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GEOGRAPHY AND ENVIRONMENTAL LITERACY: AN APPRAISAL WITH REFERENCE TO HIGH SCHOOL GEOGRAPHY IN SINGAPORE AND ABROAD

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Abstract: Place, and by logical inference, the total environment comprising both the natural and cultural at different scales, from the local to the global, forms the core of geographic understanding. Invariably in geography curriculum from the primary to the high school and beyond, the study of total environment, often artificially dissected, for convenience of treatment, into human and physical, has been assumed to bring about awareness and appreciation of the environment and environmental problems. Whether this awareness is synonymous with environmental literacy is quite another matter. This paper examines the issue of environmental literacy in relation to geography education, and assesses to what extent this literacy has been achieved through the teaching and learning of geography at the high school level. Reference is made to some junior colleges in Singapore and high schools in England and elsewhere.

Introduction

Geography has always laid special claim to the physical environment in its treatment of the discipline, although very often, in a dichotomous and artificial way in identifying it as 'physical geography' and separating it from the social dimension or 'human geography'. In essence, it seeks to understand what gives a place or region, through its tangible and intangible attributes, patterns, processes and relationships its distinctive character, meaning and visible landscape. In the past, physical geography was dominated by the regional approach such as in the understanding of the evolution of physical landscapes, and many theories propounded bore the influence of this approach. The scientific approach to the understanding of the physical world in the past two to three decades has given the impetus to process-based investigations that dominate current literature on physical geography. Stochastic-based investigations have led the way to a better understanding of complex natural and random phenomena and processes in nature which then allow for the development of predictive models that could be applied in tackling real world problems. Despite these advances and geography's contributions in the appreciation of the natural environment, of late, its role seems to be eclipsed by other environmental sciences that have emerged in the past couple of decades. This understandably generates some anxiety amongst geographers. However, geography can still reassert its environmental edge over many other disciplines precisely because of its inherent strengths. Such strengths include the emphasis on spatial distribution of natural phenomena; current preoccupation with man-land relationships and environmental problems; holistic and syncretical approach to the study of the earth's surface at different scales and to differing degrees of complexity; the understanding of the relationships, processes and components within a geographical space; and its forte in fieldwork observation and investigation (Goh, 1999).

That geography has adapted itself to contemporary environmental problems is well reflected in the numerous studies carried out by geographers, sometimes alone, and at other times, in collaboration with researchers in other sciences, on issues such as environmental degradation, pollution control, conservation and sustainable development, climate change and resource management. Gregory (1992), a decade ago, recognized that “..contemporary physical geography is more in tune with recent changes in the environment than it was 20 years previously, most particularly in its increasing emphasis on global change and strategic (applied) research.”

While the above seems to be a commendable trend in geographical research, in the area of geography curriculum however, what seems to be still missing is the almost complete silence on ‘environmental literacy’. Is this an aim so alien to the subject or is it an issue that has been deliberately neglected because it falls outside the ambit of what the discipline is all about?

Geography’s utility as a subject should not stop at providing environmental knowledge nor merely creating awareness of environmental problems. In understanding man-land interaction and the impact society has on the environment, geography can help inculcate a sense of values within a geographical space, thus bringing about an enlightened and responsible citizenry (Goh, *ibid*).

This paper examines the issue of environmental literacy through the study of geography, in particular physical geography, at the high school level. Through the arguments provided the author places high advocacy on the attainment of environmental literacy in geography, which should be an explicit goal in geographic education.

Environmental Literacy – Definition

The concept of literacy in language is better understood as the ability to read and therefore understand what is written in order to be able to place it into a context of meaning. From this basic position, Orr (1992) elaborated its application to ‘environmental’ or ‘ecological literacy’ or sometimes termed ‘earth literacy’. But environmental literacy is more than the ability to read about the environment. Beyond the obvious, it also involves developing a sense of the spirit of places since the landscape within a place is itself a text that informs us about its capacity to produce and support life, its history, and its constituent fauna and flora. Environmental literacy connotes more than the ability to identify the different organisms or understand the processes that operate on the surface of the earth. It should in fact incite in the learner a sense of wonder of the complex assemblage of elements that distinguish each site from another, thus making a place special and memorable.

Others have defined environmental literacy in terms of its varied facets - functional, cultural or critical literacy.¹ Some have gone round the difficulty of defining such an elusive term by coming out with explicit statements that relate to knowledge,

¹ The different types of environmental literacies have been discussed in *Environmental Education Research* 4/2, 1998, 155-164.

understanding, attitudes and active involvement as used by UNESCO. Chapkanova (2000) seems to subscribe to this view. He described an environmentally literate person as one who has the knowledge necessary to comprehend inter-relatedness, an attitude of care or stewardship, and the practical competence required to act on the basis of this knowledge and feeling – all this with regard to the environment. Thus knowing, caring and practical competence become the basis of environmental literacy. In a similar vein environmental or earth literacy could be understood in terms of fulfillment of certain requirements.²

Disinger and Roth (1992) provided their definition of environmental literacy in terms of: “ a 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.”

Roth (1992) defines it in terms of observable behaviours at three levels:

- a. Nominal – ability to recognise many of the basic terms used in communicating about the environment and to provide rough, if unsophisticated, working definitions of their meanings;
- b. Functional – a broader knowledge and understanding of the nature and interactions between human social systems and other natural systems; and
- c. Operational – progress beyond functional literacy in both the breadth and depth of understanding and skills.

It is evident from the above that environmental literacy is a difficult concept to define, and therefore more work needs to be done to refine the components and expectations of what the term connotes.

Why the need for Environmental Literacy?

Despite the plethora of environmental educational modules and heavy emphasis of the subject in many disciplines, it would appear that environmental education has been patchy, and the high school students upon graduation would not have sufficient knowledge and exposure to lead them to become environmentally literate individuals. This would be true of education at the tertiary levels as well, where the stress on discrete disciplines with varying amounts of environmental concerns does not ensure the attainment of environmental literacy as envisaged in the discussion above. The following quotations summarize the diagnosis clearly:

² Such requirements include: a quality of mind which seeks out connections; a sense of wonder rooted in an affinity for the living world; a broad understanding of how people and societies relate to each other and to natural systems, and how they might do it sustainably; a knowledge of the planet's vital signs, its ecosystems and the dynamics of the modern world; a thorough understanding of the ways in which people and whole societies have become destructive; how social structures, religion, science, technology, patriarchy, culture and the human consciousness combine as causes of our predicament; the ability to make a reasonable distinction between what is 'natural' and what is not; a broad familiarity with the development of an environmental consciousness; an understanding of alternative minority traditions which emphasize democratic participation, the extension of ethical obligations to the land community, careful ecological design, simplicity, widespread competence with natural systems, the sense of place, holism, decentralization of whatever can be decentralized, and human-scaled technologies and communities; the development of prudence, stewardship and the celebration of Creation; the development of the practical art of living well in particular places.

‘Environmental education had produced citizens armed with ecological myths but lacking the knowledge and conviction of their own role in the environmental problems.’ (Gigliotti,1990)

“Most formal, informal and non-formal environmental education methodologies are not designed to achieve the goal of environmentally responsible behaviours” (Volk, et al.,1984).

‘It is possible that we are becoming more ignorant of the things we must know to live well and sustainable in the earth.’ (Orr, 1993)

Given this verdict, in the United States it has been recognized that there is a tremendous need for environmental education and training, because the public presently lacks the knowledge to fully understand and respond to environmental concerns. It was realized that environmental literacy is needed to prepare and motivate the public to make responsible decisions and to take positive actions that ensure sustainable development. At the Federal level, the Federal government’s broad mission, goals, and objectives for environmental education and training should ensure that sustainable is reached through:

- improving environmental literacy
- providing educators with the knowledge to teach critical thinking and problem-solving skills which ensure decisions and action that conserve, protect, and enhance human health and the environment;
- increasing educational and training opportunities to enable individuals to pursue environmental careers that lead to the conservation, protection, restoration, and management of the environment.

(Ad Hoc Working Group on Environmental Education and Training Report).

In Scotland, curriculum planners have included environmental literacy as one of the four goals of ‘environmental citizenship’ (Scottish Office, 1993).

Here in Singapore, environmental literacy has not been explicitly articulated in the curriculum, although the understanding of the environment, environmental awareness and concern feature prominently in certain subjects like geography and biology.

Given the importance of the environment and resources and the close link between human consumption and resource use, and the resultant environmental impact, the whole question of sustainability of the earth has become an issue of universal concern and urgency. Yet, the potential impact of unsustainable development and consumption on human life itself has not been fully appreciated.

Problems of Interdisciplinarity?

Given the pervasive nature of environmental problems which affect every human being and living thing, the need to infuse environmental education throughout the entire curriculum has become necessary and urgent. To be effective, some have argued that

environmental education must be taught in an ‘holistic’ manner by reaching across all disciplines. Environmental education is an interdisciplinary “outcome-based” body of knowledge that does not fit into individual subject molds. At the same time, since the study of the environment embraces many disciplines, such as biology, meteorology, economics, and human health, it is extremely difficult to systematically integrate environmental education into the entire educational system. Environmental education is no longer the sole property of one discipline, as it is taught at different times, and in different ways through a multiplicity of disciplines in the school environment as well as through one’s own understanding of the world in day-to-day contact with reality.

The argument that every student should be environmentally literate means that, on completion of their higher education course, he/she should be able to:

- i) understand the principles of sustainability relating to biodiversity, environmental values and ethics, natural cycles, people as part of nature, quality of human life (as opposed to standard of living), the depletion of finite resources and the earth’s carrying capacity
- ii) recognise the environmental impact of personal choices and decisions
- iii) appreciate the relationship between human activity and global environmental problems, such as : acid rain, desertification, ozone depletion (Foster, 1999).

While the argument for environmental literacy through interdisciplinary studies is strong and that every child going through school should attain this objective, needful, the reality is more difficult to achieve. For pragmatic reasons, while there is need to have an overall strategy to inculcate environmental literacy all through the curriculum, the traditional disciplines that have the distinctive features that could engender this outcome such as geography should not be discarded or downgraded. The distinctive nature of geography lends itself well as a disciplinary vehicle for environmental education because it integrates the natural and social sciences in studying environmental problems and issues. Geography has the necessary organizational structure of both contents and skills towards making children environmentally literate. It, in fact, integrates information derived from the environmental sciences, which include geology, physical geography, hydrology, the atmospheric sciences, ecology, anthropology, biology, and human ecology, and through fieldwork.

Geography and Environmental Literacy in A-Level Curricula in Singapore and Abroad

Most geography students, by the time they reach high school level would have a reasonably good grasp of the environment in which they live. The geography syllabuses at different levels have always contained the element of man-environment dimension as **Figure 1** encapsulates.

In general the approach to the study of geography whether in Singapore or elsewhere is well captured by Naish et al’s (1987) summary, that geography:

- “focuses on the interrelationships between people and their environment

- takes as its starting point enquiry into question, issues and problems of relevance in the world today
- offers a clear perspective on the contribution of geography to environmental understanding and to environmental action
- provides opportunities for organising study in an enquiry-oriented sequence so that students can develop a range of skills
- facilitates the introduction of controversial topics and the provision of opportunities for values enquiry
- is out-ward looking and encourages links with other subject areas and with activities beyond school
- emphasises understanding and awareness of place and space
- enables students to gain useful knowledge about a balanced selection of areas and places in the world
- offers the possibility for enquiry to draw on new approaches to geography as appropriate to the topic”.

In the A-level geography syllabuses of the various examination boards in England and Wales, the environmental component of these syllabuses in general aims to enable students to achieve a certain level of understanding of processes, variations, patterns and relationships on the earth’s surface with some emphasis on the development of problem-solving skills through fieldwork and impact analysis. In the Foundation Module Cambridge UCLES Syllabus, for example, the topic of Physical Environmental Influences contains components that seek answers to the following questions:

What is an environment?

What are the criteria by which different environments may be described and analyzed?

What evidence is there for variations in the nature of environments on a global scale?

What are the advantages and disadvantages of living in different environments?

These are followed by the following questions:

What are the distinctive characteristics of the major global physical environments?

What are the global system and processes which explain the global distribution of different natural environments?

What are the principal characteristics of the chosen physical environment?

How do physical processes interact to produce the distinctiveness of physical environments?

How do changes over time in systems and processes interact to influence changes in physical environments?

In what ways do inquiry methods help in the understanding of the changing environments?

How do values and attitudes of different human groups affect the character and development of physical environments?

The Singapore A-Level syllabus tends to emphasize on developing understanding of the different types of environmental processes be they atmospheric, hydrological, geomorphological processes in the humid tropics, on coasts or in cold regions as well as skills in environmental analysis.

It is quite obvious that the issue of environmental literacy as defined above does not feature as an explicit aim of the geographical learning. It would appear that environmental concern that could influence the behaviour of an 18-year old is seen more as an incidental bi-product of such learning than as an explicit objective to be achieved. Perhaps because of this lack that more and more geography educators are advocating values education that will effect behavioural change vis-a-vis the environment through the creation of a responsible citizenry, and in the process creating environmental literacy.

Discussion and Conclusion

Earth literacy or environmental literacy is an aim worth achieving and it is attainable by the time pupils reach 18 years old. Much literature has shown that adolescents have empathy with the environment and is disturbed by the destruction of habitats, but is not able to go beyond this level of emotional involvement. Tan, et al (1998) have shown that geography Secondary three (15 year old) and first year junior college (17 year old) students in Singapore have high environmental knowledge scores and moderately positive attitudes towards the environment, and some frequently practised positive environmental behaviour. Adolescents in Germany have only a moderate degree of factual environmental knowledge but a very high degree of emotional concern about environmental destruction, and sympathy with living things (Blum, 1987; Szagun and Mesenholl, 1993). Other studies have also shown that students completing an environmental studies course have ‘a more internal locus of control for reinforcement for environmentally responsible behaviour, a higher perception of their knowledge of and skill in using categories of environmentally responsible behaviour, and more frequent performance of selected environmentally responsible behaviours at the end of the course than at the beginning than did students enrolled in the history course.’ (Smith-Sebasto, 1995). In a small study of 20 A-Level students, Cox (Undated) came to the conclusion that A-level students showed a very technical understanding of environmental issues and in many cases are able to empathize with the natural world. However, among this small group of students the most significant conclusion is that many young people are not able to translate their concern for the environment into significant social action.

Despite some variations in the above findings and some apprehension expressed about adolescents’ environmental literacy, there is much to commend the predisposition of students at this age range with regard to the issue of environmental awareness and concern and to some extent action. However, the current study of geography, if the syllabuses designed are anything to go by, reinforces the idea that it is meant to touch the cognitive rather than the affective part of the students’ being. A subject like geography should capitalise on the opportunity afforded to bring about environmental literacy as its outcome. Environmental education has set itself the aim of effecting a long-term change in people’s awareness of nature and the way they treat nature. If this aim is to be achieved, it is not sufficient to impart knowledge about pollution or even to carry out

practical ecological projects. It is necessary to reach people's deep convictions and their emotions, which environmental literacy should engender.

The study of geography should go beyond the attainment of subject understanding or even developing certain skills. It has the necessary prerequisites to go one step further of creating responsible behaviour and environmentally literate person. To achieve this, the geography curriculum should explicitly articulate environmental literacy as one of its objectives.

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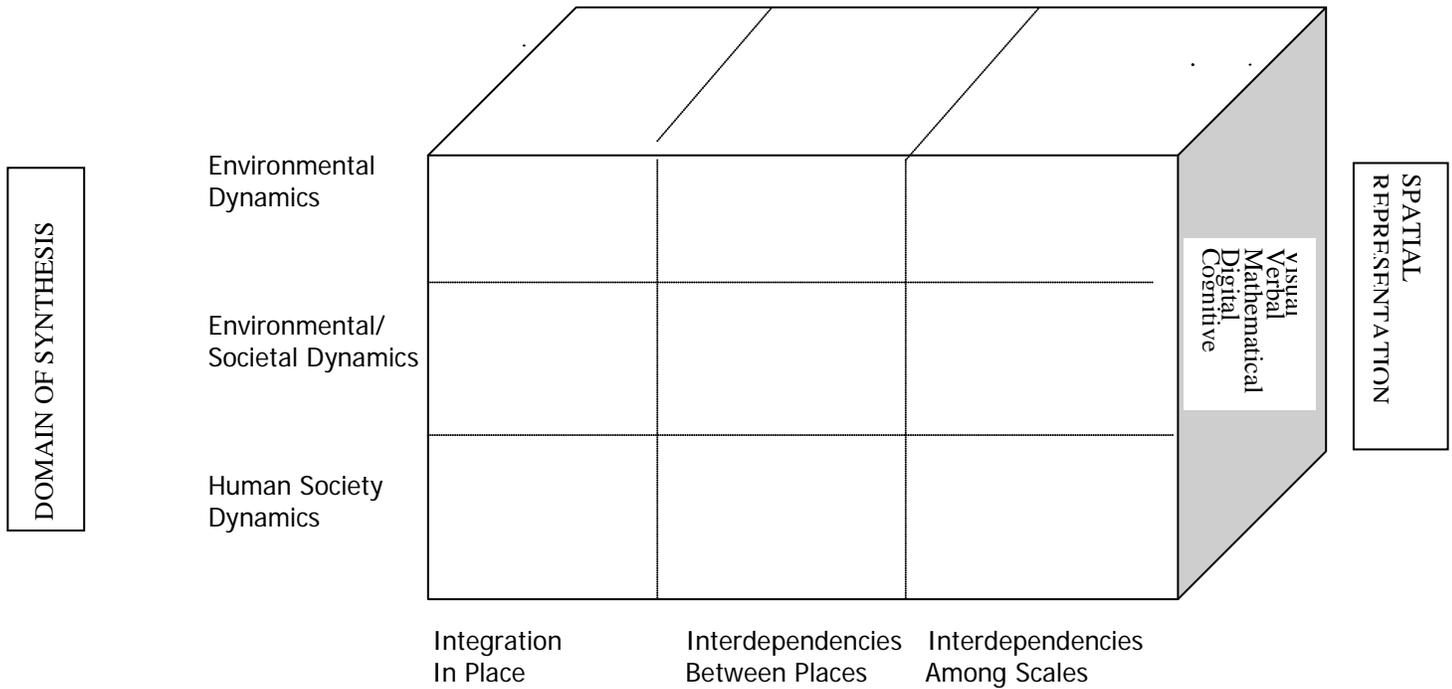


Figure 1 Components and dimensions in geography