%	**32 78%**	6 14.6%

Note: (n n percent)

Discussion of Participant Environmental Knowledge

On average the participating staff earned a 52% on overall ecological knowledge. This would translate to an equivalent grade of an F. According to the NEETF/Roper research of 2005, only a third of the American populace can pass a basic test on environmental knowledge (Coyle, 2005). Although it has been theorized that environmental literacy should equip the individual with more than just ecological knowledge (Roth, 1992), a firm understanding of the interrelationships between natural and social systems should form the foundation from which environmentally responsible behavior is developed (Hungerford et al., 1980).

The twelve questions from the environmental knowledge section were designed to provide a very general perception of the test takers' overall competency in this area. The test items are qualified by the objectives, goals,

principles and concepts as designed within the Tbilisi Intergovernmental Conference on Environmental Education; Hungerford et al's Goals for Curriculum Development in Environmental Education and the California's Environmental Principles and Concepts (EP & C). A complete listing of each of these can be found within the Appendixes.

For the purpose of evaluating and categorizing the participant responses, the researcher used the EP & C. Some of the questions could meet the requirements of more than one principle, but for the purpose of this evaluation, the researcher chose to assign each item to a single principle. Information sources for the corresponding correct choices was provided.

Principle I: People Depend on Natural Systems (Questions: 1, 2, 7, and 11)

Both questions one and two relate to the important ecosystem services rendered by pollinators. The topic of pollinators became a media focus with the National Research Council of the National Academies 2007 release of the Committee on the Status of Pollinators in North America. The findings of this study revealed that there were strong declines in all pollinator populations. This was important news as the study informed the reader that an estimated 75% of the planet's flowering plants rely on

200,000 species of animal pollinators to various extents to meet their reproductive needs (National Research Council of the National Academies, 2007). Animals specifically pollinate a ⅓ of the world's major food crops. Both national and public concern generated from this crisis has since resulted in the creation of National Pollinator Week as designated by the U.S. Senate and U.S. Department of Agriculture, four pollination stamps issued by the U.S. Postal Service and the sponsorship of various public outreaches to foster awareness and concern for all pollinators. Yet even with all of this publicity, only 46.3% of the participants knew that cereals are not dependent on pollination from animals and 4.9% recognized that ⅓ of all food crops require pollination by the animal kingdom. With regard to the respondents' 68.3% support that ⅔ of our food crops are pollinated by animals, the general consensus could have been to include all cultivated crops.

Question 7 asked what percentage of the world's fresh water supply comes from groundwater. The correct response is 90% of which 29.3% of the participants appropriately answered. This information is based upon facts supplied by the National Groundwater Association (NGWA, 2005). Groundwater quality is therefore very important. Awareness

that it is such a critical resource could lead to more environmentally responsible behavior such as the appropriate disposal of household hazardous wastes.

Question 11 asked respondents to correctly rank the USA's use of renewable energy sources from greatest to least. Respondents would first need to know what constitutes a renewable energy source and then be familiar with how they are presently used to support the economy and culture of our country. The correct ranking for this question was response, D: biomass, hydrogen, geothermal, wind, and solar. Facts on this question were gathered from the Energy Information Administration (EIA), which provides the official energy statistics from the United States government (EIA, 2007). Only six teachers, 14.6% of the participants answered correctly. A greater number of respondents, 24.4%, selected C: coal, oil, gas, and nuclear. Three of these are known fossil fuels. Why is this important? How can we form sound judgments about our nation's energy policies when we are not cognizant of key facts? For educators, there is a need to overcome this knowledge gap in order to better inform our students on so crucial a matter as energy. Americans as a whole are very supportive of developing our use of alternative renewable energy sources (Brittle, n.d.), but we first need to know

what they are. According to the Roper report of 2002, just 12% of Americans could pass a basic quiz on energy concerns. In their opinion, this type of "energy illiteracy means that Americans are less likely to make energy smart decisions about their homes, transportation and workplaces. Energy illiteracy also keeps us dependent on foreign oil" (NEETF & Roper ASW, 2002, p. v).

Principle II: People Influence Natural Systems (Questions: 4, 8, and 10)

Question four asks the respondent which of the following is not an endangered species of California. The majority of the participants, 63.4%, selected the correct answer, D: California Quail. Surprisingly, the second highest pick, with 22% responding, was C: Delhi Sands Flower Loving Fly. This is the only fly that is considered to be an endangered species. It's native habitat is located within the Inland Empire in the same location as the study's high school. The Xerces Society for Invertebrate Conservation considers the Delhi Sands Fly to be a flagship for the whole Delhi Sands Dune habitat. Constant land development in the region has nearly caused the extinction of both the fly and its distinct bioregion (The Xerces Society, n.d.). Knowledge of the local flora and fauna as well as environmental issues would be needed

to support the effective teaching method of place-based education as described in the literature review. So rather than focusing on the endangered species of another continent, students can learn to appreciate the extreme biodiversity of their local region.

Question 8 examines correct examples of drought-tolerant landscaping. Knowledge of this concept is important, as California has been experiencing a drought for the past three years. The local climate zone and soil of the selected school site is best suited for drought tolerant plants. The correct response to the question, "What is not an example of drought-tolerant landscaping?", is A: using fertilizer. Twenty-five or 61% of the respondents answered the question correctly. The second most popular selection, was thinning plant beds, with 29.3% responding. The California Integrated Waste Management Board provides information on how to properly xeriscape for efficient water use (CIWMB, 2003).

Question 10 asks the participant to correctly select the definition of an invasive exotic plant. The correct response is A: did not exist in the native landscape prior to European contact. This was the top response, with 58.5% answering correctly. Currently, invasive plant species are a notable problem in California. According to the

California Invasive Plant Council the estimated cost for control, monitoring and outreach for the problem is $82 million a year (CAL-IPC, 2009). The council reports that "invasive plants increase wildfire potential, reduce water resources, accelerate erosion and flooding, threaten wildlife, degrade range, crop and timberland, and diminish outdoor recreation opportunities" (CAL-IPC, 2009, ¶ 1). Sharing this knowledge with students would improve their understanding of the fragility of some ecosystems and the sometimes detrimental impact of human activities upon these natural systems.

Principle IV: There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing between Systems (Questions: 3, 5, and 6)

Question three asks about the regulations placed upon carrying the USDA organic label. Seventy point seven percent of the participants answered correctly with D: all of the above. Produce bearing the USDA organic label cannot be subject to synthetic pesticides, genetic engineering or irradiation according to the United States Department of Agriculture (North Carolina Cooperative Extension, n.d.). By purchasing organic foods, consumers support the use of more environmentally friendly farming methods that reduce the amount of toxins in our air, water, soil and in turn food supply (Ecology Center, n.d.)

Questions five and six concern the local environmental issue of per chlorate contamination of the city's aquifer. Respondents needed to know the source of the contaminant and its possible health effects on the local population. Forty-three point nine percent of the participants knew that the perchlorates came from rocket fuel while only 22% were aware that this contamination has been linked to Attention Deficit Disorder, learning disabilities and decreased IQ (Jahagirdar, 2006). This has been a much reported health issue and economic hardship to the city and its inhabitants. Teachers need to be aware of such important local issues, especially as they concern the learning abilities of their students. Educating the students about this issue gives true relevance to Principle IV.

Principle V: Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors (Questions: 9 and 12)

Most of our students will become part of the voting population and so a sufficient understanding of factors that impact the decision making processes in regards to resources and natural systems is important to their education on local, state and national policies. Question 9 concerns a social justice issue as it links to the environment. These disparities between the varying levels

of socioeconomic groups exist between people and the natural and built environments. The issue in question 9 relates to the lack of safe open spaces in parks and schools, particularly in communities of color and low income and how it increases the likelihood of childhood obesity (Garcia, Flores, & Chang, 2004). Sixty-three point four percent of the respondents were correct in their response, while 31.4% did not see it as being correlated to any of the choices. Environmental justice is defined as the "belief that all citizens, regardless of ethnicity or socioeconomic class, should equally share in the benefits of environmental amenities and the burdens of environmental health hazards" (Department of Environmental and Occupational Health Sciences, 2009, ¶ 1). Exploration of similar local environmental justice issues could encourage the development of critical thinking skills within our students.

Question 12 tests the respondents' knowledge of the No Child Left Inside legislation. Seventy-eight percent of the respondents selected the correct response that its purpose is to strengthen and expand environmental education in America's classrooms and reconnect children with nature. It is important that as educators, we strive

to keep abreast of legislation that will ultimately impact what we teach in the classroom.

Results of Participant Environmental Education Attitudes

This section will focus upon an assessment of general attitudes and concerns of the participating staff regarding their teaching as it relates to environmental education. Results have been summarized in Table 5.

Table 5. Environmental Education Attitudes of Participants

Statement	SA	A	A/MR	D	SD
EE is an important curriculum to teach in southern California	22 53%	16 39	2 4.9%	1 2.4%	0 0.0%
Environmental education can provide valuable life skills.	19 46.3%	18 43.9%	4 9.8%	0 0.0%	0 0.0%
Quality environmental education directly affects consumer use and consumption of natural resources.	17 41.5%	16 39%	7 17.15	1 2.4%	0 0.0%
Students at our school are knowledgeable about specific ways to conserve resources.	1 2.4%	17 41.5%	19 46.3%	4 9.8%	0 0.0%
Education is the best way to help change behavior.	20 48.8%	11 26.8%	8 19.5%	2 4.9%	0 0.0%
Environmental education is promoted within the district that I teach.	0 0.0%	2 4.9%	13 31.7%	20 48.8%	6 14.6
Teacher training in environmental education related curriculum would be valuable to me.	7 17.1%	16 39%	15 36.6%	3 7.3%	0 0.0%

Statement	SA	A	A/MR	D	SD
I believe that teaching environmental education to high school students is important.	18 43.9%	17 41.5%	6 14.6%	0 0.0%	0 0.0%
I believe it is important to integrate environmental concepts and issues into my teaching.	11 26.8%	14 34.1%	12 29.3%	4 9.8%	0 0.0%
Time prohibits me from introducing new material into my curriculum.	10 24.4%	11 26.8%	12 29.3%	6 14.6%	2 4.9%
I am knowledgeable about local and national environmental issues.	3 7.3%	7 17.1%	19 46.3%	8 19.5%	4 9.8%
I am knowledgeable in specific behaviors that promote resource conservation.	2 4.9%	11 26.8%	21 51.2%	4 9.8%	3 7.3%
I would feel comfortable in teaching a short unit on environmental education if given materials that fit my curricular area.	10 24.4%	20 48.8%	6 14.6%	1 2.4%	4 9.8%
I would feel comfortable in teaching my class outdoors.	16 39%	13 31.7%	9 22%	2 4.9%	1 2.4%
Interested in creating an interdisciplinary curriculum guide for use with an outdoor workspace.	6 14.6%	16 39%	10 24.4%	6 14.6%	3 7.3%

Discussion of Participant Environmental Education Attitudes

In order for teachers to integrate environmental concepts into their respective curriculums, it is important to first analyze their beliefs, values and attitudes about EE. This would provide the EE program

developers and the school administrators greater information from which to facilitate staff in-services and provide needed teacher support. Such practices have been proven to foster teacher buy-in which is a proven pre-requisite to the successful adoption and use of any new educational model or pedagogy (Turnbull, 2002; Datnow & Castellano, 2000). Unfortunately the top down approach is typically utilized and the inclusion of new programs or technologies is poorly incorporated into the teacher's syllabus. The purpose of this second section was to assess the general attitudes and concerns of teachers regarding environmental education and its inclusion into the curriculum. From the results it is the researcher's objective to evaluate teacher readiness and willingness to include environmental concepts within their disciplines.

The fifteen questions in this section were grouped by the following themes: the teacher's perceived value of EE and its ability to motivate environmentally responsible behavior (ERB); the teacher's perception of the need for EE at the school site; perceived district support of EE; the teacher's confidence and willingness to teach environmental concepts within their classroom; the teacher's desire to acquire training in EE; and the teacher's support of the outdoor workspace.

Teacher's Perceived Value of Environmental Education and Connection to Environmentally Responsible Behavior

As evidenced in Table 5, 92% of the staff believed that environmental education is an important curriculum to teach in southern California. This percentage mirrors the results of the 2005 NEETF report (Coyle, 2005). Ninety percent of the staff participants believe that environmental education can provide valuable life skills and a full 81% agree that quality environmental education directly affects consumer use and consumption of natural resources. This is higher than the teacher perception of 76% that education is the best way to help change behavior. Twenty percent of the staff agreed with minor reservations, while 5% disagreed with this concept. As evident in Figure 2, 85% still believe that teaching environmental education to high school students is important. Just 15% agreed with minor reservations.

The results for this section were very encouraging. If a teacher deems the subject matter to be valuable and believes that it should be taught at their level, it has a greater chance of being received by the staff and by the students. Teachers that believe in the curriculum are more motivated to teach it (Krebs, 2008). Motivated teachers

tend to inspire students better than those that question the integrity and value of the subject matter.

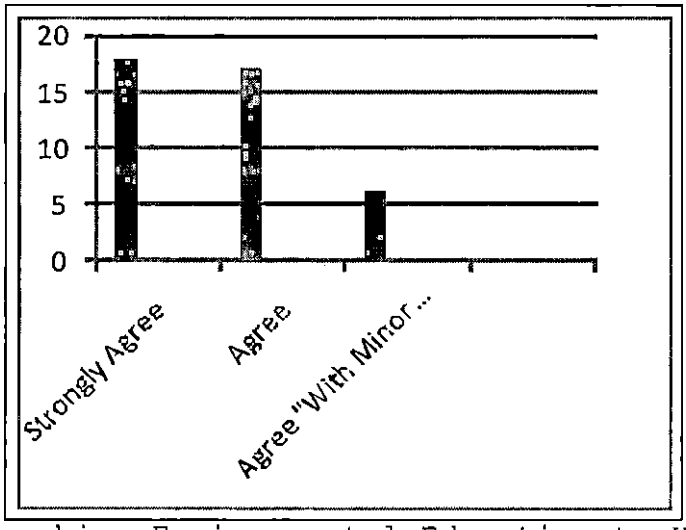


Figure 1. Teaching Environmental Education to High School Students is Important

Teacher's Perceived Need for Environmental Education at the School Site

In response to the statement, "students at our school are knowledgeable about specific ways to conserve resources," 42% agreed with minor reservations while 56% disagreed with this statement. Only 2% believed that the students were competent in this concept. Since the majority of the staff believes that teaching EE to high school students is important, this supports the staff's perceived need for EE to be included as a valid curriculum for their students.

Perceived District Support for Environmental Education

An evaluation of the WCEE survey reported evidence that correlated the importance of district support to the success of EE being fully integrated at the school sites (Lane et al., 1994). Currently 63% of the staff participants do not believe that the district promotes environmental education. Thirty-two percent believes that the district promotes EE with minor reservations. As the researcher of this survey only included one statement in regards to district promotion, this would be an area requiring greater research. Support from the district would definitely promote the cause of EE inclusion at the school site.

Teacher's Perceived Skill Level and Willingness to Teach Environmental Education

Though the majority of the teachers believe that EE is a worthwhile subject to teach to high school students, only 61% believe it is important to integrate environmental concepts and issues into their teaching. Twenty-nine percent agreed with minor reservations while 10% disagreed with the statement. This attitude could be called "not in my curriculum" (NIMC). The second statement addresses a common barrier to integrating EE concepts. Fifty-one percent of the staff believed that time would

prohibit them from introducing new material into their curriculum. Twenty-nine percent of the participating staff agreed with minor reservations while only 20% disagreed with the statement. This perception could be rectified provided that the marketing of EE integration is done effectively. Teachers at the site need to be informed that the Model Curriculum is being designed to fit with teacher's existing lesson plans without increasing instructional content. This was done in response to the results from the 10,000 Educator Needs Assessment (CAL-EPA, 2009).

The majority of the participating staff members do not exude over confidence in the area of being knowledgeable about local and national environmental issues. Twenty-four percent agreed with the statement, 46% agreed with minor reservations and 29% disagreed. Since 52% passed the environmental knowledge section of the assessment, this is a fairly valid perception of their EE aptitude. However, this is a matter that can be improved with staff training in EE, of which 56% perceive to be personally valuable and 37% would agree to with minor reservations. Only 7% of the tested staff were resistant to the idea of EE staff training as being of value to them. Perceived teacher knowledge in specific behaviors

that promote resource conservation was high. Thirty-two percent agreed with the statement; 51% agreed with minor reservations and 17% believed that they lacked competency in this area. Many teachers realize that good teaching strategies can be applied to any concept and so feel confident in their pedagogical skills.

When asked if they would feel comfortable in teaching a short unit on environmental education if given materials that fit their curricular area, 73% agreed and 15% agreed with minor reservations. Only 11% would not feel comfortable teaching EE in their curriculum if given the materials. This represents a low percentage and so is an encouraging result.

Teacher Support of the Outdoor Workspace

The Conservation and Renewable Energy Club (CARE) under the auspices of the researcher, constructed an outdoor work space that promotes xeriscaping, habitat for pollinators, native plants, and health with a meditation labyrinth. The site was especially designed to promote field studies or outdoor learning for all curriculums. The final two questions were designed to assess support for this project.

When asked if they would feel comfortable in teaching their class outdoors, 71% of participating staff agreed,

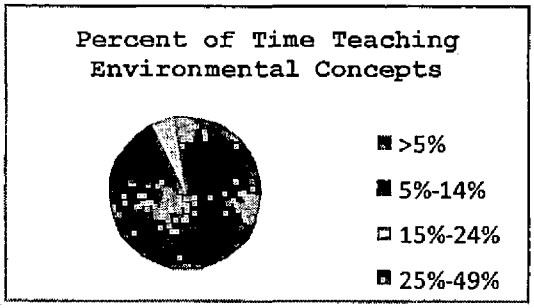
22% agreed with minor reservations and 7% disagreed. Learning that 38 staff members could be encouraged to use the site is very encouraging news and validates the effort of the projects. Staff was also asked if they would be interested in providing input toward creating an interdisciplinary curriculum guide for use with the outdoor workspace. Fifty-four percent agreed, 24% agreed with minor reservations and 22% would not be interested. The results for this question will initiate meetings with interested staff members over the course of the next year. Teacher buy-in is always an asset to the success of any school project.

Results of Current Teaching Practices in Environmental Education Practices of Participants

Table 6. Current Teacher Practices In Environmental Education Questions 1-7

Statement	SA	A	A/MR	D	SD
Environmental education can be taught within most any curriculum.	10 24.4%	19 46.3%	10 24.4%	2 4.9%	0 0.0%
I am not interested in teaching about the environment.	1 2.4%	3 7.3%	3 7.3%	19 46.3%	15 36.6%
I only teach what is included in the state standards for my curricular area.	3 4.9%	9 22%	9 19.5%	12 29.3%	10 24.4%

Statement	SA	A	A/MR	D	SD
I am effective at infusing the study of environmental concepts and issues into my subject.	0 0.0%	4 9.8%	13 31.7%	18 43.9%	6 14.6%
A goal of my teaching is to increase students' level of environmental responsibility.	0 0.0%	5 12.2%	14 34.1%	16 39%	6 14.6%
I provide students with opportunities to gain actual experience in resolving environmental issues.	0 0.0%	3 4.9%	8 19.5%	17 41.5%	14 34.1%
I help students develop a set of values and feelings of concern for the environment through some of the activities that I assign.	1 2.4%	4 9.8%	11 26.8%	16 39%	9 22%



a. less than 5% 32(78%)
b. 5% to 14% 6(14.6%)
c. 15% to 24% 2(4.9%)
d. 25% to 49% 1(2.4%)

Figure 2. Time Spent on Environmental Concepts

Table 7. Methods Used to Teach Environmental Concepts

Method	Frequency of Users	Percent of Users
Cooperative learning	10	24.4%
Environmental issue Investigations	5	12.2%
Data gathering and Analysis	4	9.8%
Experiments	2	4.9%
Outdoor teaching	3	7.3%
Guided discovery	7	17.1%
Role playing	2	4.9%
Problem-solving	10	24.4%
Observations (field trips, demonstrations, guest speakers)	4	9.8%
Art or Music	7	17.1%
Case Studies	3	7.3%
Lectures	20	48.8%
Audiovisuals	12	29.3%
Computer-oriented	3	7.3%
Self-directed Learning	9	22%

Note: Question 9. Please circle all of the methods that you currently use to teach any environmental education concepts

Discussion of Current Teaching Practices in Environmental Education Practices of Participants

The development of environmentally responsible behavior is a component of environmental literacy. It has been found that a sound environmental curriculum that is only knowledge based will not provide the opportunities to develop environmental sensitivity or the skills necessary to engender the desired behavioral changes that foster

responsible citizenship behavior (Hungerford & Volk, 1991).

The purpose of this section was to assess information regarding ways that teachers currently infuse environmental education into their curriculum. It also continued to assess feelings that might influence their practices. The majority of teachers surveyed (71%) believed that environmental education can be infused into most curriculums and a full 83% reported that they are interested in teaching about the environment. This is similar to the Wisconsin study in that 69% of those teachers currently infuse EE concepts into their curriculum while 80% agreed that EE should be a priority in the schools (WCEE, 1997).

Just 27% of the participants stressed that they only teach what is included in the state standards for their curricular area. That EE concepts do not relate to the teacher's curricular area was listed as a barrier to infusing EE concepts by 25% of the teachers in the Wisconsin survey. However, this will not be a huge concern for California teachers as the EEI Model Curriculum is written to support current state standards within the core curriculum. A good proportion of the staff (54%) were open to teaching concepts outside of their curriculum, while

20% agreed that they taught only their state standards with minor reservations. This group is possibly flexible to trying new concepts.

As only two teachers had received any formal training or education in EE concepts, it was not surprising to learn that 59% did not feel effective at infusing the study of environmental concepts and issues into their subjects. Of the remaining participants, 32% agreed with minor reservations and 10% agreed that they were effective at meeting this competency. In the WCEE assessment, 24% of the educators listed a lack of EE knowledge and teaching methods as a reason for not teaching EE concepts. This is another concern area that can be rectified with teacher in-services, access to curricular resources and time to prepare.

Since teachers are not under any state mandates to include EE concepts in their teaching, the results for increasing students' level of environmentally responsible behavior were not unanticipated. The majority of the staff, 54% do not see this as a curricular goal. Support for providing students with opportunities to gain actual experience in resolving environmental issues was also low, with 76% not supporting this EE strategy. Of the WCEE educators that practice EE integration, 88% provide these

experiences and 90% see the development of environmentally responsible students as a goal. The results also evidenced a difference in supporting student development of values and feelings of concern for the environment through class activities. Results from this study indicate that 61% of staff do not help students with this objective as opposed to 96% of the WCEE educators that currently practice EE concept integration.

Teachers were asked to identify what percent of their time was currently spent on teaching EE concepts. This study and the WCEE reported similar results. Of the participants from the current study, 93% spent less than 14% of class time on EE concepts with 78% of that number spending less than 5% on the subject matter. As indicated by the WCEE study, 77% of teachers spent less than 14% of class time on teaching environmental concepts.

As with the Wisconsin survey, teachers for this survey were asked to identify which methods they use to teach environmental concepts. The chosen methods were similar in both studies although the Wisconsin teachers used them with a greater frequency. For this study, teacher preferences for the top four methods were lectures (49%); audio-visuals (29.3%); cooperative learning (24%); and problem-solving (24%). For the WCEE study, teacher

preferences were observations (81%); audiovisuals (69%); lectures (68%); and problem-solving (66%). Teachers tend to be more familiar with these methods and so probably have a greater confidence in using them to teach the curriculum.

Two of the preferred EE models of curriculum, EIC and Place Based learning focus on the constructivist methods of student-centered learning and experiential teaching within the local context. Since the teachers in this study tended to prefer the use of lectures and audio-visuals, training in these processes would be essential in order to encourage the successful implementation of EE. Enabling students with the skills necessary to investigate and problem solve local environmental issues would aid in reducing the disconnect from nature that urban children today tend to exemplify. With local, district and administrative support, teachers could nurture students' sense of place and connectedness to their present environment. This would in turn develop our students' commitment to being more environmentally responsible citizens.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Our students will be the recipient stewards of this planet and its resources. Consequently, they will need to be equipped with the appropriate knowledge, values and skills in order to effectively resolve ecological problems while learning to satisfactorily maintain a sustainable lifestyle. Today's educators will need to model this environmentally responsible behavior before they can effectively facilitate student learning of environmental literacy. The purpose of this study was to initiate an exploratory assessment of the teacher knowledge, values and environmental education practices at a local urban high school to gain a general perception of a staff's readiness to yet embrace another teacher certification requirement.

In order to teach English and Math across the curriculum, the state of California requires every teacher to pass the California Basic Educational Skills Test (CBEST). In order to teach a diverse population of learners, California teachers are required to attain a Crosscultural Language and Academic Development (CLAD)

Authorization or Bilingual Crosscultural Language and Academic Development (BCLAD) authorization. These mandates were created in order to certify qualified teachers, proficient in meeting the needs of the general population.

Likewise, if it is the goal of our state and country to develop environmentally literate citizens, than teachers will need to be the first to exemplify this expectation. Credentialed teachers that have not been required to take an EE prerequisite may need to receive remedial in-servicing in order to meet this competency.

Unfortunately, unless training is required to maintain the status of valid certification as in the case of CLAD and BCLAD training, the success of this goal may go unmet. It is the researcher's experience of 20+ years in the profession that without this fiscal threat, the expectation for a competent skill level will go unsatisfied. Wisconsin studies prove the point (Lane & Wilke, 1996). It is only human nature to limit activity to what is required of the worker in order to achieve the expectations that job security demands.

Teachers, however, from this study report that they are interested in receiving EE training and the majority indicate that they would integrate EE concepts into their current curriculums if it supported their standards. Yet,

what people do is not always consistent with what they say they value. Personal motivations can call into question the integrity of our value statements. In the end it is what we give time and energy to that delineates our true priorities and lends integrity to our convictions.

Limitations of Study Design and Procedures

There were some limitations of this study. This study represented a small sample size which limits its generizability. For the purpose of this study, the researcher's current teaching site was selected. A more representative and larger sample would need to be obtained from high schools of various districts within the Inland Empire in order to provide a broader understanding of teacher knowledge, attitudes and practices of EE. It would also be useful to compare districts that support an EE curriculum to those districts that don't.

Reasons for Optimism

The findings show that although overall teacher knowledge in environmental concepts was poor, the teachers perceive a need for environmental education to be offered at the high school. The majority of the sample are also open to receiving teacher training in EE as long as it can be linked to the standards of their curriculum. A

supportive district administration that can promote and facilitate staff acquisition of effective EE pedagogical processes would encourage the progress of increased implementation of EE concepts across the curriculum while engaging students in more experiential methods of learning.

The majority of the surveyed staff were supportive of the desert habitat. Teachers were generally receptive to teaching their students in an outdoor setting. Being provided the additional resource of an out of classroom learning opportunity was viewed positively. A follow-up survey will be issued which specifically addresses teacher involvement and curriculum development for the xeriscaped habitat and meditation labyrinth.

Future Research and Recommendations

In order to present a greater understanding of current teacher attitudes and practices, it would be beneficial to conduct observations and interviews. It would also be useful to survey teacher needs and concerns for future EE related in-services and development of curricular resources in regards to the outdoor workspace.

A survey of district and administrative goals in relation to EE implementation at the high school would be

essential in predicting whether EE would be appropriately supported. Ultimately it will require the harmonious teamwork of the district, high school administration and teaching staff to promote a learning atmosphere able to sustain the goals and objectives initially established during the Tbilisi Conference of 1977 of which have been progressively reinterpreted over the past 30+ years.

APPENDIX A

THE GOALS, OBJECTIVES, AND PRINCIPLES OF THE TBILISI CONFERENCE

The Goals, Objectives & Principles of the Tbilisi Conference

The goals of environmental education are:

1. To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;

2. To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;

3. To create new patterns of behavior of individuals, groups and society as a whole towards the environment.

The categories of environmental education objectives are:

> **Awareness**: to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.
>
> **Knowledge**: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.
>
> **Attitudes**: to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.
>
> **Skills**: to help social groups and individuals Acquire the skills for identifying and solving Environmental problems.
>
> **Participation**: to provide social groups and Individuals with an opportunity to be actively involved at all levels in working towards Resolution of environmental problems (*Tibilisi Declaration*, 1978, p. 3)

The guiding principles of environmental education should:

1. Consider the environment in its totality - natural and built, technological and social (economic, political, cultural-historical, moral, esthetic);

2. Be a continuous lifelong process, beginning at the pre-school level and continuing through all formal and non-formal stages;

3. Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;

4. Examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions into other geographical areas;

5. Focus on current and potential environmental situations while taking into account the historical perspective;

6. Promote the value and necessity of local, national and international cooperation in the prevention and solution of environmental problems;

7. Explicitly consider environmental aspect in plans for development and growth;

8. Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;

9. Relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;

10. Help learners discover the symptoms and real causes of environmental problems;

11. Emphasize the complexity of environmental problems and thus the need to develop critical thinking an problem-solving skills;

12. Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical civilities and first-hand experience.

The Tbilisi Declaration
Intergovernmental Conference of Environment Education
October 14-26, 1977

APPENDIX B

GOALS FOR CURRICULUM DEVELOPMENT IN ENVIRONMENTAL EDUCATION

Goals for Curriculum Development in Environmental Education
(Hungerford, Peyton & Wilke, 1980)

The Superordinate Goal:...to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level I. Ecological Foundations Level

This level seeks to provide the receiver with sufficient ecological foundations knowledge to permit him/her to eventually make ecologically sound decisions with respect to environmental issues.

The Ecological Foundations Level would minimally include the following conceptual components:

A. Individuals and populations.
B. Interactions and interdependence.
C. Environmental influences and limiting factors.
D. Energy flow and materials cycling (biogeochemical cycling).
E. the community and ecosystem concepts.
F. Homeostasis.
G. Succession.
H. Man as an ecosystem component.
I. the ecological implications of man's activities and his communities.

Level II. Conceptual Awareness Level-Issues and Values

This level seeks to guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment and, also, how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, design making, and finally, citizenship action.

Goals at this level are formulated to provide opportunities for receivers to conceptualize:

A. how man's cultural activities (e.g., religious, economic, political, social, etc.) influence the Environment from an ecological perspective.
B. how individual behaviors impact on the environment from an ecological perspective.
C. a wide variety of environmental issues and the ecological and cultural implications of these issues.

D. the viable alternative solutions available for remediating discrete environmental issues and the ecological and cultural implications of these alternative solutions.
E. the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.
F. the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making.
G. the need for responsible citizenship action (e.g., persuasion., consumerism, legal action, political action, ecomanagement) in the remediation of environmental issues.

Level III. Investigation and Evaluation Level

This level provides for the development of the knowledge and skills necessary to permit receivers to investigate environmental issues and evaluate alternative solutions for remediating these issues. Similarly, values are clarified with respect to these issues and alternative solutions. Goals at this level are presented in two components.

Component A: Goals for Component A are to develop in receivers:

A. the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and to synthesize the data gathered.
B. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
C. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.
D. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.
E. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.
F. the ability to evaluate, clarify, and change their own values positions in light of new information.

Component B: Goals for Component B are to provide receivers with opportunities to:

G. participate in environmental issue investigation and evaluation.
H. participate in the valuing process in a manner as to permit the receiver to evaluate the extent to which his/her values are consistent with the super ordinate goal of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment.

Level IV. Environmental Action Skills Level-Training and Application

This level seeks to guide the development of those skills necessary for receivers to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment. Goals at this level are presented in two components.

Component A: The goal for Component A is to develop in receivers:

A. those skills which will permit them to effectively work toward ends which are consistent with their values and take either individual or group action when appropriate, i.e., persuasion, consumerism, political action, legal action, or ecomanagement.

Component B: The goals for Component B are to provide receivers with opportunities to:

B. make decisions concerning environmental action strategies to be used with respect to particular environmental issues.
C. apply environmental action skills to specific issues, i.e., to take citizen action on one or more issues.
D. evaluate the actions taken with respect to their influence on achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of the environment.

APPENDIX C

CALIFORNIA'S ENVIRONMENTAL PRINCIPLES AND CONCEPTS

Education and the Environment Initiative
Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003) and
Assembly Bill 1721 (Pavley, Chapter 581, Statutes of 2005)

California's Environmental Principles & Concepts

The environmental principles examine the interactions and interdependence of human societies and natural systems. The nature of these interactions is summarized in the Environmental Principles and Concepts.

Principle I

People Depend on Natural Systems

The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services. As a basis for understanding this principle:

Concept a. Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept b. Students need to know that the ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept c. Students need to know that the quality, quantity and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

Principle II

People Influence Natural Systems

The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies. As a basis for understanding this principle:

Concept a. Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept b. Students need to know that methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept c. Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

Concept d. Students need to know that the legal, economic and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

Principle III

Natural Systems Change in Ways that People Benefit from and can Influence

Natural systems proceed through cycles that humans depend upon, benefit from and can alter. As a basis for understanding this principle:

Concept a. Students need to know that natural systems proceed through cycles and processes that are required for their functioning.

Concept b. Students need to know that human practices depend upon and benefit from the cycles and processes that operate within natural systems.

Concept c. students need to know that human practices can alter the cycles and processes that operate within natural systems.

Principle IV

There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing between Systems

The exchange of matter between natural systems and human societies affects the long-term functioning of both. As a basis for understanding this principle:

Concept a. Students need to know that the effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.

Concept b. Students need to know that the byproducts of human activity are not readily prevented from entering natural systems and may beneficial, neutral, or detrimental in their effect.

Concept c. Students need to know that the capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

Principle V

Decisions Affecting Resources and Natural systems are Complex and Involve Many Factors

Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. As a basis for understanding this principle:

Concept a. Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Concept b. Students need to know the process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.

APPENDIX D

INFORMED CONSENT FORM

Letter of Informed Consent

Dear Educator:

My name is Joye Cantrell and I am currently a student at California State University San Bernardino in the Masters Program in Environmental Education. You are being asked to participate in a survey that will assist me in fulfilling my graduate thesis. This study has been approved by the California State University, San Bernardino, Institutional Review Board Committee. This particular survey is being administered to gain important information about what teachers know about current environmental concerns, teacher attitudes about teaching environmental education within their discipline and current practices of teachers engaged in teaching environmental education within their instruction. The attached survey will provide needed information for maximizing the outdoor wildlife habitat and meditation labyrinth for teacher and student learning of related environmental concepts.

The data obtained from this survey will be used as a constructive guide for developing appropriate and relevant curriculum, and all responses will be confidential and anonymous. There are no foreseeable risks to the participant of this survey. Your participation and completion of all parts of this survey is voluntary. If you choose to participate, please fill out the survey as completely as possible by responding to the questions as directed. If you do not wish to answer a question, please leave the response section blank and proceed to the following question. The survey should only take 8 to 12 minutes of your time.

Upon completion of this survey, please return the printed survey to my mail box or leave in the labeled manila folder with your academy's secretary. Those that are returned your academy's secretary will be collected one week from today. You will also have the option of forwarding your completed survey via the email. It would be greatly appreciated if the surveys are completed in a timely manner and returned to me as soon as possible. If you have any questions please feel free to contact me, Joye Cantrell at the following e-mail address: jcantrel@rialto.k12.ca.us. Thank you for your cooperation and the valuable information you are providing in this survey.

Sincerely,

Joye Cantrell
California State University San Bernardino
Masters' Student

APPENDIX E

SURVEY

Teachers' Perceptions of Environmental Education at Rialto High School

The purpose of this survey is to assess teachers' general knowledge of environmental education (EE) concerns and issues, teacher attitudes about teaching EE, and current teacher practices of including EE within their curriculum. Your responses to the questions in this survey will provide the researcher with information to support sustainability and maximum usage of an onsite wildlife habitat and meditation labyrinth. Your participation in this survey is voluntary, and all information will be kept anonymous and confidential. Thank you for your time and participation!

Survey

Section I: Your Environmental Knowledge

This section covers both local and national issues of environmental concern. For each question, please circle the response that you believe to be correct.

1. Which plants are not dependent on pollination from animals?
   A. fruits
   B. vegetables
   C. cereals
   D. stimulants like coffee and tea

2. Insects, birds and mammals pollinate...
   A. ¼ of our food crops
   B. ⅓ of our food crops
   C. ⅔ of our food crops
   D. all of our food crops

3. To carry the USDA organic label, produce cannot be subject to:
   A. synthetic pesticides
   B. genetic engineering
   C. irradiation
   D. all of the above

4. Which of the following is not an endangered species of California?
   A. California condor
   B. Catalina Island Fox
   C. Delhi Sands Flower Loving Fly
   D. California Quail

5. Rialto's aquifer was polluted by perchlorates from...

   A. rocket fuel
   B. cement plant waste
   C. agricultural run-off
   D. pesticides

6. Studies have shown that high levels of perchlorate can cause health effects with conditions like...

   A. attention deficit disorder
   B. learning disabilities
   C. decreased IQ
   D. all of the above

7. What percentage of the world's fresh water supply comes from groundwater?

   A. 30%
   B. 55%
   C. 70%
   D. 90%

8. What is not an example of drought-tolerant landscaping?

   A. using fertilizer
   B. using native plants
   C. using mulch
   D. thinning dense plant beds

9. A lack of safe open spaces in parks and schools, particularly in communities of color and low income is considered a social justice issue that...

   A. leads to reduced levels of school drop out
   B. increases the likelihood of childhood obesity
   C. reduces crime
   D. none of the above

10. An invasive exotic plant is considered to be a plant that...

    A. did not exist in the native landscape prior to European contact
    B. does not grow well in the local ecosystem
    C. uses too much water
    D. is a weed and so undesirable for landscaping

11. What is the proper ranking of renewable energy sources in the USA by order of their Use from greatest to least?

    A. wind, solar, geothermal, hydropower, biomass
    B. solar, hydropower, biomass, wind, geothermal
    C. coal, oil, gas, nuclear
    D. biomass, hydropower, geothermal, wind, solar

12. 'No Child Left Inside' is legislation that seeks to…

    A. take standardized testing outdoors
    B. increase playgrounds
    C. strengthen and expand environmental education in America's classrooms and reconnect children with nature
    D. cure the issue of childhood obesity

Section II: Environmental Education Attitudes

The purpose of this section is to assess general attitudes and concerns regarding your teaching as it relates to environmental education (EE). For questions 1-15, use the following key to indicate your opinion. Please circle only one number.

5 = Strongly Agree
4 = Agree
3 = Agree with minor reservations
2 = Disagree
1 = Strongly Disagree

1. Environmental education is an important curriculum to teach in Southern California.

   5 4 3 2 1

2. Environmental education can provide valuable life skills.

   5 4 3 2 1

3. Quality environmental education directly affects consumer use and consumption of natural resources.

   5 4 3 2 1

4. Students at our school are knowledgeable about specific ways to conserve resources.

   5 4 3 2 1

5. Education is the best way to help change behavior.

   5 4 3 2 1

6. Environmental education is promoted within the district that I teach.

   5 4 3 2 1

7. Teacher training in environmental education related curriculum would be valuable to me.

   5 4 3 2 1

8. I believe that teaching environmental education to high school students is important.

   5 4 3 2 1

9. I believe it is important to integrate environmental concepts and issues into my teaching.

   5 4 3 2 1

10. Time prohibits me from introducing new material into my curriculum.

    5 4 3 2 1

11. I am knowledgeable about local and national environmental issues.

    5 4 3 2 1

12. I am knowledgeable in specific behaviors that promote resource conservation.

    5 4 3 2 1

13. I would feel comfortable teaching a short unit on environmental education if given materials that fit my curricular area.

    5 4 3 2 1

14. I would feel comfortable in teaching my class outdoors.

    5 4 3 2 1

15. I would be interested in providing input toward creating an interdisciplinary curriculum guide for use with an outdoor workspace.

    5 4 3 2 1

Section III. Current Teacher Practices in Environmental Education

The purpose of this section is to assess information regarding ways that you currently infuse environmental education into your curriculum. For questions 1-15, use the following key to indicate your opinion. Please circle only one number.

5 = Strongly Agree
4 = Agree
3 = Agree with minor reservations
2 = Disagree
1 = Strongly Disagree

1. Environmental education can be taught within most any curriculum.

   5 4 3 2 1

2. I am not interested in teaching about the environment.

   5 4 3 2 1

3. I only teach what is included in the state standards for my curricular area.

   5 4 3 2 1

4. I am effective at infusing the study of environmental concepts and issues into my subject.

   5 4 3 2 1

5. A goal of my teaching is to increase students' level of environmental responsibility.

   5 4 3 2 1

6. I provide students with opportunities to gain actual experience in resolving environmental issues.

   5 4 3 2 1

7. I help students develop a set of values and feelings of concern for the environment through some of the activities that I assign.

   5 4 3 2 1

For questions 8 and 9, choose the answer that best fits your teaching situation.

8. What percentage of your instructional time includes infusion of environmental Concepts?

   a. Less than 5%
   b. 5% to 14%
   c. 15% to 24%
   d. 25% to 49%
   e. 50% or more

9. For this question, please circle all of the methods that you currently use to teach any environmental education concepts.

   A. cooperative learning
   B. environmental issue investigations
   C. data gathering and analysis
   D. experiments
   E. outdoor teaching strategies
   F. guided discovery
   G. role playing
   H. problem-solving
   I. observations (field trips, demonstrations, guest speakers)
   J. art or music
   K. case studies
   L. lectures
   M. audiovisuals
   N. computer-oriented activities
   O. Self-directed learning

Section IV. General Information

The purpose of this section is collect general demographic information.

For all questions that require a Yes or No response, please circle one.
For all other questions, please circle the correct descriptor.

1. What is your gender?

   A. male B. female

2. How many years have you been teaching in your current district:

   A. 1 to 5 years
   B. 6 to 10 years
   C. 11 to 15 years
   D. 16 to 20 years
   E. 21 to 25 years
   F. over 25 years

3. In total, how many years have you been teaching?

   A. 1 to 5 years
   B. 6 to 10 years
   C. 11 to 15 years
   D. 16 to 20 years
   E. 21 to 25 years
   F. over 25 years(congrats!)

4. Have you received teacher education or training in environmental education?

   A. yes B. no

5. What subject or type of class do you teach? Please circle only one.

   A. English & Language Arts
   B. History & Social Studies
   C. Math
   D. Science
   E. Career Technical Education & ROP
   F. Visual and Performing Arts
   G. Physical Education
   H. Health
   I. Foreign Language
   K. ROTC
   L. Special Education
   M. AVID
   N. ELD

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY!

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