

## Book Reviews

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### SUSTAINABLE COMMUNITIES, SUSTAINABLE ENVIRONMENTS: THE CONTRIBUTION OF SCIENCE AND TECHNOLOGY EDUCATION

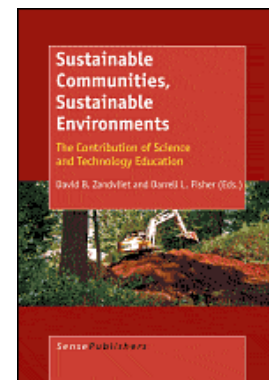
By David B. Zandvliet and Darrell L. Fisher (Eds.)

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The concept of the sustainability was increasingly used and evolved in past two decades, and the increasing importance has been given to this concept. However, there is still a lingering discussion about whether this concept is dealt with sufficiently or not. A good answer to this question might be the action taken by United Nations (UN). For the sake of ensuring the sustainability for now and the future, UN declared Decade of Education for Sustainable Development (UNDESD) covering the years 2005-2014 (Sato, 2006). Deriving from this importance, sustainability is now an evolving concept used for describing the broader purpose and goal for education.

The book “*Sustainable Communities, Sustainable Environments*” was basically designed for providing international perspectives by considering the fields of science and technology to teachers in different levels (primary to tertiary), teacher educators and academic researchers who are dealing with education for sustainability (Efs) and education for sustainable development (ESD).

This edited book consists of twelve chapters, each of which provides an understanding and insight into a particular view(s), practice of sustainability and research findings. As it is observed in the chapters, some of the ideas seem to be overlapping whereas the others are in opposition to other views.

#### Chapter I

##### *Sustainability: An Open Question*

by Siobhan Ashe, Michael Caulkins, Gillian Judson, Quirien Mulder ten Kate and David Zandvliet

Framed ESD as an open question, this chapter is dedicated to definitional problems of sustainability and ESD. It is discussed in the chapter that even though too much definitions have been done for these concepts, there is still diversity, vagueness and unclearness showing no agreement on those definitions. Starting in 1987, endorsement efforts on sustainable development by UN General Assembly resulted in Agenda 21, Chapter 36 of which is dedicated to education for sustainable development (ESD). Continuous discussions and reform attempts by international political and economic forums point out that education would eventually be key element / cornerstone for sustainability. Despite this importance, sufficient developments pertaining to ESD were not realized. Finally, this importance was confirmed and UN dedicated 2005-2014 to Education for sustainable development. However, ESD still seems to be as a lingering discussion. In the chapter, this discussion is elaborated with the four essays written by the ones who are struggling with finding answers to “*What does ESD really mean?*”

*Chapter II*

*"Tweaking" Conventional Science Curriculum: Addressing Synergies between Environmental Science and a Model for Teaching Critical Thinking*

by Philip L. Balcaen

In this chapter of the book, Philip L. Balcaen argues the idea of environmental issues providing a rich curricular focus of critical thinking in the sciences. He believes that a little attention has been paid for the ways of accomplishing the critical thinking that is identified as a desired outcome of the science education by most of the educators. He offers and then elaborates a model [symbolized as (CT)<sup>2</sup>] that provides a coherent approach to help the teachers teach critical thinking effectively within the environmental sciences instructions. In his model, he reflected his works with the science educators from several countries.

He believes the necessity of linking environmental science programs and the approach for teaching critical thinking. He summarizes three nature of environmental sciences curriculum as reasons behind this necessity, (1) kinds of complex problems, (2) interdisciplinary approach and (3) engaging for students.

The model that Philip L. Balcaen elaborated includes four crucial fronts that provide an approach in order to encourage, teach and assess the qualities of the critical thinkers. These fronts indicated in the model are (1) providing critical challenges, (2) Teaching the tools, (3) regular criterion referenced assessment and (4) building communities of thinkers.

*Chapter III*

*Ecological Education: Reconnecting with Nature to Promote Sustainable Behavior*

by Susan Barker

Susan Barker basically focus upon a criticism pertaining that ecology, a science which explores the interrelationship among plants, animals and the environments, is failing to live up to its potential. She mentions about the shifting emphasis of Ecology from environmental education to economics, social and civil systems. Furthermore, she tries to explore how ecology and ecological education can be justified and developed as a crucial cornerstone for ensuring the sustainability of the earth. In the article, she argues the criticisms and the recommendations toward finding an effective way for ecological education to make connection ecology and sustainable development.

Based upon the criticisms and changing emphasis, Barker re-examines and discusses the place of ecological education in the evolving area of education for sustainable development.

*Chapter IV*

*Developing the Scientific Imagination: A key to Sustainability?*

by Sean Blenkinsop and Mark Fettes

The authors share their scientific works (project) pertaining to developing the scientific imagination with the readers. The project that they conducted is basically about determining the benefits and contributions of scientific imagination method, so called approach, used for teaching water unit of science education curricula of 4<sup>th</sup> grade in three public school districts in British Columbia. They conducted this project specifically named as *Learning for Understanding through Culturally Inclusive Imaginative Development* (LUCID) with 4<sup>th</sup> grade students in order to try to connect scientific imagination with the sustainable development. With the project, the authors also aims at connect scientific knowledge with the moral, cultural and natural worlds of people.

The authors also mention about five scenes that they followed so as to successfully realize the project. Those steps proceeded by the authors in their project are (1) A mythic framework, (2) Making sense through the body, (3) Romantic explorations and (4/5) Toward philosophical understanding. The completed project reveals that the students discovered that the science was not detached from human and natural realities.

*Chapter V*

*Introducing Eco-Justice and the Revitalization of the Common Issues into Thinking about Environmental Education*

by Chet A. Bowers

Bowers discusses how the globalization of Western techno-scientific-industrial culture is influencing the rate of changes in specific three areas which are vitally important for the future quality of life. These vital areas identified in the paper are (1) the loss of linguistic/cultural diversity that plays such an important role in maintaining biodiversity, (2) the loss of intergenerational knowledge that represents cultural alternatives to an individually-centered consumer dependent lifestyle, and (3) the further degradation of natural systems – potable water, topsoil, fisheries, climate changes, spread of toxic waste. It is emphasized in the article that Western techno-scientific-industrial culture accelerates the emergence of these life-threatened effects.

Bowers is further making a suggestion for involving faculty and students in a dialogue regarding educational reforms.

*Chapter VI Controversial Socio-scientific Issues in the Science Classroom: Managing Uncertainty in Climate Change Education*  
By Joan M. Chambers and Patricia Rowell

In their article, Chambers and Rowell mention about how inclusion of controversial socio-scientific issues in the science classroom is recognized as an important component of science education. They discuss that including the controversial socio-scientific issues which are inherently tentative and uncertain raises concern about how this vagueness ought to be dealt with. One of the contemporary socio-scientific issue which has been perceived as controversial is climate change discussed in this chapter of the book.

In the study, they analyzed and interpreted the language of the documents pertaining to climate change education which was produced by sub-communities in the field. They tried to investigate how the reality of climate change has been addressed in the textual resources used in the schools in Alberta. The findings of their analysis of textual recourses indicate the extent to which and how discursive management of uncertainty and materials used in the school have been used for constructing the realities of climate change and appropriate actions and responses.

*Chapter VII Sustainable Communities, Sustainable Environments: Industry Supported Professional Development in the Mineral Resource Sector*

by Dan Churach and Di Nichols

Churach and Nichols discuss the possible positive and negative effects of technology on the desired condition, which is sustainability, in people's interaction with the environment. They argue that the ability to learn and apply people's knowledge to solve the problems depends on existence of species. The people who are in the industry sector can be actor for realizing those solutions. In the article, this point of view is supported with the findings of the several research studies done in Australia such as Western Australian Government's 2003 Youth Survey. Those research studies further indicate that teachers have been influencing the students to select a career in mining and mineral resources sector. In addition, the authors states the findings of their pilot study with 43 teachers in order to determine a shift in teachers' attitudes toward the industry as a result of personal development training. The pilot study points out that there are a strong association between teachers participating in the professional developments and a positive shift in their attitudes towards the industry.

*Chapter VIII Education and Research for Sustainable Living*  
by Bruce Johnson

Johnson proposes the earth education model in order to make decision and take action for sustainable life, for understanding the natural system of the world and for grasping the big picture of how life works. As models of Earth Education, Johnson introduces the model programs of Earthkeepers – KEYS for 10-11 years olds, Sunship Earth for 10-12 years olds, Sunship –III for 13-14 years olds, Rangers of Earth for 10-11 years-olds and Lost Treasures for 8-9 years-olds, each of which emphasizes programmatic approach, a sense of being on a learning adventure and personal contact with the nature. Furthermore, he reports initial findings of the longitudinal project aiming to determine how understandings, perceptions, and actions develop as students to participate in the sequential earth education programs in Pennsylvania and Louisiana.

*Chapter IX An Earth Systems Inquiry-Based Approach Reshapes Teachers' Beliefs about Instruction of Diverse Students*

by Julie Lambert, Benjamin Lester, Okhee Lee and Aurolyn Luykx

The authors presents their research study regarding as how 5<sup>th</sup> grade teachers' beliefs changes as a result of an inquiry-based Earth system curriculum with the elementary school students who comes from different cultural and linguistic background. They describe *The Living Planet* curriculum, designed by considering one of the earth education approaches. In order to overcome the difficulties of linguistically and culturally diverse students who often left behind in science, teachers tend to use inquiry-based methods. However, while doing so, teachers do not well take into consideration students' different language and cultural backgrounds. They reported 23 teachers' in-depth perspectives and experiences which reflect implications for curriculum development and professional learning experiences for teachers teaching culturally and linguistically diverse students. Their research provides evidence that a theme like *The Living Planet* may enable the teachers to participate in culturally diverse and global communities.

*Chapter X Creating Sustainable Online Learning Environments for Mature Age People*

by Stephen Quinton, Darrell Fisher, Heinz Dreher and Paul Houghton

Quinton, Fisher Dreher and Houghton discuss the sustainability through the online learning environment designed for mature age people. They share a research project that aims to construct an online design model which will satisfy the preferences of mature age people.

They argue that revealing the preferences, needs and requirements of adult people will help improve the quality, variety and relevance of the learning for this group of people in the society. They also argue on new technologies and approaches for effective implementation of complex learning environment. As far as the stages of the Mature Age project are concerned, the understanding of “*one size fits all*” which basically depends on traditional approaches does not seem to work anymore. The Mature Age model enhances human capabilities, and encourages collaboration and engagement activities which provide common understanding on a determined issue.

*Chapter XI Evaluating a Professional Learning in Shark Bay, Western Australia*  
by Rowena Scott

In this chapter, Scott reflects implications and implementations of the one of the goals of the United Nations which is “to ensure environmental sustainability, in particularly, to integrate the principles of sustainable development into policies and programs (p.131)”. The author expresses her experiences and gives some examples about how one government organization has sought ways to enhance ecological literacy and integrate the principles of sustainable development into educational programs. The author describes a specific program in which primary, secondary and even university teachers attended to become well informed about local projects and actively participate with local scientist in Shark Bay as a sustainable community of fauna in World Heritage Area in Australia.

*Chapter XII A Classroom Teacher's Reflection on Learning Sustainability*

by Sandra Wooltorton

Wooltorton reflects her own teaching experiences regarding as the implementation of the aspects of the sustainability education in her own primary school classes. She identified her 2004 class and how she developed her 2005 class based upon the lessons taken from 2004 class. The project she involved points out that children tend to change their habits and actions associated with technocratic consumerism when the school culture is totally reoriented to the understanding of sustainability. She argues the ways of gaining the habits and practices for sustainable future. In this regard, she shares some examples emerging from her own experiences.

## REFERENCES

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The reviewer's main research interests are predictors of responsible environmental behavior, environmental literacy, curriculum development, analysis and evaluation, and instructional planning and evaluation.