

Global Possibilities'

East and Midwest Regional Conference

For a Solar Future

“Design Education, Climate Change,  
And Sustainability: A Prototype for Developing  
Green Curriculum”

*Summary Report*

**GLOBAL POSSIBILITIES • October 1, 1999 • THE EARTH GROUP**

presented at the

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Ball State University

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# **DESIGN EDUCATION, CLIMATE CHANGE, AND SUSTAINABILITY: A PROTOTYPE FOR DEVELOPING GREEN CURRICULUM**

**Ball State University, Muncie, Indiana – October 1, 1999**  
**GREENING OF THE CAMPUS III: Theory and Reality**

Introduction and Background by Jean Gardner, The Earth Group

## **The National Sustainable Design Education Initiative**

In order to make the transition from a fossil fuel based economy to one using renewables, and thus reduce the damaging effects of global climate change, Global Possibilities and The Earth Group believe that the education of architects, landscapers, urban planners, and product designers is a key factor. Sound scientific and economic analysis shows that current building practices alone use two-thirds of the energy consumed in the United States, thus causing one quarter to one third of the carbon dioxide that produces global climate change. Consequently, we believe we can have the greatest impact in mitigating climate variability in the shortest time if we start with those people responsible for designing the built environment. Our immediate objective is to develop design education strategies for a sustainable solar future.

Global Possibilities' first Symposium for a Solar Future was held at UC Santa Barbara in 1997 entitled "The Backburner Status of Solar". It was clear by the end of the symposium that the key to a less dependent society on non-renewable fossil fuel is education. Held on the eve of the Kyoto Climate Change Conference, we were all optimistic about emissions reductions. However, the reality of the results are that we are dealing with less than adequate reductions in greenhouse gases and these reductions will take years to ratify.

Policy makers and economists are not paying enough attention to the impacts of how much energy we use or waste, nor are they considering viable solutions. For this reason, we are appealing to educators to educate the designers of the future to the need for resource efficiency in the built environment and the use of renewables, especially the limitless energy of the sun. Our hope is to help create a world which sustains life for us, and our children, and our children's children.

On October 22, 1998, Global Possibilities, in collaboration with The Earth Group, held its Second Annual Symposium for a Solar Future, "Rethinking Design Curriculum: Integrating Solar Energy For A Sustainable Future" which brought together design educators from colleges and universities throughout the United States at the Cooper-Hewitt National Design Museum, Smithsonian Institute in New York City. The purpose of the symposium was to launch an educational initiative to evaluate the current teaching of design, identify problem areas and develop strategies for strengthening the teaching of sustainable design. This initiative includes the creation of an on-line, just-in-time, collaborative curriculum utilizing the internet.

On June 25, 1999, Global Possibilities and The Earth Group held the Southeast and MidAtlantic Regional Conference for a Solar Future in Washington, DC at the Smithsonian Institute. This first "regional conference" entitled "The Impact of Design Practices and Policy on Climate Variability - How Can Design Education and Policy Help Mitigate Climate Change?" brought together design and planning educators, policy makers and developers to discuss the urgency of climate change. Key topics of discussion at this conference examined the impacts on climate variability and potential vulnerability to future climate change, as well as strategies and approaches on how architecture and design can help to mitigate these stresses in the Southeast and Mid-Atlantic. The conference covered climate change issues in the states of Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North & South Carolina, Puerto Rico, Tennessee and Virginia.

Our long-term objectives for all our symposiums, conferences and workshops are to give the designers of the future an understanding of the social, economic, and ecological impacts of their profession and to provide a networked context in which alternative design practices for a sustainable society can be created and disseminated. In addition to a series of educational conferences on Regional Climate Change issues, Global Possibilities is planning conferences for real estate developers, urban planners, and educational briefings for television and film writers in an effort to get our important message into the mainstream through the use of the media.

## Acknowledgments

The workshop *Design Education, Climate Change, and Sustainability: A Prototype For Developing Green Curriculum* was developed by Global Possibilities and The Earth Group as the second in a series of Regional Conferences for a Solar Future.

A very special thanks to Paul Ryan, Director of Media at The Earth Group and creator of the Earthscore Notational System, who organized the ten questions for this discussion.

Thank you, also to Bob Koester and Ball State University for having the vision and comprehension of the need and urgency of the Greening of the Campus III: Theory and Reality conference.

Global Possibilities wishes to express deep appreciation toward the thoughtful input by the workshop participants at this conference who made possible this informative Summary Report.

This report was compiled, refined and edited by Casey Coates Danson and Carolyn Ward of Global Possibilities and Jean Gardner, The Earth Group.

## The Earthscore Methodology ©

The Earthscore Methodology organizes and guides the development of the National Sustainable Design Education Project initiated by Global Possibilities and The Earth Group. According to the creator of Earthscore, Professor Paul Ryan of the Graduate Media Studies Department at the New School University, New York City: “Developing a sustainable curriculum requires a method compatible with sustainability. *Earthscore* is such a method. This method combines semiotics and cybernetics into a coherent approach to learning to learn. Semiotics, or thinking in signs, provides comprehensive interdisciplinary understanding of whatever you are investigating. Cybernetics, or thinking in circuits, provides a self-correcting way of knowing. Combined as *The Earthscore Method*, these two ways of thinking have been used to create curriculum about sustainability. *The Earthscore Method* is generated from a single, original cybernetic circuit. This circuit can serve as a figure of regulation for organizing current curriculum content and our ignorance into informed thinking that can grow organically in support of sustainable societies. That is to say, the *Earthscore Method* supports learning to learn about living in ways that do not destroy the environment.”<sup>1</sup>

The Earthscore Methodology has five components:

1. Three Comprehensive Categories of Knowledge or Generic Skill Sets for Learning;
2. The Relational Circuit, a formal way to organize these categories;
3. A Process of Cooperative Learning regulated by the relational circuit;
4. A Semiotic System to coordinate interpretation of what you are learning;
5. Creative Envisioning or problem solving within the context of sustainability, based on the coordinated interpretation.

### ***Component 1: Three Comprehensive Categories of Knowledge or Generic Skill Sets for Learning***

Earthscore, and consequently, the National Sustainable Design Education Initiative, uses the comprehensive categories of knowledge developed by the American philosopher, Charles Peirce (1839-1914), who is acknowledged by scholars as the best American philosopher. For Peirce, knowledge comes in three basic categories: in non-technical terms, these categories are quality, fact, and pattern. These categories are also the three basic ways that we learn: by feeling quality, identifying fact, and recognizing pattern. “Peirce argued that by working with these categories, it is possible to determine, from our knowledge of some parts of what we are investigating, what other parts are missing, and to prevent arbitrary additions. Knowledge can grow organically, like the body of an animal. By thinking about sustainability using these categories we can develop a unified and comprehensive understanding of the ecology, and of ourselves in relation to the ecology. “

“The important thing about these categories of quality, fact, and pattern is that they are comprehensive. As we attempt to learn about sustainable society, we are confronted with ‘everything’. We need to make selections. If those selections are arbitrary, the final understanding can leave out significant aspects of the situation. Significant omissions can make our interpretation faulty. Faulty interpretation can result in failure to achieve sustainability. Peirce’s categories of quality, fact, and pattern are, in effect, a theory of everything. Using these comprehensive categories or generic skill sets, we can make selections that are responsible to ‘everything’.”

“The generic skill sets speak to the theme of lifelong learning, necessary in a sustainable society. Since we always already have these skills, they can be activated in any age group in any circumstance. These generic skills also speak to the questions of interdisciplinary curriculum. Each discipline can be approached based on these three basic categories. In science, the first skill set has to do with abduction, the second with induction and the third with deduction. In mathematics the first set has to do with intuitive sketches or diagrams of a problem, the second with measurement and the third with calculation.

In literature, the first skill set has to do with poetry, the second with descriptive prose and the third with reflective essays. In social studies the first has to do with prejudice, myth and ideologies, the second with facts and conflict and the third with law, governance, policy and practices.” In art and architecture, the first has to do with possibilities evoked, the second with factual concerns such as materials and utilitarian function, and the third with social, political, and economic contexts as well as ecological constraints.

### ***Component 2: The Relational Circuit, a Formal Way to Organize the Three Categories***

The second component of the Earthscore Methodology is a formal figure, called the relational circuit that organizes the three categories by giving each a position within the circuit. “The relational circuit is to the Earthscore System what the staff and bars are to classical music notation. ... For the purposes of sustainability, it is important that Earthscore is based on a circuit. To explain the importance of circuitry for sustainability, I will draw on the work of Gregory Bateson. ... The Greek word “cyber” means a steersman on a ship. How a steersman uses information from the wind and the water to control and correct his course is understood cybernetically in terms of differences that make differences. Differences in the angle of the wind make differences in how the steersman sets the tiller, which, in turn, make differences in the direc-

tion of the boat. Differences in the direction of the boat make differences in the angle of the wind, which, again, make differences in how the steersman sets the tiller and so on round the circuit. These circuits of differences enable the steersman to identify and eliminate error in the course of a ship. To say the same thing in another way, the steersman's understanding of differences enables him to guess, with better than random success, the best course to set for his ship."

"Cybernetics applies this sort of understanding to any phenomena that involves self-correction and self-organization. Bateson argues that our unsustainable life results from a mistake in the way we think. We have misidentified the unit of survival. We have thought it was our individual selves, our own kin, or tribe or nation or even our own species. But a species that destroys its environment destroys itself. Bateson argues that the unit of survival is a flexible species in a flexible environment."

"Bateson identifies the unit of survival with the unit of evolution. Essentially, he is saying that the plants and animals, which have evolved successfully, have been flexible groups of organisms in flexible environments, redwood trees along the northwest coast or coral reefs off Florida. In a sense, humans have tried to exempt themselves from this orthodoxy of evolution and thus have become a heretical species. We fail to recognize the patterns that connect us with the environment. We fail to live in terms of self regenerating circuits that would allow both us and our environment to thrive in a sustainable way."

"In terms of a curriculum for sustainability, we need to evolve units of mind-evolution-survival for students. That is to say, complete circuits of understanding that include students and their ecosystems using design, literature, science, mathematics, art, social studies, design, and whatever else we can find that will help track the circuits of differences that make differences for sustainability."

### ***Component 3: A Process of Cooperative Learning Regulated by the Relational Circuit***

The formal organization of the three generic learning skills or categories of knowledge according to the relational circuit allows you to create a pattern of cooperative behavior that can accelerate learning. Basically, this pattern amounts to each learner taking turns in the different positions in the relational circuit and behaving accordingly. For the purposes of the National Sustainable Design Education conferences that Global Possibilities and The Earth Group are holding, these different role relationships have been codified in the following Protocols for four participants, each of whom has the opportunity to play each role once. The first category of learning, Feeling Quality – underlies The Intuiting Role of Poetic Response; the second category, Identifying Fact – underlies The Reacting Role of Devil's Advocate; and the third role, Recognizing Pattern – underlies the Mediating Role of Seeing the Big Picture. The fourth role is that of an Initiator, who, in the case of the Sustainable Design Education Conferences, begins each round with a summary of responses to focus questions each conference participant answered prior to the conference. (see Component Four for a description of how the questions were generated and our website for participant responses to the questions: <[Spiderweb.org/globalpossibilities/solar-future](http://Spiderweb.org/globalpossibilities/solar-future)>)

### ***Component 4: A Semiotic System to Coordinate Interpretation of What You are Learning***

"The fourth component of the Earthscore Method uses the relational circuit to transform Charles Peirce's semiotics into a process that facilitates learning and communication in diverse disciplines among diverse groups. .... As a cybernetic system, Earthscore thrives on differences. To cultivate differences, Earthscore uses semiotics. Semiotics (from 'sem', the Greek word for 'sign') is a general approach to knowledge based on an appreciation of knowledge as a process of generating signs. The semiotics used in Earthscore comes out of the philosophy of Charles Peirce and encompasses both perception and language. In principle, any kind of local knowledge, any art form and any educational or scientific discipline can be included in this system. In general, any sign (a quality) represents something (its object, a fact) to somebody (the interpretant, a pattern) in some respect. The system is too complex to present here, but it is inclusive of everything from a smudge of paint to a syllogism. The system exfoliates from Peirce's three comprehensive categories into a tenfold schema, a twenty-eight fold schema and a sixty-six fold schema."

*Protocols for Cooperative Learning Groups*

**Initiating Role:**

**6 minutes**

**Intuiting Role:**

**3 minutes**

**Reacting Role:**

**3 minutes**

**Mediating Role:**

**3 minutes**

**Articulation of**

**talking points re:**

**subject being studied Listening and giving feedback as a**

**POETIC RESPONSE, to based on qualities and feelings**

**feedback as DEVIL'S ADVOCATE, based**

**on seeing obstacles**

**and facing facts**

**Listening and**

**giving feedback**

**in terms of the**

**BIG PICTURE,**

**based on seeing**

**patterns and context**

**Listening and giving**

*Description of Rounds*

*Round One*

**Initiating Role: 6 min.**

**Intuiting Role: 3 min.**

**Reacting Role: 3 min.**

**Mediating Role: 3**

Participant A

Articulation of talking  
points re: subject being  
studied Participant B

**POETIC  
RESPONSE**

Participant C

**DEVIL'S  
ADVOCATE**

Participant D

**BIG PICTURE**

*Round Two*

**Initiating Role: 6 min.**

**Intuiting Role: 3 min.**

**Reacting Role: 3 min.**

**Mediating Role: 3**

Participant B

Articulation of talking  
points that includes  
results of First Round  
and thoughts  
of Participant B. Participant C

**POETIC**

**RESPONSE**

Participant D

**DEVIL'S ADVOCATE**

Participant A

**BIG PICTURE**

*Round Three*

**Initiating Role: 6 min.**

**Intuiting Role: 3 min.**

**Reacting Role: 3 min.**

**Mediating Role: 3**

Participant C

Articulation of talking points that includes results of Second Round and thoughts of Participant C Participant D

**POETIC**

**RESPONSE** Participant A

**DEVIL'S**

**ADVOCATE** Participant B

**BIG PICTURE**

*Round Four*

**Initiating Role: 6 min.**

**Intuiting Role: 3 min.**

**Reacting Role: 3 min.**

**Mediating Role: 3**

Participant D

Articulation of talking points that includes results of Third Round and thoughts of Participant D Participant A

**POETIC**

**RESPONSE** Participant B

**DEVIL'S**

**ADVOCATE** Participant C

**BIG PICTURE**

The twenty-eight-fold schema organizes the website of the Sustainable Design Education Initiative: <Spiderweb.org/globalpossibilities/solarfuture>. Peirce's ten-fold system underlies the focus questions sent to participants before each conference and discussed in the collaborative rounds described in Component Three. Below, abbreviated, is a list of the questions sent to participants in the October 1998 National Design Education Symposium. The purpose of the questions was to help organize our understanding of the current state of sustainability design education in the United States. See project website for full questions:

- Question 1*     *Imagine possibilities....*
- Question 2*     *Use what we have ...*
- Question 3*     *Invent new designs out of playing ...*
- Question 4*     *Predict Results....*
- Question 5*     *Contextualize Sustainable design ...*
- Question 6*     *Integrate sustainable/solar design into earth systems...*
- Question 7*     *Engage social, economic and political problems...*
- Question 8*     *Create new forms through sustainable design, use of solar...*
- Question 9*     *Criticize current sustainable/solar design...*
- Question 10*    *Reason about sustainable/solar design...*

Peirce's tenfold semiotic system, of course, is philosophical and does not address any particular subject. Below is a generalized codification of his tenfold system to indicate how it can be used in developing specific focus questions for any discipline. Fill in the "... " with the name of your subject area:

- Sign 1. Any feeling about anything for anybody  
As a dreamer about ... and sustainability, what mood would you cultivate that would best support your dreaming?
- Sign 2. Some specific index about anything for anybody  
As someone skeptical about ... itself, what stance would you take in discussions about using ... to cultivate sustainability?
- Sign 3. Some specific index about something for anybody.  
As an amateur ..., a tinkerer, what experiments would you like to play around with that may or may not be related to sustainability?
- Sign 4. Some specific act about something for somebody  
As an engineer, what specific problem regarding sustainability would you like to solve?
- Sign 5. Some pattern about anything for anybody  
As a storyteller and mythmaker, what comprehensive visions or stories of the complex process of using ... to achieve sustainability could you generate?
- Sign 6. Some pattern about something for anybody.  
As an investigative reporter looking for clues about how ... fails to support sustainability, how would you go about your investigation?
- Sign 7. Some pattern about something for somebody  
As an activist, how would you organize your school community to address a specific obstacle to creating a sustainable society?
- Sign 8. Some pattern about some pattern for anybody  
As a teacher, how can you best stimulate your students to imagine a future in which ... operates in the service of sustainability?
- Sign 9. Some pattern related to some pattern with some specific effect  
As a critic, how can you equip your students to think critically about schemes, visions, plans and policies for sustainable societies?
- Sign 10. Some pattern related to some pattern that results in some habit  
As a master teacher, how can you teach your students to think about ... sustainability and the future so that the students can establish the habit of living sustainably?"

#### ***Component 5: Creative Envisioning Understood in the Context of Sustainability***

The fifth component of the Earthscore Method is specifically concerned with creativity. "We must dream the sustainable life before we can live it. Students will have to help invent sustainable societies. Such an inventive process will require releasing the creativity inherent in young people in ways that will make the Renaissance seem minor. In the Earthscore approach to education, there is a basic necessity to respect intuition and support discipline that fosters creativity. Creative

envisioning involves an instant vision of a complex process. The vision occurs in the mind like a fist in the hand because there is a spontaneous, intuitive appreciation of a pattern.”

The fifth component is engaged when one undertakes a project creatively, based on explorations of the subject of the project, using the first three components exfoliated into the ten questions. For instance, in the case of the Sustainable Design Education Conferences, the Next Steps portion of the conferences gave participants the opportunity, based on the results of their collaborative learning groups, to propose steps to transform design education for sustainability. We have just begun the Creative Envisioning component of the Sustainable Design Education Initiative, which the website is central in supporting and generating. For results to-date see: <[Spiderweb.org/globalpossibilities/solarfuture](http://spiderweb.org/globalpossibilities/solarfuture)>.

Another “concrete example of creative work relevant for the Earthscore educator is James Lovelock’s Gaia Hypothesis. ... In the 1970’s the atmospheric scientist and inventor, James Lovelock began thinking about the atmosphere of the earth. The atmosphere’s peculiar mix of gases could not be explained according to the laws of chemistry. Twenty-one percent oxygen in the atmosphere was an anomaly in terms of how gases would ordinarily mix. Yet twenty-one percent oxygen was critical to maintaining life on planet Earth. Four-percent less and many forms of life would die of oxygen starvation. Four-percent more and most woodlands would burn up with the next lightening fire. Other such anomalies struck Lovelock. Three-percent salinity in the ocean supported many life forms, which would die if that percentage were altered. A constant range of temperatures had been maintained over the history of the Earth, despite a twenty-percent rise in the temperature of the sun. Lovelock guessed that maintenance of all of these mechanisms could not be explained unless one posited that the earth itself is a self-regulating, self-correcting, “living” organism. His creative envisioning, his abduction in scientific terms, his creative intuitive leap was that life is as much a part of earth as feathers are part of a bird. Inspired by his fellow villager, William Golden, the author of *Lord of the Flies*, Lovelock named his intuition the Gaia Hypothesis, after Gaia, the Greek Goddess of the Earth.

Stated simply, Lovelock’s “Gaia Hypothesis” argues that the Earth is a living organism. Not metaphorically, but cybernetically. Thinking in circuits, thinking cybernetically, a very intuitive scientist has given us a rather startling and rich understanding of the earth. As of this writing, Lovelock and others are busy identifying mechanisms of planetary self-correction and a scientific consensus about the validity of this hypothesis is steadily building. As is proper in the scientific method, the abduction of the initial guess must be confirmed by careful induction from evidence. Once such a guess enters the realm of scientific law then we can safely deduce from that law certain predictions about what will happen to the self-correcting mechanisms of the planet. If the Gaia Hypothesis holds up, understanding those predictions will help us learn to regulate our behavior accordingly.

Regulating our behavior according to the self-correcting mechanisms of the Earth is critical for a sustainable society. Learning how to achieve such self regulation, as a flexible species in a flexible environment, is what Earthscore education is about.”

<sup>1</sup> Earthscore is copyrighted and trademarked. Any use of it should be arranged by contacting Prof. Paul Ryan at the Graduate Media Studies Department of the New School University in New York City, 212- 229 8903 (ryanp@newschool.edu). All quotes are from the writings of Prof. Ryan. See especially the review of his book “Video Mind, Earth Mind” by Oliver Lowenstein in the Autumn ‘96 issue of Fourth Door Review, at <<http://www.spiderweb.org/globalpossibilities/solarfuture/Fdesign/earthscore.html>>.

# DESIGN EDUCATION, CLIMATE CHANGE, AND SUSTAINABILITY: A PROTOTYPE FOR DEVELOPING GREEN CURRICULUM

Ball State University, Muncie, Indiana – October 1, 1999  
**GREENING OF THE CAMPUS III: Theory and Reality**

Presented by

Casey Coates Danson, Global Possibilities and Jean Gardner, The Earth Group

**Introduction** The way a culture lives and the way it interacts with its environment has a direct relation to its sustainability. Global Possibilities and The Earth Group have been convening national and regional conferences for design educators and others responsible for design practices.

**Objective** To develop curriculum that is more responsive to sustainability issues such as Global Climate Change. This workshop utilizes results to date of Global Possibilities' Symposiums for a Solar Future. It interactively demonstrates the methodology used to organize curriculum developing tools, i.e. the national and regional conferences, the focus questions for discussion, the protocols for collaborative group discussion, and our world wide web site ([www.spiderweb.org/global-possibilities/solarfuture/](http://www.spiderweb.org/global-possibilities/solarfuture/))

## DISCUSSION

**Question 1. Describe how climate events in the Eastern Midwest Region, such as heat waves, droughts, floods, frosts, cloudiness, the frequency of hot or cold spells, and the intensity of associated fire and pest outbreaks, as well as tornadoes, are taken into consideration in current education.**

### Eastern Midwest Regional Issue – The Business of Agriculture

- The initial discussion involved the importance of curriculum changes that include education about climate change and its effects on agriculture because it is one of the main businesses in the region. It is essential that developing strategies include the university community as well as the surrounding communities. The strategies highlighted the challenges of how to change the curriculum, what departments would be involved and the available resources.
- Strategies included teaching climate change issues as a clinic – team teaching with different departments and programs, or a General Education course that everyone takes. Either one department can offer the course or each department could have a similar version. When a new course is added the questions are: who teaches it, how do you pay for it, and how do students work it into their schedule?

### Resource Strategy – Student Credit Hours Generate Dollars

- Since departments generate money from student credit hours, they would fight to offer General Education courses, because of the potentially large enrollment. The resource trade-off could be that if you use this subject matter as a basis for what you are teaching anyway, then you really aren't adding a new course, you are just changing the content, or slightly twisting the content to focus on a very prominent contemporary issue. Thus you would not need more faculty, or to develop more curriculum. If you had to call it a new course, you would swap out something else, still depending the delivery of the degree of the course, only more general in that department.

### Anecdotal Usage

- Comments about weather, or its impacts, or catastrophes that are happening relative to various disciplines can be woven into classroom discussions. Someone teaching math might choose to model, calculate, simulate, quantify or measure by using an anecdotal reference to something in the news. For example, in Indiana this summer, the governor declared 2/3 of the state as an open flame-free zone because it was so dry. This fact could be presented in any class – could be a math class or a philosophy class. The resolution of that was having a course in every department. It seemed like everything could be resolved.

### Inventing Strategies

- When inventing strategies, strategy is a product of wanting to do something. If you want to get it done, you will figure out a way. If you don't want to get it done you will have a strategy for not getting it done. So it all comes down to what you want to do. If the belief is there, it will happen.

## **Question 2. What change could we make in current education to respond to changes in climate events in the Eastern Midwest Region?**

### **General Scale and Pragmatic Scale**

- Summarizing this dialogue, there is a very general scale and then a very pragmatic scale. The general scale was a vision of having a place either on a web page or some common place where we could storyboard the story of global warming at the local level, the national level, the global scale and maybe include the Rio and the Kyoto Accord. The pragmatic scale brings it right down to the local level.

### **Make It Relative – A “Climate Rap”**

- It is critical to make climate change a very experiential, sexy, involving issue. A “climate rap”, if there is such a thing, would get the people that are not engaged, to be more engaged and try to tie that together. Also, really making connections with the local economy and how it affects jobs, how it affects farmers, how it will affect our communities and combining with the Arts and Sciences to put this together in a more glamorous way.

### **Solving the Environmental Challenge with Building Design**

- GP has created a slide presentation titled “Architecture and Climate Change” that makes the connection of buildings using 2/3 of the nation’s energy supply which produces up to one-third of emissions causing global climate change. It depicts the problem - images of toxic and ravaged areas that have been deemed Super Fund Clean-up sites due to environmental damage.

It presents the solution - buildings that integrate solar energy, proper site placement and daylighting principles. Some of the examples are homes designed by Casey Coates Danson. This presentation, developed for Bioneers 2000, is promoted to architectural firms, real estate developers and educators.

### **Today’s Curriculum Concern – Where Is the Leadership?**

- There is real concern about the lack of political leadership to respond to changes in climate events. Many people do not care because they are more concerned about their jobs and going about their daily lives. But, politicians who should be leading the fight, are possibly even less concerned.
- The challenge here is how do you build the kind of community memory that is long enough to grapple with these questions. In building curriculum, it is necessary to involve the students in some of the decision-making about what is going to be taught about climate change, what is important and what would make a difference to them.

## **Question 3. What changes could we make in education to respond to indirect impacts of climate change?**

### **A Disconnect from Nature**

- In responding to “indirect impacts” of climate change, a broad perspective of the word education needs to be addressed. First, semesters were historically related to an agricultural climate and cycle. We have disconnected from that today. Adapting the school year to an agriculture cycle could reconnect education to climate change. Second, all fields need to incorporate the topic into their education – biology, economics, sociology. It is important to the field-oriented biologists in studying pest outbreaks as they might impact individual research but it is just as relevant to environmental justice issues.

### **Outdoor Education**

- Moving education out of doors is important because it puts one in contact with climate change and its multiple causes, many of which have to do with a civilization that depends on cars that produce carbon monoxide and cuts down forests. You get off the grid or out of the civilization, which is producing it. Being outdoors puts one in contact with the phenomenon described in terms of climate change and so the student experiences the changes directly in the body. Education can be in large measure outdoors. It would no doubt compound the problems that exist but it is a step in the right direction.

### **Societal Changes at Root of Vulnerable Ecology**

- Every discipline has something to say about climate change. A lot of them, like sociology or anthropology, don’t always make the connection. For example, when 600 elderly people died in the heat wave in Chicago a few years ago, it was the result of a larger social structure situation – moving from a nuclear family to an extended family. They were left on their own which was a different way of caring for the elderly.
- Loss of property is increasingly due to population growth, urban planning decisions, and expanding development into

ecologically vulnerable areas. Populations are moving into delicate situations where they never would have lived before. Since every discipline has something to say about climate change rather than having one course, a much more effective strategy would be to integrate it into the overall curriculum.

### **Linking Education to Climate Change Issues**

- Education needs to lead straight to the decision-making processes and policy responses to climate change and indirect effects of climate change. It is essential for education to be more directly linked, not just studying and separate from the process of determining what our responses to climate change need to be. Campuses have the opportunity to lead by example, designing sustainable buildings for their programs like Oberlin College's Adam Joseph Lewis Center for Environmental Studies. This building integrates John Todd's "Living Machine" which can be viewed on [www.Oberlin.edu/newserv/esc/livingmachine.html](http://www.Oberlin.edu/newserv/esc/livingmachine.html)

### **Question 4. How would you change the current model of relationships between climate and education (as described in your response to Question 1) to accommodate climate changes?**

#### **Sustainable Design Issues Are Climate Change Issues**

- Climate change is very much a part of the discussion of environmental studies and geography. Not all sustainable education occurs in the classroom. Facilities Management has certain programs underway. They are in charge of transportation and are taking measures to use natural gas in their vehicles. They have instituted recycling and so are taking sustainable measures. This discussion includes not just climate and education and the relationship between the two, but all sustainable design issues.

#### **Is Industrial Design Counteractive to Sustainable Design?**

- Industrial Design has not traditionally addressed sustainable design issues. What industrial designers create runs counter to sustainable design since it leads to the avarice for more "stuff" and ultimately fills the landfills with discarded stuff. The idea of introducing sustainable principles into Industrial Design curriculum is somewhat new and often challenged by tradition in the way that the subject has been taught.
- In an ideal world this discussion of climate, sustainable design and sustainable issues would start at a much earlier point in education – from kindergarten on up. This earlier implementation of the relationships and all of the dynamic systems involved would be part of the overall educational discussion all the way through college. This would form the ideal world point-of-view that would require challenging many traditions, such as the tradition in teaching Industrial Design. Many in Industrial Design think of sustainability as a passing fad, and regard it as something of very little importance. The case is quite the opposite in other disciplines such as Environmental Studies.
- Educational models need to be changed.
- There are many non-traditional approaches to education that would help answer this question. One suggestion is that we need to acknowledge some of the small steps that are being made as a way of encouraging further steps. Playing devil's advocate, from the culture of the college student's point of view, many things pertaining to climate change and sustainable design are typically not regarded by college students as being "cool". Some students are subject to ridicule if they practice some of these sustainable principles. One student mentioned that he has taken a very strong step by permanently putting his car into the garage and canceling his auto insurance. His only means of transportation is to ride his bike and this decision has made a huge impact on some of his college friends. They couldn't believe that he would take such a dramatic step.

#### **Form Over Function**

- Educational institutions, more out of inertia than out of ignorance, often don't provide positive examples. The University of Cincinnati is the size of a small city with 40,000 students. It boasts two different recycling programs, both at odds with one another and neither being currently implemented. The Dean in this small village felt that the recycling bins violated the aesthetics of the Peter Eisenman building renovation for the College of Design, Architecture, Art, and Planning (DAAP) and so removed them from the premises. This controversial building has served some function in that it has given the school notoriety and is responsible for increased enrollment in Architecture. There is a Signature Architecture program series on campus that it has provided, a brand new Frank Gehry building, and a couple of other very notable buildings that have put University of Cincinnati on the map. But all of them have completely ignored sustainable design principles. What an incredible comment on the state of design today and our design scholars.

### **Question 5. How can the general model described in your response to Question 4 be fitted to the particular ecosystems of the region that your school is located in, including its cities?**

No response to this question due to time constraints.

**Question 6. If current social and economic policies have resulted in climate changes, what changes could we make in those policies, both in our schools and in our community, in order to mitigate the impacts of current policies?**

#### **Unbridled Consumerism Forms Policy**

- In the United States policies are formed to the will of the individual. Social and economic policies are sculpted by what motivates people to do what they do, which include consumerism, our comfortable living conditions and personal responsibility.

#### **Individual Car Use Promotes Poor Policies**

- One policy change that could possibly mitigate the impacts of current policies is if faculty and staff would get out of their cars, depend more on biking and walking, resulting in being more connected to the land and observing the environment. Imposing huge parking fees on campus makes leaving your auto at home a viable transportation alternative. By choosing to ride the bus or train they discover how challenging public transportation can be and might therefore become a force in terms of policy change. Try taking a different position and see how challenging and complicated it can be. What is necessary is a compromise and mediating between all sides. The result is what needs to be done.

#### **Levels of Organization Outside the Campus**

- Even though the subject is the Greening of the Campus, it is necessary to observe this issue with more of a macroscopic view of society at certain quantum levels of organization outside the campus. First of all, divesting power to the regional level enables people to see the effects of these problems, to see change, and also to see the tangible progress that happens when you work together. Whereas, when something is passed at the National level, it is somewhere out there, it's amorphous. No one really knows what is going on or who is in control of the process.
- Secondly, if power is divested to a supra-national organization, something like the UN that deals with common properties like the air or the ocean, which are currently outside of the realm of anyone's jurisdiction, they are therefore open to exploitation.

#### **Children Teaching the Parents**

- The foundation of local approach was turning the phrase location, location, location to education, education, education. The suggestion is that this has to be International and it has to start with the young. Educate them when they are malleable, when their mind is open which also has a beautiful way of feeding back to the parents to keep them honest. The best approach is hands-on holistically scientific. You get the young people out and involved, feeling as if they are a part of the environment, getting their hands dirty, seeing what's what and where they fit into it. There is a whole range of education that needs to be done in our courses because then we get it into the homes and then we're making a dent.

#### **Educating Business**

- The colleges need to educate the industries and companies where the students will be working. There is a whole range of preparation to ready them to leave college, but who is preparing business? Even some of the biggest architecture firms in the cities are not up on green building. One of the keys is educating Real Estate developers, who will then make requirements of construction companies.

#### **Positive Encouragement**

- Help companies and small organizations make positive change. Have some incentives for doing good things, not just come down hard when somebody messes up but helping them along the way. Something like getting people out of their cars by giving tax breaks to companies that do carpooling and encourage walking. Introducing zoning changes that encourage pedestrian walkways and bikeways and piggybacking that on to legislation. For example, make a public funded project environmentally friendly. When building a housing project, keep in mind the long term costs at all levels and make it sustainable. Also give the existing organizations some real teeth, like enabling the EPA to enforce the rules already in existence.

#### **First Eco-Tax Is Gasoline Tax**

- One of the most sensitive policies in all communities is gasoline tax. This is the first most important eco-tax we can have and we already have it. Here is an opportunity to make policies visible at the local level and it is a reality check. Make it local. Whenever there is a battle on gasoline tax, it is always about revenue. But in reality this is an environmental tax. It is the first step in people understanding the fundamental truth – that it is all about us and our interaction

with nature.

### **Consider Photosynthesis**

- A general point about climate change from an Ecologist is that a large number of impacts of atmospheric change are direct responses of the elevated amounts of carbon dioxide on the biota and there are interesting interactions, like how much is even elevated by grass. A lot of that comes from Biology, too. Life depends on photosynthesis and we're more than doubling that principle. A lot comes from plants.

**Note: No response to the following questions due to time constraints. But authors wish to include all ten questions for future use.**

Question 7. How can we create motivation in our regions for the new social and economic policies with students, faculty, administrators, other relevant regulatory bodies, and the public in general?

Question 8. Given new social and economic policies to mitigate climate change (see Question 6), what kind of political struggles could result both within your institution and within the larger community?

Question 9. What steps, such as educational pilot projects to link climate data and education, could we take to help institute new educational and governmental policies?

Question 10. If you had no restraints on your curriculum development, what could you imagine that education in the Eastern Midwest could do vis-à-vis climate change in this region?

## **THE EARTHSORE METHOD**

### **THE PROCESS AND PREPARATION OF THE GLOBAL STUDENT**

The following questions were posed to Jean Gardner to clarify the workshop process.

#### **Did Peirce write an outline of his system used in this workshop?**

Actually, it's also Gregory Bateson and Semiotics. It's been adapted and there is more information on our web site.

Peirce only did the semiotics, the phenomenology, which is how you learn. Charles Peirce was the teacher of William James, and he is the source for Dewey. The cybernetic system comes from Gregory Bateson. It's a lot of ancestry that is explained on the web site.

#### **When you're teaching this in class do you have your students learn how to come up with these questions? How do you do this?**

I do with my graduate students. But I have students from all over the globe and have no idea where they are going to be living and working. They have no idea what problems they are going to be facing. It is no longer so important to teach information as it is to teach the system of thinking and that it be open ended and participatory so that they can deal with whatever problems they encounter. I use architecture, because they are architecture students.

#### **So in other classes would you hand them the questions?**

It depends on how much time is available.

#### **The reason that I ask is because I'm in a class at the moment that one of the biggest things our Professor stresses is knowing how to come up with the right questions.**

Critical thinking. I recommend looking at Peirce's 10 Sign System because they are the philosophical principles of what you have to know about anything to ask the right question.

#### **This would be a question about the procedure or the technique. I am at a small liberal arts college, and I would rarely have as many as 20 students to work on this. What would you recommend?**

There are protocols you could do in groups of three because there are three primary ways of learning. The initiator is in the role of the poetic response. The questions are sequential and so can be grouped. When you read through them, you will see that question 1 and 2 can go together. In other words, if you only have five groups, but there are these 10 basic areas that need covering, one group could do that question. I recommend when you try it in the beginning, that you don't leave out any questions until you really think that they are absolutely not necessary because this is not a random system.

As I mentioned it is based on principles of Charles Peirce's semiotic system. He is the Founder of Pragmatism. The pragmatic approach is often used to characterize what it is to be quote "an American." This practical approach of

“does it work?” He was trying to establish the 10 features that anything has to have to be what it is. It is a philosophical system. This is his system and these are the 10 steps that he thought you would have to go through to self-correct yourself. You go back over the questions again and again. It is a systemic approach he developed in the 1890’s.

#### **FINAL COMMENT**

I think it’s really nice that in the brief time we were able to have a workshop that would convey the method. I was not so sure that it was going to work, but it did come through, at least for me.

– Bob Koester, Conference Host, Ball State University

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