KNOWING AND ACTING IN THE ENVIRONMENT: THE RELATIONSHIP BETWEEN KNOWLEDGE, BELIEFS AND ACTIONS IN ENVIRONMENTAL STUDENTS AND ALUMNI

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Thesis
Entitled

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ABSTRACT

Interest in the relationship between individual and group beliefs and actions in the environment has grown in recent years. Although there is a great deal of research concerning wider social interaction between people and the environment, little research has been forthcoming to explore the actions of informed actors. Research on informed actors can be a useful litmus test for wider community interaction with the environment and speaks to the necessary change that is to come.

The environmental conundrum in contemporary society can be expressed in terms of a paradox that while most people have positive environmental attitudes and are concerned about environmental issues, a much smaller proportion of people actually translate their concern to action. It is therefore important to explore why in today's climate of environmental concern and uncertainty about the future, there is a great deal of incongruence between the way people interact with the environment, and the way they would prefer to interact with it. The role played by informed actors needs to be explored because their location to the center might point to the view that any inconsistency noted between theory and practice, can be accounted for in terms of differing degrees of focus and intimacy on specific issues in terms of time and space.

This research found that there are significant differences between what environmental students and alumni do in practice in environmental terms. The variation between the two groups sheds light on strategic alignments (theory and practice) that social actors make as they negotiate the complexities of every day lived experience. To bring the two groups to alignment is possible through change strategies. Such change is conditional on degrees of focus and intimacy on specific issues in terms of time and space and the way in which they might appropriately be explained.

The findings of this study are beneficial for all who are interested in how ideas are acquired (education) and how they are realized (practice). The research techniques and methodology from this study can be applied to a multitude of social situations where knowledge, attitude and practice converge and are in need of explaining. Human action models are complex as is life itself. In light of such complexities it is recommended that future research focus upon the social intercultural subtleties and differences that object orientation plays towards effective interaction with the environment in terms of time and space.

KEY WORDS: ENVIRONMENT/ EDUCATION/ INFORMED ACTORS/ THEORY AND PRACTICE/ CONFLICTING VALUES/ CONSENSUS/ TIME/SPACE

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CHAPTER I
INTRODUCTION

The realization that a consumerist resource-wasteful lifestyle will have a major detrimental impact on the planet health is finally reaching a high level of acceptance. The negative environmental issues we have already created such as ozone depletion, climate change, loss of biodiversity and the creation of toxic mountains of waste resulting in the fouling of land, sea and air must now be resolved to ensure that the planet can sustain future generations.

The various disciplines such as sociology, psychology and education are well suited to help us find appropriate solutions to the crisis we collectively face. Through understanding the human condition and the relationship with the planet together they can help us to address the ecological problems facing humanity. However, what we find at present in environmental debates is a depreciation of postmodernist environmental perspectives stressing reflexivity and systems approaches. Postmodern is used here both in its emerging from or reaction to modernity as well as in its rejection of clear central hierarchy or organizing principles sense. A postmodern environmental perspective can help us navigate the extreme complexity, contradiction, ambiguity, diversity, and interconnectedness of the planet (Spiro 1996). Ecocentrism as a guiding philosophy offers an entry point to understand the systematic human-nature relationship and is a central theme that runs through this research.

As we contemplate action within the existing setup, the world is progressively deteriorating and severely limiting its ability to sustain us. The role of

education in highlighting the way forward by teaching for action, showing alternative possibilities and in arguing for change cannot be underestimated in any future change-models and it is indispensable to the hope for humans and the planet. In the words of Spencer: The great aim of education is not knowledge, but action (Herbert Spencer, 1820 - 1903).

Spencer's words have a particular relevance to the field of environmental sustainability, where it is those people with the deepest knowledge and understanding of the complex environmental issues upon whom the world will depend on to address the most significant questions of sustainability and environmental protection today.

1.1 Present relationship between humans and the planet

Most environmental problems that confront us today are the result of people's behavioral practices (Oskamp, 2000; Howard, 2000). It is precisely in line with this observation that the *National Center for Environmental Research* (2006) has seen behavioral research as important to developing effective solutions to environmental problems because the causes and remedies are behavioral in nature. Thereby, better understanding of polluter motivations and environmental values can improve human and ecosystem health, decrease pollution control costs, and improve the efficiency and effectiveness of environmental policies. At the same time the situation we find ourselves globally and locally today is dire. Sanidvongs (2007) in climate modeling projections found that the modeling suggests that we will see the effects of global warming sooner than we thought, in 2020s instead of 2040s and 2050s (Figure 1.1).

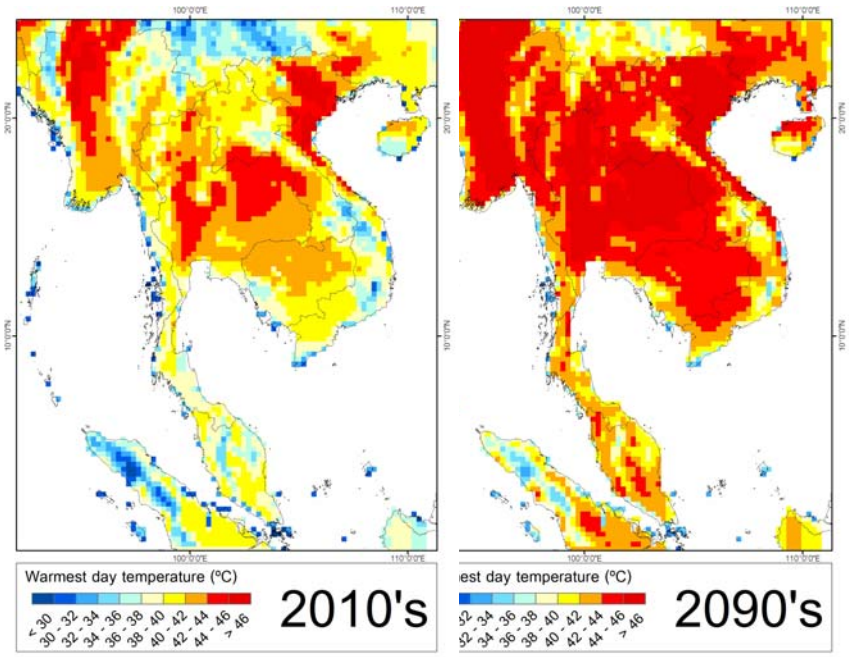

Figure 1.1: Warm days per annum projections for Thailand 2010's and 2090's

Source: Sanidvongs (2007)

For Thailand, new findings suggest that by 21001 much of the country could be spending eight months a year in summer temperatures of 35 degrees plus, compared to just three months at present (Figure 1.1). Additionally, it finds that dispersement of warm days will occur across the whole of Thailand (Appendix A).

The important implications that stem from such climate modeling scenarios turn on whether we continue on the present course of environmental degradation or not. The climate scenario assumes that there is little reduction in carbon emission in the future and little cooperation among governments to address global warming. This is the present predicament we face. Importantly, it argues that while we are not in a crisis yet, there's still time to adapt and prepare a response (Sanidvongs, 2007).

---

[1] Preliminary findings have been kindly provided by Southeast Asia START Regional Center at Chulalongkorn University courtesy of Mr. Suppakorn Chinvanno.

If there is time to prepare a response, then appropriate understanding of the dynamics of our present course needs to be understood, evaluated and alternatives proposed. Therefore, the contribution that research as the present one can make towards understanding and explaining the environmental phenomenon we collectively face is invaluable.

The participants in this thesis are Thai environmentally aware citizens drawn from a major university in Thailand. To speak of environmental students and alumni is to elaborate individuals and groups who are for all intents and purposes “informed actors” on environmental issues when compared to the general population. Being informed places them in a privileged position. In them is vested great responsibility in the way that they individually and collectively respond to the greatest threat to human and planetary survival to date. How they have individually and collectively responded in their private and public lives, speaks to important similarities and differences among and between them. Their respective contribution as individuals and groups, their particular responses to research instruments, can provide a valuable insight into the human-planet relationship. Similarly, their environmental knowledge, attitudes and practices profile as informed actors can shed important light on why we have continued on the present course of action despite their unique position when compared to the wider global community.

While the local parochial context is suggestive of narrowness of focus this research has wider scope and implications in a global sense. The social connection between knowledge, attitude and practice and the cultural ‘flows’ that connect them need not be Thai specific but speak to the western dominated economic culture that has dominated contemporary thoughts and actions worldwide.

1.2 Human involvement in the environmental crisis

Human negative interaction with the environment at its expense is well

documented and will not detain here. A number of recent examples will suffice to illustrate the human impact on the environment. The oil spill by Exxon Valdez near Alaska, the Chernobyl nuclear disaster in Soviet Ukraine (World Commission on Environmental Development, 1987) globally and environmental degradation of the Mekong (Sanidvongs, 2007) regionally, are just a few examples that point to the negative ways in which we have interacted with the environment to date. Additionally, industrialization has been the catalyst for a number of environmental problems that include loss of biodiversity, air and water pollution, and most importantly global warming (United Nations Environment Programme, 2002). Globally, it has spread havoc upon world climates; regionally it has translated into projection of major changes that have potential to affect all aspects of human life (Sanidvongs, 2007).

As for individual environmental actions by actors, this is discussed in detail in sections 2.3.4 Pragmatism, environmental world views, and sustainability; 2.4.3 Meaning-making and acting in psychology; and, 2.6.4 Activism and external drivers. Briefly, what individuals do with respect to the environment can make an important difference to the way we interact with the planet. For example, the question why an informed environmental actor continues to waste paper in the office by printing on one side only or failing to reuse printed paper is an important one. However, the reasons for such actions can be numerous, and differ from one individual to the next and can be inclusive of motivation, opportunity, office equipment, time, conventions, office politics and similar. This thesis looks at group action for the light it will shed on the wider human environmental experience. No doubt, individuals have shared responsibility and are accountable for their individual as well as their group actions on a daily and ongoing basis. However, as Horne has put it in *Ideas for a nation* (1989) emphasis on the 'individual' can lead to the view that everyone might have a different conceptualization of reality in action. It is for this reason that this work has

prioritized group action in consensus. Here, the external variables such the environment within which individuals operate and the opportunity to act it affords, as well as the internal variables such as personal motivation, are particularly important ways in which to understand positive and negative human interaction with the environment. A group approach was deemed appropriate to analysis in this work because frequently internal variables are at the same time external in the example of motivation and opportunity in office recycling. The demarcation between the internal and external is mitigated in group analysis because the median far better reflects wider society than does any single representative interpretation.

1.3 Grounding the thesis

To the extent that the theoretical grounding of this thesis can be located within a particular world view then it is to be found in the ecocentric view that the environment is both a determining factor in socializing and a significant influence in human daily action as well (Eckersley, 1992; Wolf, 1994; Isaacs, 1980; Tatz, 1999, 2005; Clark, 1962-1987; Spiro 1996; Kempton et al., 1996; Panya, 2003). This is in sharp contrast to existing anthropocentrism and its derivative biocentrism, both of which prioritize man over environment, and have been identified by environmentalists and social theorists alike as a root cause of the ecological crisis we face today (Naess, 1973; Plumwood, 1993, 1996; Lanza, 2007).

What we find today, in an economy dominated anthropocentrism that as humans are variably removed from their setting in terms of time and place dimensions, and as the message and frequency of the stimulus is thereby reduced, the impact and connection to time and place is reduced. The marks we thereby leave behind in our daily activity are etched in the surface of the planet we inhabit and frequently to its detriment.

1.4 Rationale and justification

It would seem that it is abundantly clear that the environment and society generally have suffered greatly at the expense of economic growth and political and actual expediency. In light of the environmental problems that we daily encounter, there is considerable pressure from both internal and external stakeholders to remedy existing behavioral strategies and practices. In response, educational institutions have extended their traditional curriculum-reach to include the environment. In doing so, they have crossed many boundaries that have traditionally been owned by the private sector (Hoffman, 2000).

Nevertheless, an ancient Indian proverb succinctly describes our responsibilities to our planet and to our children in this way:

Treat the earth well. It was not given to you by your parents; it was loaned to you by your children. We do not inherit the earth from our ancestors, we borrow it from our children" (Ancient Indian Proverb).

At the simplest level this proverb is about respect and care for the environment. Our planet is important and our children are important too. And we have a great responsibility to leave both in good shape to the future.

Taking a cue from this proverb, while at the same accepting in principle that most people have positive environmental attitudes and are concerned about environmental issues, it is also true that a much smaller proportion of people actually translate their concern to action (Costanzo, Archer, Aronson, and Petigrew, 1986). It is therefore important to explore why in today's climate of environmental concern and uncertainty about the future, there is a great deal of incongruence between the way people interact with the environment, and the way they would prefer to interact with it (Australian Bureau of Statistics, 1996).

English philosopher Herbert Spencer (1820-1903) accurately frames the central argument of this thesis with his popularized words: "The great aim of

education is not knowledge but action" (Spencer, 1932:61; Spencer, 1970).

The question that exercises the findings by Panya (2003) as well as this present research is: whether informed actors translate beliefs into actions? The appropriateness of reply depends on suitable understanding of the 'positive feedback loop' that we are caught up in that has led to continued environmental degradation where: "loss of focus" has led to "loss of idealism" which when intercepted by a "commitment to (dominant) societal values" has served to reinforce and justify the present course of action. Ultimately, the cycle has led to a further erosion of focus. Subsequent cycles compound the focus deficit and have resulted in further erosion of environmental cohesion between beliefs and action.

Senge (1990) argues that reductionism is a significant factor behind the current environmental crisis we face. Consequently, profound change is required both in the way we see and in the way we respond to environmental issues. Such a change amounts to no less than a wholesale 'paradigm shift' (Figure 1.2) in society away from a belief that the world was created of separate unrelated forces, to a world-view that sees the whole. Such a 'humanist' shift prioritizes an ecocentric worldview that necessitates a whole and complete movement of the plane and not just the boundaries of the axis.

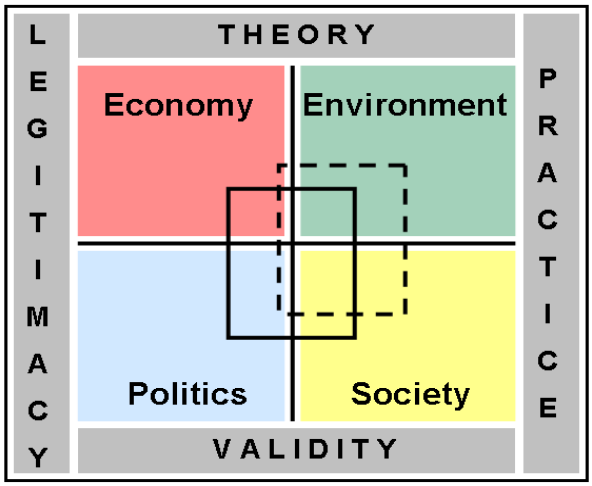

Figure 1.2: Societal paradigm shift

(Made after Senge, 1990)

Figure 1.2 borrows from Senge (1990) the 'holistic' total systems approach to problem solving. This approach envisages a world community in organizational terms in which people continually expand their capacity and where new expansive patterns of thinking are nurtured. In such a world-view collective aspirations are set free in individuals as well as in groups. The freedom afforded can permit both groups to continually learn and see the whole rather than individual parts of the same problem. Ultimately, it aspires to break the 'positive feedback loop' that society is presently caught up in.

This thesis is informed by facts on the ground, real life itself with all its complexities. While this work acknowledges that there are no simple one-to-one solutions to environmental problems we face today, it argues that raising awareness that many current environmental problems arise in the gap between knowledge and knowledge translated into action is a valuable step in the right direction. Similarly, that loss in focus and intimacy upon environmental issues are significant factors that can help explain the gap between theory and action.

Following threads of previous research in the field, Hacker and Washington (2003) in particular, observe that a link between knowledge and resistance to change

exists. This research agrees with Judson (1991) and Hacker and Washington (2003) who argue that there are six factors that determines an organization's resistance to change: (i) feelings about change in general; (ii) conflict between the existing culture and what is to be changed; (iii) the number of unanswered questions that arise; (iv) historical events; (v) the extent that the change threatens basic needs; and (vi), the extent to which the change impacts feelings of self-worth or self-importance. To which could be added focus and intimacy as the 7th variable.

This research paper then, explores whether there exists a behavioral change between what students learn and practice while at university in Thailand and what they 'hold-on-to' as they negotiate the real world when they enter the workforce and in their private lives. Similarly, whether such a change can be measured and tested. It aims to test this change process and explore ways in which it can be reversed or at the very least suggest ways in which regression can be delayed through an intervention program.

The expected results from this study include raising awareness at the need to investigate and map out the change-process in psycho-sociology [2] of environmentally sustainable behavior in individuals and groups, so that the change process might more readily be understood. An understanding of this process can contribute to the ways in which we can reduce the negative impact of our behavior on our planet. Furthermore, it argues that this is a necessary undertaking. In doing so, it might lead to more effective migration of the knowledge, skills, strategies and

[2] Whereas Sociology is primarily concerned with the study of people in relation to their fellow human beings (group) and Psychology with explaining and sometimes changing the behavior of humans (individuals), 'psycho-sociology' or more correctly 'social psychology" is an area within psychology that seeks to blend concepts from psychology and sociology and that focuses on the influence of people on one another focusing on situations of change (Robbins, 2005:12-14)

practices acquired at university to the workplace and into people's private lives.

1.5 Problem statement

Based on the discussion in the previous section (1.4 Rationale and justification) the environmental problem that this research has identified can be summarized in the following points:

In today's climate of environmental concern and uncertainty about the future, there appears to be an incongruence between the way people interact with the environment and the way they should.

While our awareness and understanding of the central environmental issues is growing through research and education, the state of the environment continues to deteriorate.

1.6 Key research questions

The key research questions revolve around discovery, confirmation of existing assumptions, refinement of method and finally testing the thesis hypotheses (Neuman, 2004). This research was guided by the following research questions (Figure 1.3):

What is the current condition or social situation of informed environmental actors (students and alumni) in terms of environmental knowledge, attitude and practices?

How is the situation maintained over time?

What are the processes by which their condition/ situation changes, develops and operates?

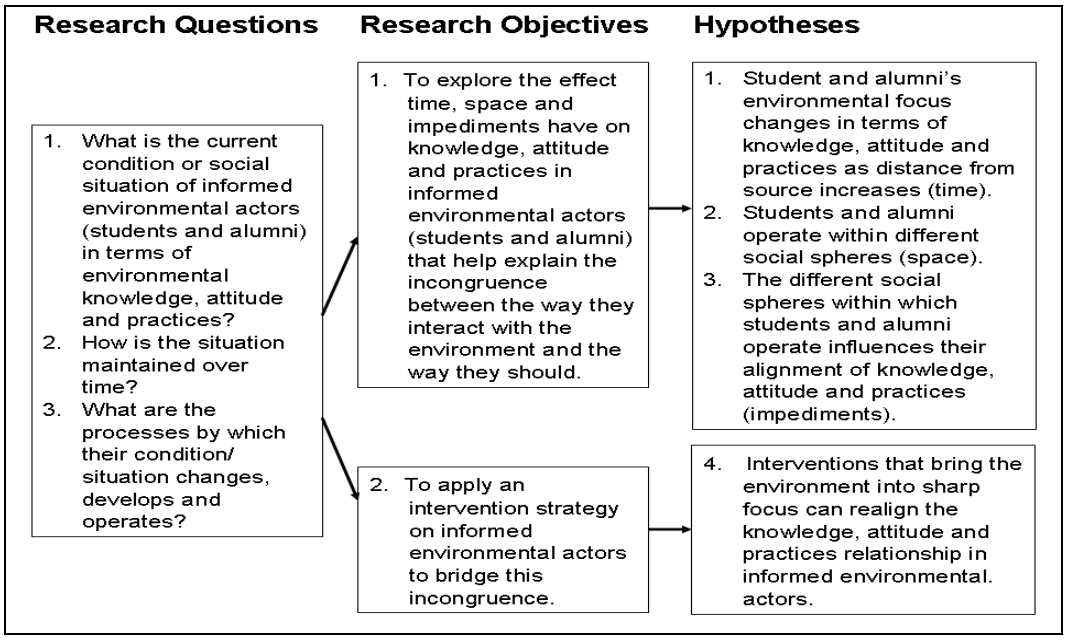

Figure 1.3: Relationship between research questions, objectives & thesis hypotheses

The relationship between the research questions, research objectives and thesis hypotheses is shown diagrammatically above (Figure 1.3).

1.7 Research objectives

The objectives of this study focus on current and former (alumni) environmental students acting as informed environmental actors in their respective daily social life. The first research objective is exploratory, while the second is an intervention thus:

To explore the effect time, space and impediments have on knowledge, attitude and practices in informed environmental actors (students and alumni) that help explain the incongruence between the way they interact with the environment and the way they should.

To apply an intervention strategy on informed environmental actors to bridge this incongruence.

1.8 Hypotheses

Following Turner's (1998) sociological structure of theory (Figure 3.1) the

following hypotheses will be tested:

Student and alumni's environmental focus changes in terms of knowledge, attitude and practices as distance from source increases (time).

Students and alumni operate within different social spheres (space).

The different social spheres within which students and alumni operate influences their alignment of knowledge, attitude and practices (impediments).

Interventions that bring the environment into sharp focus can realign the knowledge, attitude and practices relationship in informed environmental actors.

1.9 Scope of study

This study explores the relationship between environmental theory and practice in university students and alumni as they interact and grapple with a range of social and environmental issues in the process of living a life. Ecological and human systems are integrally connected so that the social and ecological are both at once "one" and "separate" concerns. This work aims to identify the key internal and external factors that influence the integration of ecological values into human daily life and how they are translated into practice. While the social and ecological manifest themselves in daily life as separate spheres, this research aims to develop and test an intervention program aimed at raising awareness during a trial period so as to bring both into closer alignment.

1.10 Contribution of the study

In spite of growing knowledge of environmental issues and the enormous development of environmental education in the past decades, the situation is hardly improving. This thesis will shed light on the relationship between knowledge, activism and beliefs in the hope that through better understanding, environment and core issues can both be brought to closer alignment. The pertinent social environmental variables are considered in light of an ecocentric disposition where

education plays an important role.

Specifically, the contribution of the thesis lies in gaining a deeper understanding of the effects time, space and social impediments play in everyday life situations in determining why even environmentally aware people act in ways which are damaging to the environment. This study will determine whether an intervention on informed actors can refresh knowledge, attitude and practice to previous levels in terms of time and space resulting in more environmentally aware actions.

The originality of the thesis approach is in the use of integrative [3] methodology applied to students that places individual sphere data collected within its respective cultural context. Moreover, the data collected and interpreted through its cultural milieu is subsequently given global treatment through pragmatist frameworks. In sum, it is a contribution whose primary focus is the current environmental impasse within which education has played, continues to play and has an important role to play in the future.

1.11 Defining the terminology

The following section elaborates the key terminology as it is used in this thesis that has a bearing on appropriate understanding and for cohesion of method and explanation used. Its theoretical emphasis is in line with the 'genre' of this type and the audience it is directed at.

[3] Theoretically, 'integrative' is used as Boyden (1979) and van Kerkhoff (2005) have used it to signal a systematic approach to analysis. Pragmatically, it is used to mean to combine. Integration and integrative research as used in this study are further defined below (Defining the methodology).

1.11.1 Informed social actors

When this research speaks of social actors and informed actors it does so in the sense that Schutz (1962) has elaborated them in terms of behavioral research and Weber (1968) in terms of 'ideal types'. For both, a 'social actor' is engaged in an on-going process of making sense of the world. Put differently, the ordinary person, acting in the world, is "in a biographically-determined situation, doing what he or she does according to the system of relevance that enables them to select from the environment and from interactions with others, those elements that make sense for the purpose at hand" (Schutz, 1962:42). An 'informed social actor' on the other hand, what Schutz has called 'the well-informed citizen', is actually in contribution to the sociology of knowledge (Schutz, 1962:124-134). As an 'ideal type' (Weber, 1968) such an individual is both 'informed' as to the choices before them and they understand the reciprocal 'responsibility' that being informed entails. In this, they are differentiated from 'the man on the street' for whom the relationship between knowledge, thinking and acting is: "not homogeneous; it is (1) incoherent, (2) only partially clear, and (3) not at all free from contradictions" (Schutz, 1964:132).

Environmental students and alumni, in the same way that Schutz's example of well-informed citizen thinking, acting and making considered choices in terms of appropriate 'zone(s) of relevance' to which they have privileged access, involves responsibility (Schutz, 1962:124-134) and such actions entail reciprocity (Weber, 1968).

1.11.2 Ecocentrism

Ecocentrism is a philosophy that recognizes that the ecosphere, rather than any individual organism, is the source and support of all life and as such advises a holistic and ecocentric approach to government, industry, and individual. It recognizes the importance of the environment and the web of life, and realizes that

no single organism is more important than another. Instead, in ecocentrism it is the entire "sphere" of life that is important (Eckersley, 1992). Appropriate understanding of the human interaction with the planet is gained through a systematic approach in what humans do and the effect it has on the planet.

1.11.3 Pragmaticism

Reitan (2006) argues that our ideas, theories, and worldviews should be examined and evaluated in the light of their impact on lived experience, according to how well they enable us to maneuver through experience successfully. The link between pragmatism and environmentalism is in the fundamental assumption that there exists an essential link between our outlook on the world and our behavior.

Pragmatism argues that society conveys and accommodates all the ways in which by associating together humans share their experiences, and build up common interests and aims (Dewey, 1957). The process of socialization is inherently educational. All groups educate their members; socializing is immersion of members into the group culture that marks of “us” from “them”.

Consensus is the result of playing out complex and competing interests as solutions to problems that are pursued in common group interest (Dewey, 1902). An adjustment in how humans see and the way in which they act necessitates two-way communication. Firstly, experience has to be formulated (conceived and be seen as others would see it) in order to be communicated (Dewey, 1924). Secondly, to be a recipient of a communication (network flows) is to have an enlarged and changed experience in the agreement towards the consensus that has been won (Dewey, 1916). Pragmatism holds that both the meaning and the truth of any idea is a function of its practical outcome. Furthermore, pragmatism challenges the assumption that knowledge and action are two separate spheres, but permits for inconsistency between knowledge, attitude and practice in terms of time and space

as organisms orient themselves to real events in order to cope with life.

1.11.4 Integrative research and integration

In this study integrative research and integration when used in relation to human and environmental systems means the totality and not just the parts (Boyden, 1979; Horne, 1986). When used in terms of research methodology it means combining and pooling the expertise and knowledge from the various responsible fields as van Kerkhoff (2005) has used it. In terms of research instruments it is taken to mean a multi-pronged method that combines qualitative (constructivism) and quantitative (positivist) approaches (Kempton, Boster & Harley, 1997). Pragmatically, it means to combine the parts of the whole towards a more thorough and global understanding of human and system action (Reitan, 2006; Dewey, 1916, 1924, 1957). These various approaches are further elaborated below.

This thesis proceeds from the view that an integration of modern life-style systems helps us to see beyond the current environmental and social problems to underlying causes. Such an approach can in turn help provide valuable opportunities that can lead to more effective interventions. The rationale for this view is located in the limitations of statist[4] approaches when data sets are permitted to speak in their isolated contexts (Horne, 1986). An understanding of the wider social dynamics within which data sets are revealed offers better opportunities to understand society's inner contradictions. Similarly, interventions based on empirical data findings alone, can lead to treating symptoms rather than the underlying causes.

An integrated approach to analysis is necessary because people and environment systems are integrally connected and any intervention in one part of a

[4] Statist is used in the way that Wearne (1989) and Horne (1986) have used it to signal an empirical method where primacy is given to statistical data as fact.

system inevitably affects other parts. Integration is taken to mean bringing the various parts into a whole to more thoroughly understand the operations of the system. This research therefore argues that an integrated view of modern living should include relationships between society and environment, each affecting the other. People and their institutions act on the environment, and the environment creates opportunities and constraints for their actions. Within this view society is seen as both individuals and wider units, and their institutional arrangements and power relationships arising from the organization of their society (such as economic arrangements and power relationships) that limit or permit individual and group action (Ross, Poungsomlee, Punpuing, and Archavanitkul, 2000).

The integrative framework in this study builds upon Boyden (1979), and is more recently elaborated on by van Kerkhoff (2005). Both emphasize an interactive cycle between people's and organization's perceptions of and actions upon the biophysical environment, and the environment's enabling or constraining of possibilities for human action (Figure 1.4).

Figure 1.4 illustrates that the human-environmental cycle occurs at all societal scales, from individuals to groups, and through the various levels of institutional arrangements. People and organizations take actions which shape and reshape the environment which, in turn, affect the way they live and operate. While the relative power relations that are attributable to financial means, social status and political influence, strongly influence each party's capacity to affect the environment and must be considered a limitation, such limitation is mitigated in the respondent socio-economic profile. Participants in this research can be described as well educated in a social context, and informed in terms of the environment. Economically, their class potential is overwhelmingly middle-class oriented.

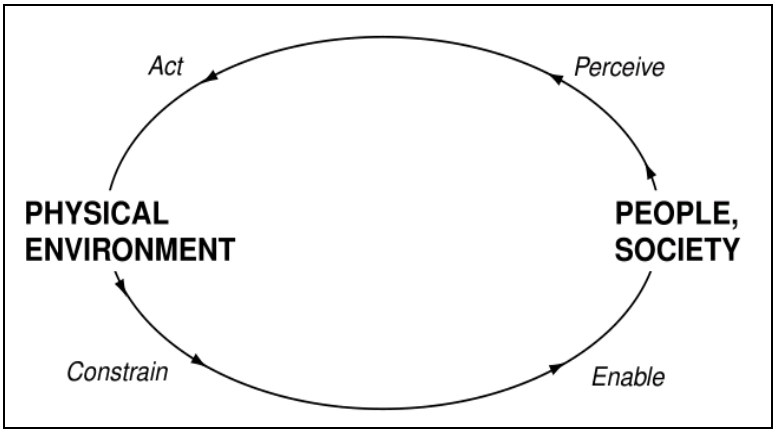

Figure 1.4: Interactions between people and environment

Source: Made after Boyden (1979)

1.11.5 Metaphors and imagery

Horne (1966; 1976; 1986; 1989) argues persuasively for the importance of metaphors and filters as significant images in understanding human action because they both at once help explain how things are and they influence human action as well. Similarly, Pavlov (1927) in his study on conditioned reflexes found that perception that resulted from imagery was a significant factor in action. Barthes (1985) further elaborates on the importance of imagery in *Camera Lucida: Reflections on Photography* and found that photographs as images hold important mental cues for human interaction with their environment. Consequently, when this research draws on imagery, such as centrifugal escape (Qi, 2000) and neural image (Schluppeck & Engel, 2002), it does so for both the explanatory value that they help provide and for their centrality to human action in the way Horne (1966; 1976; 1986; 1989), Pavlov (1927) and Barthes (1985) have explained them.

In a few words here, the law of motion in two dimensions known as ‘centrifugal escape in physics shows that when an object is placed further out from the center it feels a greater force and eventually it will slide off the platter (Figure 1.5). As for ‘neural image’ perception, the important point made by Schluppeck and Engel (Figure 1.6) can be illustrated in how subjects viewed Rubin's vase-face image

and reported perceptual alternations.

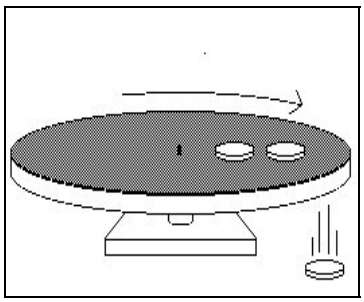

Figure 1.5: Centrifugal escape
Source: Qi (2000)

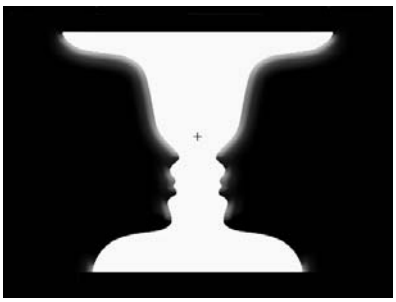

Figure 1.6: Neural image
Source: Schluppeck & Engel (2002)

Perception changes in the absence of any physical changes in the stimulus. This change process is explained in more detail in the conceptual framework. Its bearing here is on the point that images hold important mental cues for human interaction with their environment

1.12 Why examine university students and alumni?

Students and alumni as individuals and groups are environmentally "informed actors". As such they operate under social and environmental assumptions that differentiate them from the general population. Being informed places them in a privileged position and it bestows on them reciprocal social and environmental obligations (Schutz, 1962; Weber, 1968). How they have individually and collectively responded in their private and public lives to the environmental dilemma we face, can provide a valuable insight into the human-planet relationship. Similarly, their environmental knowledge, attitudes and practices profile as informed actors can shed important light on why we have continued on the present course of action despite their unique position when compared to the wider global community.

1.13 Conceptual framework

The conceptual framework that helps explain the dynamic-model behind this study is made up of conceptual and operational models (Figure 1.7). The 'conceptual' model considers the chief social variables that bear upon our daily lives and that at present compete for primacy and hold sway over contemporary thinking: the economy, environment (planet health), politics, and society (social justice) (Senge, 1990; UNEP, 1992, 2000). The 'operational' model describes the interaction between theory and practice that renders a world of conflicting ideas, rules and strategies where subjects orient themselves in practical ways to real situations by modifying their ideological and theoretical frameworks (concept) towards real-world action (operation).

Figure 1.7 shows that the concept is conceived as a 3-step beacon filter representing the human social daily life-cycle that individuals enter and through which they emerge changed in terms of their (K)nowledge, (A)ttitude and (P)ractice levels. Students and alumni are representatives of two distinct groups, but in their transitional form, they represent a third group which is shown in the overlapping ovals at the bottom of the concept diagram. The overlap is dynamic where the human action-cycle engages the physical environment and the individuals and groups of that society in terms of ongoing dialogue in terms of the validity of perceptions about certain realities that are either enabled or constrained that ultimately translate into 'real' action (Boyden, 1979).

The conceptual model comprises a series of steps that build towards a unifying representation of the world we live in and that help explain it.

At the first step, the mouth of the beacon depicts humans as entering the real world of possibility wherein on a daily basis they are confronted with various competing schemas offering 'real' choices with respect to the 'physical environment' and 'people in society' that revolve around various action cycles that

enable or constrain particular world views (1. Human-action cycle - Boyden, 1979). The direction of the arrows represents the gradient shift between the social that seeks to enable and the physical that constrains.

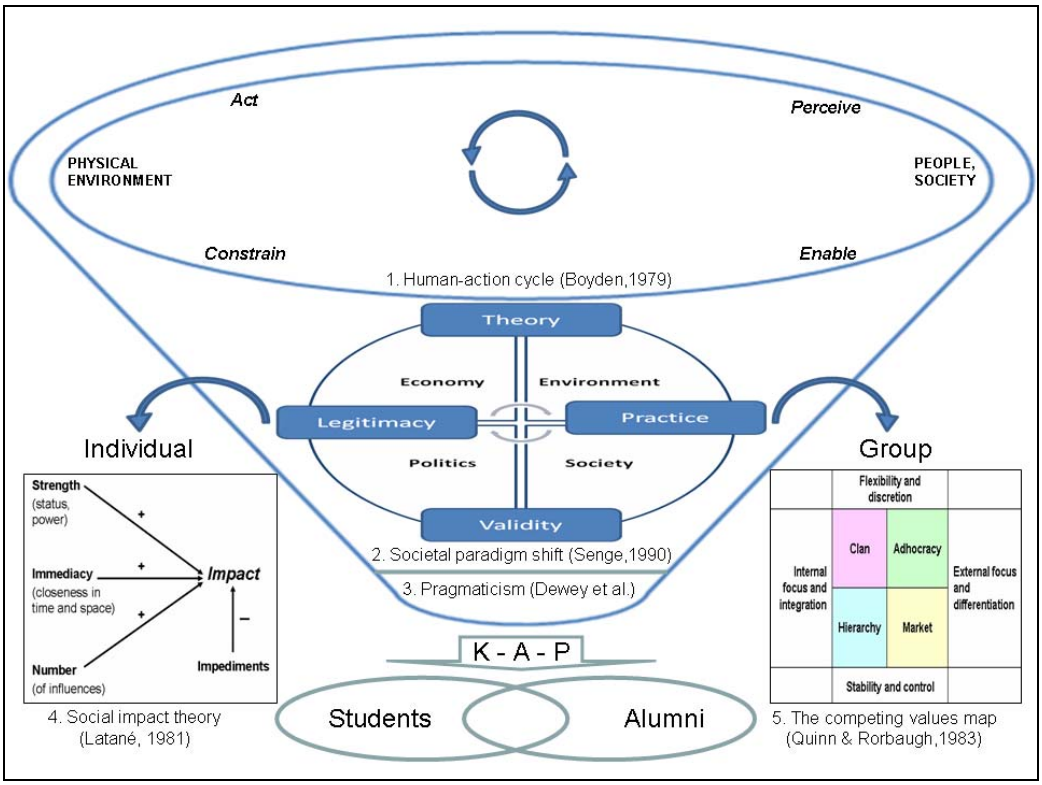

Figure 1.7: Conceptual framework

At the second step, deep within the beacon-filter, the dynamic real world of possibilities is further elaborated by various competing values that modify, confirm, reject the validity of established personal and group views and these are reproduced (2. Societal paradigm shift - Senge, 1990). The societal paradigm by Senge (1990) illustrates the daily machinations and struggles between the economy, politics theory and practice where counter-clock wise is the present paradigm that elevates the economy and clock wise is the paradigm of possibilities where the environment is prioritized.

At the third step, the point of egress helps explain the way in which humans modify their actions in terms of a ‘cost-analysis’ model whereby change occurs

when there are personal and societal benefits in change (3. Pragmaticism - Dewey et al.). Where no benefits exist, they are not observable or measurable, change does not occur.

Students and alumni emerge from the 3-step beacon-filter model changed in terms of their (K)nowledge, (A)ttitude and (P)ractice levels and this change can be explained at an individual level by social impact theory in terms of time and space (4. Social impact theory - Latané, 1981), and the organizational setup within which actors operate (5. The competing values map - Quinn & Rorbaugh, 1983). Naturally, there is considerable demarcation between individual and group systems in these models.

In order to hop out of the system that presently results in negative environmental impacts we must successfully negotiate the various variables that at present hold sway over current thinking where the economy dominates (2. Societal paradigm shift - Senge, 1990). At the level of the individual, escape is possible by bridging time and space dimensions, increasing the impacts of environmental messages, while at the same time reducing the impediments that inhibit positive outcomes (4. Social impact theory - Latané, 1981). Similarly, at a group level, a way out is offered through appropriate understanding of the role that the organizational setup plays within which actors operate (5. The competing values map - Quinn & Rorbaugh, 1983). The existing operational framework enables or impedes change possibilities while reproducing the existing setup (status quo).

No one to one relationship is presupposed in the social situation of students and alumni in the cross sectional research design. None can be offered because society is complex and so is human action. What can be said, is that the similarities and differences among and between theses groups in terms of: ideas and strategies; theory and practice; and, the rules of education and real life can point to wider realities in the human-planet relationship dilemma in these groups. The similarities

and differences can be illustrative of knowledge, attitude and practice levels in terms of time (distance from source), place (cultural setting) and space (situation). The relationship between informed actors (students and alumni) is daily colored by the competing schemas of economy (wealth and growth) environment (planetary health), politics (legitimacy) and society (social justice). The two groups as well as the 'overlap' offer unique and valuable research opportunities to collect meaningful data that will shed light on where these groups are located at present, but also provide an opportunity to see and understand something of the history of this process. Likewise, to gauge where the trend suggests we are heading in the future.

The critical point where intervention is possible within the 3-step beacon filter conceptual framework that represents human social daily life-cycles can be mapped out in diagrammatic form shown in Figure 1.8 where (L)ow involvement is education through provision of information and (H)igh is through information, motivation and empowerment to act. The intervention is conceived as an attempt at behavior modification.

The diagram in Figure 1.8 depicts the model as the interaction of the pertinent factors. Attempts at behavior modification in groups generally and intuitively, involve two main constructs (Baudains, 2003:104): (i) organizational factors such as culture, policy and structure; and (ii) individual factors such as attitudes, motivations and demographic characteristics.

The intervention proposed by this study involves individual factors such as attitudes, motivations and demographic characteristics. It attempts to influence these factors through the application of educational strategies (6. Intervention framework – Baudains, 2003).

The centre square in Figure 1.8 represents the role of educational intervention, which can vary in the level of participant involvement from [L]ow (information) to [H]igh (individual self-leadership and empowerment to act). This

thesis argues for [H]igh (individual self-leadership and empowerment to act) intervention approaches and further suggests that empowering and involving people in learning and decision making, thereby encouraging self-regulated learning (Baudains, 2003). The right hand side of the diagram represents the result of educational intervention as outcomes that lead to changed individuals, while the dashed arrow leading back to the individual is a positive feedback loop that serves to increase the base. Following Baudains (2003), it is hypothesized that a [H]igh level of involvement afforded by the educational intervention can lead to increased levels of focus and intimacy on targeted issues so that the change in individual might translate to changes at organizational level as well.

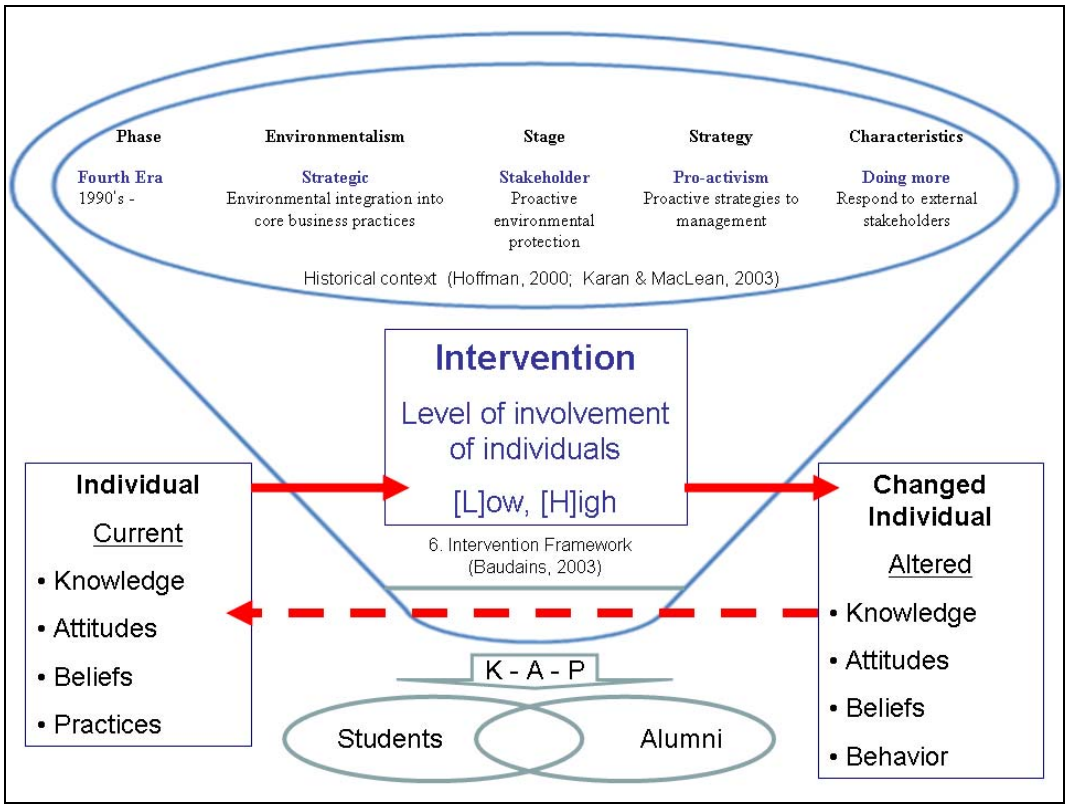

Figure 1.8: Intervention framework

Source: Made after Baudains, 2003:104.

In its simplest form the conceptual framework can be formulated and explained through the use of a metaphor of a series of “filters” (Figure 1.9) that help

actors make sense of their world and draw them to consensus.

The inverse ice-berg model shows the filtering process (mediation) that takes place as we negotiate the real world as we are drawn to consensus (snapshot) (Horne, 1986). This is not an exhaustive system of filters. The diagram highlights the most important variables (filters) that help us distill the various influences that impact upon our daily lives such as: ideas, social variables, theory/practice, rules and strategies.

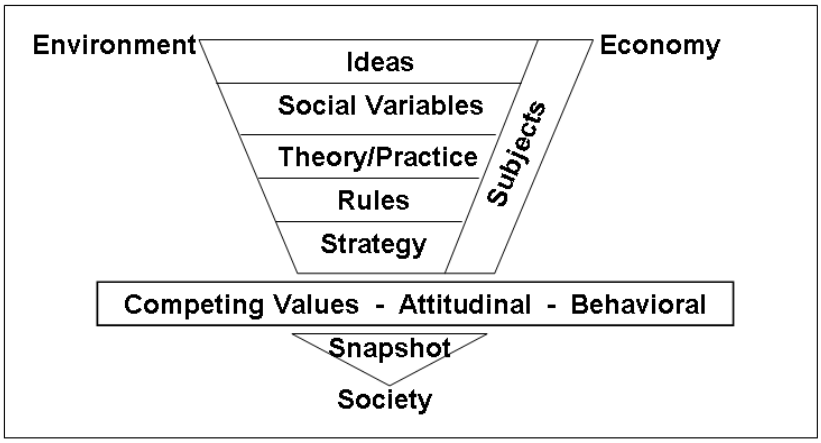

Figure 1.9: Social filters towards consensus

Source: Made after Horne (1986).

Figure 1.9 depicts the subjects (students and alumni) as using filters to make sense of their world, modify their central assumptions, justify their decisions, find new strategies to cope with change and similar. Public actors, students and alumni in this instance, are influenced by each filter to varying degrees, but the main point is that as social actors they are not detached from the process to which they are integrally connected, and they are influenced, consciously or unconsciously, knowingly or unknowingly, by the system in ways that can induce orientation. This study seeks to capture this moment of orientation (snapshot) by identifying, profiling, testing and recommending change by using instruments such as: ‘competing values framework’, attitudinal and behavioral survey and ‘face-to-face” interview and

intervention program.

1.14 Limitations and mitigation

Naturally, there is significant bias embedded in any study of groups operating within complex human systems. Both the exploratory and the intervention strategy considered ways that such predisposition can be mitigated in the sample group profiles with respect to the total population, and in their demographic profile comparatively and correspondingly. While, this study explores environmentalism in informed actors, it is arguable whether such findings are attributable to the general population. Similarly, this study researched the essential knowledge, attitude and practice levels of groups of individuals from a university in Thailand. The extent to which these findings are true of any university in another time and place are likewise unsettled.

At the same time, it is noted with respect to the above limitations that distance from source of relevance and the resultant behaviors connected to it are a universal phenomenon that need not necessarily be anchored to one time (today) and place (Thailand). It is possible that the interconnectedness in themes and social variables between the research findings and other social environmental situations, places and outcomes might at the very least converge on the issue of regression in knowledge and practice levels in human subjects in terms of time and space and the dislocation of attitude on questions of social action in ethical terms.

The limitations of this research are intrinsically linked to recommendations that stem from it and are inclusive of comparative research between other universities and nations as well. Additionally, focus needs be placed on replicating the methodologies employed in this research to other situations as well. It would be interesting for example if governmental support for the present research type-approaches might yield more favorable long term and sustainable environmental

results in interventions through support networks. Similarly the importance of pragmaticism on how individuals and groups come to consensus cannot be underestimated.

The relationship between the exploratory and intervention framework design and the problems and limitations they posed for this research are addressed in detail in the appropriate methodology chapter 3 sections (3.4 Research design, 3.6 Integrated research and integration, 3.8 Research objective one: Exploratory, 3.8.7 Limitation of research method, 3.8.9 Testing and validation of research instruments, 3.9 Research objective two: Intervention, 3.9.3 Intervention mediums) and concluding chapter 6 sections (6.5 Limitations, 6.6 Directions for future research).

Briefly here, in order to obtain the depth and breadth of data in terms of the thesis objectives and hypotheses this study utilized a multi-pronged method (‘integrative’ as defined earlier) by combining qualitative (constructivism) and quantitative (positivist) approaches (Kempton, Boster & Harley, 1997). The exploratory study (research objective 1 and hypotheses 1-3) employs questionnaire design to identify the role that time, place and impediments play on informed environmental actors in terms of knowledge, attitude and practice. While, the intervention study (research objective 2 and hypothesis 4), utilized the findings from the exploratory research to apply and test whether interventions can realign knowledge, attitude and practices in research participants by bringing the environment into sharp focus.

In terms of the exploratory study, all care was taken to minimize the bias in the research method. With respect to students, all students were sampled, thereby minimizing the embedded bias in the study. With respect to alumni, Random Number Generator (Devilly, 2004) was utilized to minimize the selection bias. Nevertheless, for both, the extent to which the returned data is representative of each respective group as a whole is dependent on factors out of the control of the research

method and instruments used. Such limitations include time to complete the questionnaire, motivation to participate, as well as a whole host of other variables that make up the human condition. In order to test the validity and appropriateness of the research instrument for a study of this type a quantitative survey was conducted at Thammasat University in Thailand and the data results were used to benchmark the findings from the final survey and to fine-tune the data collection instrument.

As for the intervention framework, following Baudains (2003) the most effective educational strategy to use in a workplace situation in terms of individuals to induce voluntary behavior-change to more environmentally friendly modes, requires the design of an intervention which focuses on involvement and ownership of the learning process (Table 3.2: Intervention table). The administration intervention strategy adopted the 'deep learning' approach that is bottom-up oriented that stresses personal ownership to translate knowledge and attitude into practice. Writers in the field of environmental corporatism have identified 4 phases in paradigm thinking: (i) pre 1970's; (ii) 1970's; (iii) 1980's; and, (iv) current (Hoffman, 2000; Karan and MacLean, 2003). The strategy is in line with current thinking and fits into the fourth phase (fourth era) of corporate environmentalism that focuses on stakeholder management and proactive protection of environmental issues over which individuals and groups have control (Table 3.3 Corporate environmentalism and corporate strategy).

1.15 Expectations

This research stems from the expectation that university students of the environment are more likely to practice positive environmental behaviors than are alumni. Similarly, both students and alumni are more likely to practice what they know and believe when focus on environmental issues is immediate. As the

intimacy changes scale and location so does the level of practice and impediments to practice increase (Yearley, 2005; Reitan, 1998). Pragmatically, the further humans are removed from the center the stronger the effect of the change stimulus from the outside. Following Parker (1996) the phenomenon of change can be explained as an expression of pragmatism as human actors orient themselves to outside forces and life itself where "the righteousness of the action is largely system-dependent" (Parker,1996:26) and the aim of ethics in such a system is not perfect righteousness, but "creative mediation between claims to value" (Parker,1996:26). Here, place is a crucial determinant that affects behavior in different settings. In this regard, Orr (1992) writes: "The study of place ... has a significance in reeducating people in the art of living well where they are" (Orr, 1992:130). The pragmatist variation of theme of place, argues that in change, the fact that we may proceed by trial and error does not imply that we are "getting it right": rather that we are "making it work" for the time being (Stables, 2004:233). Here, cohesion between beliefs and actions is related to time and place and consensus is won in the junction between beliefs and actions for a purpose.

Social impact theory (Latané, 1981) helps to address the complex questions of the pragmatic orientation between human subjects and the environment (Reitan (2006) in terms of individuals. While competing values map (Quinn & Rorbaugh, 1983) helps explain the organizational setup within which actors operate as a group. The link between pragmatism and environmentalism is in the fundamental assumption that there exists an essential link between our outlook on the world and our behavior and that this changes in terms of time and space.

Pragmatism argues that society conveys and accommodates all the ways in which by associating together humans share their experiences, and build up common interests and aims (Dewey, 1957). Consensus is the result of playing out complex and competing interests as solutions to problems that are pursued in common group

interest (Dewey, 1902). An adjustment in how humans see and the way in which they act necessitates two-way communication.

Change can occur. Learning approaches that prioritize the relative strength of ‘knowing about knowing’ as tools to learning, stress that appropriate action depends on appropriate knowledge of the world on which they act. When an individual knows what it knows, its actions are different from an individual that is locked out of its library of knowledge. Zimmerman (1986, 1990) argues that learning for behavior change is more effective if the learner is self-regulated in terms of awareness and in control of their own learning. The prime feature of self-regulation is that learners of this type are metacognitively, motivationally and behaviorally active participants in their own learning (Zimmerman, 1990). Intervention strategies that accommodate metacognitive variables into the learning change-process provide the best possibility for effective long term change. The intervention strategy administered in this work adopts the ‘deep learning’ or [H]igh level of involvement approach as outlined by Baudains (2003) and others. Such an approach is both current and 'best practice' (Hoffman, 2000; Karan and MacLean, 2003) and can be located in the fourth phase (fourth era) of corporate environmentalism that focuses on stakeholder management and proactive protection of environmental issues over which individuals and groups have control.

1.16 Summary

The purpose of this chapter was to provide an overview of this thesis which deals with environmental activism in informed environmental actors. The objectives of the study were to identify key internal and external factors that facilitate or impede the integration of ecological values acquired from environmental education and applied in the real world in terms of knowledge, attitude and practice. Informed environmental actors were chosen as target group because of their unique position

with respect to the center of current environmental knowledge. Students are immediate to the latest cutting-edge environmental know-how, while alumni are variably removed. Both groups individually, collectively and correspondingly offer a unique specimen for research to examine the present and past, and can additionally help project future possibilities for environmental paradigms in action.

In terms of the exploratory study (Figure 1.7) the concept is conceived as a 3-step beacon filter representing the human social daily life-cycle that individuals enter and through which they emerge changed in terms of their (K)nowledge, (A)ttitude and (P)ractice levels. At the top level (the point of entry) the 'physical environment' and 'people in society' enable or constrain particular world views (Boyden, 1979). At the secondary level, the societal paradigm (Senge, 1990) illustrates the daily machinations and struggles between the economy, politics theory and practice that ultimately determine individual and group outcomes of action in environmental terms of. Whereas, pragmaticism (Dewey et al.) helps explicate the way in which humans come to consensus (cost-analysis) in daily life in terms of their respective actions in a given situation. Where no benefits exist, change does not occur. Students and alumni emerge from the beacon-filter changed in terms of (K)nowledge, (A)ttitude and (P)ractice levels and this change can be explained at an individual level by social impact theory (time and space) (Latane, 1981). While, the competing values map (Quinn & Rorbaugh, 1983), illustrates the influence of the organizational setup that enables, constrains or reproduces particular world-views as observed in action.

The intervention is conceived as an attempt at behaviour modification (Figure 1.8). Generally, in groups this involves two main constructs (Baudains, 2003:104): (i) organizational factors such as culture, policy and structure; and (ii) individual factors such as attitudes, motivations and demographic characteristics. The intervention proposed by this study involves [H]igh level of individual involvement

in self-leadership and empowerment to act that is inclusive of individual factors such as attitudes, motivations and demographic characteristics. It attempts to influence these factors through the application of educational strategies (Baudains, 2003:104). This approach is contextually located in the final phase of environmental corporatism in terms of theorized paradigms of which there are four: (i) pre 1970's; (ii) 1970's; (iii) 1980's; and, (iv) current (Hoffman, 2000; Karan & MacLean, 2003). This approach focuses on stakeholder management and proactive protection of environmental issues over which individuals and groups have control.

1.17 Organization of the study

The thesis is presented in six chapters. The first part delineates the central problem, states the hypotheses which informs the study and specifies the research question and objectives of the research.

The second chapter examines the current literature about the environment from several perspectives: sociology, psychology, education, organizational behavior and activism. By exploring the ways in which individual disciplines have responded to the environmental crisis, the various frameworks provided by them on the path to understanding the human condition, it seeks a unifying theme that can lead to change.

The third chapter seeks and elaborates an appropriate methodology for this research including the rationale and content of the questionnaire instruments and the intervention framework used to test the central hypothesis.

The fourth chapter reports the findings of the empirical studies conducted for this thesis.

The fifth chapter provides an integration of the findings from the empirical and qualitative studies (experimental and intervention framework) so as to more thoroughly understand both problems and solutions in the environment.

Finally, the sixth chapter draws together the theoretical and practical findings of this research and considers the implications of these findings for public policy. As well, this chapter ascribes the limitations of the study and elaborates recommendations for further research.

CHAPTER II
LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide a review of literature concerning society, environment and education related to existing frameworks that help explain the way in which the relationship between knowledge, attitude and practice has been conceived and explained. The review is presented in a number of parts. The first part highlights the complexity and interrelatedness of the human-nature relationship so that a contextual view might lead to a broader awareness to the intricacy of both problems and solutions in environmentalism. The second section examines the worldviews that have informed environmental debates to date in terms of environmental sociology and psychology and the important contribution cultural 'flows' perspectives have made in their time and place dimension towards a better understanding of the human-environmental interaction so far as the planetary crisis we face today is concerned. The third slice looks at education and does so from the perspective of global and local, institutional and societal responding. In particular it asks whether education is the answer to the problems we face. Finally, the last part explores the role that pragmatism plays as a broad bridge between humans and society and theory and practice.

The problem of environmental degradation and the solutions are integrally connected and complex. While humans have more understanding than ever of the natural world they inhabit, there remains widespread killing, destruction and insensitivity to forms of life and the sources producing them (Rolston, 2006).

2.2 Literature context

Answers to the environmental dilemma we presently face have been forthcoming from numerous fields including psychology, sociology, organizations and activism and this is discussed below. For the moment, existing approaches that have compartmentalized research have failed to appreciate that real life itself is not organized in the categories they have created. Furthermore, group separations have tended to lead to 'politically neutral' frameworks of power, mostly "because no one else is trained to understand 'the other two thirds' of their intercessive discipline that they leave out" (Huber, 2001:9). The main point to be made here, is that there is no singular solution to the problem but a combination of a number approaches is necessary and drawing on the knowledge and experience from a number of disciplines (van Kerkhoff, 2005). At the same time, the problem of environmental degradation persists.

2.2.1 Environmental narrative

Sustainability is a core principle for global change. It stands at the crossroads between meeting the needs of the present generation without compromising the ability of future generations to meet their needs (World Commission on Environment and Development, 1987). It is at once inclusive of both economic factors concerned with economic growth while simultaneously protecting the environment and natural resources and all that that entails. Such a definition charges all citizens from whatever realm with global and social responsibility to share in the common triumph over environmental degradation. Therefore all humans have a role to play in changing existing patterns of consumption, production and in minimizing environmental damage (United Nations, 2002).

At the World Summit on Sustainable Development in Rio in 1992 (United Nations Environment Programme, 1992) the international community adopted

Agenda 21, which represented both an unprecedented rallying of the world community towards a single cause and provided a strategic plan to mobilize the citizens of the world to action on the issue of sustainable development. The theme of working towards a common cause was continued in May 2000 at the Inter-governmental Panel on Climate Change in Nairobi, Kenya (United Nations Environment Programme, 2000). The most important cause of the environmental crisis was formally identified as the vast consumption of fossil fuels for energy and how this has led us on a path to increased global warming.

Sixteen years after the Rio Summit and eight years after Nairobi, the point at which we stand today is even more serious. Just recently, The Bulletin of the Atomic Scientists (2007) adjusted the metaphoric clock that is used to measure the degree of peril we globally face from 7 to 5 minutes before midnight. The change was precipitated by findings that over the next three to four decades climate change could cause irremediable harm to the habitats upon which human societies depend for survival (Mitchell, 2007).

While the environment is a common source of concern, human decisions are influenced by more than one factor. The complexity between beliefs and actions on the one hand and competing social issues on the other, is a fundamental cause that needs to be considered as we strive to achieve the goals of sustainable development. Decision makers must simultaneously consider aspects of the economy, environment and society (equity) (UNEP, 1992; UNEP, 2000). The complexities involved in managing sustainable development from an administrative perspective in a competing values context, are highlighted time and again. For example while community studies have identified a deep desire for positive environmental outcomes and preservation of environmental quality, issues that do not have an immediate impact on individuals and the economy are often marginalized or labeled as a lower priority. Preference is often given to actions that will attend to the most

immediate source of problem or risk, and as a result physical support for the environment becomes far more difficult (Environmental Protection Agency, 1994; 1995). In this vein, Lothian (1994) reported that 75% of Australians felt they were concerned for and supportive of the environment. However, despite this apparent support, often described as 'verbal commitment' to the environment, actual behavior is often found to be contradictory (Baudains, 1998; Clarke, 1996; Finger, 1994). This inconsistency between intention and behavior is the focus of much literature in the fields of psychology, sociology and in education, and provides an important backdrop to the current research, which explores ways to bring behavior more in line with knowledge and attitudes.

Similarly, some of the assumptions about education also need to be reevaluated. In particular, to explore whether knowledge imparted in formal education leads to retention of that knowledge, and can be applied in situations outside the classroom. Understanding the assumptions that education has made about the role knowledge plays in human beliefs and actions has a direct bearing on the relationship between knowledge, beliefs and actions.

There are no longer any excuses for procrastination or inaction on environmental issues that affect the planet. The United Nations Environment Programme (2007) in *The Fourth Global Environment Outlook: Environment for Development* report of the 25th October 2007 has highlighted the important difference between previous arguments about the crisis (the third report, released in 2002) and the latest GEO. The GEO-4 report contends that previous claims and counter claims over climate change are in many ways over. The Intergovernmental Panel on Climate Change (IPCC) now estimates that the impacts will take effect not in the distant future "but within the lifetime of our generation" (UNEP, 2007:18).

The challenge now is not whether climate change is happening or whether it should be addressed but how and when. Climate change solutions however, cannot

be compartmentalized into single responsibilities of individuals, countries, governments or groups. Climate change and environmental issues threaten all of us and everything. Negative change impacts on every facet of human life and it is therefore the responsibility of every individual to play a part in addressing the problems we ourselves have created (Oskamp, 2000; Howard, 2000).

Ironically, as Wearne (2007) has argued we are confronted today with cumulative problems that derive from how we typically understand the world in which we live. We are presently in a situation whereby we have to find a path that will allow us to make a contribution to public justice while also critically uncovering the taken-for-granted political dogmas that we have inherited and by which we, in repentant retrospect, have followed to planet and human detriment. Significantly, in our actions we continue to proceed through life as though we are content with the compromises we have made with respect to the planet (Wearne, 2007).

However, action by social actors is a complex process. Social actors do not metaphorically or actually clock on or off as they traverse from one social setting to another. Cultural “baggage” in sociological contexts is a three-fold interaction between institutions, organizations and relationships. This triad is a basic sociological framework within which social action can be analyzed and understood. Actors are held to institutional bonds quite apart from their will or their “clocking on or off”. Organizational membership is a matter of forming the conditions of some or other social relationships and indeed one may "clock on" and become constrained by one's managerial line. Inter-personal relationships occur in all institutional and organizational settings, as well as outside of them, and can be formed to a greater or lesser extent (Wearne, 2004). What this means for environmental activism is that while top-down environmental initiatives might yield empirical results on the job, the extent to which these directives serve as positive environmental “enablers” and are able to be internalized and migrated outside the working settings is debatable. At

the same time, the social setting might serve as an “inhibitor” to personal “will” where such activism is already present in individuals and groups, yet the workplace setting is of such configuration that it does not permit such views to flourish. The importance of enablers and inhibitors is accordingly prioritized in this thesis.

2.2.2 Complexities of problems and solutions

Yearley (2005) contends that in everyday life what we find is that people assess environmental issues in a more complex manner than the single hierarchy of post-materialism would imply. The values that inform actions are heavily dependent on local context which tends to weaken the reliability of more generalized value dispositions that seek a one to one relationship between knowledge and actions.

Some of the problems that environmentalism has faced concern ways of explaining beliefs and actions. In part this is on account of a definition deficit in identifying problems by looking to individual disciplines for answers. The other has been historical, in struggling to find answers to the when, how and why questions in life. In seeking answers to both these issues, Yearley (2005) and Reitan (1998) have argued for a new worldview. But, not just new in name, but one that can accommodate the complexity of the problem which van Kerkhoff (2005) has alerted us to, so that pooling of intellectual capital to fight a common enemy on a united front is not only increasingly necessary but indispensable.

In terms of definition, the problem we face today in the environment is primarily in the categorization of the argument and how we have conceptualized both the problem and the solution. Generally, compartmentalization of environmental problems has been framed in terms of: (i) pollution and depletion; (ii) severity of the problem; and, (iii) values and value change. At the same time we note that environmental problems are integrally connected, the environment is systematic, and this has been highlighted time and again in numerous studies in the field

(Carson, 1962; Harding, 1968; Lovelock, 2006; Schumacher, 1997; and Vannote, 1980).

Yearley (2005) argues persuasively that since the period of environmental activism and policy debates that date from around the end of the 1960s, the idea has been firmly fixed that pollution and resource depletion are complementary sources of threat and anxiety. The argument is framed in terms of the view that if pollution does not ultimately catch up with mankind, resource depletion will (Club of Rome, 1972). The principal problem with the pollution/resource distinction in terms of explaining, is in clarity of definition and meanings that Yearley (2005) illustrates in the example of genetically modified farmed fish. For example, should farmed salmon that escape captivity be regarded as a form of genetic pollution since they threaten to inter-breed with native fish and pollute the gene pool. At the same time their escape has a direct impact on the salmon fishery when looked at as a resource base, since their inter-breeding and competition with native fish will have an unpredictable effect on the natural resource.

In the above example causally both outcomes are linked at the source, yet the priority given to neatly packaged problems frequently treats each as a separate sphere requiring individual solutions. As the ecosystem is linked, each individual solution ultimately leads to the perpetuation of the original problems and often creating new unforeseen ones as well (Glasbergen and Cörvers, 1995; Kraft and Vig, 2003).

Other complexities endemic to the environmental debate revolve around the view that in order to create a sustainable human society that is at the same time rooted in a flourishing natural environment, we need to change how we think about our relationship with nature. Reitan (1998) argues that this is a noble endeavor, but that a simple change in public policy is not enough. While modest social changes such as increased use of public transportation or a growing commitment to recycling

are a start on the right path to change, that too is not nearly enough. Similarly, while education and teaching about the environment have provided a rich catalog of detail about the dangers of current practices and the value of caring, this is not the kind of paradigm shift that is required at this time. While arguing in ethical terms can go some way towards the kind of social change that is required, individual and collective moral duty is subjected to numerous social filters on the path to consensus so that what is translated into action is not necessarily consistent with the ethic that inspired such action. Instead, proponents of new world views paradigm argue that what is needed is a wholesale change in our worldview that Leopold (1949) and others have proposed. Others still, have argued that a radical revision of previous assumptions in terms of worldviews is "already underway" (Capra, 1996:6). However, paradigm shifts are problematic in many respects: in definition, in failing to causally link theorizing with real life, and in looking for solutions from within individual disciplines. Moreover, paradigm shifts are resisted because they threaten the existing order.

The existing order that constitutes the contemporary social paradigm finds expression in the long-standing anthropocentric tradition of modern western culture that dates back to the industrial revolution proper. However, its founding idea of man's control over the planet can be traced back to popular religion at its source (White, 1967). Therefore any paradigm change proposed strikes at the very foundation of modern society and does so economically and culturally too.

Furthermore, finding an objective definition that helps explain a dynamic, changing and subjective concept such as nature is itself problematic. There are perhaps as many individual views about what constitutes nature as there are people. Miller (2002) for example identifies two main streams that help explain nature: 'atomistic' or individual-centered and 'holistic' or earth-centered. Atomistic is one where humans have a tendency to be 'anthropocentric' or 'biocentric', and

‘biocentric’ views in turn are ‘species-specific’ or ‘individual-centered’. A holistic view is either ‘biosphere-centered’ or ‘ecosystem-centered’. The difference between atomistic and holistic worldviews turns on the conceptualization that either man rules nature or is part of nature. There are numerous other approaches between and beyond atomistic and holistic that make up the middle ground and the fringes. Deep ecology is one example that helps explain the relationship between man and nature whose central premise is nature conservation (Naess, 1972; Pepper, 1996). It presupposes an ecocentric ethic that denotes equal value to all parts of the ecosystem, including humans. It rejects the dualism of humans and nature, and instead argues that human and nature are indeed one (Pepper 1996). Human life should therefore proceed from the principle that to live with nature is a desired state and not against it.

Ecopsychology is yet another common way to describe the relationship between humans and nature. It stresses a connection between psychology and ecology. Its central feature is an attempt to fuse together psychology, cosmology, and ecology “to heal the human mind from increasing alienation from nature, especially in industrial society” (Roszak, 1993: 320).

The above theoretical approaches are illustrative of the multitude of frameworks that have served to guide towards an appropriate human-nature relationships (Catton and Dunlap, 1978; 1980). In emphasizing the narrow anthropocentrism of classical approaches to environmental problems, and in proposing an adoption of new ecological 'paradigms', these alternative frameworks have made a significant contribution to the debate. However, any commitment to a paradigm shift that is either premature or wholesale, without at the same time embracing a total systems understanding of the problem, the dynamics of everyday life, and the necessity for an integrated approach to both problem identification and resultant solution, is itself part of the problem and does not lead to a “true” path out of the quagmire we find ourselves in today (Yearley, 2005; Reitan, 1998).

Increasingly the environmental debate today has coalesced around the view that an integrated approach offers the best solution for the future (van Kerkhoff, 2005). Such an approach would require designing an integrative research program that is able to negotiate a balance between the scientific interest of research and the practical interests of non-scientific partners. Furthermore, an effective approach would examine the validity of both the categorization of existing problems and solution, and the tangible expressions of the practical politics involved in reconciling scientific and practical interests (Yearley, 2005) and Reitan, 1998). An integrative approach that successfully accommodates the geographic scope of policy arenas, sources of scientific credibility, and the political risks facing partners offers the best hope towards appropriate identification of problems and therefore discovering appropriate solutions that fit (van Kerkhoff, 2005).

2.3 Environmental sociology response to crisis

The following are a few brief moments drawn from sociology to provide a context to issues in environmental sociology. The problems and challenges that it has faced, how it has responded to the environmental crisis and similar are all illustrative of a social approach that attempts to deal with real-life situations in real-time. The contours of the historic specificity of the problem are all illustrative of stop-gap social philosophy that has for too long neglected the underlying reasons for existing environmental problems. In the main, the complexity of the problem sociology has been presented with reflect upon its responding because it has at once been part of the problem as well as the solution. In seeking to capture a society as it moves, it has primarily focused on explaining society and nature as two separate spheres. When the solutions have come, society and problem had already shifted. Consequently, sociology has theorized group action on the run and this has been at the expense of the environment.

The sociology of the environment follows two distinct strands with a number of other frameworks filling in the middle and fringe ends. One strand derives from the US following the redefining of the distinction between sociology of the environment and it's rewording and emphasis on ‘environmental sociology’ (Dunlap and Catton, 1979; Dunlap and Catton, 1994). Another strand emanates from Europe and its catalyst is The Club of Rome (1970; 2006).

2.3.1 Societal paradigms

Environmental sociology is the study of the reciprocal interactions between the physical environment, social organization, and social behavior. For sociology the environment encompasses all physical and material bases of life in a scale ranging from the most micro level to the biosphere. An important development in sociology as discipline is the shift from a “sociology of environment” to an “environmental sociology”. While the former refers to the study of environmental issues through the lens of traditional sociology, the latter encompasses the societal-environmental relations in a way that recognizes both the complexities of the problem and that the problem itself is problematic (Dunlap and Catton, 1979; Dunlap and Catton, 1994).

A paradigm or worldview in sociology is a unifying frame of reference that allows an individual to conceptualize notions of self, society, and the universe and to perceive and interpret the world. A worldview in its generic form provides a framework for generating, maintaining, and applying knowledge. Environmental worldviews on the other hand are peoples’ multidimensional beliefs concerning their everyday role in the natural ecosystem and the built world (urban areas and infrastructures). They include an environmental ethic, and assumptions and values about “how the world operates” (Hill, 2006:166). Our environmental worldviews determine the questions we ask and conclusions we make concerning environmental issues that translate into human action. The experiences that make up an individual’s

worldview are interpreted differently by groups. Additionally, worldviews "are held in different ways across subgroups of the population" (Nooney, Woodrum, Hoban, and Clifford, 2003:779) as well. Culture is yet another variable that interfaces to give meaning to a worldview.

Culture can be defined as a shared meaning system, a context for educational efforts, and a path for learning. Culture is a repository for what social group members agree about. It is an expression of emotions and rational thought aligned with ideology. It is based on the unique history of a group of people intersecting with physical, social, economic, and political interests that are always dynamic and changing. Culture is learned, challenged, resisted, sustained, and transmuted through education and includes "the total life space in which individual development takes place" (Alfred, 2002:7). Cultural beliefs and values are organized by people using cultural models. Cultural models are a way in which we attempt to put order where order is sometimes not easily discernable. Sustainable development is an example of cultural model whose central premise is that "humans are part of the (limited) environment and depend upon it; nature is interdependent, balanced and unpredictable; different parts of nature are so interdependent that altering one can have multiple linked chain reactions" (Kempton, Boster, and Hartley, 1995:43). The 'River as a Continuum' by Vannote (1980) is another example of a cultural model that argues that nature is interdependent, yet in many respects predictable, and that this permits for an understanding of the dynamics of the various interconnections in the cause and effect chain.

Kellert and Wilson (1993) provide an overview of worldviews over the whole gradient in terms of the conceptual function that the world view affects. Table 2.1 is an adaptation of this functional approach by Kellert and Wilson (1993:59). This framework provides a range of common "values of nature" that humans have employed through time. The important feature of this formulation is that there is no

single approach to which all of society has coalesced around to serve as a significant leading image towards change. The theoretical differences in conceptualizing the human-nature relationship are deeply illustrative of differences in human value judgments about what is nature and how we should interact with it. The similarities point to an equally disturbing puzzlement about our position with respect to nature (in/out hypothesis). A general commonality across approaches is that nature has a means-ends function for humans. Whether in appreciation, utility or in understanding the interconnectedness of the nature system, each approach has stressed time and again nature's provider role. The pertinence of these views is in the relationship that they point to between knowledge, attitude and practice in societal terms on the one hand, and the appropriate interaction with society on the other. The relevance for this thesis that flows from the above premise is in illuminating the student alumni relationship. Student frames of reference are colored by exposure to the latest environmental knowledge within a unique operational space, whereas alumni as integrated members of the wider social system have found integration to encapsulate perpetuation of existing dominant environmental paradigms and world views (Kellert and Wilson, 1993).

2.3.2 Issues in environmental sociology

Sociology has been slow in responding to the emerging environmental crisis both in "responding" to and in "theorizing" the environment.

According to (Huber, 2001:2) in terms of responding, firstly, sociology has been a late-comer to environmental research. Secondly, it initially failed to take the discipline of environmental sociology and the environmental crisis seriously enough. Thirdly, it conceived that it was necessary to first find an appropriate role for environmental sociology both within sociology as well as in the field of interdisciplinary cooperation before it could act.

Table 2.1: Environmental worldviews

Term	Definition	Function
Utilitarian	Practical and material exploitation of nature	Physical sustenance/security
Naturalistic	Satisfaction from direct experience/contact with nature	Curiosity, outdoor skills, mental/physical development
Ecologistic-Scientific	Systematic study of structure, function, and relationship in nature	Knowledge, understanding, observational skills
Aesthetic	Physical appeal and beauty of nature	Inspiration, harmony, peace, security
Symbolic	Use of nature for metaphorical expression, language, expressive thought	Communication, mental development
Humanistic	Strong affection, emotional attachment, "love" for nature	Group bonding, sharing, cooperation, companionship
Moralistic	Strong affinity, spiritual reverence, ethical concern for nature	Order and meaning of life, kinship and affiliational ties
Dominionistic	Mastery, physical control, dominance of nature	Mechanical skills, physical prowess, ability to subdue
Negativistic	Fear, aversion, alienation from nature	Security, protection, safety

Source: Kellert and Wilson (1993)

In terms of theorizing in environmental sociology, sociology has been burdened by three reductionisms in considering environmental degradation and sustainability strategies: sociological reductionism, physical/biological sciences reductionism, and technological reductionism. While all three 'reductionisms' interrelate in the real world, sociology has mostly relied on individual theoretical approaches. For example, instead of analyzing how consumption, technology, and politics interact in certain embedded processes of competition and scale, it adopted counter opposed functionalist and false dualisms to rely instead on a "naive

technological salvationism at a loss to implement itself" (Whitaker, 2002:1).

2.3.3 The Club of Rome

The Club of Rome is a group of scientists, economists, businessmen, international high civil servants, and current and former heads of state who pool their different experiences from a wide range of backgrounds to come to a deeper understanding of the 'world problematique'. World Problematique' is a concept coined by the Club of Rome to describe the set of the crucial problems: political, social, economic, technological, environmental, psychological and cultural facing humanity. The complexity of the world problematique lies in the high level of mutual interdependence of all these problems on the one hand, and in the long time it often takes until the impact of action and reaction in this complex system becomes visible (Club of Rome, 2006).

The Club of Rome (1970) first raised attention with a proposal in 1970 alerting to growing world-wide environmental complexities and uncertainties. However, it was with 'Limits to Growth' in 1972 that they formally entered the environmental debate. It was in the later that they predicted that economic growth could not continue indefinitely because of the limited availability of natural resources, particularly oil (Ayres, 1996).

The Club of Rome (2006) mission in brief is concerned with: (i) identification of the most crucial problems facing humanity it calls 'problematique'; (ii) to research future alternative solutions and elaboration of scenarios for the future; and, (iii) communication of such problems to all. The organization's principles are founded on the belief that what is required to address the environmental problems that confront us today are: (i) a global perspective in examining issues beyond the capacity of individual countries; (ii) holistic thinking that seeks deeper understanding of complexity in contemporary problems; and, (iii) an

interdisciplinary and long-term perspective focusing on the choices and policies. Their scope and purpose are primarily directed at five major global concerns: (i) accelerating industrialization; (ii) rapid population growth; (iii) widespread malnutrition; (iv) depletion of nonrenewable resources; and, (v) deteriorating environment (Meadows, 1972). Education is a central pillar in the organizational philosophy where education is both part of the global problematique and also an essential tool to empower individuals to become effective actors that are in control of their own lives and the roles that they play individually and collectively in society.

Where the Club of Rome converges and at the same time departs from some of the other world views and environmental approaches discussed above, is in recognizing that contemporary environmental problems involve more than any single or parallel problems. Instead, it focuses on the "totality of the problematic events that add up to our world system" (The Club of Rome, 1970:11). The operational framework that The Club of Rome employs is derived from a threefold hypothesis: (i) the predicament we seek to understand is systemic in character and that the boundaries of the system encompass the entire planet; (ii) the real problematique has transcended discrete categories of events such as overpopulation, malnutrition, poverty, pollution and others; and, (iii) any desirable, or even acceptable, resolution of the problematique will entail fundamental changes in our current social and institutional structures (The Club of Rome, 1970:12).

While eco-centered system approaches such as that employed by The Club of Rome make considerable headway in the environmental debate towards solution, especially in calling for fundamental social change, it is significantly deficient on grounds of optimistic naivety. Society and existing structures that prioritize the economic paradigm of consumption are not so easily changed. The inner logic that drives such a paradigm and the patterns of maintenance and social reproduction ensure that the complexity itself inhibits desired change.

2.3.4 Pragmatism, environmental world views, and sustainability

There has been an emerging philosophical discussion among environmental philosophers over the question whether philosophical pragmatism can have a place of value in the environmental movement. Pragmatism is the distinctively American philosophical school which, roughly, holds that our ideas, theories, and worldviews should be examined and evaluated in the light of their impact on lived experience, according to how well they enable us to maneuver through experience successfully. The pragmatic basis of environmentalism lies in the fundamental assumption that there exists an essential link between our outlook on the world and our behavior. The fundamental justification for changing our worldview then, is that making such a change is the only realistic way to sufficiently change our harmful behavior.

Reitan (2006) argues that there are two principal pragmatic criteria for evaluating worldviews in pragmatic terms: The first is the Criterion of Meaning, otherwise known as the “pragmatic method”; and, The second is the Criterion of Truth otherwise known as “pragmatic account of truth”.

The pragmatic method (Criterion of Meaning) can best be explained in terms of trying to interpret each notion by tracing its respective practical consequences. In other words to seek an answer to the question: What difference would it practically make to any one if this notion rather than that notion were true? If no practical difference whatever can be traced, then the alternative means practically the same thing, and all dispute ceases to exist and consensus has been reached. Whenever a dispute is serious, we ought to be able to show some practical difference outflows from one side or the other for one view to be valid (James 1991). From the standpoint of environmental philosophy that seeks harmony between humanity and nature, this criterion calls for an explicit examination of the effects that alternative worldviews have on the sustainability of human-natural systems, and to distinguish them according to the practical impact on these systems. If two environmental

worldviews have the same impact on the human-nature relationship, they are taken to have the same environmental meaning (Reitan, 2006).

In terms of the second pragmatic criterion (the Criterion of Truth), according to James (1991), truth becomes true when it has a functional application. It is functional when it helps us to get into satisfactory relations with other parts of our experience. Put differently, the litmus test of a worldview truth is how well it enables us to function in the world of experience. This means that a truth not only enables us to passively interpret our experience in a consistent way, but also how well it guides us through the active dimension of our lives. In environmental terms, a worldview is valid when it enables us to sustainably act in ways that are compatible with the dictates of the worldview itself and the rest of our experience. It is invalid when a worldview cannot be lived out without running into contradictions or without undermining the very preconditions for the possibility of living it out - then it is pragmatically false. For example, a worldview which defines success as the accumulation of material wealth might be viewed as self-defeating, and hence false, if the pursuit of wealth destroys the natural resources on which wealth-accumulation depends. However, in pragmatic criterion of truth, "truth" is never final, since a belief that works in one experiential setting might no longer work given the advent of new experiences (Reitan, 2006). Here then is a social philosophy that can account for the dynamics of everyday life where time and place and individual issues are dynamically connected and critically impact on each other. While they might be contradictory, contradiction itself is endemic to the system where social actors negotiate as best they can to find satisfactory outcomes given all the data sets at their disposal.

A pragmatic solution to the world problematique then, is to stop contaminating natural systems more quickly than those systems can cleanse themselves. In many respects pragmatism offers the best hope to a comprehensive

understanding of the relationship between theory and practice. Firstly, it considers and accounts for the deep complexity of the problem both in terms of environmental issues and in explaining. Secondly, it helps us understand the dynamics involved of the various issues that impact in any disjunction between beliefs and actions. Thirdly, it provides the methodology that can aid in bridging the gap between beliefs and actions. Lastly, it helps to provide an appropriate explanation as to why misalignment might be endemic to the system and therefore not susceptible to easily being changed through contemporary and accepted worldviews. The subsuming of the environmental paradigm within the social economic-paradigm, and in seeking environmental change within this umbrella relationship might mean that environmental dilemmas might not be able to be changed within the current setup. This is discussed in more detail below.

2.4 Environmental psychology response to crisis

The significant milestones in psychology can be sketched out to provide a context to environmental psychology. The various theoretical frameworks that help explain human action and learning can all point to a way forward and out of the environmental crisis. Some are more suited to a global problem that we confront than others. However, the same problems that have confronted sociology in the historic specificity of the theorizing and of individual discipline approaches have also plagued psychology. While sociology concentrated on group action, psychology has theorized individual action and has frequently blurred the distinction lines between the two. The important contribution that psychology has made in the environmental debate has been in sketching out the important cognitive mental cultural-models that humans have employed to make sense of their world and on which they have responded by drawing consensus from competing values.

At present, the psychology of environmental sustainability is occupied by psychologists who fall into the category of ‘social psychologists’, ‘behavioral psychologists’, ‘community psychologists’ and so on. The location of the study of environmental issues within a number of different sub-disciplines of psychology leads to a tendency for these slightly different theoretical approaches to be thought of as in competition with one another. A further outcome of such competition is a reduction in the degree to which researchers adopting different theoretical positions are able to communicate with one another and develop an understanding of the commonalities and differences and relative strengths and weaknesses of the various positions. These various responses have added to the difficulty in understanding the human-planet relationship.

2.4.1 Human operational models

In the main, there are four general psychological approaches to the analysis of environmentally sustainable behavior: (i) rational-economic; (ii) social dilemmas; (iii) attitude-behavior models; and, (iv) applied behavioral analysis. These are not four clear positions without lines of demarcation between them. However, the four approaches have some common features that may be categorized for the purpose of elaboration. The pros and cons of each are discussed below.

The central feature of the rational-economic model is found in people’s tendency to engage in behavior which is primarily determined by whether or not it is in their financial interests to do so. Following Archer, Pettigrew et al. (1987), it is possible to argue that such a model assumes that individuals will engage in a process of cost-benefit analysis when deciding upon appropriate action, the results of which will guide their subsequent behavior. Changes in behavior using an economic basis to bring about change are premised on altering the pricing structure of both resources and devices. A cost analysis approach to conservation renders the act of

conserving more economically beneficial to individuals than of not conserving. However, Gonzales, Aronson et al. (1988) have argued that the deficiency in a strictly rational-economic model stems from the fact that individuals will often require 'persuasive communication' in order for them to respond to changes in economic parameters. This means that in addition to making conservation more economically viable it is also necessary to persuade people that these economic benefits exist and that they warrant changes in behavior.

The process that individuals engage in when making decisions regarding consumption of resources is the commonality between the rational-economic and social dilemmas model. The difference between these models is situational as decisions made have specific characteristics that need to be considered. Liebrand, Messick et al. (1992) argue that concepts such as 'social dilemma' describe situations in which private interests are at odds with collective interests. These interests form a complex and competing relationship between groups of individuals who have access to scarce common resource. In this scenario individuals are confronted with a dilemma where they have the option of behaving for either their own individual gain (consume at will), or for the good of the collective (monitor consumption so as to not threaten the resource itself) and realize the collective good in the long term. This dilemma is social because the long-term status of the common resource is determined by the collective decisions of all the members of the group. The social dilemmas approach essentially addresses two types of rationality conflicts that need be considered. The first one is when individuals make decisions in a social context. The other, when dilemmas exist that effect the whole group. This dilemma Hardin (1968) has termed the "Tragedy of the Commons" and is a typical example of the social dilemmas model. Problems are caused by the tendency of individuals to make choices leading to personal gain; these in turn are ultimately to the detriment of the collective, who also rely on the shared resources.

As for the attitude-behavior approach, Kaiser, Wolfing et al. (1999) argue that underlining this approach is the common assumption that in considering environmentally sustainable behavior of individuals, they will be guided, to varying degrees, by their personal attitudes towards either the natural environment in general or to the specific, situational, environmentally sustainable behavior itself. In this view the key factors to promoting environmentally sustainable behavior depend on: (i) the extent to which pro-environmental attitudes have an influence upon environmentally sustainable behavior; (ii) the extent to which the attitudes people have towards environmental issues determines behavior; and, (iii) the conditions under which an individual's environmentally sustainable behavior is guided by their attitudes. In theory the attitude-behavior model is similar to the dilemmas approach in allowing for both the influence of individual considerations and in the factors of the specific conditions in which individuals operate. The two differ in terms of focus. Where the social dilemmas approach considers the inter-relatedness of individuals in a social context as its primary focus where it is the group that becomes the primary focus of analysis, the attitude-behavior model places the individual as the primary focus and unit of analysis. Additionally, they differ on the issue of whether the context may be influenced by characteristics of the individuals (social dilemmas model) or if it is the individual who may be influenced by their social context (attitude behavior model).

In behaviorist models the focus of analysis is on the direct referent and consequences of the specific behavior. In an intervention context, behavioral models seek to identify ways in which environmentally sustainable behavior can be modified by providing points of reference (such as information leaflets, prompts or modeling) and by re-structuring consequences such as through feedback or monetary measures (reward and punishment) and through social reinforcement (Cook and Berrenberg, 1981). The behavioral approach draws on the Skinnerian tradition of

behavior modification and is based on learning theory (Dwyer, Leeming et al., 1993).

In terms of similarities and differences between the four approaches discussed above, the behaviorist model runs counter to the attitude-behavior model because the behavioral approach marginalizes the influence of cognitive concepts such as attitudes. However, the behavioral approach shares with a rational-economic model reward and punishment through the use of monetary reinforcement to promote behavior. It differs however, by asserting that behavior is determined by many factors besides the simple economic contingencies that relate to the behavior. In turn, the behavioral approach shares with the social dilemmas model the importance attributed to certain variables such as punishment, and feedback on the status of the resource pool, which are significant in behavioral interventions. The main difference between a behavioral approach and a social dilemmas approach lies in the focus of the analysis. Where the behavioral approach focuses on the behavior of an individual and its direct related consequences, the focus in the social dilemmas approach is on the group that shares a resource and the inter-relatedness among that group's members.

The four psychological models elaborated above assist in understanding the complex human-planet relationship in action. The common feature between them is that change requires social environments that allow both the talk and the behavior of others to help attune individuals to the environmental affordances of the objects in their environment. Such a social environment should also allow for the conversational and observational transmission of the relevant skills and knowledge required to utilize these affordances. Naturally, there is not a single solution or model that can help explain all the various contradictions in human environmental action. However whenever possible, in an applied context, attitudes and behavior should at the end be left to the discretion of the individual who has the most knowledge of the financial, social and cultural constraints of the area in which they

are operating and the behavior that they are attempting to influence (Kurz, 2002). Ultimately however, any change needs to lead to a point where there is harmony between people and land. Leopold (1949) has noted, actions have no meaning without conscience, as the problem we face is ethical and is thereby an extension of the social conscience between people and land.

Behavior change in psychology includes closely related concepts of learning and knowledge, values and attitudes, motivations and goals, self-efficacy, and finally behavior and behavioral change. These are complex variables that directly affect our mind frames when we act and are broadly discussed next.

2.4.2 Learning in psychology

Learning includes the acquiring of knowledge through systematic study in a field such as that in schools as well as behavior acquired or modified through interaction with the individual's environment (Bandura, 1977). The difference between the two approaches is that the first is structured while the other is experiential. For both, the act of learning is a social phenomenon and it is transmitted or mediated through social agents such as parents, teachers, peers, mentors and others (Greenall-Gough, 1993). Knowledge on the other hand, can be broadly defined as the mental components of an individual that result from any and all processes, whether innately given or experientially acquired. Put differently, knowledge is, collectively, the body of information possessed by a person, or, by extension, by a group of people or a culture (Reber, 1995). Values in turn, are considered to be beliefs derived from physical, emotional and intellectual (cognitive) needs, which influence attitudes and behavior (Gilbert, 1996; Rokeach, 1973) whereas, attitudes are more specific evaluative statements or beliefs about objects, such as opinions or ideas, and as such are more numerous and varied than values (Fishbein and Ajzen, 1975). Values are important because they mediate attitudes as

they are the cause, the underlying reasons why we form attitudes and they transcend objects and situations, and as a result are more abstract and difficult to measure. Attitudes are more specific and concrete, and often more situation related, and they can be measured with carefully constructed questionnaires (Kuo, 1994). In these terms, values and attitudes are comprised of three components: cognitive (knowledge, awareness and intellectual components); affective (feelings attached to the attitudes or values); and behavioral (the aspects leading to action). Motivations are the more specific reasons that underlie, guide and influence behavior (Maslow, 1954). Motivations are the reasons 'why' an individual is interested in an area, or willing to participate in an activity. In theories of motivation it is assumed that people have needs (Alderfer, 1969) and desires (Vroom, 1964) that they strive to satisfy (Garling et al., 2002) in ways that meet their needs. Understanding what motivates individuals to act in particular ways is useful when attempting to achieve particular behaviors through education. Goals are operationalised motivations. They are very specific, and there can be many different motivations behind the formation of one goal.

Research on goal setting has focused on the relationship between goal difficulty and performance (Garling et al., 2002). Self-efficacy beliefs, are at the simplest level "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986:391). Self-efficacy provides the foundation for human motivation, well-being, and personal accomplishment because unless people believe that their actions can produce the outcomes they desire, they have little incentive to act or to persevere in the face of difficulties. Hatwell (2000) argues that there is an inconsistency between behavioral intention and actual behavior. Individuals with high positive environmental attitudes who indicate they intend to participate or complete a particular activity, often report a lower level of actual behavior (Andrich and Styles,

1998; Styles, 1993). At the same time, while links exist between levels of attitude, knowledge and behavior, an increase in one does not by consequence result in an increase in another (Styles, 1993). Similarly, following 'cognitive dissonance' theory Tertoolen et al. (1998:172) it is possible that individuals may place high value on the environment and its preservation but also value their current lifestyle despite negative impacts on the environment, therefore holding two simultaneously and conflicting set of attitudes. Taken from a different perspective having a positive attitude to an issue does not translate into positive behaviors, if there are significant external and, or internal barriers to completing the behavior (Andrich and Styles, 1998; Styles, 1993). However, whenever possible education can aid tendencies to act.

Views about learning styles and categories differ widely (Table 2.2). According to Schmeck (1988) there are two basic types of learning styles. One is global-holist/field dependent/right brained, the other is focused-detailed/field independent/left brained. Schmeck asserts that, although both styles are equally good for problem solving, each style is likely to be associated with greater efficiency in specific tasks. The most effective problem solvers should exercise strategies connected with both styles. Styles and Lawrence (1986) in turn, define six major strands of learning in psychology: Behaviourist, Cognitivist, Social learning theory, Humanistic psychological, Self-regulation of learning, Socio-cultural theories of learning (Table 2.2).

There are pros and cons associated with each learning approach described above and each provides partial and possible solution to the environmental dilemma we face. Some are better at explaining the wider predicament we face than others. However, collectively, they provide possible explanations and solutions across the whole spectrum.

The primary feature of the behaviorist learning theory is its use of rewards or

incentives to modify and maintain behavior through positive or negative reinforcement of a desired behavior (Reber, 1995). The type and amount, as well as frequency of the incentive will differ according to time and space and on individual issues. An incentive is taken to mean a product or consequence which provides some benefit to an individual engaging or desired to engage in a target behavior (McKenzie-Mohr and Smith, 1999). However, behavior motivated by rewards or punishments is primarily controlled by outside forces. Where an incentive is used, continuity of the desired behavior is contingent of the ongoing incentive program. Removing the incentive altogether in turn, risks achieving a negative (Burn, 1991). In contrast, the punishment alternative where disincentives or negative reinforcements are used, is often less predictable since the punishment suppresses an unwanted behavior but does not directly encourage a positive alternative. An example of differing results between reward and punishment can be drawn from the environmental field on the issue of littering. Cialdini, Reno et al. (1990) report that research in littering patterns show that bottle deposits that reward people for not littering are far more effective than fines that punish people for littering.

Table 2.2: Theoretical perspectives on learning processes

Major Theory Identities	Interpretation of learning Phenomena	Empirical Focus of Theorizing and Research
Behaviorist Pavlov, Hull, Skinner, Watson	All behavior is learned and conditioned and modified by reinforcement learning via stimulus-response bondings.	Overt, observable, measurable, countable, manipulable pieces of behavior.
Cognitivist Developmental Piaget, Bruner, Kohlberg	Learning determined by level of cognitive structural organization, via processes of assimilation and accommodation, cognition develops with age and interaction with the world.	Solution to problem tasks assumed to reflect cognitive organization. Inferences from samples of thinking to underlying structures of intellect.
Cognitivist Human Information Processing Newell and Simon, Polya	Learning acquired and applied in procedures and processes for storing information in memory and applying to problems.	Solutions to problem tasks, computer simulations, processing models of mental processes.
Humanistic Psychological Rogers, Maslow	Learning is self motivated, natural orientation to growth and self actualization.	Clinical and observational explanations.
Social Learning Theory Bandura	Learning is influenced by social influences via observational learning and reinforcement.	Modelling, social inferences to explain social behavior and personality.
Vygotskian Theory Vygotsky	Learners are active constructors of knowledge, but dependent on others in their society for learning from inter-individual to intra-individual as learner internalizes concepts/skills etc.	Social interaction, adult/child and child/child is THE WAY in which learning takes place: it IS learning. Collaborative learning is considered vital
Self-Regulation of Learning Brown, Paris, Zimmerman	Learners are active participants in their own learning. Self-regulated learners adapt to self, task and context characteristics.	Learning strategies to plan, monitor, evaluate and regulate learning, knowledge about learning

Source: Styles and Lawrence (1986) in Baudains (2003:78)

The cognitive approach to learning depends solely on internal or intrinsic motivation. Intrinsic motivation is taken to be behavior that is dependent on factors that are internal in origin, and are usually derived from feelings of satisfaction or fulfillment rather than external rewards. Success of intrinsically motivated learning depends on the level of value an individual places on any new knowledge being offered, or the value placed on the potential results from a change in their own behavior. Schools and universities and governmental education campaigns are prime examples of the cognitivist learning approach where an assumption is made that that increasing awareness or knowledge of an issue will automatically increase the occurrence of a desired behavior (Merriam and Caffarella, 1991). The primary reason cognitivist learning has difficulty in changing people's behavior, especially in the environmental field, is that it fails to account for the multiple barriers that exist in real life (McKenzie-Mohr and Smith, 1999).

The humanistic psychological approach derives from Maslow (1954) and postulates that learning is self motivated and is a natural part of growth and the process of self actualization of the individual in the world. The humanistic approach in many respects sits comfortably with theories of learning that focus on self-regulation (Rogers et all., 1971). The self-regulated model argues that learning for behavior change is more effective if the learner has awareness and is in control of their learning environment. The prime feature of self-regulation is that learners of this type are metacognitively, motivationally and behaviorally active participants in their own learning (Zimmerman, 1986; 1990). A further characteristic in self-regulated learning is in the way learners select and articulate their goals for learning and understand and manage the learning process in order to achieve these goals. Learners involved in this learning process make a conscious effort to address specific situations and problems and they consciously attempt to reduce the influence of existing barriers to their behavior. In action, this approach is highly

situational, yet theoretically, at its core is the utility of methods for multi-use situations. However, the extent to which strategic connections can be made by the learner between situations is always debatable. Similarly, the extent to which learners in one situation can meaningfully transfer such concepts and realizations to another situation is also individual and situational.

Social learning asks of learners to be more active participants in the learning process, who not only acquire facts and information but are involved in the social interaction (Bandura, 1977). Here, learning comprises knowledge, interaction, and the observation of the behavior of others. The role educators play and the emphasis they place is in facilitation of learning. The subject is expected to learn by being exposed to information as in the cognitivist approach, but is additionally, an interface and in some cases a role model also. In this conceptualization of learning, the individual is not a learner in isolation but enters in a dynamic relationship with leader. The leader is a role model where modeling involves demonstrating a desired behavior in which role models are important instruments in achieving social change (Burn, 1991). The primary problem with this approach is that while modeling is important it is the appropriateness of the behavior modeled that is crucial to its effectiveness.

Vygotskian (1978) theory sees learners as active agents who construct their own formulation of the knowledge acquired. They use collaborative strategies by dependence on other social actors in their society for learning. Learning is a joint effort between the leader and the learner. The educator facilitates learning by providing challenges and problems for the learner to solve and additionally provides support in the learning process. This is a student centered model of learning where emphasis is placed on the actual learning, rather than learning how to learn. The key to intellectual growth is effective teaching that leads to intellectual development (Connell, 1980). However, the construction of individual paradigms for action by

collaborative dependence on significant others in society is on the one hand dependent on the effectiveness of the education strategy used by leader and the knowledge they seek to impart, and on the other, the extent to which the lesson and knowledge desired to be transferred is understood as intended. Collaboration implies appropriate feedback mechanism to test learning and teaching effectiveness. However, the challenges provided to student that form the backbone of the learning process, are individual teacher dependent. This is problematic in terms of consistency and reproducibility, because what counts as learning gained in one situation cannot be taken for granted in all others. Similarly, drawing on Saussure's "semiotics" from poststructuralism nothing can even mean the same to teacher and student (Culler, 1986). What students learn is never quite what teachers have taught them. As meaning is deferred indefinitely in semiotics, neither teacher nor student "ever completely know what is learnt, when precisely it was learnt and from whom" (Stables, 2004:236). Language is thereby an active process of ongoing exploration and discovery.

Beyond the theoretical learning constructs discussed above, in practice two fundamental assumptions underlie the formal education systems today: (i) whether students retain knowledge and skills they acquire in school; and, (ii) whether students can apply them in situations outside the classroom. The extent to which these propositions are true has a direct bearing on the relationship between knowledge, beliefs and actions. Put differently to what extend is knowledge memory recall or the result of deep learning that has the potential to effectively translate beliefs to actions?

Knowing about knowing argues that appropriate action depends on appropriate knowledge of the world. When an individual knows what it knows, its actions are different from an individual that is locked out of its library of knowledge. Primacy is given to actions and beliefs play a secondary role. Knowing about

knowing as conceived in education is supported by recent studies (Goodale et al 1991; Baillargeon, 1995; Hood et al., 2000). These studies overwhelmingly point to a dissociation between knowledge that is revealed through perception and knowledge revealed through action. Where knowing does occur, research from education has found that even when students report not using the knowledge acquired in school, a considerable portion is retained for many years and long term retention is strongly dependent on the initial level of mastery (Semb and Ellis, 1994). There is much less consensus on the crucial question of how much knowledge acquired in school transfers to tasks encountered outside formal educational settings, and how such transfer occurs (Perkins and Salomon, 1992). In this regard, while some psychologists claim very little transfer occurs (Perkins and Grotzer, 1997; Detterman, 1993) others argue significant transfer of knowledge is successfully implemented in public life (Halpern, (1998).

Metacognition enlarges on the theme of knowing about knowing through 'deep learning' perspectives. It seeks to resolve the paradox between what we know and the extent to which we know it and can apply it. It assigns metacognition a central role in mediating between conscious and unconscious determinants of cognition and behavior (Haifa University Research Project, 2006; Koriat, 1993) (Figure 2.1).

The model in Figure 2.1 draws a distinction between two modes of operation. In the explicit-controlled mode of operation, which underlies much of our daily activities, behavior is based on a deliberate and conscious evaluation of the available options, and on a deliberate choice of the most appropriate course of action.

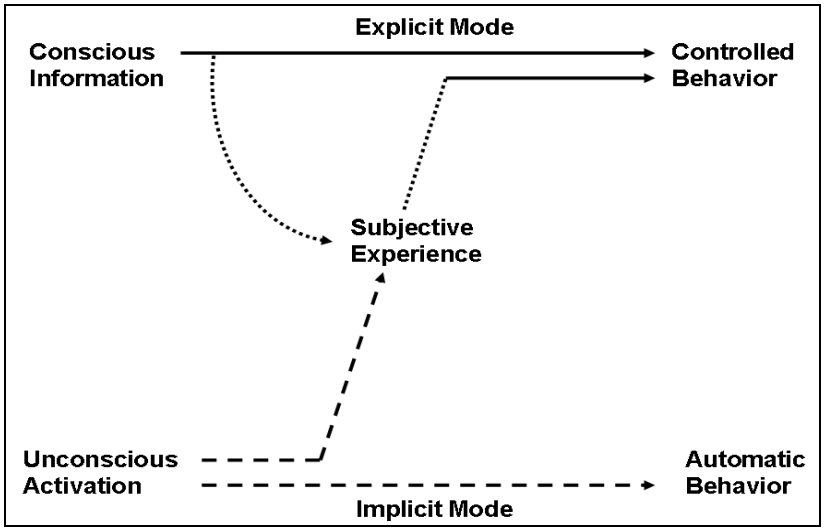

Figure 2.1: Conscious and unconscious mediation
Made after: Koriat (1993) and Haifa University Research Project (2006)

The factors that affect behavior in this mode of operation are generally conscious, and the person is in control of his or her actions. In contrast, in the implicit-automatic mode, various factors registered below full consciousness may influence behavior directly and automatically, without the mediation of conscious control. Metacognitive feelings may be influenced and shaped by implicit factors that operate below full consciousness. Once formed, however, these subjective experiences can serve as the basis for controlled, conscious action. It is in the intercepting of metacognitive feelings that the interface between unconscious and conscious processes can best be understood to serve as aid in understanding the relationship between what we know and what we believe we know, and the way in which this translates into action. The value of metacognition for environmental students and alumni is in the implicit-automatic mode of operation where various factors registered below full consciousness may influence behavior directly and automatically, without the mediation of conscious control. Such automatic reflexes can point to important differences between action strategies employed between groups who are integrally connected at the network-flow level but who operate

within different time and space dimensions (Haifa University Research Project, (2006).

According to Otani et al. (2005) metacognition consists of two components: knowledge and control. Metacognitive knowledge pertains to knowledge about how individual cognition operates, whereas metacognitive control pertains to how individuals control their cognitive operations. Nelson and Narens (1990, 1994) have conceptualized metacognition as operating at two levels: the objective level and the meta-level. The objective level carries out cognitive operations, whereas the meta-level controls activities that occur at the objective level. In terms of cognitive theories of action, clinical trials and findings suggest successful encoding activations are predictive of subsequent recognition memory. Consciousness provides a monitoring function that has the capacity to mediate effects on behavior in the relationship between theory and practice (Maril et al. 2002). For environmental education the implications that stem from studies of metacognition include the need to prioritize courses in activism. Knowledge is identified as an important variable, yet the ability and motivation to act is also an indispensable part of the learn-ing/doing process that can not be ignored.

The relative strengths and weaknesses of the learning strategies elaborated above provide important links that help explain the way in which knowledge is acquired and imparted. In their similarity they can point to the effectiveness of existing models for learning and teaching. In their differences they highlight the need for collaborative arrangements between theoretical frameworks towards more effective learning. In spite of differences between educational approaches, education has an important role to play in leading society to consensus. Indeed, it is one of the primary agents by which existing societal knowledge is acquired, maintained and reproduced. This acquisition is not always overt as through institution, but can take in a whole host of other social phenomena drawn from outside mainstream

psychology. For example, models of crowd behavior show that learning and consensus may be built into the human system (Le Bon, 1896; Festinger, 1954; Kaminka and Fridman, 2006). The value of subliminal learning can be particularly helpful for environmental education because it can aid "prediction of the behavior of groups of people, who are in close geographical or logical states, and that are affected by each other's presence and actions" (Kaminka and Fridman , 2006:1).

A phenomenon observed in crowds is that people in a crowd act similarly to one another, often acting in a coordinated fashion, as if governed by a single mind (Le Bon, 1895; Allport, 1924). Importantly, this coordination is achieved with little or no verbal communication. Le Bon (1896) argues for a view of crowd behaviors as a "collective mind" and further notes that an individual who becomes a part of the crowd is transformed, into becoming identical with the others in that crowd. In these terms, individuals seem to lose their individuality so far as personality and thoughts are concerned when they group. This pattern of behavior is attributed to two individual but complementary constructs: (i) imitation, where people in crowds imitate each other; and (ii) contagion, where people in the crowd behave very differently from how they usually behave, individually. Freud (1951) expands on Le Bon's (1895; 1896) findings by theorizing that individuals in the crowd identify with the leader and with each other, and that is why they behave as one. The value of crowd modeling for evaluating environmental behavior-change is in the change-process individual undergo as they are drawn towards group conformity. Of particular value for the present research is the view that individuals might hold strong environmental views but fail to realize them in group situations in terms of action.

2.4.3 Meaning-making and acting in psychology

The process by which humans understand and make sense of their world

towards individual and group action is complex and is encapsulated in numerous theoretical frameworks. Naturally, some approaches are better than others in explaining the human condition, and at the same time some do better in certain situations than they do in others. The importance of appropriate understanding of the way we make sense of the world is located in more comprehensive understandings of the reasons for which we act or fail to act, given appropriate levels of issue specific knowledge and attitude.

The ‘Theory of Reasoned Action’ (TRA) argues that a person's behavior is determined by a person’s intention to perform the behavior and that this intention is, in turn, a function of their attitude toward the behavior and their subjective norm (Ajzen, 1980; 1991). The best predictor of behavior in this view is intention. Intention is the cognitive representation of a person's readiness to perform a given behavior, and it is considered to be the immediate precursor to expectant behavior. This intention is determined by three things: their attitude toward the specific behavior, their subjective norms and their perceived behavioral control. The theory of planned behavior holds that only specific attitudes toward the behavior in question can be expected to predict that behavior. In addition to measuring attitudes toward the behavior, it is also necessary to measure people’s subjective norms. In order to predict someone’s intentions, knowing these beliefs can be as important as knowing the person’s attitudes. Finally, perceived behavioral control influences intentions. Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior. These predictors lead to intention highlighted in Figure 2.2 As a general rule, the more favorable the attitude and the subjective norm, and the greater the perceived control, the stronger should be the person’s intention to perform the behavior in question.

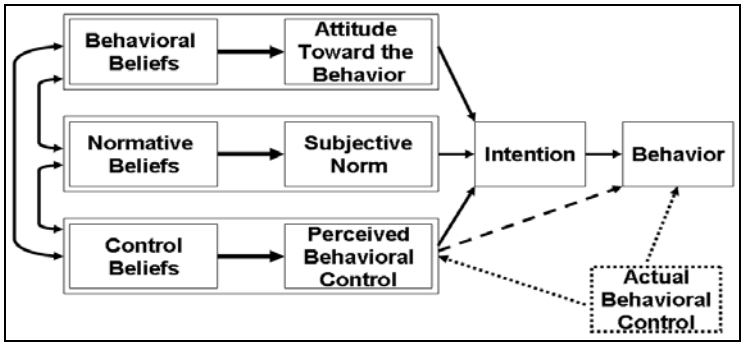

Figure 2.2: Theory of reasoned action
Source: Ajzen (1991)

The Theory of Reasoned Action stresses the factors and inputs that result in any particular behavior. At the simplest level the detailed model shown in Figure 2.3 is a function of goal oriented flows where: Attitude → Intention → Behavior.

The important variables that constitute a person's attitude toward a behavior consist of: (i) a belief that a particular behavior leads to a certain outcome; and, (ii) an evaluation of the outcome of that behavior. If the outcome seems beneficial to the individual, he or she may then intend to or actually participate in a particular behavior. Another consideration is the attitude an individual holds toward a given behavior which is known as their concept of the subjective norm. Ultimately, a person's attitude toward a behavior determines whether or not they act as shown in Figure 2.3.

Subjective norm is a person's perception of what others around them believe that the individual should do. In its purest form a subjective norm is a type of peer-group pressure. Whether or not a person participates or intends to participate in any behavior is influenced strongly by the people around them. These people may include friends or a peer group, family, co-workers, community leaders and other significant others. People may also be inclined or not be inclined to participate in a behavior, based upon their desire to comply with others. Laws or rules prohibiting a behavior may have an impact on a person's attitude toward participating in a behavior also.

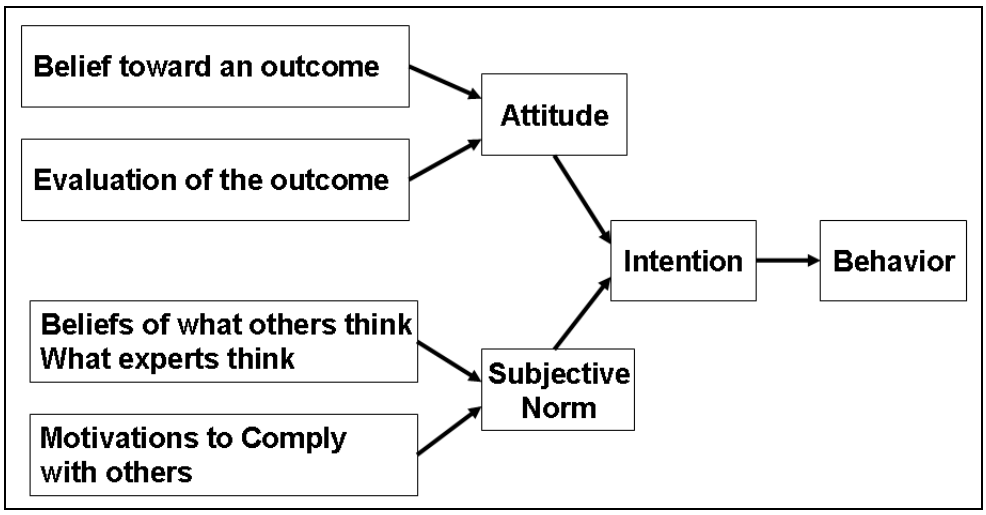

Figure 2.3: Theory of reasoned action flows
Adapted from: Ajzen (1991)

Petty and Wegener (1998) examine the critical confrontation between attitude and results. Attitude refers to a person's overall evaluation of persons (including self), objects, and issues. Attitude in particular refers to how favorably or unfavorably or how positively or negatively in general a person views some object of judgment. Examples of attitudes can range from ethical issues such as "the defendant," as cause and "capital punishment," as effect. It is also inclusive of mundane everyday attitudes such as what "shoes" to wear. People differ greatly in their evaluation strategies that determine their attitudes and subsequent outcomes. Attitude change is possible. Bringing about change in attitudes (or beliefs) by presenting facts and information in a relatively objective fashion can be called education, whereas bringing about change by slanting information and evidence is often referred to as propaganda (Zimbardo, Ebbesen, and Maslach, 1977).

In most communication settings, a confluence of factors determines the nature of information processing rather than one variable acting in isolation. The important feature for this study is in the notion that self generated attitude changes tend to persist longer than changes based on passive exposure to a communication such as knowledge alone (Petty and Wegener, 1998; Elms, 1966). Understanding the

processes by which source, message, recipient, and context variables have in impact on attitude change is important. It is important for the conceptual understanding it provides and also because there are some very important consequences associated with the process by which attitudes are changed. The general conclusion drawn by Petty and Wegener (1998) is that attitude changes that are accompanied by high levels of issue-relevant cognitive activity about the dimensions central to the attitude object are stronger than changes that are accompanied by little issue-relevant thought, or by considerable thought along dimensions that are not central to the merits of the attitude object. High levels of issue-relevant cognitive activity tend to lead to change because they are likely to require frequent accessing of the attitude and the corresponding knowledge structure. Finally, attitudes that are changed as a result of considerable mental effort tend to be stronger than those changed with little thought. As well, they are more persistent and substantively resist counter persuasion. The dynamics of everyday life however, are not particularly straightforward beyond the theoretical frame of reference in the relationship between knowledge, attitude, beliefs and action as some have postulated (Petty and Wegener, 1998; Elms, 1966; Zimbardo, Ebbesen, and Maslach, 1977). Others have in turn argued strongly in favor of knowledge spirals that more accurately reflect the competing values that constitute real life itself (Langberg, Kamma, 2002; Huber, 2001; Nonaka et al., 1998).

The interaction between an individual's knowledge and the rest of the organization within which knowledge spirals operate is a complex system. At the simplest spiral-level it is an arena where meanings are made through a complex set of drivers such as socialization, externalization, combination and internalization. These are mediated through a process of field building, ongoing dialog, linking of explicit knowledge and learning by doing (Figure 2.4). It is at once inclusive of high levels of issue-relevant cognitive activity that can lead to the kind of knowledge that

can bring about change (Petty and Wegener, 1998; Elms, 1966; Zimbardo, Ebbesen, and Maslach, 1977) while at the same time it provides a valuable exchange system where knowledge is accessible for individuals and for groups (Figure 2.5).

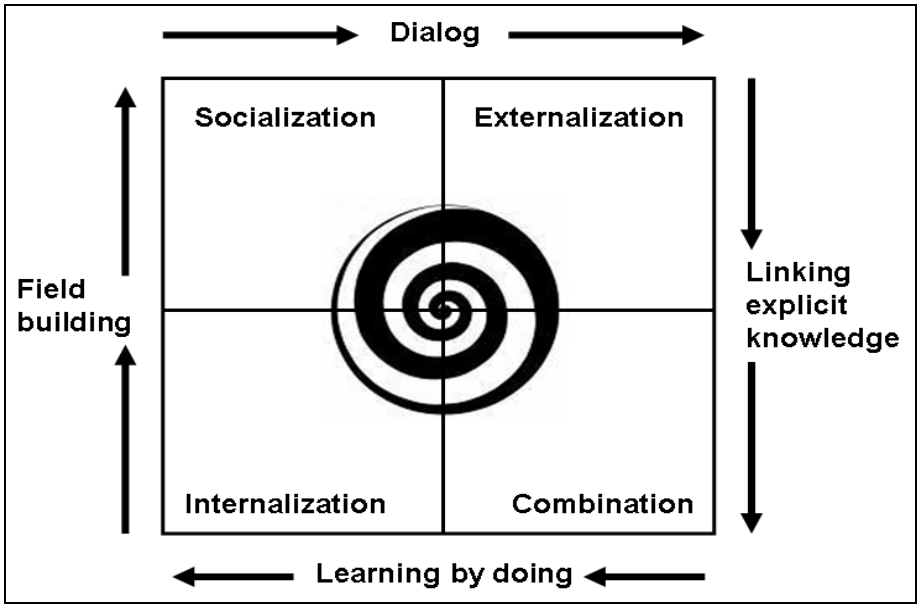

Figure 2.4: The knowledge spiral
Made after: Nonaka et al. (1998)

Figure 2.5 illustrates knowledge spirals in a triple helix system where an exchange system is constituted to include knowledge that is accessible for both organizations and individuals that are already part of the spirals or have the knowledge of the system and spirals, but not for others. (Langberg, 2002).

Groups employ ‘knowledge spirals’ as ways to strengthen group solidarity and to maintain group membership. Here, membership is a function of maintenance of a group’s knowledge, beliefs and links (Ford, 1983). From another perspective, knowledge spirals tie into Metaconitive concepts in the way in which knowledge is acquired and how it translates to action as it is mediated through attitudes and beliefs. Variations of this concept are sometimes referred to as ‘knowing about knowing’ or ‘deep learning’.

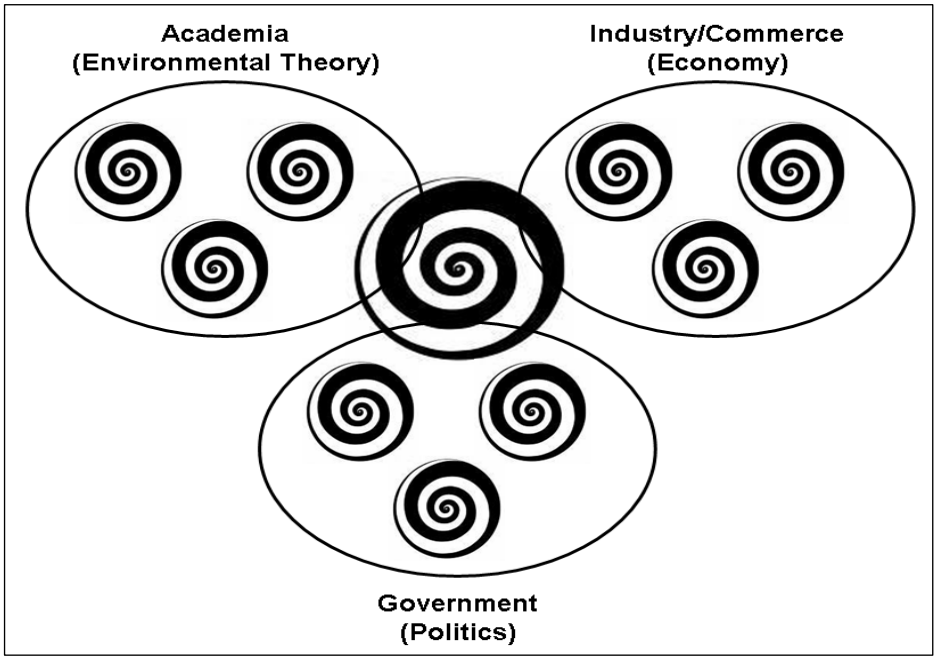

Figure 2.5: Knowledge spirals in a triple helix system
Made after: Langberg (2002)

Knowledge spirals in psychology are related to network flows from sociology in system dynamics. Where knowledge spirals refer to systematic organization of knowledge towards action-oriented meaning-making for both individuals and groups, network flows focuses on the systematic meaning-making relation between the space of flows and the space of place (Nelson and Narens, 1990, 1994: Mol and Spaargaren, 2006; Castells, 1996; Urry, 2000a, 2000b, 2003). The critical contribution to be made by network flows perspectives is in helping to understand the relationship between nature and humans in the emergence of various dilemmas (Mol and Spaargaren, 2006:1).

The strength of network and flows approach to understanding society lies in the way in which it responds to the traditional way in which our daily lives have been conceived and upon which we have been called upon to act. While the traditional paradigm has conceptualized the processes of dwelling in cities in terms

of the infrastructural provisioning of daily social practices, instead network and flow perspectives stress the interplay between the daily routines involved in handling our 'local daily portion of flows' like energy, water, green products, and waste-services that are connected in an intimate and direct way to the global networks and scapes which sometimes and in certain respects give these everyday flows the character of determined fluids (Mol and Spaargaren., 2006:24). Variations of network flows as a central guiding framework have been used in a number of environmental studies to date (Carson, 1962; Harding, 1968; Lovelock, 2006; Schumacher, 1997; Vannote, 1980).

2.5 Environmental education response to crisis

Education, formal and informal, is an important component in understanding human action. It is for this reason that education is discussed here not only in its formal structural sense, but inclusively of the ways in which organizations and activism have conceived it and practiced it. The rationale for this approach is argued on the grounds that appropriate action depends on appropriate knowledge of the world in its many guises. Factors registered below full consciousness may influence behavior directly and automatically, without the mediation of conscious control. Such influences extend beyond the classroom proper and can take in knowledge and experiences from a variety of sources such as organizations, corporate or otherwise, and communities as well. Factors that have a determining effect include not only content but also subliminal variables such as over education and job-satisfaction, as well as activism (feelings to act). This approach highlights the important demarcation between experience-based and information-based judgments.

Furthermore, as the findings in cognitive theories suggest that partial familiarity with the cue and/or partial access to the sought-after target may be responsible for the phenomenological experience of "feeling-of-knowing" (FOK)

(Maril et al. 2002) this provides an important link for a study that looks into the possible disjunction between theory and practice in transition such as that which can occur between students as learners, and graduating students as employees. This has significance for environmental education in the knowledge students have of the subject area. It is for this reason, amongst others, that the exploration of the relationship between knowledge, beliefs and actions in environmental students and alumni can shed light on the learning process and on society generally. Especially since, successful encoding activations are predictive of subsequent memory recognition in the relationship between theory and practice in environmental knowledge.

2.5.1 Education background

Agenda 21 challenges nations to create an atmosphere in which the young can become active participants in planning for their environment. This action plan for global sustainable development cites young people‘s participation as vital to the development process (UNEP, 2000).

Furthermore, Agenda 21 implores the young to learn about environmental ‘opportunities’ urging them to ‘think global, act local’. In doing so, they could serve as vital contributors to the community as young environmental planners.

Additionally, the United Nations Charter has called for the involvement of the young in environmental decision-making processes with the following words (UNEP, 1992):

> It is imperative that youth from all parts of the world participate actively in all relevant levels of decision-making processes because it affects their lives today and has implications for their futures. In addition to their intellectual contribution and their ability to mobilize support, they bring unique perspectives that need to be taken into account (UNEP, 1992:275).

In these words it would seem that an appropriate base has been made upon which to build a firm structure both in theory and in practice for an environmental framework to educate global citizens in sustainable ways so that global environmental aspirations might be realized. The extent to which such a call to action has successfully translated into action can be an important litmus test of existing environmental approaches from an educational perspective.

2.5.2 Local education theory and practice: Thailand

In the Thai setting, the 1997 Constitution of Thailand (OEC, 2004; ONEC, 2000a; ONEC, 2000b) served as an appropriate guide until recently in providing the prerequisite for realizing environmental goals to educate towards positive environmental outcomes. This was superseded by the new constitution of 2007 (Constitution of the Kingdom of Thailand, 2007). The implications for the environment and education that stem from the 2007 constitutional amendments are discussed below. As for the 1997 Constitution, Section 69 under the heading of 'Duties of the Thai People' in particular provided that it is the duty of all people of Thailand to "conserve natural resources and the environment, as provided by law". In turn, Section 80-81 under 'Fundamental State Policies' served to regulate education and the responsibilities of the system towards the young. Both education and environmental responsibility are further reinforced through the 'Lifelong Education Concept' which reaffirmed the duty of citizens and learners in terms of the philosophy of sustainable development. The Thai educational process evolved through a number of steps on the path to formal then official/national environmentalism, the history of which can help fill in important gaps between local knowing and acting. From one perspective, these steps together illustrate the environmental commitment that informs education environmental curricula in Thailand. From another, it highlights the reactive nature of the global education system of which Thailand is but one

component. While environmental degradation continues to morph, so does education. Reactively, however, education is a step behind.

The ‘Thai higher education reforms’ were designed to promote new curricula and mechanisms for teaching and learning. By design, it undertook to ensure flexibility and diversification to meet the demand of individual learners,, and the dynamic of national requirements. Through adoption of learning innovation and information technology it prioritized a student-centered learning approach that placed emphasis on project and group-based activities. This approach was deemed appropriate because it provided a significant shift away from the traditional teacher-centered approach (ONEC, 2000a; ONEC, 2000b) and helps to bring Thailand in line with Agenda 21 (UNEP, 1992) and world’s best practice.

The ‘1999 National Education Act’ served as catalyst for education reform in Thailand, including higher education. Higher education reform aspired towards a number of admirable educational goals that are integrally linked to the merger of intellect gained and empowerment to act: (i) to provide a central and unified mechanism of policy formulation and integration, planning, budget allocation and evaluation; (ii) to improve access to and participation in higher education; (iii) to achieve academic excellence, requisite standards and quality assurance; (iv) to manage with autonomy and flexibility; (v) to mobilize resources from various sectors; and, (vi) to balance the development of intellect and ethics of Thai graduates with desirable attributes of physical and mental strength (ONEC, 2000a; ONEC, 2000b).

The underlying principle behind the higher education reform was to give priority to analytical skills, critical thinking and learning motivation. Moreover, importance was placed on research and accumulation of knowledge and technology for development of the nation that stressed accountability of the higher education system to the public. These are collective skills that can lead towards fusion of

knowledge and practice that in turn can foster activism. Paitoon (2002) argues that the declaration of the National Education Act in 1999 can be regarded as a very significant turning point in Thai education because it was not only a change in philosophy of education but also in the methods of delivery and management. The purpose of education, according to the Act, is not only to enable the learners to work for society but also to be complete human beings.

2.5.3 2007 Constitutional amendments: Thailand

Thailand passed a new constitution in 2007 (Constitution of the Kingdom of Thailand, 2007). There are some changes, whose wider meanings and implications do not detain here. So far as this research is concerned the continued commitment to the environment and education are both explicit and implicit entailing a general continuity in both from that outlined above with respect to the previous constitution.

Pertinent to the environment, '*Part 12 - Right to Assembly: Section 66*' is specific about Thailand's ongoing commitment to positive environmental outcomes:

> The right of a person to give to the state and communities participation in the preservation and exploitation of natural resources and biological diversity and in the protection, promotion and preservation of the quality of environment for usual and consistent survival in the environment which is not hazardous to his or her health and sanitary conditions, welfare or quality of life, shall be protected.... (Constitution of the Kingdom of Thailand, 2007:13).

And adds the caveat, that protection of the environment is not just a citizen right, but that it entails reciprocal obligation:

> Any project or activity which may seriously affect the quality of

> environment shall not be permitted, unless its impact on the quality of environment have been studied and evaluated and opinions of an independent organization… have been obtained prior to the operation of such project or activity (Constitution of the Kingdom of Thailand, 2007:13).

With respect to education, '*Part 4 - Religious, Social, Education, and Cultural Policies: Section 79*' is specific about Thailand's ongoing commitment to innovation in education theory and practice. It differs from the 1997 Constitution of Thailand (OEC, 2004; ONEC, 2000a; ONEC, 2000b) in a number of respects. Section 3 includes a commitment to the "the philosophy of sufficiency economy" but has maintained the concept of "innovative learning" under points 3:

> (3) The state shall develop the quality and standard of education in conformity with socioeconomic changes, support innovative learners, create and indoctrinate the correct perception of morals and ethics, the philosophy of sufficiency economy, unity and discipline, develop the quality of career teachers and academics, and provide duly sufficient budget for education (Constitution of the Kingdom of Thailand, 2007:16).

Additionally, Section 4 adds and elaborates a commitment to "educational decentralization" and stressing "participation" and "management" at local levels:

> (4) The state shall encourage and support power decentralization in education to local administrative bodies … to enable them to participate in management and develop the quality of education in compliance with the need of each locality (Constitution of the Kingdom of Thailand, 2007:16).

While some differences are noted between the Constitution of 1997 and 2007,

they do not adversely impact upon education and the environment. Furthermore, Chapter I (*General Provisions - Section 4*) commits to existing International treaties and obligations consistent with previous undertakings:

> Human dignity, rights, liberty, and equality of the people shall be protected by provisions of this Constitution in accordance with the tradition of the democratic form of government with the King as head of the state and international obligations, which Thailand has endorsed (Constitution of the Kingdom of Thailand, 2007:1-2).

While a number of steps testify to Thailand's recent educational reforms, overall these changes have been progressive in nature. The three essential periods in educational development in Thailand can be identified as: the beginning period (1975-1980); the expanding period (1981-1986); and, the revising period (1987-1990). Additionally, two subsequent periods can be noted: stagnation and reevaluation; and, the new direction period (1999-present) (Paitoon, 2000, 2002; Ramsden, 2003). The 2007 Constitution is yet another step that helps describe a system in the process of evolution. Comparatively, the point at which Thai education currently stands in terms of underlying educational goals and system design, places it in good stead with respect to current global approaches. Furthermore, in emphasizing the connection between humans and nature, individual and society, the merger between citizen rights and reciprocal obligations is further suggestive of a system that can help to educate in favor of the environment.

2.5.4 The United Nations and educational standards: Global

The United Nations Educational, Scientific and Cultural Organization is the only UN body with a mandate for higher education. UNESCO supports member states and higher education institutions to tackle pressing challenges so that higher

education can fully contribute to sustainable national development (UNESCO-UNEP, 1976; UNESCO, 1980). The premise upon which the UN promotes higher education is in the belief that education is a key factor for cultural, economic and political development, as an endogenous capacity-builder, as a promoter of human rights, sustainable development, democracy, peace and justice (UNEP, 2000). The vision and action plan was formulized and first articulated at the *World Conference on Higher Education* (UNESCO, 1998) with the words:

> On the eve of a new century, there is an unprecedented demand for and a great diversification in higher education, as well as an increased awareness of its vital importance for sociocultural and economic development, and for building the future, for which the younger generations will need to be equipped with new skills, knowledge and ideals (UNESCO, 1998:2).

UNESCO's vision is future oriented and helps to serve as an important marker from which to measure educational success. The extent to which educational goals have broached environmental concerns in action is yet another index upon which educational achievement needs be measured.

At the recent Asia-Pacific Programme of Educational Innovation for Development International Conference (2007) UNESCO recommended that Thailand improve its curriculum for students from kindergarten to higher education level. In his opening address at the conference Sheldon Shaeffer, Director of the UNESCO Asia and Pacific Regional Bureau for Education said that curriculum "is the first problem about education that Thailand should tackle" (APEID International Conference, 2007). He clarified this remark by suggesting that Thailand should improve quality assessment and researches, reduce the number of unemployed graduates, and provide adequate libraries. He also pointed out that Thai higher

educational institutes should reach out more to communities. It is worth noting that the UNESCO recommendations are accommodated in the latest as well as the previous Constitutional arrangements in Thailand, the problem then for Thailand that it needs to "tackle" is one of practice rather than essence.

2.5.5 Theoretical assumptions underpinning contemporary education

The UN education initiatives (UNESCO, 1998), the 1999 National Education Act of Thailand Act (Office of Education Commission Thailand, 2004; Office of the National Education Commission Thailand, 2000a; Office of the National Education Commission Thailand, 2000b), as well as the 2007 Constitutional amendments (Constitution of the Kingdom of Thailand, 2007) come together on the issue of environmental sustainability and on emphasizing responsible informed actors acting towards ends. These various initiatives in sum, did not occur in isolation, but were instead the result of a rich history of education reforms. Reforms that were the consequence of important understandings had of the way in which the human mind works, and the way in which knowledge is imparted and acquired. It is fair to say, that the theoretical teaching and learning assumptions imbedded in the UN and Thai initiatives promise much for the future.

There are numerous approaches to modern learning in a global sense. Most join in the view that learning needs to create shared understandings through authentic, meaningful activity. The aim of such learning models is informed by a number of theoretical generalizations such as: (i) learning is constructed by the learner; (ii) learning occurs within context; and, (iii) teaching supports learning construction.

Learning is a natural part of human life and is constructed by individuals over time in an attempt to make sense of their world through personal experience (Bruner, 1990; Piaget, 1970, 1971). Here, knowledge, skills, and dispositions are

developed through the assimilation and accommodation of existing knowledge structures through new experiences (Piaget, 1970, 1971). Meaning and reality are created and not discovered. Negotiation is the art of constructing new meanings by which individuals can regulate their relations with each other (Bruner, 1986; Fosnot, 1996; Cobb, 1996). What is important in frameworks of learning is not whether the individual or the social should be given priority, but "what the interplay between them is" (Fosnot, 1996:23). Learning is shaped by context, and rather than the focus being on processing information, learning is regarded as an active process in context: "The situation as a whole must be examined and understood to understand the learning" (Duffy and Cunningham, 1996:171). Furthermore, learning is influenced through mediational factors, the environment itself, such as language, signs, place and time (John-Steiner, 1997). Learning, as the flip-side of teaching, is a process that integrates assisted performance which helps to connect the theoretical ideas how the teacher can support the learner to grow (Vygotsky, 1978). Through interaction with more capable others, learner and teacher can gauge where the learner is in terms of their actual developmental level through task based problem solving where they operate independently but assisted by a capable adult or peers.

2.5.6 Can education save the world?

There are two essential views about the effectiveness of current education strategies: those that claim the mix between the theoretical and practice is right, and others that it is the "mix" itself that is wrong and is at the root of the problem.

From the camp arguing in favor of the "mix", in Thailand this has meant employing techniques that are consistent with the lifelong education approach theoretically (Toumsoboon and Sukwanich, 1998:61). In practice it has included the use of a variety of teaching media such as field trips, field training, environmental projects in communities, inclusively of all levels of environmental stakeholders as

learning networks (Veeravatnanond, 1996:155-157). Effective implementation of this approach is prescribed as being able to result in the discovery of truth: “the truth about students’ knowledge, taking into consideration the students’ motives” (Ministry of Education, 1989:99-101). Creating a desirable “mind-set” has been at the heart of those in the various levels of educational management as well as the public (Ministry of Education Thailand, 2004:63-64) towards more effective merger between theory and practice. This has been deemed an essential task to achieve on the path to the “truth” about individuals, the human condition and the ways in which human action can be modified in favor of the environment. At its core has been the twin metaphor of redemption and rescue. It has argued that there is urgent need to rescue nature and to liberate and redeem people who have strayed from the accepted norms whose actions have damaged the environment (Sloane, 2004). Recently, this view has been validated through constitutional amendments that have prohibited any “project or activity which may seriously affect the quality of environment” (Constitution of the Kingdom of Thailand, 2007:13). The Thai environmental approach is corroborated by views that environmental education is critical and relevant to the daily lives of all people: “because complex environmental challenges require a well-trained public who have the knowledge and skills to fully and actively participate in solving these problems” (National Environmental Education Advisory Council, 1996:i)

Others in turn, such as Sloane (2004) and Stables (2004) have argued against contemporary education approaches from three primary perspectives: (i) the reasoning we use about environmental education; (ii) education reasoning re-instills some of the same ways of thinking we are trying to overcome; and, (iii) need to look at environmental education through a different theoretical lens - one that emphasizes strategic reflexivity (Sloane, 2004). The primary problem is identified as any commitment to education for sustainability that assumes that teaching and learning

can reduce or prevent damage to the biosphere. Such an assumption remains deeply problematic because “without certainty about what we are trying to conserve or how we might go about, any action is only one of faith” (Stables, 2004:233).

In the same way as the environment is not static, but is instead a movement whose trajectories are always establishing boundaries and destroying others in complex and varying ways in different times and places, education also needs to be a fluid discipline to meet the ever changing face of the environment (Sloane, 2004). This view holds that the role of education cannot be surrendered to educational approaches that relegate learners to participants or theorists. Within such a paradigm teachers and learners are rendered as objects and instruments in the realm of generating knowledge and truth (Foucault, 1977). Instead environmental education ought to be conceived as an approach that critiques our own critical reasoning of environmental education itself. This view is premised on the notion that as humans are both learners and shapers of their world, and that the object we seek to understand is changing, education must therefore be proactive and not reactive. The kind of education needed is one that challenges the assumptions, practices, and outcomes taken for granted in dominant culture and in conventional education. This means the linking of school and place-based experience to the larger landscape of cultural and ecological politics, where the twin social and ecological objectives of decolonization and reinhabitation become one (Gruenewald, 2003; Bowers (2001)

Finally, drawing on de Saussure’s (1916) “semiotics” from poststructuralism nothing can even mean the same to teacher and student (Culler, 1986). What students learn is never quite what teachers have taught them. As meaning is deferred indefinitely in semiotics, neither teacher nor student ever completely know what is learnt or “when precisely it was learnt and from whom” (Stables, 2004:236). However, regardless of which educational perspective is accepted as being able to address the environmental peril we together face, education is an important

instrument for socialization and it is even more relevant today to meet the environmental challenges we currently face.

2.6 Corporate-institutional response to crisis

Culture is an important distinguishing feature of any organization as it consists of the values, beliefs and social ideals of its members, and can be either an asset or a liability. As an asset it can generate high levels of cooperation because of the shared beliefs and values, but a liability when these do not align with the needs of an organization and can lead to a breakdown between individual and group consensus.

To understand the type of organization culture within which actors operate is to gain valuable appreciation of the dominant ideas that mediate individual action. Culture is at the same time constituted of both complementary and oppositional forces. Moreover, it is at various points resisted and challenged. The point at which individual and institutional cultures clash, the competing values that prevail, can lead to profound changes in both parties – usually at the expense of the individual. The stress that Nonaka et al. (1998) and Langberg (2002) have placed on the cultural dimension of organizations as 'learning organizations' provides an important link between formal education and learning that takes place outside the classroom. This link can provide an insight into the change-process that informed actors undergo, who find themselves inside or outside the integral 'network ties' that are necessary for them to successfully negotiate organizational space. The point at which these two spheres meet is a cultural-clash that can help explain why informed actors abandon knowledge and beliefs in favor of practices that are inconsistent with their individual and group knowledge and beliefs that they acquired in their formal education.

2.6.1 Approaches to the study of organizational culture

Organizational culture has been variously defined (Ott 1989; Schein 1990). It generally includes a wide range of social phenomena, including an organization's customary dress, language, behavior, beliefs, values, assumptions, symbols of status and authority, myths, ceremonies and rituals, and modes of deference and subversion; all of which help to define an organization's character and norms.

According to Schein (1985) organizational culture is the pattern of shared basic assumptions, invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration. This is a culture whose history has shown that it is durable and has worked well enough to be considered valid. Validity in turn permits that it be transmitted and taught to new members as the correct way to perceive, think, and feel in relation to those problems which confront organizational well being (Schein, 1985). As with other culture conceptions, organizational culture too, attempts to reconcile the often divergent aims and actions of its members. Its emphasis is on the role of shared basic assumptions influencing beliefs and behavior. To successfully engender change in organizational behavior it is important to understand the collective thought processes informing that behavior at both conscious and unconscious levels.

To the extent that there is agreement as to what constitutes organizational culture, then it is generally described in the following terms:

> …a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (Schein, 1992:12).

There are numerous models that have been used to study organizational culture (see Sinclair, 1991; Seymour, 1992; Kabonoff, 1993 and Whitaker, 1993). Organizational culture consists of both internal and external drivers and their individual and group dynamics are complex and these are discussed next.

2.6.2 Key internal and external organizational culture factors

Individuals who operate within culture models, be they social or organizational, are subjected to numerous internal and external pressures to adapt or comply. Of late, organizational cultures have additionally had to integrate a holistic, ecological perspective into their routines where they have been legislated for and prioritized. In doing so, they have had to employ new perspectives in thinking and ways of doing. In thinking they have had to accommodate and balance economic growth, environmental protection and social responsibility (Schaltegger, 2002). In practice this has frequently included whole new ways of doing and new systems and procedures that were previously not part of the organizational experience (Starik and Rands, 1995).

Ecologically aware and committed organizations hold certain central values that are demonstrable in practice. These values include respect and care for nature. They recognize that integrating a long-term vision of environment and social responsibility is a core corporate responsibility (Ruckelshaus, 1989). They are tasked with leading its employees towards compliance ultimately leading to a fusion of this culture and the individual as one common group (Kaufman and Franz, 1993). Such a fusion represents different levels of change depending on individual levels of ecological values. Change is however resisted. Moreover, frequently organizational culture differs substantially from that of its employees. Just as individuals don’t check in their personal cultural baggage at the front door when they arrive, likewise they do not by necessity take the new paradigm home. Integration is complex

process. Understanding the point at which organizational and social spheres clash is important to understanding the global dilemma that has become a desirable environmental orientation.

A factor repeatedly reported as influencing success in workplace programs was the cultural disposition of the organization. If participating organizations were sympathetic towards environmental outcomes the programs were more likely to be successful (Ciaburro et al., 1994). In workplace based programs the size of the participating organization and clear support from management are reported as influencing and having a bearing on success of programs.

Changing any human behavior draws heavily on current understandings of psychological and educational theory. Arbuthnot (1977) suggests the success of public policy decisions, educational programs, and other efforts are dependent on specific individual action in the realm of environmental issues which hinge upon our understanding of the relationships between personality characteristics, attitudes, and environmental values, knowledge, and behaviors.

The framework that is ideally suited for analysis of an organization's culture so that the conflicting dynamics of groups might be understood is Jung's psychological archetypes (**Error! Reference source not found.**). This methodology helps to identify current values that make up an organizational strength. When modified, it is able to capture possible disjunctions between individual and group culture-types. From the perspective of culture strength successful integration points to factors that can help identify why individuals frequently abandon individual beliefs and practices in favor of group consensus and network ties. From another perspective, the disjunction points to resistance in the form of external variables that have a determining bearing on unsuccessful integration.

<table>
<tr><td></td><td colspan="2">Flexibility and discretion</td><td></td></tr>
<tr><td rowspan="2">Internal focus and integration</td><td>Clan</td><td>Adhocracy</td><td rowspan="2">External focus and differentiation</td></tr>
<tr><td>Hierarchy</td><td>Market</td></tr>
<tr><td></td><td colspan="2">Stability and control</td><td></td></tr>
</table>

Figure 2.6: The competing values map
Made after: Quinn and Rorbaugh (1983)

The four types of cultures that emerge from Jung's psychological archetypes framework (Figure 2.6) are :clan, adhocracy, market, and hierarchy (Cameron, 1985).

The Competing Values Framework for cultural assessment (Figure 2.6) is distilled by Quinn and Rorbaugh (1983) from analysis of Campbell's longer list of effectiveness dimensions into a two dimensional pattern. Its underlying concept is cultural where that Horizontal: In/Out, to the left, attention is primarily inwards, within the organization, whilst to the right, it is outwards, towards customers, suppliers and the external environment. An internal focus is valid in environments where competition or customer focus is not the most important thing, but in competitive climates or where external stakeholders hold sway, then this challenge must be met directly. The Vertical: Stability/Flexibility determines who makes decisions. At the lower end, control is with management, whilst at the upper end, it is devolved to employees who have been empowered to decide for themselves. Stability is a valid form when the business is stable and reliability and efficiency is paramount, but when environmental forces create a need for change, then flexibility becomes more important.

The four types of cultures that emerge from this framework are: clan, adhocracy, market, and hierarchy (Cameron, 1985) can be delineated below:

Clan: The clan organization has less focus on structure and control and a greater concern for flexibility. Rather than strict rules and procedures, people are driven through vision, shared goals, outputs and outcomes. In contrast to Hierarchies, clans often have flat organizations and people and teams act more autonomously. It has an inward focus and a sense of family and people work well together, strongly driven by loyalty to one another and the shared cause. Rules, although not necessarily documented, do still exist and are often communicated and inculcated socially. Clan leaders act in a facilitative, supportive way and may take on a parental role.

Adhocracy: Adhocracy has even greater independence and flexibility than the clan, which is necessary in a rapidly changing business climate. Where market success goes to those with greatest speed and adaptability, the adhocracy will rapidly form teams to face new challenges. It will use prototyping and experimenting rather than long, big-bang projects and development. Leaders in an adhocracy are visionary, innovative entrepreneurs who take calculated risks to make significant gains.

Hierarchy: Hierarchy takes on a traditional approach to structure and control that flows from a strict chain of command as in Max Weber's (1959) original view of bureaucracy. Hierarchies have respect for position and power. They often have well-defined policies, processes and procedures. Hierarchical leaders are typically coordinators and organizers who keep a close eye on what is happening.

Market: The market organization also seeks control but does so by looking outward, and in particular taking note of transaction cost. A market organization is not only focused on marketing, but one where all transactions, internal and external are viewed in market terms. Transactions are exchanges of value. In an efficient

market organization, value flows between people and stakeholders with minimal cost and delay. Market cultures are outward looking, are particularly driven by results and are often very competitive. Leaders in market cultures are often hard-driving competitors who seek always to deliver the goods.

2.6.3 Education and corporate-institutional commonalities

Educational emphasis, patterns of internal and external structures as well as policy have recently driven educational institutions to operate in ways similar to that of the competitive sector found in business. The consequences have been that education has had to adapt to the requirements of the single market (Balázs-Ivanics, 1998). Conversely, organizations in the competitive and service sectors too, have of late, displayed features similar to the characteristics that define educational organizations such as the growing importance of the human factor and the individual approach, the use of organizational devices that modify market conditions and similar. For both, profound structural and operational changes have meant that the significant influence each wields in terms of influence over its members has also been redefined and reshaped. However, as both draw their members from a common spring already immersed in a common ideology, nevertheless, resistance can occur and does.

In institutions as in society there are two primary drivers, those who favor change and those who resist it (Levin, 1951). Change is expressed in many ways such as proposed amendments to rules, laws and regulations, customer demand and buying power and similar. Resistance is frequently an expression of fear, unfamiliarity, insecurity, uncertainty, trust and others (Dawson, 1994). There are additional variables seldom mentioned in the literature that can have a dramatic effect on the cohesion of groups and consequently are detrimental to effective utility of change strategies. Over education and job-satisfaction in organizations are but

two examples that can impact significantly socially and institutionally because they are at the same time both internal and external drivers. Additionally, they enliven the perennial debate whether the role of education is to educate for jobs or for knowledge.

Bowlby (1999) argues that there have been criticisms directed at the education system, including universities, that students are not acquiring adequate employment skills or human capital for today's rapidly changing global economy. University data shows that education had been of value for graduates in three main respects: (i) the types of jobs they had acquired in the labor market; (ii) positive assessments of their university education acquired; and, (iii) the range of skills that graduates said they had learned in their programs. However, about half of all graduates also remarked that their programs lacked a practical dimension and that some job-specific skills should have been learned. Furthermore, Smetherham's (2005) analysis on graduate employment, underemployment and unemployment found that "a significant minority of workers are employed in jobs for which their current qualifications are not a requirement, that is, they are 'over-educated' " (Smetherham, 2005:5). According to Brown et al. (2003), accepting a job that does not require a graduate qualification is demotivating and graduate employability tends to intensify the mismatch between supply and demand. Therefore job satisfaction needs to be considered as a variable that might shed light on the relationship between job, education and behavior. For example Graduate follow-up surveys in the UK show that just over two thirds were very or fairly satisfied with their present job, while those not satisfied tended to feel they were not using their skills or qualifications sufficiently, that their qualifications are wasted (Connor, Tyers et al. 2004).

Over education, underemployment and job mismatch effect job satisfaction. Job satisfaction in turn affects people's attitudes and can be an influence on beliefs

that translate or fail to translate into actions. This is especially pertinent where informed and trained students of the environment are gainfully employed in jobs or disciplines that are unrelated to their education and training. It is possible that this can lead to disappointment in individuals and result in declining motivation for activism in the short and long term. At the other end of the spectrum, it might also lead to an abandonment of their desire to engage in environmental activism of any kind that they have learnt and trained for in their formal education that was consistent with the attitude and beliefs that they originally held.

2.6.4 Activism and external drivers

The external driving forces towards environmentally responsible practices have evolved, are evolving and continue to morph (Banerjee, 1999). Although they differ in terms of place, industry and in intensity, they represent a level of coercive influence on society to act in particular ways. The principal drivers for societal change are governments, citizens in their role as consumers, and local communities.

Governments through the coercive apparatus of officially sanctioned rules, regulations and laws have provided a top-down brand of environmentalism to force companies and groups to compliance (Warhurst, 2005). They have been able to bring to bear a multitude of social sanctions such as fines and in some circumstances prison for non compliance (Mirvis, 1994). Still, environmental degradation persists.

Citizens in their role as consumers have the capacity to significantly influence the environmental debate through their purchasing power. However, as Schaffner Schroder and Earl (2003) note consumer behavior is complex. There are a multitude of studies that have highlighted consumer influence on industry (Certo, 1997; Baron, 2003 and Manning, 1990). At the same time, there is an equally compelling body of literature that consumers are not always ready to pay the price for ecologically safe products (Bergrström, Solér and Shanahan, 2005; Lin Jones

and Hsieh, 2001 and Sriram and Foreman, 1993). Still, environmental degradation persists.

Local communities in a narrow sense, includes those within the immediate space of living or working environments. Often in the past living and working communities were one and the same. In a wider sense communities are inclusive of the wider geographic boundaries that potentially or actually influence the environment and living organism within its scope (Lawrence Weber and Post, 2005). A community in its wider environmental definition is related to ethnicity in its anthropological attribute. Both are processes of inclusion and exclusion from within and from without. Both use cultural symbols in order to differentiate themselves from other groups as a “subjectively self-conscious community” (Brass, 1991:19). The boundaries to which communities and ethnic groups make claim to are social boundaries, though they may have ‘territorial’ counterparts. In other words if, ‘a group maintains its identity when members interact with others, this entails criteria for determining membership and exclusion’ (Barth, 1969:10-11). Communities and ethnic groups therefore are expressions “a real sense of group identity which links the members of ‘we’ because it emphasizes their differences from ‘them’ (and because it) is not programmatic and even less is it a political concept" (Hobsbawm, 1992:24). There have been numerous examples of community initiatives, cooperative success stories and similar between community and industry (O’Brien, 2001; Hoffman, 2000; Cannon, 1994 and Genest, 2005) that have favored the environment. Communities do have the capacity to contribute to the environmental debate. Nevertheless, they are local expressions and environmental degradation is a global phenomenon. The principal limitation of communities is explained succinctly in the words that they are “not programmatic and even less … a political concept” (Hobsbawm, 1992:24) therefore their ability to influence facts outside their community is limited and to the detriment of the wider environment. Still,

environmental degradation persists.

External driving forces towards environmentally responsible practices share some common traits that can be expressed in terms of a deep commitment to the environment, nature and to sustainable development (OneWorld, 2006; The Australian Greens, 2004; Greenpeace International, 2007). However, gains made through activism have generally not translated into high standards in policy making, and still less to any fundamental change in behavior of individuals and society in general toward sustainability (OneWorld, 2006). Still, environmental degradation has continued at an alarming rate (GEO, 2006).

Many studies have also tried different ways of changing the knowledge, attitude, and behavior of individuals by educating though dispensing knowledge (Aggleton, 1997; Cook and Berrenberg, 1981). This has had little effect too. More recently change theories have been developed that focus on levels of efficacy and self-regulation as important factors in determining a transition between positive attitudes and actions, yet there is little evidence of these theories being applied to achieve environmental outcomes (Whelan, 2001). As for importance of work-based environmental education programs as a means of helping to achieve an ecologically sustainable society, the literature is vast and varied. The literature generally argues that members of organizations represent a large body of people that offer an enormous potential for change if it can be mobilized to achieve environmental improvements (NIACE, 1993). Where this potential for change exists, educating a workplace requires different strategies from those successful in the education of individuals. Walker (1996) reported that in addition to formal education programs, informal education and work-based cultural influences appear to mediate the environmental attitudes and beliefs of staff (Walker, 1996). According to Robbins et al. every organization has a culture and, depending on its strength, culture can have a significant influence on the attitudes and behaviors of organization members

(Robbins, Waters-Marsh, Cacioppe, and Millet, 1994). This has significant implications for achieving environmental outcomes within organizations and in aligning and reproducing the environmental knowledge and beliefs that environmental students have and seek to translate on the job. The extent to which they are able to migrate their environmental knowledge outside the classroom is an important variable to understand the environmental dilemma we face today framed in terms of an environmental orientation subsumed within an economy-dominated paradigm.

2.7 Can environmentalism save the world?

There is considerable argument that modern environmentalism is no longer capable of dealing with the world's most serious ecological crisis (Shellenberger and Nordhaus, 2004; Steffen, 2004; Tokar, 1997; Epstein, 1995). Many suggest that we will never be able to turn things around as long as solutions to problems "are essentially technical" in nature (Shellenberger and Nordhaus, 2004:6). The alternative solution consists of the necessary formation of 'Strategic Values' as a tool to redress the problems that environmentalism confronts. The new values call for an identification and realignment of "the core values and beliefs that inform how individuals develop a range of opinions on everything from the economy to abortion to what's the best SUV on the market" (Shellenberger and Nordhaus, 2004:7). These new values can provide a valuable "road map to guide the development of a set of proposals" (ibid.) that are progressive in nature and can help to provide a long term vision that will lead to a way out of the situation we find ourselves in.

2.8 Pragmatism as a bridge to environmentalism

The value of pragmatism is in the valuable instrument it provides for explaining. Through a pragmatic account can be derived an important understanding of existing society by mediating between what is and what ought to be. Both

theoretically and structurally pragmaticism is able to accommodate the various contradictions that make up the world we live in. Notably, a distinction is made in this research between pragmaticism of economic accumulation and exploitation that has informed modernity, and pragmaticism as a framework that can lead to more thorough understanding of contemporary society. At the same time, both (economic rationalism and the inner workings of contemporary society) are useful in understanding the whole.

2.8.1 Out of the quicksand

Reitan (2006) alerted to the view that our ideas, theories, and worldviews should be examined and evaluated in the light of their impact on lived experience, according to how well they enable us to maneuver through experience successfully. The link between pragmatism and environmentalism is in the fundamental assumption that there exists an essential link between our outlook on the world and our behavior. The fundamental justification for changing our worldview then, is that making such a change is the only realistic way to sufficiently change our harmful behavior (Reitan, 2006). The pragmatic method seeks explanation through interpreting each notion by tracing its respective practical consequences. Whenever a dispute is serious, we ought to be able to show some practical difference that must follow from one side or the other for one view to be valid (James 1991).

From the standpoint of environmental philosophy, that seeks harmony between humanity and nature, this criterion calls for an explicit examination the effects of alternative worldviews have on the sustainability of human-natural systems, and to distinguish them according to the practical impact on these systems. If two environmental worldviews have the same impact on the human-nature relationship, they are taken to have the same environmental meaning (Reitan, 2006). If there is inconsistency between a worldview and its application in practice than

this is a legitimate subject for analysis and in need of explaining. Inconsistency, for pragmatism is not the problem, the challenge is under what conditions such inconsistency occurs in the system and how we explain it.

2.8.2 Pragmatist approaches

Pragmatism is a philosophic school of thought that originated in the late nineteenth century and primarily considers practical consequences or real effects to be vital components of both meaning and truth. At its core is the notion that there are no fundamental differences between practical and theoretical reason or ontological difference between facts and values.

The value of pragmatism in understanding human action is in its rejection of notions of ‘false consciousness’ or lack of ‘idealism’ as in Marxism (Gramsci, 1975; Marx and Engels, 1977) as determinants in human action. There is no one- to-one relationship between belief and action in the real world. Instead, pragmatism holds that both the meaning and the truth of any idea is a function of its practical outcome. Furthermore, pragmatism challenges the assumption that knowledge and action are two separate spheres, but permits for inconsistency between knowledge, attitude and practice in terms of time and space as organisms orient themselves to real events in order to cope with life. The dichotomy between means and ends reproduced through formal education in society has led to a path of environmental degradation because it has educated for separateness.

However, meaningful labor and education are not separate in the real world so that one (education) is a preparation for the other (life) but that together they are “life itself” (Dewey, 1910; Dewey, 1938/1997:47). Appropriate education needs to be conceived as a two way street. For student it should have both a societal purpose and purpose for the individual student. For teachers, they are tasked with providing students with education and experiences that are immediately valuable and which

better enable the students to contribute to society. Succeeds for both teacher and student depend on the extent to which it contributes to the well-being of individuals and society. (Dewey, 1938/1997). As for notions of truth, inquiry is real-world truth, rather than truth or knowledge, the essence of logic. The experiences we have in life, the various episodes, should be understood in terms of the conditions of life. Man shares with animals certain basic vital needs, and derives the means for satisfying these needs from his animal nature. Life goes on not only in an environment but in interaction with that environment. The live creature uses its organs to interact with the environment through defense and conquest. Every need is a lack of adequate adjustment to the environment, and also a demand to restore adjustment. At the same time each recovery is enriched by resistance met and overcome to restore balance (Dewey, 1934/1958). Therefore, pragmatism prioritizes practice. The central basic premise of the movement is that human capability of theorizing is integral to intelligent practice. Theory and practice are not separate spheres. Instead, theories and distinctions are tools for mapping as human actors orient themselves to real situations as they find their way in the real world. Theory is an abstraction from direct experience (past) and to which it returns ultimately informing experience in the present.

2.8.3 Dewey's pragmatism

A proper understanding of pragmatism requires tracing this theoretical and philosophical framework to the source. The source is by necessity one of the fathers of the modern pragmatic tradition - John Dewey (1859-1952). The value of Dewey's pragmatism is in the depth and breath of theorizing that directly impacts upon this thesis. It can help to bridge the separateness taught between education and action and serve as an important link between disparate individual discipline theoretical-frameworks discussed above. Dewey at once addresses education, social interaction

and human beliefs and actions amongst others. Through understanding of pragmatism can be provided an explanation why any misalignment between knowledge, beliefs and actions might occur so that such a misalignment might be better explained as being endemic to the system and therefore not susceptible to easily being changed through contemporary and accepted worldviews.

Dewey's philosophy of life was naturalism. While the naturalism is evident in most of his works, Dewey explicitly confirmed the holistic aspect of his theoretical grounding in his article entitled ‘Half-Hearted Naturalism’ (1927) where he calls himself an empirical naturalist who allows no break or discontinuity between nature and social man. For Dewey, human affairs, associative and personal, are projections, continuations, complications of the nature which exists in the physical and pre-human world. There is no gulf between man and the natural world, there are no two spheres of existence, no `bifurcations' but merely only a "thorough-going continuity" between man and nature (Dewey, 1927: 58). His humanism stresses that man is a part of nature and that he has emerged as the result of a continuous process. A break in the fabric of this continuity, modernity itself, has been detrimental to both humans and nature thereby highlighting that existing acquisitive and profit-motivated society has shown itself to be inadequate. Contextually and theoretically, Dewey’s moral theorizing is an appropriate environmental framework to explain society as it moves because it is cyclic in nature, does not pursue a simple cause and effect explanation of phenomena (Means-Ends Hypothesis) and it provides a better account of our contemporary relationship with nature. Equally, because it is accessible and open to intuitive, common sense – man on the street forms of understanding.

Dewey’s work might be categorized into discreet headings that reflect directly upon the themes in this thesis: (i) humans in society; (ii) society and consensus; (iii) knowledge; and, (iv) process of learning and education.

Humans in society: Dewey's naturalism correctly locates man's place in the scheme of things as being the result of the natural process "in interaction with other things" (1954:145) nature itself. The distinguishing mark between humans and animals is that all that is distinctively human is learned, not native - as it could not be learned without native structures which "mark man off from other animals" (1954:24). Socializing into the human family results from limitation of capacity learned as a process of growth and it is learned through "the experience of consequences" (1916:197). Where a single directional causal connection between experience (A) and consequences (B) results in individual issue-specific socialization (uni-directional), an experience of consequences approach instead provides a two-way feedback mechanism that builds upon previous experience and results in adding to the total sum of pool - multi-directional (Figure 2.7). It is within this framework that adult members of society who possess the knowledge and customs of the group help "transmit it through communication" to the young (1916:3). A student, both formal and informal, is systematically led to utilize his earlier lessons to help understand the present one, and also to use the present to "shed additional light upon what has already been acquired" (1916:163). Successful teaching bears the hallmarks of "affecting interconnection" (1916:249). Group harmony and order is contingent on proper interconnectedness and transmission between learning provision and that internalized, accepted and learnt.

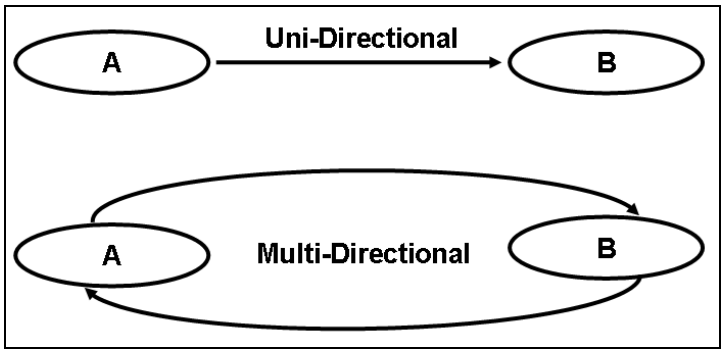

Figure 2.7: Dewey's experience of consequences
Made after: Dewey (1916:197)

Society and consensus: For Dewey society conveys and accommodates all the ways in which by associating together men share their experiences, and "build up common interests and aims" (1957:200). The process of socialization is inherently educational. All groups educate their members, socializing is immersion of members into the group culture that marks of "us" from "them". Although, quality and value of the socialization is dependent upon the habits and aims of the group" and they differ among groups (1924:96). The social environment consists of all the activities of fellow beings that are "bound up in the carrying on of the activities of any one of its members" (1916: 22). Social institutions including economic, domestic, political, legal and religious all "enlarge and improve experience" (1916:6). All institutions are educational in the sense that they operate to form the attitudes, dispositions, abilities and disabilities "that constitute a concrete personality" (1946:62). Naturally, as societies become more complex in structure and resources the need for formal or intentional "teaching and learning increases" exponentially (1924:11).

Consensus is the result of the playing out of complex and competing interests as solutions to problems are pursued of common group interest. Solutions of group problems comes only by getting away from the meaning of terms that is already fixed upon and coming to see the conditions from "another point of view" (1902:3). Dominant values underpin the consensus that is pursued and differing opinions are

treated as a "factor in a problem needing adjustment" (1902:3). An adjustment necessitates two-way communication: Firstly, "experience has to be formulated" (conceived and be seen as others would see it) in "order to be communicated" (1924:67); Secondly, to be a recipient of a communication is to have an enlarged and changed experience in the agreement towards the "consensus that has been won" (1916:5) (Figure 2.7).

Socialization of society's members is inherently progressive and at the same time reformist. Utilizing social instruments such as law and punishment, by social agitation and discussion, society regulates and forms social contracts of convenience that help maintain social order and permits society to move in the direction in which it "wills" to move (1964:437-438). Initiation and accommodation occurs otherwise the group will cease its "characteristic life" (1916:3).

Knowledge: Knowledge in social terms is a tool for "managing experience" (Dewey, 1924:321-322) and knowledge is achieved by sending the mind to school of nature to learn her "processes of change" (1957:42). Knowledge at the same time is inclusive of knowledge in itself and beliefs - although the two a different. Knowledge in its fullest sense is demonstrative and necessary - true reality, while belief is only opinion - relates to the world of change (1929:18). More specifically knowledge is a perception of those connections of an object which "determine its applicability in a given situation" (1916:338), while our beliefs are only hypotheses, theories, suggestions, guesses, and are entertained tentatively and utilized as "indications of experiments to be tried" (1916:197). Mistakes occur in both knowledge-proper and belief systems. However, making mistakes is an "incidental requirement towards growth" (1916:176). Mistakes are unavoidable, although the results might be mitigated when they take place under conditions where they can be utilized to increase the total "sum of intelligence in the future" (1957:175).

Knowledge is variably useful and some knowledge has greater social value and it is therefore prioritized. “value” for Dewey as a term, concept or paradigm has two distinct meanings. One, designates the attitude of prizing a thing, finding it worth while, for its own sake, or intrinsically - to value in this sense is to appreciate. The second, is a distinctly intellectual act, a process of comparing and judging to evaluate – to value in this conceptualization is to consider which of the various possibilities of a situation is to be preferred in order to reach a full realization, or vital experience (1924:291-292). For Dewey, education is perhaps the most significant social value. As the means of the general institution of intelligent action, it holds the key to “orderly social reconstruction”. (1929:252).

Process of learning and education: For Dewey, at its simplest level learning is the “transmission of knowledge that occurs by means of communication” of habits of doing, thinking, and feeling from the older to the younger (1916 3). While, education is not a means to living (means-ends), it is instead a complete process that is “identical with the operation of living a life” itself (1916:239). It is not the means-ends value of education that is intrinsically important but the total whole which is “inclusive of both means and ends” (1916:359). Learning is an active process that involves reaching out of the mind ever outward exploring possibilities. It involves assimilation of two antithetical processes whereby it “originates within the self but also departs” from it (1902:9).

Socially and individually, “learning is what an individual does when he studies” (1924:390). At once learning is a process of learning the consequence of “direct activities” (1924:199) while at the same time leading to growth that literally “rewards the mind” (1924:171). Institutionally, “learning” encompasses both the sum total of what is known (knowledge and experience) and that which humans do when they study (1916:334). Within the institutional schema, both formal and informal, the role of teacher is to induce a vital and personal experiencing in the

learner compelling them to internalize the subject so that in the process the individual themselves may “become a part of experience” itself (1902:23).

Teaching is a “calling” and “vocation” is social learning in the same way as Weber (1959) has explained it. The teacher is a social servant whose role is the maintenance of both proper social order and the securing of the right “social growth in social actors” (1964:435). While, the dominant vocation of all humans is at all times aimed at “living-intellectual and moral growth” (1924:362). Growth is distinguishing human characteristic of life and education is one with growing - it has no end beyond itself. Therefore, the primary value of formal education is the extent to which it creates a desire for continued growth and supplies “means for making the desire effective” in fact (1924:62). According to Dewey, where the inclination to learn from life itself exists, enabling those conditions to also exist is the “finest product of schooling” (1924:60).

Dewey’s views about the important role that education plays in society is best captured in ‘My Pedagogic Creed’ (1897/1964):

> I believe that all education proceeds by the participation of the individual in the social consciousness of the race. This process begins unconsciously almost at birth, and is continually shaping the individual's powers, saturating his consciousness, forming his habits, training his ideas, and arousing his feelings and emotions. Through this unconscious education the individual gradually comes to share in the intellectual and moral resources which humanity has succeeded in getting together. He becomes an inheritor of the funded capital of civilization. The most formal and technical education in the world cannot safely depart from this general process. It can only organize it; or differentiate it in some particular direction (Dewey, 1897/1964:77).

Finally, according to Dewey the teacher is engaged, not simply in the training of individuals, but in “the formation of the proper social life” for action (1897/1964:80). With these final words Dewey provides us with appropriate method to both understand society in the process of living with all its flaws, but also helps to explain why informed actors will translate their knowledge and beliefs into action in one setting and not in another.

2.9 Critical response to environmental crisis

Interests in the development of appropriate strategies to understand the implementation of change have been increasingly on the rise of late. There are two components and forces for change in organizations and in society generally. One is forces for change and the other is the forces that resist change. Notably, change will rarely occur where forces that resist change are stronger than those striving to affect that change (Lewin, 1951).

The problems and challenges that sociology, psychology and education have faced, how they has responded to the environmental crisis and similar are all illustrative of a social approach that attempts to deal with a real-life situation in real-time. The contours of the historic specificity of the problem are all illustrative of stop-gap social philosophy that has neglected the underlying reasons for existing problems. For sociology the complexity of the problem it has struggled to explain has reflected upon its responding because it has at once been part of the problem as well as the solution. In seeking to capture a society as it moves, it has primarily focused on explaining society and nature as two separate spheres. When the solutions have come, society and problem had already shifted. Consequently, sociology has theorized group action on the run and this has been at the expense of the environment. While it has rightly argued in terms of culture, groups, consciousness and in pragmatic terms society is far too complex to be explained by

one theory.

Psychology has also encountered difficulties on the path to understanding human behavior. While it has offered a number of approaches such as social dilemmas, rational-economic, as well as attitude and behavioral models, these models have proved adequate in many respects to explain the human condition individually and on a case basis, but have not been particularly successful in substantively reorienting the debate by shifting paradigm boundaries.

Environmental activism, organizations and education have also contributed to the debate and have coalesced around the notion of sustainable behavior. Their individual approaches have provided partial answers to some of the pieces in the puzzle that can help explain the relationship between education, beliefs and action. Increasingly, however, an integrated approach to explaining and understanding the human-nature relationship has been necessary because past individual-discipline approaches have not significantly provided the kind of reciprocal orientation in human behavior that the extent of the environmental problem has required.

Many studies have tried different ways of changing the knowledge, attitude, and behavior of individuals (Aggleton, 1997; Lee and Balchin, 1995; Whelan, 2001; Zelezny, 1999). These have ranged from instructive style methods which involve telling people how to do, to reward based methods where the required behavior can be rewarded either by tangible incentives or social praise. At the same time, many environmental organizations such as government and private have invested substantial capital (moral and funds) to engender more environmentally sustainable behavior, yet there is little evidence in the literature that many of these theories applied have achieved substantial environmental outcomes (IPCC, 2007).

In terms of psychology of environmental sustainability, at present this position is occupied by psychologists who fall into various categories. The study of environmental issues within a number of different sub-disciplines creates difficulty

in the degree to which researchers adopting different theoretical positions are able to communicate with one another and develop an understanding of the commonalities and differences and relative strengths and weaknesses of the various positions. However, despite the variance and sometimes differing positions in psychology to explain human behavior, there is agreement that there exists an inconsistency between behavioral intention and actual behavior (Hatwell, 2000). One explanation offered to explain this phenomenon is the existence of conflicting values (cognitive dissonance). Individuals may value the environment and its preservation but also value their current lifestyle despite negative impacts on the environment, therefore having simultaneously two sets of conflicting attitudes (Tertoolen et al., 1998:172). Another explanation concerns the higher level of difficulty associated with action as opposed to professed attitude (Andrich and Styles, 1998; Styles, 1993). Therefore, no matter how positive an individual is about particular behaviors, if there are significant external or internal barriers to completing the behavior, its incidence will be lower than may be expected.

Environmental sociology has provided approaches that have helped unmask and resolve some of the dilemmas in daily practices of informal and formal policies, formal institutionalized frameworks and their changes that have historically influenced environmental degradation in the past and that "continue to influence environmental degradation at the present" (Whitaker, 2002:17). Additionally, sociology has helped in raising awareness that the relationship between the individual and society is a two way street and individual views that find expression through groups affect dominant social views and vice versa (Callicott, 1994). Likewise, sociology has helped in locating the historic specificity of western environmental attitudes that ethically exploitation of the earth is a human right in religious texts. Biblical accounts such as the book of *Genesis* have been particularly influential on western thought in human-nature relationships by prioritizing human

over that of nature:

> 27 So God created man in His own image, in the image of God created He him; male and female created He them.
>
> 28 And God blessed them, and God said unto them, Be fruitful and multiply, and replenish the earth and subdue it; and have dominion over the fish of the sea and over the fowl of the air and over every living thing that moves upon the earth (Chapter 1:27-28:).

The *World Conference on Higher Education* (UNESCO,1998) and the 1999 National Education Act of Thailand Act (OEC, 2004; ONEC, 2000a; ONEC, 2000b; Constitution of the Kingdom of Thailand, 2007) converge on environmental sustainability and on emphasizing the necessity of educating for responsible informed actors acting towards an end. At the same time while more and better education has been called for in the environmental field, Gruenewald (2004) examined recent trends in environmental education and argues that its institutionalization within general education works against its own socially and ecologically transformative goals. The institutionalization of environmental education has muted its potential as a transformative educational discourse practice.

While some authors have suggested that “environmental education should be abolished” (Gruenewald, 2004:93), education has a role to play in environmentalism. However, the kind of education called for is one that is able to negotiate the complex ecological interactions between science, politics, and culture, between social and ecological systems, and their impact on human and nonhuman life.

In terms of ethics, education has argued that in order to create a sustainable human society we need to change how we think about our relationship with nature. A simple change in public policy such as increased use of public transportation or a

growing commitment to recycling, and in stressing the dangers of current practices and the need to care for the earth, education has not done enough. Additionally, education has had difficulty in explicating the meanings of, and in translating important concepts such as “environment,” “sustainability,” and “sustainable development” towards action. It is not only in semantics that the ambiguity of these terms has been left wanting, but the vagueness itself of appropriate conceptual delineation and measurement that precisely these phrases entail have themselves “contributed to the difficulty of education” in its attempt to save the world (Stables, 2004:235).

As far as organizations are concerned, the main reason change programs fail is not to be found in answers that individuals resist change. Instead, individuals resist change, because those that implement the change don't understand the change. For change to be lasting there must be detailed understanding of what the change is (Hacker and Washington, 2003). The same problems that education has found in the vagueness of key environmental concepts and policies, has plagued organizational change too. Furthermore, organizations as a cultural entity, has to reconcile the often divergent aims and actions of its members. Additionally, organizational behavior needs to reconcile the collective thought processes informing behavior at both conscious and unconscious levels. This is where a deeper analysis and understanding of organizational culture is necessary and a widespread commitment to the change program too. Where, clear support from management has been provided, success has come too (Wake, 1999). However, organizations like society are complex cultures, and often individual beliefs conflict with organizational values (Emerson and Tansley, 1999). Such conflict has severe implications for any educational intervention in organizational terms. Nevertheless, organizational culture is a socialization process to which indoctrination is complex and often it depends on the founder’s philosophy and support. Where both exist, changes can be profound such

as occurred at Virgin Records where it led to significant cultural and ethical realignment of the whole organizational structure (Robbins, 2005). Others have followed suit such as automobile giants like Toyota and Mercedes, and the petroleum companies the likes of Esso who have contributed with Green products. Still, dominant culture is frequently challenged by individuals and sometimes this challenge is located in subliminal factors that manifest themselves in countercultural and subcultural activity which may translate to resistance or subversion of policy or ideology.

The origin of the term counterculture is disputed though, as Marcuse notes, counterculture probably had its modern origins in Hegel's ‘negativism’ and dialectical view of history and social change. This concept of ‘anticulture’ embodies the view that it grew out of or even co-existed with "procultural" or traditionally established forms (Leventman, 1982:4). In its modern usage, counterculture gives rise to two different but not entirely clear categories: 'counterculture' and 'subculture,' which "cut across and fuse with each...a number of phenomena addressed by these two terms" (Bash, 1982:22). Secondly, to the extent that the two terms can be separated, the difference "must be understood in dynamic terms" (Walter, 1982:75) where counterculture directly challenges the dominant culture and subculture in turn, relishes in diversity and difference.

The role that job satisfaction can play in countercultural and subcultural terms in underemployment, and of workers who are employed in jobs for which their current qualifications are not a requirement, where they are ‘over-educated’ can be significant to the disadvantage of group consensus (Bowlby, 1999; Smetherham, 2005; Brown et al., 2003). This phenomenon has generally been glossed over in organizational environmentalism.

As for official environmentalism, the disappointment in translating theory to practice has led some environmentalist to look into the patterns of failure from

within the movement itself. An examination of the Annual Reports of the major environmental organizations for instance, has highlighted an unhealthy extent of overt corporate influence upon the leading national environmental groups (Steffen, 2004; Tokar, 1997). Despite this, the problem is ultimately traced back to the individual. For instance, while the clear messages from citizens is that they want the environment protected, there's little, if any, evidence that most voters are willing to do as much as they need to do to achieve sustainability (Steffen, 2004; Shellenberger and Nordhaus.2004). Lee (2003) also found a contradiction between people's beliefs and their practices.

However, whether the problems and solutions are vested in individuals or groups, a prerequisite for any substantial or lasting realignment must start with a move away from 'anthropocentric' conceptions of nature towards a more ecocentric view (Capra, 1987; Naess, 1988). Unless we are able to successfully translate theory to practice in the form of a new ecological paradigm in action the consequences of continuing on the present path can be dire and irreversible:

> … the environmental community today finds (itself) head-down and knee-deep in the global warming river ….[it is] time we got back to shore and envisioned a new path for the crossing (Shellenberger and Nordhaus, 2004:34).

2.10 Chapter summary

Interest in the development of societal environmental sustainability has been increasing. Many theoretical models have been offered to explain human action from a number of disciplines such as sociology, psychology and education. Recently a large number of companies from the corporate world have tried methods and strategies to integrate ecological values into their practices and through education

strategies to immerse their workers into a new line of thinking. All too often these explanations have been individualistic. Increasingly an integrated approach has been favored and adopted. The main external drivers to change come through merger of the available theoretical and ethical framework into a cohesive educational strategy for change. In practice these drivers have come from environmentally responsible parties such as governments, local communities and from people themselves (customers) calling for change. The intensity of the push for change has varied in terms of place. Still, environmental problems persist. Changing social or corporate culture is not easy. Society is a complex web of competing spheres of interests. Additionally, business must also accommodate economic-driven goals. Change is resisted, and it is multi-directional. Frequently it is the result of lack of trust, lack of understanding of the change process, insecurity or uncertainty (Lewin, 1951).

The gap in the knowledge that this research points to is in the methodology used to analyze and explain the inner workings of existing society. While many interpretative frameworks have thoroughly and effectively understood parts of the system, their shortcomings are identified in individualistic approaches that have neglected the cultural contexts within which their subjects operate. Consequently, this research has approached the study of informed environmental actors from a multidisciplinary ecocentric approach perspective by borrowing and adapting. Through this approach it is hoped can be gleaned a more relevant picture of the dynamics of social actors operating within a complex time and space.

For real societal and corporate change to take place in favor of the environment, insights that permit participants to see the whole picture and not just the parts (systems thinking) are required. The interconnectedness between the parts makes change difficult. A bottom-up change strategy from the grass-roots offers the best hope for the future. In any such approach, education needs to be a central player to continue to discover and uncover the limitations in existing knowledge that lead

to environmental degradation. As for the most effective educational strategy to use in a workplace situation to induce voluntary behavior change, an understanding of the ways in which organizational culture influences change programs and where self-regulation is the preferred model within which change is more likely to occur (Baudains, 2003) is required.

CHAPTER III
RESEARCH METHODOLOGY

The purpose of this chapter is to describe the research methodology employed in this study (exploratory and intervention). The method links the general research subject discussed in the previous chapter with the specific research objectives and thesis hypotheses. While research design explores local contexts the data results are given global dimensions in explaining through appropriate theoretical frameworks. Administration of research instruments and populations are drawn from current and former (alumni) environmental students from a leading Thai university.

3.1 Background

The relationship between the polluter and the ones who suffer the pollution is expressed by Thornton (2007):

> The poorest countries in the world, with 738 million people, make no contribution to climate change, but it is those same people who face the worst consequences…..One hundred and sixty thousand people are already dying every year due to climate change- related diseases and billions will face drought, floods, starvation and disease (Thornton, 2007).

The shortcomings in the relationship between people's beliefs and actions can best be described as a form of "environmental pragmatism" (Parker, 1996). In Hong Kong for example there is an emerging social norm that is based on a fatalistic mood among the public, on the one hand, and the pragmatic concerns of the elite

with economics, on the other (Lee, 2003). For both Lee (2003) and Parker (1996), pragmatism is not simply that shortsighted, allegedly “practical-minded” attitude towards the world that is a major obstacle to environmentally responsible behavior. Instead ‘pragmatism’ contends that the human sphere is embedded at every point in the broader natural sphere, that each inevitably affects the other in ways that are often impossible to predict, and that values emerge in the ongoing transactions between humans and environments (Parker, 1996). The most interesting aspect of pragmatism is its rejection of the dualistic "spectator theory" of knowledge and its companion, the simple "correspondence theory" of truth. In pragmatism there are no observers in life or absolute truths (Parker, 1996) the mind is instead integrally connected to this world:

> “…it is a part of the world. “Knowing the world" is not a detached activity. It is, rather, a mutual transaction between the organism and its surroundings. In this transaction an uncertain, doubtful, indeterminate situation is reconstructed so as to make more sense, to be more intelligible. The process of reconstruction transforms both the knowing subject and the known object (Parker, 1996:23).

The above insight by Parker (1996) that the interaction between human and planetary systems is in need of explaining informs the methodological design of this thesis – that understanding why people continue to pollute, and use up valuable resources at an increasing rate despite numerous years of environmental education, needs to be explored and explained. The literature has identified environmental problems that confront us today as the result of people’s behavioral practices (Oskamp, 2000; Howard, 2000; National Center for Environmental Research, 2006).

3.2 Informed actors knowing and acting as a case study

On the basis of a holistic perspective as a leading image and guide to acting, informed environmental actors are charged with translating individual and group acquired environmental knowledge, attitude and particular know-how's into real world action. Theirs is a "duty of care" - a responsibility of crafting and integrating a particular brand of activism into their individual and collective group lives towards sustainable use of the planet, and its resources and to ensure that we leave the planet in good shape for those that follow. Individual and collective environmentalism implies that humans are viewed here as being inseparable from their negative environmental and social impact. In terms of informed actors, their environmental knowledge puts them at the cutting edge of societal awareness. In so far as they act, then as informed actors, they are expected to act by transforming their ways of thinking in order to respond "environmentally" to the challenges offered by an ever changing and challenging dynamic world. Their duty of care is real-time and transmittal. Their responsibilities at the same time accommodate and transgress the normal limits of social responsibility. Their particular brand of social responsibility needs to incorporate appropriate social reproduction of informed action into the wider community. In their activism they serve as role models for the broader society.

Informed actors seek to balance the ecological limits of action while at the same time living a life. Their boundaries cross-over and are constantly encroached upon in the face of innumerable internal and external pressures. Their individual and collective experiences are at once both general and specific. While they share much with the general population, in environmental knowledge they are distinct from it and separated.

This work focuses on informed actors knowing and acting in time and space that seeks the contours of a holistic perspective that helps inform action by the participants in different timeframes (time) and different settings (space). The value

of the case study approach for a research of this type is in the emphasis on exploring and explaining phenomena within its real-life contexts (Yin, 2003).

The unit of analysis in this study is informed environmental actors as they have been identified in the literature as a differentiated group from the average citizen on whom being "informed" places them in both a privileged position and bestows on them reciprocal social and environmental obligations (Parker, 1996; Schutz, 1962; Weber,1968). They are informed because they have completed or are in the process of completing their environmental education. The study population was drawn from the pool of environmentally knowledgeable and aware social participants from a leading university in Thailand over a thirty year period.

3.3 Research strategy

This chapter begins by gathering together the range of concepts presented in chapters I and II. Utilizing the conceptual framework, the methodology is explained that describes the participants, data collection methodology, and analysis procedures and research design.

The 'Sociological Structure of Theory' model forms the 'base' of this research upon which sits the 'superstructure' (Turner, 1998 and Figure 3.1).

In social sciences, "superstructure" is the set of socio-psychological feedback loops that maintain a coherent and meaningful structure in a given society. It can include the culture, institutions, power structures, roles, and rituals of the society. It is inclusive of variables internalized through conditioned behaviors (both interpersonal and situational). It serves to enforce a set of constraints and guidelines on human activity in a stable and effective fashion, such that it engenders a society's characteristic organization (order). In Marxist terms superstructure is the particular form through which human subjectivity engages with the material substance of society. The form is to an extent objective and to an extent subjective. The

relationship between superstructure and base is dialectical (Marx, 1977).

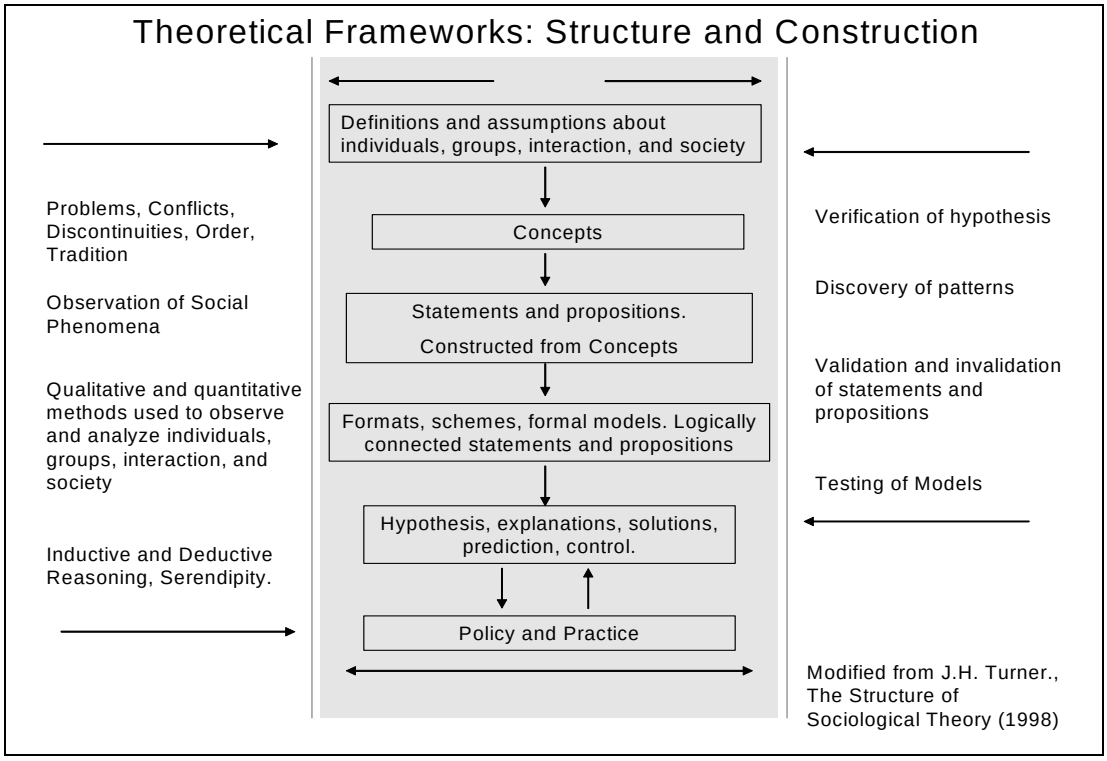

Figure 3.1: The sociological structure of theory
Made after: Turner (1998)

The schematic diagram shown in Figure 3.1 is adapted and modified from Turner (1998 a and b) and helps to explain in schematic form the underlying thinking behind this study (base). This schematic diagram is overly simplistic, but is intended to show some of the essential aspects of a theory and also to show the difference between the construction (left panel) and refinement (right panel) of a theory and the internal structure (middle panel). In sociological practice, these different aspects are not divisible as shown in the schematic diagram, the interaction is dynamic whereby there is a continual interaction (feedback) - a moving back and forth between examination of the social world (knowing and acting) and theorizing.

The central panel of the sociological structure of theory provides a way of thinking about how a theory or theoretical framework can be considered to be

structured. The panel on the left outlines a few of the ways in which a theory can be regarded as emerging, that is, how a theoretical framework is constructed. The panel on the right notes how the theoretical framework is tested and revised, once it has been initially constructed.

The literature review (Chapter II) is located in the middle panel under "policy and practice". Here literature that has a bearing on this research and influences policy and action is focused on.

The research component of this investigation is located in the left and right panels. Here the pros and cons of theoretical frameworks are considered that are available and appropriate to be utilized to effectively test the central hypothesis of this Thesis. In the main, the competing values framework and social impact theory are particularly suited to a study that explores social actions in real life situations. Together they help explain why and how phenomena happen.

As for data collection methods and instruments different paradigms that are available for a research of this type fall into two essential camps commonly referred to in sociology as positivist and constructivism.

Primarily, a positivist paradigm is associated with quantitative methods and constructivism with qualitative. The essential difference between the two approaches quantitative or qualitative (positivist or constructivism) is in the underlying logic, the role that personal values play in systems of acting, the relationship between the knower and known (knowing about knowing) and in the causal linkages pursued.

A positivist approach gives primacy to quantitative methods that are "deductive" in nature as they move from the general to the specific. They attempt to reduce the influence of values and visions of human action into the study. The knower and the known are largely independent variables, while the cause comes before the effect. This type of method to research explores human problems by testing a theory composed of variables measured by numbers and analyzed through

statistical procedure. Its chief undertaking is to determine whether the predictive generalizations of the theory hold true (Denzin and Linclon, 1994).

In constructivism importance is attributed to the qualitative. The methodology is "inductive" and its trajectory moves from the specific to the general. It seeks to incorporate individual values and visions into the interpreting results. The knower and known are ascribed inseparable positions, while the causal linkages are imputed to be dynamic and simultaneously interacting in shaping each other. Cause and effect are argued to be inseparable. A qualitative method pursues an understanding of the individual or group by building up a complex picture incorporating all available aspects of the subject environment (Cresswell, 1994).

As Merriam (1998) has argued the demarcation between the two methods is not static and there is considerable overlap between the two. Cresswell (1994) and van Kerkhoff (2005) point out, this is an important overlap between methodological approaches and even more so a need to combine, borrow and adapt. Naturally there is bias in any approach. While the knower and the known are said to be inseparable in qualitative methods, the influence of interpretation of the researcher can itself lead to bias. Likewise, in qualitative methods while data in its factual dimension is important, facts don't speak they must be interpreted. Here too then, bias can be imbedded in the interpretative process. No method is foolproof. However a combination of approaches can help guard against and help mitigate bias in research undertaken. For this reason, this study employs primarily quantitative methods and seeks though adoption of instruments to tease out the qualitative dimension. Some instruments by their very nature are more readily adaptable to incorporate both qualitative and quantitative dimensions.

3.4 Research design

In order to obtain the depth and breadth of data in terms of the thesis objectives and hypotheses (see chapter 1) this study utilized a multi-pronged method ('integrative' defined in chapter 1) by combining qualitative (constructivism) and quantitative (positivist) approaches (Kempton, Boster and Harley, 1997).

There are two collection points for data each with its own a strategic emphasis and design. The first is exploratory using structured questionnaire surveys, while the second employs intervention design.

3.5 Data analysis and interpretative framework

Figure 3.2 depicts the data analysis and interpretative framework in this research in schematic form. Social impact theory (Latane, 1981) and the ogranizational culture assessment instrument (Quinn and Rorbaugh, 1983) are both employed as primary tools for data analysis upon which questionnaire design is structured. Together they offer an integrative social framework that considers individual and group data meanings within their cultural context.

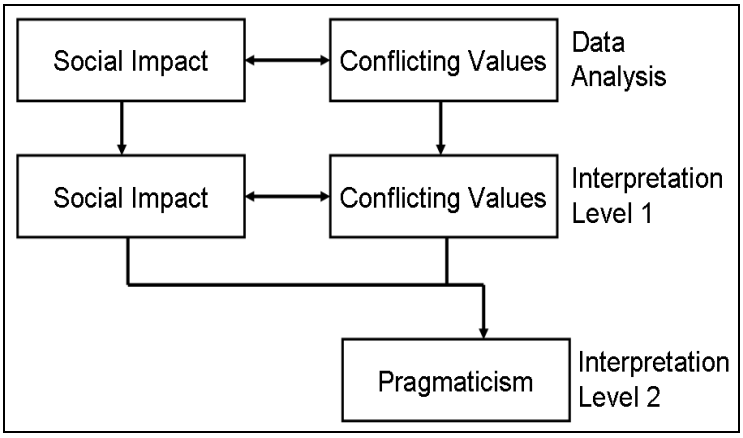

Figure 3.2: Data analysis and interpretative framework

As for interpretation and deeper in group, against group meanings of the returned data and for testing the thesis hypothesis and the extent to which research objectives have been met, a two level interpretation system is utilized. At the first level respective data sets are considered in light of social impact theory (Latane,

1981) and the organizational culture assessment instrument (Quinn and Rorbaugh, 1983), while at the second level the meaning are given pragmaticist treatment so as to more thoroughly understand the complexities of the system that is desired to be explained (Stables, 2004; Reitan, 2006; Dewey, 1897; 1902; 1916; 1924; 1929; 1938; 1946; 1954; 1957; 1958; 1964)

3.6 Integrated research and integration

Integrated research and integration have been elaborated on in Chapter 1 (Defining the terminology). Integration so far as the methodology is concerned is taken to mean brining the various parts into a whole to more thoroughly understand the operations of the system (Ross, Poungsomlee, Punpuing, and Archavanitkul, 2000).

The integrative framework in this study builds upon Boyden (1979) and is more recently elaborated on by van Kerkhoff (2005). Both emphasize an interactive cycle between people's and organization's perceptions of and actions upon the biophysical environment, and the environment's enabling or constraining of possibilities for human action. The cycle operates at all societal scales from individuals to groups, and through the various levels of institutional arrangements. People and organizations take actions which shape and reshape the environment which, in turn, affects the way they live and operate. While the relative power relations that are attributable to financial means, social status and political influence, strongly influence each party's capacity to affect the environment and must be considered a limitation, such limitation is mitigated in the respondent socio-economic profile. Participants in this research can be described as well educated in a social context and informed in terms of the environment. Economically, their class potential is overwhelmingly middle-class oriented in their individual and group profiles as "informed actors" (Parker, 1996; Schutz, 1962; Weber,1968).

3.7 Relationship research question, objectives and hypothesis

The relationship between the research question, research objectives and thesis hypothesis is shown diagrammatically in Figure 1.5 (see Chapter 1) to help explain the relationship between them. In addition, a detailed relational schematic between research objectives and questionnaire instrument questions is presented there.

3.8 Research objective one: Exploratory

This section reports on the exploratory design and administration of the data collection process addressing research objective 1 and hypotheses 1-3.

3.8.1 Outline

The first step in this research is exploratory in nature. Here, the variables that have a bearing on the ecological paradigm utilized by individuals and groups are explored for the role that they play in meaningful action.

The criteria for selecting the participants in this research was strategic (theoretical) and pragmatic (practical). It was strategic in selecting environmentally informed respondents from a leading Thai university. It was pragmatic in the type of instrument designed and used given the limitations of a non-Thai researcher operating in a Thai environment. On both levels the design aimed to maximize the data results returned so that meaningful outcomes might be attained. At the same time both presented important limitations to this research and this is discussed below under limitations.

So far as the source of the population for this research, the literature points out that as with any university, differences between Thai universities revolve around quality of curriculum employed, and quality of teaching strategies to successfully impart knowledge using the syllabus. Such differences reflect upon effectiveness of knowledge transmitted and do not by necessity reproduce significant differences

between the leading universities themselves in terms of educational paradigms used (Hug, 2006; West, 2006; Van Matre, 2006).

Permission to research humans was agreed upon and underwritten by the FERS Committee from Mahidol University, Thailand. Furthermore, as a condition for research access, confidentiality for respondents was granted by the researcher. Whenever necessary here, respondents are referred by the pseudonym number allocated upon receipt of completed questionnaire (discussed below).

The fieldwork for this research was conducted between 13th February, 2007 when a quantitative survey was conducted at Thammasat University (Bangkok, Thailand), and the 31st July, 2007 at Mahidol University (Salaya, Thailand) when exploratory questionnaire responses were collected. The detailed administrative process is explained below.

3.8.2 Structured questionnaire survey

A structured bi-lingual quantitative questionnaire consisting of four parts was administered to participants consisting of: (i) personal data; (ii) feedback about education; (iii) environmental knowledge, attitude and practices; and, (iv) organizational location[1] (Appendix B). The student questionnaire differed only in terms of wording, to reflect their social organizational position within the institution when compared to alumni (Appendix B). The questionnaire for both groups aimed to explore the existing knowledge base and behavioral operational framework (individual and group) of the participants, as well as the consequential behavior based on this knowledge and location. Whenever possible and appropriate, a five-point Likert scale was utilized for the qualitative dimension that it brings to a quantitative instrument. There are pros and cons associated with Likert scales. Too

[1] Using 'The Competing Values Map', Made after Quinn and Rorbaugh (1983)

few choices offered such as a three-point scale risks convergence of answers in the middle, whereas, too many choices such as a seven-point scale risks confusing respondents (Wright and Crimp, 2000).

In the first section of the questionnaire general demographic questions were asked so as to determine the demographic makeup of the individual and their location within the group. The group dimension was expanded upon in Section 4 where the role organizational structure plays was explored for its function in supporting or impeding the maintenance of existing beliefs and enabling or blocking positive environmental practices.

In the second section feedback about the quality of environmental education received were asked. For alumni questions related to the relationship between education and current job were emphasized, while for students the questions were modified to seek answers about effectiveness between knowledge provided and knowledge acquired and internalized. Similarly both groups were asked about the level of involvement in external activism outside the workplace and the university campus. The specific design desired to shed light about the relationship between education and job in terms of job-match, underemployment and over employment for alumni and how this might possibly translate or fail to translate into activism. For students the answers might shed light on the need to incorporate activism in the formal curriculum, while for alumni a retrospective look might lead to the view that a reevaluation of existing approaches might be necessary.

In the third section existing environmental knowledge, attitudes and practices were explored for the understanding they provide of the primary environmental issues that confront us today and the attitudes that such knowledge affords in action. Responses in this section can shed light about the relationship between education and knowledge in existing and former university students in Thailand and how these translate or do not translate into action. Globally they can inform about the effects of

hereto existing western dominated consumer-based society.

The fourth section of the questionnaire investigated organizational location of the respondents. Responses received in this section can help us to understand the role that organizational structure plays in reproducing positive or negative environmental practices in particular contexts. An important adaptation to the instrument was in qualitative terms so that existing social location in the "now" position was pursued, but also what respondents would "prefer" in an ideal situation. The now/prefer(red) dichotomy was designed to specifically address and locate the competing values framework (culture) under which individuals operate within groups in the real world. Such location is an important determinant to environmental activism or impediment to it.

The draft questionnaire was reviewed by three Mahidol University (FERS) research experts and supervisors and approved by the Research Committee to ensure that questions asked yield data that corresponds to what the instrument seeks to measure. Additionally, validation of the instrument was affected in the pre-test instrument test conducted at Thammasat University.

Based on expert comments, advice and or opinions, as well as the pre-test validation test results, modifications were made to the questionnaire instrument that included re-wording and additions and subtractions so as to reduce the length and make it more succinct, academic and meaningful.

3.8.3 Sample size

Sample size is determined based on the following formula (Yamane, 1973):

$$n = \frac{N}{1 + N e^2}$$

Where n = Number of sample size

N = Size of population

e = Acceptable amount of sampling error

For both students and alumni probability sampling methodology (Yamane, 1973; Neuman, 2004) yielded a 'sample size' of 223 for students and 302 for alumni (Table 3.1):

Table 3.1: Sample size for alumni and students

Alumni			Students		
Confidence level	=	95%	Confidence level	=	95%
Confidence Interval	=	5	Confidence Interval	=	5
Population	=	1403	Population	=	530
Sample Size	=	302	Sample Size	=	223

Figure 3.3 shows the process and sample frame for students and alumni schematically so that a global context might be had and so as to locate the relationship between the exploratory study and the intervention framework administered.

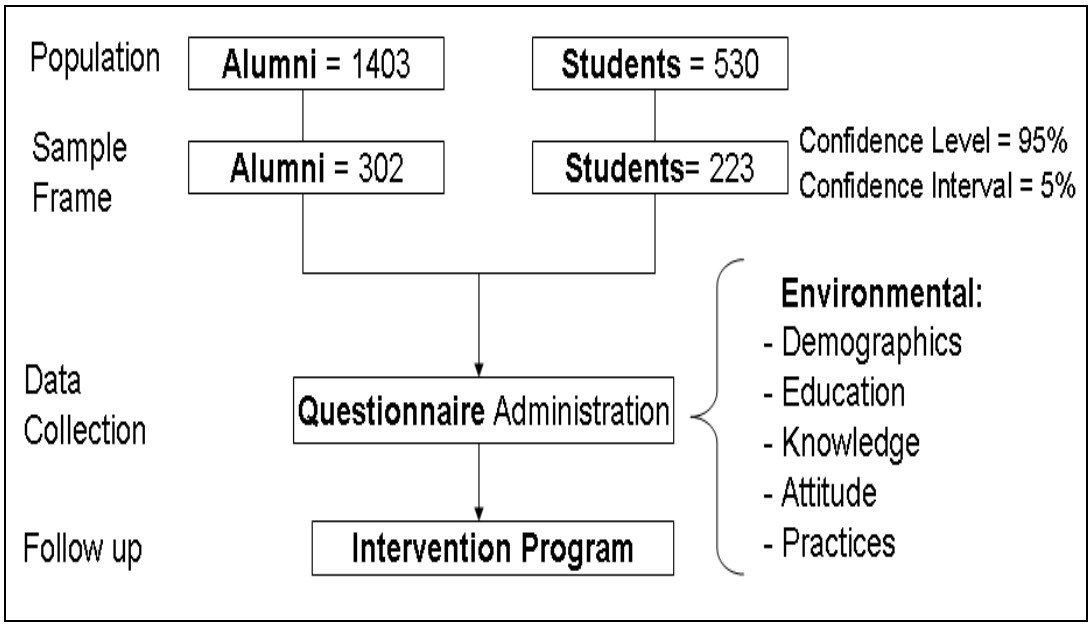

Figure 3.3: Research methodology and sample size overview

A careful and comprehensive follow-up plan was used in this study to ensure a greater response rate. The follow-up plan included: (i) introduction and

endorsement of the research by the responsible faculty (students and alumni); (ii) involvement of inline managers, administrators and academic staff to stress the importance of the research to participants (students); (iii) involvement of inline managers, administrators and academic staff in the distribution and collection process to personalize the process (students); and, (iv) liaison and interaction with administrative staff and alumni network to ensure the most up to data mailing list was used (alumni).

A bi-lingual cover letter was included for both students and alumni to explain the scope and purpose of the research and the faculty endorsement of the said research. For alumni the mailing package consisted of cover letter, questionnaire and a prepaid envelope with return address. For both students and alumni respondents were assured of the confidentiality of their responses to the questionnaire. (Appendix B).

3.8.4 Data interpretation and analysis

Throughout the data collection process for parts one through three of the questionnaire instrument (Appendix B), detailed matrices summarizing the themes/codes identified by each respondent in their "freestyle" responses were developed in order to display the core group themes/codes which emerged from the coding process (Robson, 1998). Key words and issues were grouped into a number of themes and specific trends were identified. The themes that represented group sentiments were then arranged into matrices for further analysis. The matrices enabled the researcher to more clearly understand the key internal and external factors that served as enablers or inhibitors to environmental activism. Whenever a 5-point Likert scale was utilized, the results were analyzed both to scale value and by grouping so that a qualitative and quantitative perspective might be had. In the first instance 5 corresponded to the largest influence and 1 lowest, whereas in the

second a grouping was organized so that it corresponded to an affirmative or negative response as though a “yes” or “no” response had been solicited where yes = 1 and no 0. Additionally, some questions were reverse coded so that a more reliable and representative picture of respondents true views might emerge. Descriptive statistics analysis and the Pearson correlation coefficients were performed in order to confirm the findings derived from the data results. Statistical significance was determined if the significance level was 0.5 or less. Cronbach Alpha (α) was used to assess the reliability, which refers to the extent to which some future research could readily reproduce the research findings (Nunnally, 1978).

Corporate environmental activism can be measured by the external influences that bear upon performance in specific contexts and time. The questionnaire was constructed and adapted following the ‘Competing values framework’ (Quinn and Rorbaugh, 1983) to locate the organizational culture within which individual data results occur. Group behavior can further be elaborated on in terms of ‘knowledge spirals’. Within a firm or university the knowledge flow can be focused in the interaction between the individual worker’s knowledge and the rest of the organization (Nonaka et al. 1998). Additionally, knowledge spirals in a triple helix system, that is a knowledge system of ‘crossing spirals’, produce an exchange system where the knowledge is accessible for organizations and individuals that already are parts of the spirals or have the knowledge of the system and spirals, but not for others (Langberg, 2002). Such knowledge spirals are cultural models in the same way that Barth (1969) has explained ‘boundaries’ using a socio-anthropological schematic. Both stress that personal identity and shared group identity are complex paradigms. Additionally, both emphasize the importance of identity as a significant determinant for group solidarity and consequent action strategies employed based on shared cultural capital. While knowledge spirals stress the corporate/ institutional cultural dimensions of group identity, Ford (1983) argues

for a wider cultural understanding of group ties or connections. These are not merely ties to group unity and identity, but ties of reciprocal obligations and responsibilities to "demonstrate a commitment to network members and the willingness to act in ways that will strengthen network ties" (Ford, 1983:22). Here then is a link between corporate/ institutional culture and the wider social world.

3.8.5 Measurement of internal and external factors

To measure the internal and external factors and the relationship between them that help explain current patterns of human ecological relations in research participants, the questionnaire instrument asked both qualitative and quantitative questions (Appendix B).

Table 3.3 describes the relationship between the data collection instrument, coding used and the treatment applied on the returned data.

Questions 3-9 of section one helped determine the demographic profile of participants. Questions 1-19 of section two interchangeably utilized either a 5-point Likert scale ranging form "strongly agree" to "strongly disagree" with the highest score corresponding to the largest influence or questions that solicited respondent personal views to theme so as to tease out as much individual information as possible. Questions 1-40 of section three employed a 5-point Likert scale ranging form "strongly agree" to "strongly disagree" with the highest score corresponding to the largest influence in order to collect data for environmental knowledge, attitude, practices and activism in participants. Knowledge questions were additionally recoded to 1 for correct answer and 0 for unsure or incorrect to further understand the group profiles in terms of knowledge.

In order to determine an appropriate scale to measure knowledge, attitude and practice levels in informed environmental actors, student exploratory return results were compared to Thammasat university pilot test results in order to fix an

appropriate scale. The t-test results show that student exploratory and pilot test results were aligned for knowledge and attitude but not for practice (Table 3.2). Low practice levels reported, were for the most part, the result of problems with questionnaire design and failure to translate the questionnaire to the native language of the respondents. All design faults were addressed for the final questionnaire administration (elaborated on below). Accordingly, the hypothesis for knowledge and attitude was retained and for practice it was rejected. Following strands in the literature that point to an essential link between knowledge and practice levels (Fishbein, 1980; Cable, Knudson, Udd and Stewart, 1987; Young and Kent, 1985; Stasson and Fishbein, 1990; Ajzen, 1987; Latane, 1981; Reitan, 2006; Schutz, 1964; Weber, 1968; Zimbardo, Ebbesen, & Maslach, 1977; Dewey, 1897), practice levels were pegged to knowledge in order to test the thesis objectives and hypotheses.

Table 3.2: Knowledge, attitude and practice t-test to set scale of measurement

Knowledge, attitude and practice t-test to set scale of measurement	**Knowledge**	**Attitude**	**Practice**
Sample Mean	0.91	4.62	4.44
Population Mean (μ)	0.88	4.44	3.47
Sample Standard Deviation (s)	0.059	0.394	0.447
Significance Level (α)	0.05	0.05	0.05
Sample Size (n)	271	271	271
Degrees of Freedom (df)	270	270	270
Standard Error sx	0.003583995	0.023933796	0.027153316
Lower Bound of 95% C.I.	0.904084557	4.58049687	4.395182997
Upper Bound of 95% C.I.	0.915915443	4.65950313	4.484817003
Critical t for α = 0.05, 1-tailed	-1.650516748	-1.650516748	1.650516748
Observed t	8.370547949	7.520746127	35.72307674
Probability (p-value)	1.56663E-15	4.04619E-13	1.2935E-104
Null hypothesis	Retain	Retain	Reject
Percent	90.7%	92.4%	89.1%
Note: Thammasat University $\overline{X}$	0.88 (88.66%) S.D. 0.21	4.44 (90.33%) S.D. 0.52	3.47 (69.45%) S.D. 3.54

From the comparative results between the pilot test and student exploratory data results (Table 3.2) appropriate knowledge levels for informed environmental actors at the source were expected in the range $\overline{X}$ 0.85-1.00, while for attitude and practice at $\overline{X}$ 4.00-5.00.

Table 3.3: Data collection instrument, coding and treatment

	Exploratory		Intervention
	Knowledge	**Attitude & practice**	**Mood and practice**
Section & Questions	Section 3, Questions 1-15	Section 3, Questions 16-40	Activity & Mood Journal
Data collection instrument	(Questionnaire)	(Questionnaire)	(Self-assessment checklist)
Coding	1. Likert scale 5-1 where 5 is highest and 1 lowest 2. Recoded to 1 for correct answer and 0 for unsure and incorrect.	1. Likert 5-1 where 5 is highest and 1 lowest	1. 1 for positive answer and 0 for negative (mood & practice) 2. 0-9 scale where 0 = negative (disagree) and 1-9 positive (agree)
Treatment	1. Descriptive 2. Correlation 3. Multiple regression	1. X-bar ($\overline{X}$) charts are used when there are rational subgroups of data 2. Multiple regression	1. Wilcoxon signed-ranks test 2. Pre-test/ Post-test design

To analyze, explain and model returned data for its predictive possibilities regression was utilized using SPSS V.15. Regression is mathematical technique used to explain and/or predict relationships between groups of random variables and seeks to find a relationship between them. This relationship is typically in the form of a straight line (linear regression) that best approximates X to Y relationships. The model used in this work to determine influences of time (duration after graduation)

and knowledge on practice where practice is a criteria variable is: $Y = b_0 + b_1X_1 + b_2X_2$ (where Y is practice, b_o is a constant, b_1, b_2 are coefficients, X_1 is knowledge and X_2 is time). Here, R-square measures the square of the correlation coefficient where the proportion of the variability in one variable can be explained by the variability of one or more other variables in a regression model. Consideration is given to factors such as the strength of the model and its statistical significance and to the strength and statistical significance of each explanatory variable. Other considerations include how outliers are dealt with and concerns about whether regression assumptions were met or violated.

3.8.6 Measurement of cultural setting

An organization's cultural situation can be measured using an organizational culture assessment instrument (Quinn and Rorbaugh, 1983). Questions 1-6 of section 4 of the research instrument solicited responses in the "now" and "prefer" position with a divisible target scale value ranging between 0-100 among the various question in each category. The "now" position helps to determine the participants current cultural situation in order to locate their relative environmental knowledge, attitude, practices and activism within their respective cultural setting. While, the "prefer" position is both a useful indicator of individual will and an important tool to signal potential impediments in a particular cultural setting.

3.8.7 Limitation of research method

While all care was taken to minimize the bias in the research method, nevertheless limitations exits in any method especially with respect to the extent to which the population sample represents the wider population group (Neuman, 2004). With respect to students, all students were administered (population), thereby this was both limitation and mitigation of bias in the study. With respect to alumni simple random sampling was employed using *Random Number Generator* (Devilly,

2004) to minimize the selection bias. Other limitations included, time to complete the questionnaire, motivation to participate, as well as a whole host of other variables that make up the human condition (Neuman, 2004). It is also worth noting the limitation embedded in a process when the researcher is himself a member of the population being researched. This raises question of socially desirable responses in respondents of the kind highlighted by the Hawthorn effect (Franke & Kaul, 1978). As for specific limitations, these are elaborated below. Similarly, the intervention was voluntary and this is itself a limitation that needs to be acknowledged.

3.8.8 Administration

The fieldwork was conducted over nine months between February and November inclusive, 2007. Instrument validation test was conducted at Thammasat University, Bangkok, Thailand on the 13th February, 2007. The exploratory survey was administered at Mahidol University, Salaya, Thailand between 1st July and 31st July, 2007. While, the intervention was administered at Mahidol University, Salaya, Thailand between 11th October and 9th November, 2007.

3.8.9 Testing and validation of research instruments

In order to test the validity and appropriateness of the research instrument for a study of this type a quantitative survey was conducted at Thammasat University in Thailand between 13th and 20th February, 2007. The participants were drawn from an Environmental Program in the Faculty of Environmental Science (SIIT). The study was classified as descriptive-correlational. The target and accessible populations was 181 environmental students. One environmental class was targeted for data collection n = 25 with 18 valid responses that yielded a usable return rate for the study of 72%.

The questionnaire used was a simplified version of the instrument employed in the main exploratory study that considered the thesis research objectives. At the

same time, this research also had its own individual objectives which were as follows:

1. Test questionnaire design
2. Test analytical frameworks used to explain
3. Explore existing environmental knowledge and practices
4. Explore the role institutional values can play on existing knowledge and practices
5. Test whether data expected yields expected results in the return
6. Explore the relationship between data results and thesis hypotheses

The findings of this research are elaborated in Momiroski (2007). The lessons learned in terms of relative strengths and weaknesses of the questionnaire design were significant. Firstly, the trajectory of the knowledge questions was easily discernable. Secondly, it raised the need for attitude questions to be dispersed so that their 'ethical' premise might not be easily gleaned. Thirdly, oversimplification of the OCAI (organizational culture assessment instrument) resulted in uneven spread of the data.

All identified areas and shortcomings were addressed for the final instrument design. Attitude questions were discretely dispersed within the practices section. Knowledge questions were reverse scaled every second question. While the OCAI instrument was expended for full effectiveness. Additionally, the questionnaire was translated into the native language of the respondents.

3.8.10 Population profile and administrative process

A multi-lingual questionnaire instrument was administered to students and alumni from a number of educational streams: ES – bachelor students, ET, ETS, AT, IM, RD/EP, EM/IE, RM – masters students, and DSc/PhD – doctoral students

For both groups the questionnaire was administered between 1st July and 31st July, 2007. For students Faculty of Environment and Resource Studies (FERS) administration reported a total number of current students at 530, while for alumni it was 1,447 graduated students spread across a 30 year period (1976-2006).

For students, using a confidence level of 95% and a confidence interval 5% yielded a required sample size of n=223. However, on account of administration difficulties arising from language barriers for the researcher and the difficulties involved in using a student list to source out respondents campus-wide using a list written exclusively in Thai all 530 students were chosen for administration. Two hundred and thirty one responses were collected by the due date. An additional 40 questionnaires arrived after the due date representing 51.1% usable rate.

As for alumni, a complete current-mailing list was obtained from the Faculty of Environment and Resource Studies (FERS) and mailing labels printed out. While the faculty administration reported a total number of alumni at academic year end 2006-2007 of 1,447, the mailing list provided had 44 alumni crossed out by hand as no longer resident at the address provided. Therefore the total population figure was adjusted accordingly and fixed at 1403. Using the adjusted figure 500 questionnaires were sent out on the 26th June containing the alumni questionnaire, and reply-paid return envelope. The 500 respondents were chosen from the total population figure of 1403 using valid and approved software *Random Number Generator V.1.0* from Swinburne University in Australia which was an appropriate tool for research of this type (Devilly, (2004).

Alumni population was fixed at N=1403. Using a Confidence Level of 95% and a Confidence Interval 5% yielded a required Sample size of n=302. One hundred and seventy six responses were collected with 25 questionnaires unclaimed by the due date. An additional 8 questionnaires arrived after the due date representing 60.9% usable rate. The unclaimed questionnaires represented a 5%

error margin in the calculations that were the result of dealing with data that spanned a 30 year period and inaccuracies in current data-keeping practices by FERS administration and both were out of the control of the research method.

3.8.11 Summary

This exploratory study focused on informed actors knowing and acting as a case study. It employed the holistic perspective as a conceptual guide towards positive environmental practice. An exploratory study was conducted because this method stands out at as an appropriate method to research situations involving contemporary phenomena in real-life contexts within a dynamic ever changing world.

An integrated research paradigm was employed combining quantitative instruments and adapting whenever possible to accommodate qualitative dimensions. Through this approach was presented a window of opportunity for the researcher to better understand the cultural contexts within which informed actors operate (Momiroski, 2007[2]). Life is a complex web of competing interests that humans must negotiate as they come to a consensus on issues of import. The environment presents an ideal platform from which research can be undertaken to understand human action on the most significant recent social phenomena that affects us all and where failure to adequately address shortcomings can lead to dire consequences.

3.9 Research objective two: Intervention

This section reports on the data collection process of the intervention administered addressing research objective 2 and hypothesis 4.

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[2] Refer Momiroski (2009)

3.9.1 Outline

The main objective of the intervention program was to trial the application of an environmental intervention program that was developed following 'social impact theory' Latane (1981) using focus and intimacy as primary tools to raise existing awareness in targeted groups of nominated environmental issues that will be practiced over a period in order to bridge the incongruence between the way informed environmental actors interact with the environment and the way they should. The central questions that the research method seeks answers to is: whether intervention can positively effect current ecological relations in research participants. Sub questions include:

1. Can interventions yield changes in behavior?
2. Does an increase of focus and intimacy to issues increase awareness?
3. Does the awareness translate into action?
4. What is the nature of current environmental knowledge (knowing about knowing)?
5. How sustainable is intervention success?

3.9.2 Intervention program rationale

The intervention was administered on 11th July, 2007 to Mahidol University alumni and the data collection process ran for 4 weeks thereafter. Graduated students (alumni) were selected because their attitude knowledge and practice levels in the exploratory study were not in alignment in terms of time, space and impediments as they were for students. This group provided an ideal opportunity to address research objective 2 and test hypothesis 4.

Workshops are an excellent medium through which to explore attitudes in-depth and gain understanding about underlying issues that help minimize the impediments to positive environmental practice (Baudains, 2003). In environmental

literature, an interactive workshop is generally described as a small setting that gives community members and stakeholders an opportunity to freely express their opinions about topics that are meaningful to them (Focus Groups, 2008). The intervention workshop was designed following Baudains (2003) because this type of intervention affords a 'high' level of involvement to individuals in the intervention process that can lead to altered individuals through refocus by providing appropriate tools to refresh environmental knowledge (Figure 3.4). The composition of the intervention is outlined below.

The crucial points where intervention is possible can be mapped out in diagrammatic form using a simplified model (Figure 3.4).

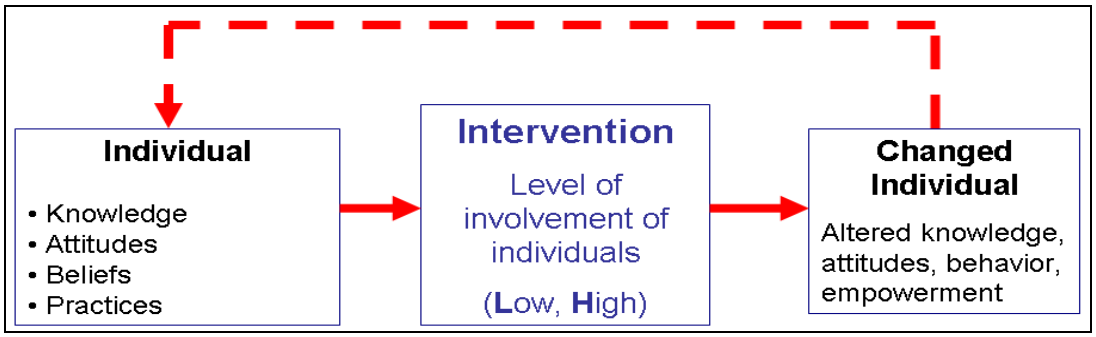

Figure 3.4: Intervention framework
Made after: Baudains (2003:104)

When dealing with behavior within workplaces[3] there are intuitively two main constructs involved, each of which focuses at the individual or organizational level. According to Baudains (2003), organizational factors include such variables as culture, policy and structure, while individual factors include attitudes, motivations and demographic characteristics. This research focuses on the individual level only as the organizational level is outside the control and scope of this study (Figure 3.4).

[3] Workplace is inclusive of university environments as used here

3.9.3 Intervention mediums

Following Baudains (2003) the most effective educational strategy to use in a workplace situation in terms of individuals to induce voluntary behavior-change to more environmentally friendly modes, requires the design of an intervention which focuses on involvement and ownership of the learning process. Table 3.4 outlines the basic structure of interventions with increasing level of involvement but including the same information content (Baudains, 2003:109-112).

Table 3.4: Intervention table

Approach complexity	Group education strategy	Treatment given	Treatment characteristics
Least complex (Top-down motivation) Surface learning	Information	Provide knowledge	Impersonal No Ownership
Most complex (Bottom-up motivation) Deep learning	Information	Provide knowledge	Personal Ownership
	Involvement	Raise awareness Alert to contradictions Provide strategies Provide tools Motivate Self monitor	

Made after: Baudains (2003:111)

Following Hoffman (2000) and Karan and MacLean (2003), the intervention strategy adopts the 'deep learning' approach that is bottom-up oriented that stresses personal ownership to translate knowledge and attitude into practice. Writers in the field of environmental corporatism have identified 4 phases in paradigm thinking: (i) pre 1970's; (ii) 1970's; (iii) 1980's; and, (iv) current (Hoffman, 2000; Karan and MacLean, 2003). The strategy fits into the fourth phase (fourth era) of corporate environmentalism that focuses on stakeholder management and proactive protection

of environmental issues over which individuals and groups have control (Table 3.5).

Table 3.5: Corporate environmentalism and corporate strategy

Phase	Type of Corporate Environmentalism	Developmental Stage	Approach and Strategy	Treatment Characteristics
Fourth Era 1990's -	Strategic Environmentalism (Integration of environmental considerations into core business practices)	Stakeholder Management (Proactive environmental protection)	Pro-activism (Employ proactive strategies to management)	Doing more (Respond to external stakeholders and protect brand and license image)

Made after: Hoffman (2000) and Karan and MacLean (2003)

3.9.4 Questionnaire and tools considerations

Following Gagliardi and Alfthan (1994) who suggest that environmental education should be seen as a life-long process, which is also supported by educational theory (Biggs and Moore, 1993), the intervention proposed is premised on the belief that empowering and involving people in learning and decision making, thereby encourages self-regulated learning. Additionally, following recent studies in knowledge utilization, a dissociation between knowledge that is revealed through perception and knowledge revealed through action exists (Goodale et al. 1991; Baillargeon, 1995; Hood et al. 2000; Maril., et al. 2002). This is suggestive of the view that knowledge and resultant actions can be altered with the passing of time and space in terms of focus and this is a valuable insight in the relationship between

knowledge had and knowledge used. With this observation in mind an appropriate intervention strategy was conceived to raise awareness and provide motivation to act.

Graduated environmental students were invited to attend through advertising on campus using various mediums such as through administration and internal newsletter and electronically from email addresses provided in the exploratory study. Additionally flyers were posted at appropriate places campus wide to maximize response. One of the limitations of this approach was that while a number of participants in the intervention indicated that they were involved in the exploratory study, few provided their student number on the original questionnaire instrument which made it impossible to match their profile across the two data collection points.

Current students were excluded from the intervention process as the data collected from the exploratory study pointed to an alignment between their knowledge, attitude and practice levels, whereas this was not noted for alumni.

Conceptually the intervention strategy consisted of: (i) raising awareness and bringing activism into sharp focus; (ii) placing focus on environmental impacts; (iii) provision of motivation and empowerment techniques to act; (iv) introducing simple, daily conservations techniques to be practiced; (v) providing a 4 week 'activity checklist'; and, (vi) providing a 4 week 'mood checklist' to help participants monitor their environmental practices and to serve as constant reminder of the need to act.

The program coalesced around a central metaphor of ''ecosave now" (Figure 3.6) which was a logo displayed on all materials provided to program participants that was modeled after Pavlov's (1927) notion to pair a neutral stimulus with an excitatory one and have the neutral stimulus eventually elicit the response that was associated with the original. The desired outcome of this image was not only to stimulate recall but also affix the words (knowledge) to time and place (events) (Latane, 1981) and to serve as a reminder to practice positive environmental

practices. Additionally, its design was to serve and a source for ongoing motivation to act.

The intervention program was at various stages of development vetted, amended for appropriateness of instrument design and anticipated administrative complexities and approved to be administered in its final form by university panel of experts and other knowledgeable environmental parties.

3.9.5 Sample size and limitations

The fieldwork for the intervention was conducted in a three hour workshop at Mahidol University (Salaya Campus) on former graduates from environmental streams on 11th October, 2007 between 4:30 and 7:30 PM. FERS administration provided a formal invitation to alumni across 10 environmental programs: ES, ET, AT, ATS, IM, RD/EP, EM/IE, RM, and DSc/PhD.

This intervention strategy was exploratory. On the one hand, it was conceived as an attempt at behavioral modification to explore whether interventions can bring about change in people. On the other, to test the central hypothesis about the relative effect of time and space on activism and the wider research objectives.

The total population of participants in the workshop was 11. While, eleven took part in the program and completed the pre-test questionnaire, one was disqualified from analysis on the grounds that the checklist instrument was incomplete. Accordingly, there were 10 complete valid responses for data analysis.

There is significant bias embedded in the intervention strategy on account of the small sample. This is an important limitation that is addressed using the Wilcoxon test which involves comparisons of differences between measurements, but does not require assumptions about the form of the distribution of the measurements. It is particularly useful when limitations such as population size occur, and the sample is too small, so that distributional assumptions that underlie

the *t*-test cannot be satisfied (Wilcoxon, 1945). This limitation is further elaborated below in section 3.9.8 Measurement mood and practice.

3.9.6 Data interpretation and analysis

Descriptive statistics were employed (percentage, minimum, maximum, standard, standard deviation, mean and similar) to describe the characteristics of the data sample returned, and the variables related to knowledge mood and practices. Similarly, appropriate statistics were employed to explore the research objectives and test the hypotheses formulated.

The model used to determine influences of time (day/week) and mood on activity (practice) where practice is the criteria variable is: $Y = b_0 + b_1X_1 + b_2X_2$ (where Y is practice, b_o is a constant, b_1, b_2 are coefficients, X_1 is mood and X_2 is time) was applied to all workshop participants (11) and analysed using SPSS V.15.

Furthermore, one group pre-test/ post-test design was employed for pre and post intervention calculations (Figure 3.5).

The pre-test/ post-test questionnaire offered seven questions that were prepared so that understanding of the scope of the task and of the level of empowerment by individuals to act might be gauged (pre-test/ post-test) by direct before and after comparison. The pre-test was completed by participants at the start of the intervention workshop, while the post-test questionnaire was completed at the end of the 28-day activity period.

Using the calculations from Figure 3.5 each of the seven questions was analyzed for before and after change in program participants. The questions were designed so that they proceeded from a general ethical statement about 'group' dimensions in environmental protection (question 1) and then focused in on the 'individual' readiness to act (questions 2-7). Progressively participants were asked to indicate their response by circling their response on a Likert scale where 0 is

disagree, while 1 is lowest and 9 highest. Scores for each respondent answer were allocated on the basis of level of agreeableness where 1,2 & 3 represented low; 4,5 & 6 medium; and, 7,8 & 9 high level of agreement. Scores were apportioned on the basis of each numeric value (1 point each) at both pre and post test, while the difference between the two measurement points was compared and given meaning. Furthermore, Wilcoxon's (1945) test was used for the intervention program as discussed in detail below.

$$t = \frac{\sum D}{\sqrt{\frac{n\sum D^2 - \left(\sum D\right)^2}{n-1}}}$$

ΣD	=	Total sum of the differences between average scores of pre-test and post-test
ΣD^2	=	Total sum of the differences between average scores of pre-test and post-test, squared
D	=	The differences between scores of pre-test and post-test of each sample
N	=	The total number of intervention participants

Figure 3.5: Formula for one group pre-test-post-test design

3.9.7 Intervention design and instrument

The intervention addresses research objective 2 and thesis hypothesis 4 to seek to bridge the incongruence between the way informed environmental actors interact with the environment and the way they should.

The methodology used benefits from the existent literature that has highlighted that the variables that influence regression in human action can also effect reversal. Important to such a reversal is the provision of an appropriate environment within which individuals and groups can translate knowledge and attitude into positive action (Cameron and Quinn, 1999; Rowan University, 2004). Equally important is the raising of awareness through educational strategies that

help increase and sustain the level of message frequency and focus (Haan and Kuckartz, 1996; Latané, 1981; Trafimow and Borrie, 1994). The significance of both internal and external motivation have been noted in the literature (Cable, Knudson, Udd and Stewart, 1987; Stasson and Fishbein, 1990; Fishbein, 1980; Ajzen, 1987). Consequently, this intervention targets both internal and external motivations to act to:

1. Raise awareness and bring activism into sharp focus.
2. Place focus on environmental impacts.
3. Provide motivation and empowerment techniques to act.
4. Introduce simple, daily conservations techniques practiced over the trial period.
5. Provide a 4 week 'activity checklist' to monitor and reminder of the need to act.
6. Provide a 4 week 'mood checklist' to help participants monitor their environmental practices and to serve as constant reminder of the need to act.

The six targeted points above are premised on the view that interventions that bring the environment into sharp focus offer a hope of realigning the levels of knowledge, attitude and practices in informed environmental actors.

The theme chosen for the intervention program was "ecoSave *now*" (Figure 3.6) and the mascot (watch-face) was designed to serve as a reminder to practice (focus) and a source for ongoing motivation to act. The significance of the intervention theme mascot has been explained elsewhere in this thesis and it features significantly in behavioral literature (Pavlov, 1972). Briefly here, it serves to anchor action to program stimulus.

Save the Planet Now

Figure 3.6: Intervention theme

The take home questionnaire checklist distributed at the intervention workshop consisted of four parts: (i) conservation techniques (strategies to be practices); (ii) activity journal (28 days); (iii) mood journal (28 days); (iv) post-test[4] questions (Table 3.6).

3.9.8 Measurement mood and practice

Data recording for mood and practice utilized a daily checklist that permitted for direct daily comparison between the criteria and predictor variables. While, for measurement the Wilcoxon signed-ranks test was used to test whether the observed results are consistent with the hypothesis as to the probability that ratings on average for A's (mood) end up higher than B's (practice) (Wilcoxon, 1945). The Wilcoxon test was considered the instrument of choice because of the limitations presented by sample size (10) when compared to the total population (1403 with sample frame of 302).

[4] Seven questions were prepared so that understanding of the scope of the task and of the level of empowerment by individuals to act might be gauged (pre-test/post-test). Participants completed the pre-test questionnaire at the start of the intervention program and again at the end of the 28-day activity period.

Table 3.6: Intervention conservation activity techniques (focus)

Focus	Activity	Treatment
Office	Print double-sided	Raise awareness
	Photocopy double sided	Alert to contradictions
	Reuse paper	Raise focus
	Turn air conditioner one (1) Degree UP	Provide tools
Home	Carry provided cloth shopping bag	Empower to self-motivate
	Refuse plastic shopping bag and use provided cloth shopping bag	Maintain focus (reinforcement) - ecoSave now theme - Cotton shopping bag - Video snippets - Journal (checklist)
	Reuse plastic water bottles	Self measure and monitor
	Refuse disposable eating utensils when dining out	- Activity journal - Mood journal
Electricity	Reduce electricity use	- Electricity and water commitment
Water	Reduce water use	Self re-focus

The mechanics of the Wilcoxon signed-ranks test proceeds by measuring the absolute difference $[X_a - X_b]$ for each pair and omitting from consideration those cases where $[X_a - X_b] = 0$; the remaining absolute differences are ranked, from smallest to largest, employing tied ranks where appropriate, and assigning to each such rank a "+" sign when $X_a - X_b > 0$ and a "-" sign when $X_a - X_b < 0$. The value of W for the Wilcoxon test procedure is equal to the sum of the signed ranks. The number of signed ranks, are designated as $n_{s/r}$, which is equal to the number of $X_a X_b$ pairs with which you begin minus the number of pairs for which $[X_a - X_b] = 0$.

The assumptions of the Wilcoxon test are the following (Wilcoxon, 1945):

1. that the paired values of X_A and X_B are randomly and independently drawn (i.e., each pair is drawn independently of all other pairs);
2. that the dependent variable (e.g., a subject's probability estimate) is intrinsically continuous, capable in principle, if not in practice, of

producing measures carried out to the n^{th} decimal place; and

3. that the measures of X_A and X_B have the properties of at least an ordinal scale of measurement, so that it is meaningful to speak of "greater than," "less than," and "equal to."

In addition to the Wilcoxon test, regression modelling was also employed on the 10 respondents to explore variable relations. The model used in this work to determine influences of time (day/week) and mood on activity (practice) where practice is the criteria variable and mood the predictor is $Y = b_0 + b_1X_1 + b_2X_2$ (Y is practice, b_o is a constant, b_1, b_2 are coefficients, X_1 is mood and X_2 is time). Analysis was conducted using SPSS V.15. Sample size (11) gives rise to important procedure limitations and little interpretative weight is attached to regression modelling here. It is offered in the interest of giving wider meaning and interpretative possibilities to the returned data results.

3.9.9 Intervention workshop

The methodology used for the workshop benefits from the experiences reported by Lee (2000) in leading participants to focus though scenario building. Focus as a term and concept is used here in the sense of bringing the subject matter to the fore as Latane (1981) has explained it in social impact theory, and not in its more specialist meaning as in “focus-group” elaborated in environmental literature (Focus Groups, 2008).

The participants: A three hour intervention conducted at Mahidol University (Salaya Campus) on former graduates (alumni) in the Environmental stream on 11th October, 2007 between 4:30 and 7:30 PM.

The program: Participants were welcomed at the start of the program and the agenda for the workshop activities was outlined of three (3) hour duration consisting of four steps.

First step: Entailed drawing attention to the subtleties and contradictions in environmental issues so as to draw awareness to and lead participants to the view that there are no easy answers or solution in the environmental dilemma we face. The workbook utilized Lee's (2000)[5] 'semi-structured interview protocol' to guide the participants to appropriate environmental contexts through a series of episodes: current model, briefing, policy responses and risk comparison.

The value of the above approach is in its interactive/ participatory dimension. The qualitative questionnaire engaged participants by providing additional segmented information and seeking their response on an ongoing basis throughout the program. The 'current model' led participants to an understanding of their own individual (current) environmental understanding and attitude, whereas, 'briefing' presented new information concerning respirable suspended Particulates (RSP) and further developed the subtleties and contradictions of this theme. The 'policy responses' section provided various proposals as ways of addressing RSP's and solicited respondent's reaction to each, while, 'risk comparison' asked respondents to relatively evaluate RSP risk against other environmental and personal hazards.

While the workbook and individual responses entered therein were collected by the researcher, they are not the subject of this analysis. The main purpose of the workbook was to draw attention to selected environmental concerns and issues and

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[5] Modeled on Lee F.Y., (2000) who kindly gave permission for his methodology to be used 'Semi-structured Interview Protocol' Unpublished Interview methodology for Lee F.Y., (2003) 'Environmental Consciousness in Hong Kong' *Southeast Asian Studies*, Vol. 41 No.1,June 2003, Accessed 10 January, 2007 from http://www.cseas.kyoto-u.ac.jp/seas/41/1/410103.pdf, Provided by the author on 23 January, 2007.

to provide a place for participants to interactively document their views on the path to environmental growth and refocus.

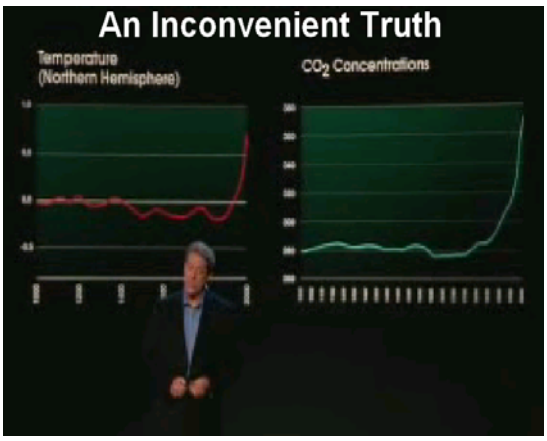
Second step: Aimed at raising environmental awareness. The environmental awareness gained and personal environmental refocus made in step one was subsequently reinforced through a multimedia presentation (Figure 3.7).

Program participants were shown selected snippets from two documentaries: *An inconvenient truth* and *Are we changing planet earth?*

Third step: Served to empower participants through provision of appropriate tools towards positive environmental behavior. Here conservation strategies were introduced and a 28 day program checklist explained.

Figure 3.7: Intervention documentary snippets - introduction
Source: Guggenheim (2006) Source: Brown and Cooter (2006)

Fourth step: Aspired to hand over ownership through responsibility to act. The workshop program concluded by emphasizing the common view from both documentaries that the link between CO_2 emissions and Global Warming is real (Figure 3.8) and alerted participants to the view that we all, individually and collectively, have a responsibility to act now. The intervention concluded by alerting participants that the time to act is now and asked each one to practice conservation for four weeks (28 days).



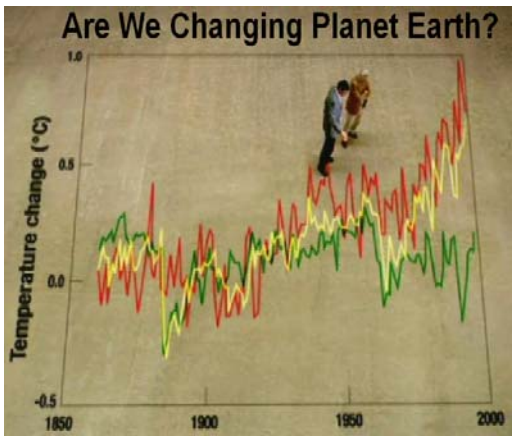


Figure 3.8: Intervention conclusion global warming and CO_2

Source: Guggenheim (2006) Source: Brown and Cooter (2006)

Four weeks was considered of appropriate duration as the literature has time and again stressed that too long in duration can result in low return, and too short fail to yield meaningful patterns in the data (Baudains, 2003; Hoffman, 2000; Karan and MacLean, 2003). Additionally, as Sintunawa (2007) has argued for Thailand that long terms studies locally can result not only in poor return, but additionally in return of incomplete data instruments.

3.9.10 Intervention strengths and weaknesses

The detailed intervention process employed as it progressed from design to administration in order to address the research objectives and thesis hypotheses is shown in (Figure 3.9).

The relative strength and weakness of the intervention strategy employed is in the large dependent on how well it can negotiate the space and time dimensions in affirmation of the thesis hypothesis and the central objectives of this research. Limitations included intervention sample size and ongoing support structures to refresh and reinforce current positive mood and practice levels. In the main, however, the literature pointed strongly to the view that empowerment and involvement (participatory) intervention design "stands the best chance for environmental gains when participants have limited control over the environment

within which they operate" (Baudains, 2003:104).

Furthermore, other questions come into view that can point to integral weaknesses in instrument design, the answers to which come into view as outcomes at the end of the research process and analysis of the returned data:

1. Is self-leadership and involvement (activism) an appropriate method to success?
2. Do workplace characteristics influence intervention success?
3. Is there a relationship between workplace behavior and other measurable psychometric variables such as attitude, knowledge and empowerment?
4. What is the nature of the environmental knowledge of the participants (knowing about knowing)?

Additionally, these questions enliven the important perennial debate about bottom-up or top-down leadership importance in change processes in humans (Watchaneeporn, 2006).

3.9.11 Summary

The intervention focused on changing human behavior through active participation in the change process in the way that participatory action research (Kemmis et al.,1988; McTaggart et al., 1991) has called for active participation to change and improve existent problems through ongoing dialog and intervention from within and without. Accordingly, the intervention framework undertook to re-educate, invigorate and motivate individuals to act on targeted conservation issues.

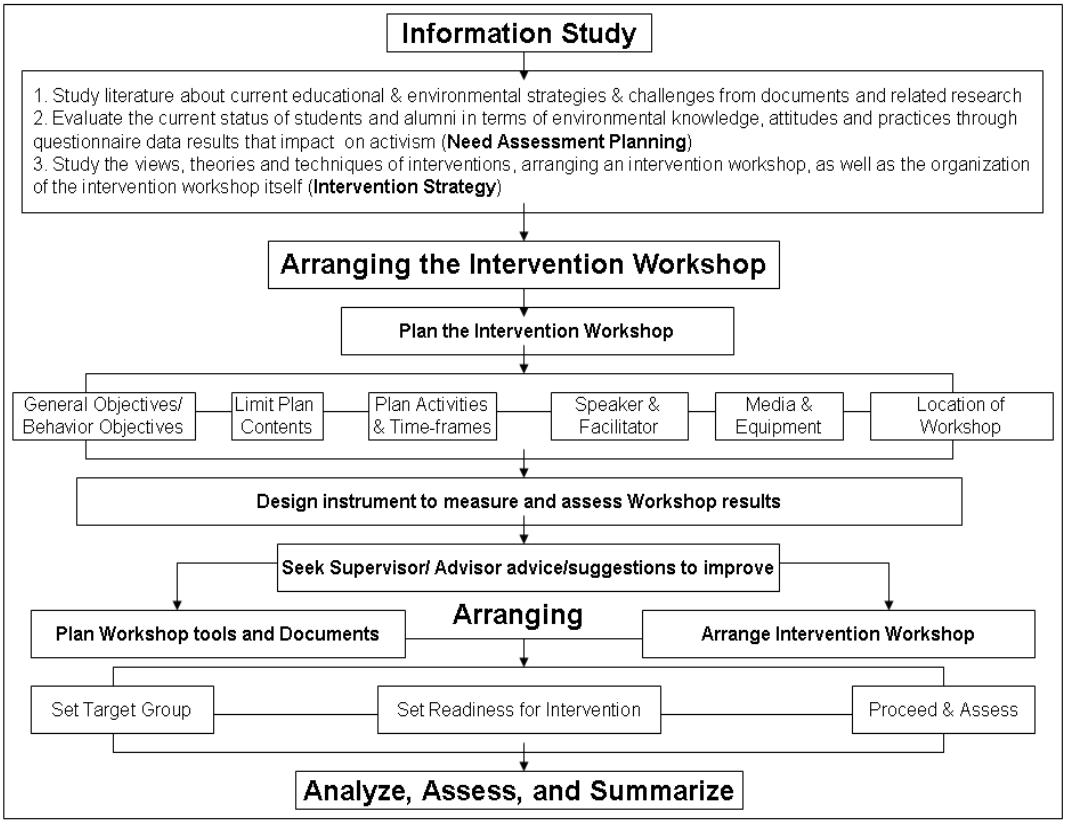


Figure 3.9: Intervention process and rationale

3.10 Chapter summary

This study focuses on informed environmental actors knowing and acting in terms of time and space within their respective cultural settings. It employs a holistic conceptual guide that is embedded in the ecocentric philosophy to seek to understand human action in its various guises. An exploratory case study is conducted because this method excels in research situations involving contemporary phenomena within it real life contexts (Yin, 2003).

A multi-faceted method was employed as strategy combining qualitative and quantitative approaches so as to cast as wide a net as possible to collect meaningful data to test the thesis hypotheses at the exploratory stage. This approach enabled the researcher to get a better understanding of individual and group operation within their cultural setting (system). The data collected in the exploration and analyzed for

their various meanings was a valuable tool to adapt the intervention framework in important and determining aspects. For example while the original intervention design envisaged conducting an intervention for both students and alumni, the data collected overwhelmingly pointed to a need to involve only alumni in that process as student knowledge, attitude and practice levels were in alignment and did not regress. Consequently an intervention framework was conducted for alumni to seek to measure the viability of reversal strategies in informed environmental actors.

CHAPTER IV
DATA RESULTS

4.1 Research objective one: Exploratory

The findings in this section are exploratory in nature to investigate the effect time, space and impediments have on knowledge, attitude and practices in informed environmental actors (students and alumni) that help explain the incongruence between the way they interact with the environment and the way they should.

4.2 Introduction

The variables that have a bearing on the ecological paradigm utilized by individuals and groups are explored here for the role that they play in meaningful action in different setting (university, home and workplace). The data returned in this section enables a view to better understand the educational, institutional and societal culture that informs actions in their strategic emphasis.

On account of the volume of the data collected, data results are reported in this chapter in terms of the two instrument categories: alumni and students. The data are subsequently discussed in order to give meaning to the individual and group findings in the next chapter (Chapter V). In this section, extensive elaboration and discussion in terms of wider meanings and implications of results are avoided whenever possible as this is considered outside the scope of a data results reporting chapter. Nevertheless, views and interpretations will be offered at both stages as they are deemed necessary and appropriate (Momiroski[1], 2009).

[1] Forthcoming publication - Momiroski, T. (2009). Informed Environmental Actors

4.3 Student data results

The following section reports the results of the exploratory research data for students, while alumni data results are reported next. Where individual response is deemed necessary to the results the respondent is identified by their allocated control number.

4.3.1 Demographics

There were 271 student respondents whose ages ranged between 22 and 32. In terms of age group spread and quantity in each group, two large numerical peaks were observed between 22-23 (59.0%) and age 25 (20.7%) representing almost 80% of all respondents. The peaks are considered consistent with the age group spread for Bachelor level under 25 years of age and over 25 for post graduate.

So far as gender is concerned female respondents represented 187 (69.0%) and they outnumbered male with 84 (31.0%) by a ratio of 2:1.

The distinctive feature of the age and gender relationship is that no female respondents were featured in the over 30 bracket, whereas there were 28 male. It is possible to speculate about female prospects about group mobility in terms of higher education, though the data does not elaborate on this theme. Conversely, the under representation of males between 23-24 years of age compared to females raises other interesting questions such as retention of male students in this field. Both of these however are out of the scope of this research (Table 4.1).

Table 4.1: Student age and gender

		Students age according to gender		
		Male	**Female**	**Percent**
Age	22	27	54	29.8
	23	0	79	29.2
	24	1	26	9.9
	25	28	28	20.7
	31	27	0	9.9
	32	1	0	0.4
Total		84	187	100

Note: n=271

No student respondent was married.

In terms of education, 70 (25.8%) respondents had completed secondary education, 71 (26.2%) had diploma or equivalence, 129 (47.6%) had a bachelor degree, and 1 respondent held a masters degree (Table 4.2).

The relationship between education completed and current job highlights that most students (95%) are unemployed in the process of acquiring an education whereas 5 % held jobs that were of a casual type (Table 4.3).

Of the 12 respondents who identified themselves as gainfully employed in relation to the question on current job status 7 were in sales and service related industries (58%), three in IT (25%), and one each in government and education (8.3% respectively). None were in environmental jobs with direct environmental responsibility, while their rank is described as white collar clerical by respondents.

In terms of years employed in current job all 12 were employed at under 4 years. There were no significant differences in terms of years of employment. The profile of this group was essentially one described as student in the process of acquiring an education.

Table 4.2: Student university program by stream (section 1 question 9)

University program		Frequency	Percent
ES (Envl science and technology)	Bachelor of Science	70	25.8
ET (Technology of Environmental Management)	Master of Science	81	29.9
AT (Appropriate Technology for Resources and Environment Development)	Master of Science	36	13.3
ATS (Appropriate Technology for Resources and Environment Development)	Master of Science	36	13.3
IM (Information Management on Environments and Resources)	Master of Science	36	13.3
RD/EP (Rural Development)	Master of Science	2	0.7
EM/IE (Industrial ecology and sustainability)	Master of Science	9	3.3
DSc/PhD (Environment and resource studies)	Doctoral	1	0.4
Total		271	100

Finally, in terms of education stream, most respondents (55.7%) were drawn from two streams: ES and ET. By stream, 25.8 % were from bachelor programs, while the balance were drawn from environmental masters programs. One participant was from the doctoral program (Table 4.4).

4.3.2 Environmental education profile

The responses solicited in this section fall into three main categories: (i) relative fit between education and different environs, (ii) activism, and (iii) views about university education program.

(i) Relative fit between education and environs

This section of the questionnaire explored the relative fit between education acquired and its application in various situations such as home and outside it.

The primary questions about the relationship between education and home are: 1) The environmental knowledge I acquired in university classes has helped me in how I think about my actions in the home; 4) I am able to transfer the environmental knowledge I learnt at university to what I do at home; and, 6.1) To what extent are your activities outside of university related to your study program

about the environment? The questions solicited a response on a Likert scale where two responses were positive and 2 negative in terms of questions 1 and 4, while 5 gradient scale options were available for question 6.1.

Table 4.3: Student education and current job

Education		Current job		
		Student	**Employed**	**Percent**
Education	Secondary	65	5	25.8
	Diploma	69	2	26.2
	Bachelor	124	5	47.6
	Masters	1	0	0.4
Total		259	12	100

Note: n=271

Table 4.4: Student university program (section 1 question 9)

University program	**Percent**
Bachelor of Science	25.8
Master of Science	55.7
Doctoral	0.4
Total	100

Note: n=271

Question 1 asked about the relationship between acquired environmental knowledge and attitude that reflects upon practices at home in environmental terms – “think”. The data elaborates a picture of the respondents as a group that is highly idealistic about any such relationship with 92.6% reporting that it had substantial influence upon their daily thinking (Table 4.5). This high figure reported raises question of socially desirable responses of the kind highlighted by the Hawthorn effect (Franke & Kaul, 1978); at the same time the high consensus in this regard can also point to high agreement related to closeness to environmental education source.

Table 4.5: Student relative fit between environmental "think" and "do" (S 2 Q 1 & 4)

Influence of knowledge:						
	Think (Q1)			**Act on knowledge - Do (Q4)**		
	Percent	**Mean**	**S.D.**	**Percent**	**Mean**	**S.D.**
Agree	92.6	4.6	0.8	26.2	1.5	1.4
Disagree	7.4	0.4	0.9	70.1	3.5	0.8

Note: n=271; Scale was coded 5 to 1 where 5 is strongly agree in descending order

Conversely, in response to question 4 that asked about the relationship between acquired environmental knowledge and transfer of that knowledge to the home in terms of environmental practices – "do" a different profile emerges. The data elaborates that in the view of the respondents as a group that they are limited in their ability to transfer and apply their knowledge in practical ways to the home (Table 4.5). Only 26.2% of respondents confirmed a fit between knowledge received at university and ability to practice acquired knowledge in the home. Just over 70% reported that they disagree with such a fit.

This relative imbalance between think and do has direct implication for universities in terms of curriculum. The responses give rise to questions about the role of universities. In other words is the role of university to impart knowledge or to train individuals for jobs and for environmental activism? The effectiveness of the curriculum offered according to respondents is discussed below, while the purpose of education is out of the scope of this research and is left to education administrators. In turn recommendations in this regard are made in the appropriate place in this thesis.

Question 6.1 asked about the extent to which the respondent's outside of university activities are related to their study program. The data results in this section highlight that of all responses that could be considered environmentally related only about 18% (unsure excluded reported at 22.6%) fell into this category (Table 4.6).

At the same time 59.4% signalled that their outside the university activities were not related to the environment. It would seem from this data result that either

university education does not adequately prepare students for environmental activism, or alternatively, this might be the result of other social factors such as availability of activist organizations, opportunity to participate, mobility or other social factors. Questions about education program and course enrolment shed further light on this issue below.

Table 4.6: Student relationship between study program and outside environmental activities (section 2 questions 6.1 & 6.2)

Activity	Percent	Total percent
Related		18.0
Member of environmental club	1.0	
Contribute financially	2.0	
Keep up to date with environmental initiatives (media)	10.0	
Share environmental views with friends and family	5.0	
Not related		59.4
Not sure		22.6

Note: n=271; 'related' are course related activist behaviors outside of university

The pertinent questions about the comparative relationship between environmental practices at university and in the home are questions: 8) To what extent do you practice conservation at university; 9) To what extent do you practice recycling at university; 10) To what extent do you practice conservation at home; and, 11) To what extent do you practice recycling at home?

For this group of questions a distinction is made in terms of practices in different environs such as university and in the home. Responses to two conservation behaviors are targeted in both venues: (i) conservation, and (ii) recycling of materials. The questions solicited response on Likert scale and responses were grouped according to the level of responses for conservation practiced: always, often, sometimes, rarely, and never.

Questions 8 and 10 inquired about conservation practices at university and at home (Table 4.7). For university, responses show a high percentage for never (48.3%),

while very often and often together represent 11.4% of the total. Sometimes was the second most frequent response with 35.4%. As for conservation practice in the home, students replied that they practiced often 20.7% of the time, sometimes with 53.1% and rarely and never with 4.4% and 21.8% respectively.

Questions 9 and 11 inquired about recycling at university and at home (Table 4.7). Of the student responses for recycling practiced at university no respondent chose always. At the same time 42.4% said they sometimes did and 11.8% that they often did. A high percentage of 35.8 said they never did and 10% that they rarely did. Whereas, for recycling in the home 53% replied that they sometimes practiced while 28.8% replied that they rarely did. Only 17.7% indicated that they often did, 21% they never did and none chose always.

Table 4.7: Student conservation and recycling at university and at home

(section 2 questions 8-11)	**Always**	**Often**	**Sometimes**	**Rarely**	**Never**	**Mean**	**S.D.**
Conservation							
University (Q8)	2.6	8.9	35.4	4.8	48.3	2.41	0.12
Home (Q10)	0	20.7	53.1	4.4	21.8	3.68	0.01
Recycling							
University (Q9)	0	11.8	42.4	10.0	35.8	2.65	0.20
Home (Q11)	0	17.7	53.5	28.8	21.8	3.51	0.21

Note: n=271; Data in percent; Scale was coded 5 to 1 where 5 is strongly agree in descending order

Comparatively, responses to conservation practiced at university and in the home depict students as having higher opportunity to practice conservation in the home. On average students chose never for university compared to home conservation by a ratio of 2:1. At the same time, 2.6% of respondents chose always for conservation practices at university, while none did so for the home. As for recycling, the most significant difference in responses was found in rarely (10% for university and 28.8% for home) and for never (35.8% for university and 21.8% for home). High responses for rarely and never in terms of university can gain further meaning in

responses to organizational policy and this is discussed below in terms of cultural influences. In both often and sometimes for the home, recycling was prioritized by respondents with 17.7% and 53.5% in contrast to university with 11.8% and 42.4%.

(ii) Activism

Questions 12 and 13 looked at activism by respondent outside of home, work and education institution. Question 12 and 13 solicited a “yes” or “no” reply and asked for elaboration.

In reply to question 12 (Do you keep up to date and informed about environmental issues other than in your classes?), 250 respondents replied that they kept informed about environmental issues (92.3%) and 21 replied that they did not (7.7%). Of those that did not keep informed (7.7%) of the total, 33.3% indicated that they were updated by the media, it was not a priority at this time, or that they were too busy. Respondents that replied in the affirmative were asked three follow up questions: what issues are of interest, what impact these issues had on their life, and why they are important to the respondent.

In terms of issues that are of interest to “yes” respondents, the replies fell into two categories: planetary effects and pollution. Concern for the planet was a major source of concern (79.7%) and the pollution (20.3%). When asked to elaborate how these issues effect the respondent’s life 93.4% indicated that they were concerned, while 6.6% reported that they were negatively impacted. When further asked to give meaning to the environmental issues that concern them in terms of their importance, 86.7% of the respondent attributed such importance to their world environmental consciousness and 6.6% each for economic priority and personal value.

In response to question 13 (Do you belong to any environmental organizations?) 19 respondents (7%) replied that they belonged to an environmental organization. Of these no respondent volunteered a name for such membership in the

space provided. Respondents that replied that they do not belong to an environmental group were asked a follow up question to clarify their answer. Of the 252 respondents who did not belong to any environmental group 66.4% cited time constraints as their primary reason, 26.6% said that they had alternative ways in which they contributed to the environment, while 7% said that they contributed financially to environmental groups; none volunteered an organization's name in the space provided.

(iii) Views about university education program

Questions 14 though 19 asked respondents to provide information about the relative value of their acquired environmental education towards a purpose.

Question 14 asked respondents to volunteer information about the positive aspects of the environmental education acquired (What are the positive aspects of your university environmental study program?). The significant feature of group response to this question is that 84.9% of responses relate to value of environmental knowledge acquired, while 12.2% felt that this increased knowledge and awareness ultimately translated into empowerment to act for participants. Only 3% felt that there was little that was positive about their program.

Question 15 asked respondents to nominate ways in which the environmental education they participated in could be improved (In your opinion how could the university study program be improved?). In reply over 90% of respondents felt that additional tools for imparting knowledge used by educators were necessary and that these should be of the 'hands-on' type and local. An additional 9.6% felt that assistance with finding a job in the environmental field should also be part of the curriculum.

Question 16 asked students to indicate what type of job they are hoping for when they graduate. The responses to this question show that 59.0% of the total were actively hoping for a job related to their study focus. There was no discernable or significant pattern for students in terms of job and age group as there was not a large

enough spread in terms of age difference between them. Although a pattern was observed in terms of gender with regard to type of job respondent was hoping for after graduation.

For male respondents environmental jobs were prioritized at 65.4% whereas non-environmental jobs were at 34.6% of the male total, whereas for female respondents the relative percentage drop was less steep with 56.0% and 44.0% respectively of the female total.

Question 17 asked respondents why they decided on the job or program study that they did. The results emphasize that environmental concern was not the primary consideration for students with just under a third (32.5%) nominating the environment as influencing their choice. The motivating factors behind job or program choice that results from the answers to this question are supported by the results for question 16 that reported that only 59% of environmental students were actively hoping for a job related to their study focus. Of particular interest however, is the view expressed by respondents to question 17 that in their view environmental courses are “soft” programs (39.9%) and therefore easier to get into because of less competition. This might also be further supported by the 9.6% who reported that family influence was a determinant in their job choice. From this data set, it is possible to suggest that in the view of the respondents, environmental education is a training ground towards winning government jobs and a higher salary.

Question 18 asked respondents about the value of their environmental degree on job prospects. The responses to this question shed light on the relationship between job and environmental consciousness with only 15.1% of respondents reporting that they considered environmental education completed as something useful for job acquisition in the field. While there is expectation that the answer to this question might lead to opportunities for future job satisfaction that might come through work in a study related field of interest, almost 85% of respondents viewed

their environmental degree as a means to an end. For them the importance was located in the "face-value" of the degree itself and for making it easier to get a job and the increased salary that flows on from university qualifications. Responses to question 18 serve to support the views expressed for question 17.

Question 19 asked whether there was anything else the respondent would like to volunteer about their study program. In reply 77% of student respondents volunteered additional information about their environmental course. Of these, 17.3% were concerned about the curriculum composition and style of teaching, 10.1% replied that they needed more support from administration – most did not elaborate, although 5 (of this group of 21 respondents) were seeking support from the teaching staff rather than from administration. Just over 20% indicated that they needed job assistance. While 16.8% and 35.6% respectively said that they were worried about the future both in terms of environmental impact and job prospects.

4.3.3 Environmental knowledge, attitude and practice

This section reports on the relationship between environmental knowledge, attitude and practice levels for students in order to more thoroughly understand the correlation between the in-group and against-group associations between key environmental variables.

(i) Knowledge

Knowledge data results are presented both in their qualitative and quantitative dimensions in the interest of the widest possible meaning making of the data returned.

As would be expected in terms of qualitative analysis, informed actors at the source reported a high environmental knowledge at 90.7% when "strongly agree" and "agree" are combined (Table 4.8) where 5 represented strongly agree and 1 strongly disagree in descending order. The data results for this component would be consistent with individuals who are at the source of environmental knowledge where

intimacy to contemporary issues and saturation of the current environmental message is high. This result is in range of the central hypothesis that intimacy and saturation, as well as reduction of impediments (time and space) ought to result in high degree of knowledge reported.

It was found that student environmental knowledge was at a high level (Table 4.8).

Table 4.8: Student knowledge data results – Environmental knowledge (section 3 questions 1-15)

Student environmental knowledge	**Percent of correct answers**	**Percentage of wrong answers**	$\overline{X}$	**S.D.**
1. We are nearing the limit of people the earth can sustain	89.7% (243)	10.3% (28)	0.90	0.065
2. Humans do not have the right to modify the environment	92.2% (250)	7.8% (21)	0.91	0.046
3. When humans interfere with nature, it produces disastrous results	91.5% (248)	8.5% (23)	0.90	0.059
4. Human ingenuity will not ensure we do not make the earth unlivable	88.6% (240)	11.4% (31)	0.89	0.071
5. Humans are severely abusing the environment	89.7% (243)	10.3% (28)	0.90	0.071
6. The earth does not have plenty of resources so we can develop them	91.2% (247)	8.8% (24)	0.90	0.055
7. Plants and animals have equal rights to humans to exist	89.7% (243)	10.3% (28)	0.90	0.071
8. The balance of nature is not strong enough to cope with the impact of industry	91.2% (247)	8.8% (24)	0.90	0.052
9. Despite out special abilities humans are still subject to the rules of nature	90.4% (245)	9.6% (26)	0.90	0.065
10. The so called 'eco disaster' facing humans has not been exaggerated	90.4% (245)	9.6% (26)	0.90	0.062
11. The earth is like a spaceship with limited room and resource	90.8% (246)	9.2% (25)	0.90	0.065
12. Humans were not meant to rule over the rest of nature	91.6% (248)	8.4% (23)	0.90	0.052
13. The Balance of nature is delicate and easily upset	91.8% (249)	8.2% (22)	0.90	0.046
14. Humans will not learn enough about how nature works and how to control it	90.1% (244)	9.9% (27)	0.90	0.062
15. If things continue as they are, we will soon experience a major eco catastrophe	92.3% (251)	7.7% (20)	0.91	0.042
Total		(271)	0.91	0.059

Note: Numbers inside () indicate the number of people answering the questions. Knowledge scale was coded 1:0 where 1 was agree and 0 disagree

The above table shows student environmental knowledge at a high level with a mean of 0.91, while the degree of freedom was greater within compared to against group (Table D3, Appendix D).

(ii) Attitude and practice

Student attitude and practice levels were measured across the following key environmental indicators: water, energy, pollution, recycling, and consumables.

The data result for student conservation attitude is very strong when “agree” and “strongly agree” are combined (92.4%). This outcome fits well with the knowledge reported by students above. Only 7.5% were unsure about the statements for this category and only 0.3% disagreed (Table 4.9).

The interesting observation that can be made about the data results for conservation attitude is to be found in the strongly agree variable where energy and pollution rated the highest with 60.2% and 66% respectively. It would seem that attitude is contingent on observable factors whereby pollution can be seen in daily life and energy can be felt due to high energy bills. Recycling and consumable conservation rated less strongly for strongly agree with 49.5% and 49.1% respectively.

In terms of practices students exhibit a strong fit between conservation attitudes (92.4%) and practice with 89.06% when strongly agree and agree are combined as indicators of practice. Almost 2% of respondents from the total disagreed with actively practicing conservation and this was reported for energy (1.5%), pollution (3.7%) and for consumables (0.4%) of the total for each category.

Student environmental attitude was at a high level (Table 4.9).

Table 4.9: Student conservation attitude across category

Student environmental attitude	Agree	Not Sure	Disagree	$\overline{X}$	S.D.
1. Water	90.7% (246)	9.3% (25)		4.40	0.433
2. Energy	98.2% (266)	1.8% (5)		4.59	0.281
3. Pollution	96.7% (262)	3.0% (8)	0.3% (1)	4.68	0.292
4. Recycling	90.8% (247)	9.2% (24)		4.57	0.426
5. Consumables	85.7% (233)	14.4% (38)		4.48	0.536
Total		(271)		4.62	0.394

Note: Numbers inside () indicate the number of people answering the questions.

Attitude scale was coded 5-1 where 5 is strongly agree in descending order

The above table shows student environmental attitude at a high level with a mean of 4.62, while the degree of freedom was greater within compared to against group (Table D4, Appendix D).

Student environmental practice was at a high level (Table 4.10).

Table 4.10: Student conservation practice across category

Student environmental practice	Agree	Not Sure	Disagree	$\overline{X}$	S.D.
1. Water	90.4% (245)	9.6% (26)		4.45	0.384
2. Energy	88.9% (241)	9.6% (26)	1.5% (4)	4.42	0.439
3. Pollution	86.0% (234)	9.6% (26)	4.4% (11)	4.37	0.627
4. Recycling	90.4% (245)	9.6% (26)		4.45	0.384
5. Consumables	89.6% (243)	10.0% (27)	0.4% (1)	4.42	0.403
Total		(271)		4.44	0.447

Note: Numbers inside () indicate the number of people answering the questions.

Attitude scale was coded 5-1 where 5 is strongly agree in descending order

The above table shows student environmental practice at a high level with a mean of 4.44, while the degree of freedom was greater within compared to against group (Table D5, Appendix D).

The data suggests that in respect to the disagree category, disagreement was on account of factors that students themselves have little control over. Energy would

on consideration be in the control of parents, pollution vested in government departments and consumables dictated by market factors. Fewer than 10% were unsure about this group of questions.

Overall, the quantitative data of the environmental practices responses depicts students as a constituent group that have very high personal practice level (89%) in terms of conservation.

The important aspect of the student data is the consistency between knowledge (90.7%), attitude (92.4%) and practice (89.1%). The data results point to the view that high knowledge has high potential to translate into high attitude, in the absence of impediments such as time and place and differences in cultural contexts between individuals. For students the causal connection between knowledge and attitude, have resulted in desirable environmental outcomes in terms of practice in this given context. This causal neat-fit between these three variables has been noted in the literature and described in Fishbein's theory of reasoned action (1980) which has generally been utilized to extrapolate action from intention. This fit is understandable given the variables and constants that make up the student paradigm and worldview in environmental campus situations. Similarly, the numeric consistency between these three indicators across all responses highlight that regression at the source is minimal and therefore regression analysis yielded no statistically significant data.

(iii) Cultural context for conservation policy

Questions that elicited responses about cultural context within which students operate are highly illuminating about the relationship between knowing and acting (Table 4.11).

Table 4.11: Students cultural context regarding institutional conservation policy

(section 3 questions 16-40)	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Mean	S.D.
Policy awareness (Q18,23,28,33,38)	0.4	18.2	42.3	29.8	9.5	1.02	0.01
Policy knowledge (Q19,24,29,34,39)	0.4	18.2	26.9	36.0	18.7	1.02	0.12
Policy agreement (Q20,25,30,35,40)	9.0	19.2	42.7	18.4	10.7	1.32	0.02

Note: n=271; Data in percent; Scale was coded 5 to 1 where 5 is strongly agree in descending order

On average university respondents reported that they do not know (39.3%) whether or not their university has conservation policy and practices with 42.3% signalling that they were unsure. At the same time just over 18% agreed with the proposition when agree and strongly agree are combined. In terms of specific knowledge by respondent of such university policy for conservation practice, 26.9% of students reported that they were unsure and 39.6% disagreed with this statement. Only 18% agreed when agree and strongly agree are combined, while 54.7% disagreed that they knew such policy. As for respondent agreement with university policy for conservation practice 42.7% were unsure, while 28.2% agreed when agree and strongly agree are combined. The data results implicates the effectiveness of university policy in practice.

There is an apparent inconsistency in the data sets between knowing university policy (18%) and agreeing with such policy (28%), although this might be on account of cultural factors where respondents do not wish to criticize university policy. Similarly, this discrepancy might be the result of both the directness of the question and the implication for university cohesion that such answers might embody. Responses of this kind have been outlined in detail by the Hawthorne effect (Franke & Kaul, 1978) which describes return of false data for some questions where the respondent is acutely aware that they are being observed, and the responses may have

implications on policy and relationship structures.

Attitude, policy and practices can be given a cultural context when looked at in organizational terms through consideration of the cultural variables which have a bearing on the relationship between knowledge, attitude and practice. The Conflicting Values Framework is particularly suited to this task and this is discussed next.

4.3.4 Conflicting values

Conflicting values institutional axis positions that help explain student personnel in both current and preferred situations provide a cultural context within which respondent data for this group might be framed.

For the purpose of the study, instrument validity and reliability were established. In assessing the reliability of scales used in the questionnaire a coefficient of internal consistency was calculated using Cronbach's alpha methodology (Santos, 1999).

Six dimensions were analysed by the organizational culture assessment instrument: dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis, and, criteria for success (Figure 4.1).

Figure 4.1 shows schematically the mean scores for each of the culture types across the six dimensions in both current and preferred situations for students: clan, adhocracy, market and hierarchy. In the current situation, the highest mean score exhibited by students was in the organizational leadership dimension (27.5%) for both market and hierarchy where management was described as one that emphasized “coordinating, organizing, or smooth running efficiency”, while the lowest mean score recorded was in the dominant characteristics dimension (22.5%) for both clan and adhocracy where the organization was described as least likely to be one that was “dynamic and entrepreneurial [where] people are willing to stick their necks out

and take risks". This is an organization that emphasizes maintenance of the status quo and where uniqueness of individual strengths, opinions and relative innovations is least likely to be rewarded.

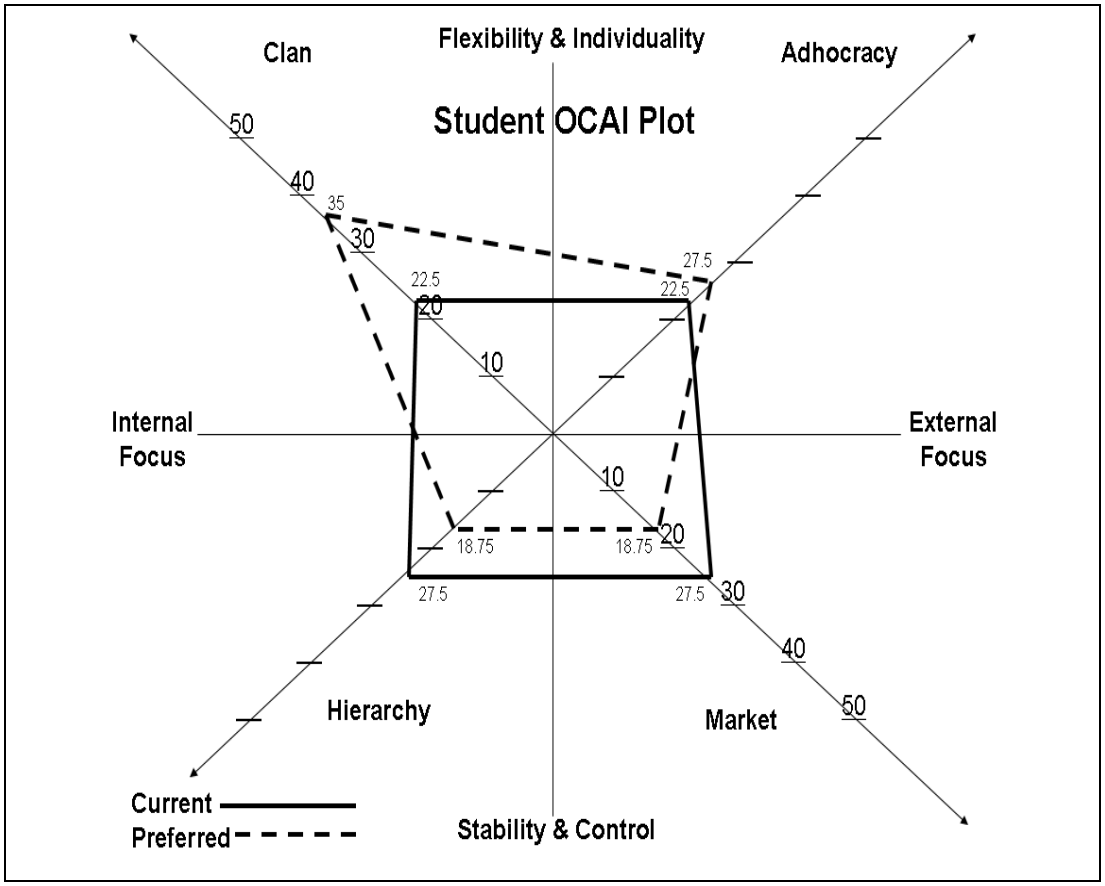


Figure 4.1: Student cultural situation in current and preferred situations

Note: All data presented as mean.

$p < .05$ mean scores could range from 0 to 100 representing a percentage out of 100

Student organization culture position and culture strength is measured in terms of axis position across the key indicators of clan, adhocracy, market and hierarchy. They help explain human action within the respective workplace cultural situation. Student group situation may be described as one that is predominately hierarchy and market culture (27.5%) followed by adhocracy and clan (22.5%). By contrast it is noted that 66% of institutions in the US generally report a clan culture type with a mean of 28 ± 5% (Smart & Hamm, 1993; Smart & St. John, 1996).

In the preferred situation students reported that a clan culture type would be a preferred choice were they given an option (35.0%) followed by the adhocracy (27.5%) then market and hierarchy (18.7%). In the preferred group view, it would seem that students would want ‘internal focus and integration’ (clan and hierarchy) as a preferred culture type at the expense of ‘external control and differentiation’ (adhocracy and market). Importantly, while falling in line with world trends towards clan preference type (28.8%), students are at the same time electing for stability and control as a balancing cultural instrument in their daily activities. Significantly, a call for a boundary change in cultural terms as depicted in the preferred position represents wholesale paradigm shift of the whole plane and not just for adjustment of individual markers.

The implications of the conflicting culture paradigm as it presently exists for students are many. These are outlined in the summary below and are discussed in the discussion chapter following. For the moment, student situation may be described as one that gives priority to stability and control at the expense of flexibility and control. It is inwardly looking in its hierarchical and clan dimensions, while at the same time dependent on external factors in its adhocracy and market aspects. A dominant culture type of this description emphasizes the status quo, where subordination and following the pack would be paramount. It is especially within a hierarchical type where change is most resisted (top-down) and individuality, innovation and difference not encouraged because support is often lacking and relationships between people is most impersonal tending on the mechanical.

4.3.5 Summary

The significance of the student data results is in the relationship between university program chosen and job intention, the relationship between environmental

knowledge, attitude and practice, as well as in the organizational culture type within which students exercise their informed environmental choices, make sense of their world and in how their participation in the real world is rationalized in these terms. These findings are analogously compared to alumni data in the discussion chapter (Chapter V).

4.4 Alumni data results

The following section reports the results of the exploratory research data for alumni. Students' data results for knowledge, attitude and practice were aligned so regression analysis was not necessary (Table 3.2). Where individual response is deemed necessary the respondent is identified by their control number allocated.

4.4.1 Demographics

There were 184 alumni respondents whose age grouping fell into 22 discrete categories ranging between 24 and 60 years of age.

Age group distribution elaborates two discernable group profiles 20 to 40 year old and 40 plus of which the 30-40 age-group is numerically higher by proportion four distinct groups: 24-29 (24%), 30-39 (51%), 40-49 (5%) and 50-60 (20%).

In terms of gender, female respondents outnumbered male by a ratio of 2:1 with 61 male respondents (33%) and 123 female (67%).

The distinctive feature of the age and gender relationship is that both male and female groupings relatively mirror each other excepting two respects: female respondents outnumber males in the below 29 age group with 44 females and zero males, while conversely male respondents outnumber female in the above 56 year group with 21 males and zero females.

In terms of marital status, 101 (54.9%) respondents were single whereas 78 (42.4%) respondents were married. Five (2.7%) did not wish to identify their marital status. All respondents who did not identify their status in this category were female

and in the over 40 age group bracket.

With regard to education completed at the time of administration (Table 4.12), 6 respondents (3.3%) had diploma or equivalence, 22 bachelor degree (12%), 144 had a masters degree (78.3%), and 12 had a doctoral degree (6.5%).

Table 4.12: Alumni education completed (section 1 question 9)

Education completed	Student	Percent
Diploma	6	3.3
Bachelor	22	12.0
Masters	144	78.3
PhD	12	6.5
Total	184	100.0

Note: n=184

Finally, in terms of education stream graduated from, most respondents (76.1%) were drawn from two streams: ES, ET and AT. By stream, 26.6 % were from bachelor programs, while the balance were drawn from environmental masters programs. Twelve participant were from the doctoral program (Table 4.13).

Table 4.13: Alumni university graduated from program (section 1 question 9)

University program		Frequency	Percent
ES	Bachelor of Science	49	26.6
ET	Master of Science	32	17.4
AT	Master of Science	59	32.1
ATS	Master of Science	5	2.7
IM	Master of Science	10	5.4
EM/IE	Master of Science	17	9.2
DSC/PhD	Doctoral	12	6.5
Total		184	100.0

The relationship between education completed and current job highlights that MA students are most likely from all education disciplines to consider themselves unemployed (4.2%) of the group total. PhD graduates were highly likely to be employed (83%) of group total with one respondent reporting as unemployed at the

moment, while one was retired. Twelve respondents were furthering their education (Table 4.14).

Table 4.14: Alumni education and current job

		Current Job				
		Student	**Employed**	**Unemployed**	**Other**	**Percent**
Education	Diploma	0	6	0	0	3.3
	Bachelor	6	16	0	0	11.9
	Masters	6	121	6	11	78.2
	PhD	0	10	1	1	6.5
Total		12	153	7	12	100.0

Note: n=184

Of the 153 respondents who identified themselves as gainfully employed in relation to the question on current job, a further 13 responded (166) that they had a working relationship of some sort – six of whom had some involvement in the IT field according to industry classification.

The significant feature of the industry to job rank relationship classification is the number of graduates who are not employed in primarily environmentally focused jobs. Of the total number, only 22 respondents (11.95% of the total, 13.66% adjusted for currently unemployed) could directly classify their job as falling within the "environmental" classification label with direct environmental responsibility. Of the employed 39% were in white collar clerical jobs, 38% in white collar management and 12% in private business. Of the 5 teachers (5%) 2 were university professors and working in the environmental field, while 3 worked in non environmental teaching jobs (Table 4.14).

In terms of years employed in current job the highest accumulation was reported at between 1-2 years (38%) while the balance was widely dispersed according to age. Twenty four (13%) of respondents were employed for less than 1 year and this figure included those seven that identified themselves as unemployed

at the time of questionnaire administration. The results are highly suggestive of a mobile graduate workforce.

Finally, in terms of education stream graduated from 26.6% were from the bachelor programs, while 66.8% were drawn from the masters program and 6.5% were doctors (Table 4.13).

4.4.2 Environmental education profile

The responses solicited in this section fall into three main categories: (i) relative fit between education and different environs, (ii) activism, and (iii) views about university education program.

(i) Relative fit between education and environs

This section of the questionnaire explored the relative fit between education acquired and its application in various situations such as work and in the home.

The primary questions about the relationship between education and workplace are: 1) The environmental knowledge I acquired in university classes has helped me in how I think about my actions on the job; 4) I am able to transfer the environmental knowledge I learnt at university to my everyday work activities; and, 6.1 To what extent is your job related to your study? The questions solicited response on Likert scale where 2 responses were positive and 2 negative in terms of questions 1 and 4, while 5 gradient scale options were offered for question 6.1.

Question 1 asked about the relationship between acquired environmental knowledge and attitude that reflects upon job practices in environmental terms – “think”. A group profile emerges that might be described as highly idealistic about any such relationship with 88.6% reporting that it has substantial influence upon their daily thinking (Table 4.15). This high figure reported raises question of socially desirable responses of the kind highlighted by the Hawthorn effect (Franke & Kaul, 1978), at the same time the high consensus in this regard can also point to high

agreement related to closeness to environmental education source.

Table 4.15: Alumni relative fit between environmental "think" and "do" (section 2 Q 1 & 4)

Influence of knowledge - Think (Q1)				Act on knowledge - Do (Q4)		
	Percent	**Mean**	**S.D**	**Percent**	**Mean**	**S.D**
Agree	88.6	4.4	0.9	30.4	1.6	1.4
Disagree	11.4	0.6	0.9	69.6	3.4	1.4

Note: n=184; Scale was coded 5 to 1 where 5 is strongly agree in descending order

Conversely, in response to question 4 that asked about the relationship between acquired environmental knowledge and transfer of that knowledge to the workplace in terms of environmental practices – "do" a different profile emerges. The data elaborates that in the view of the respondents as a group they are limited in their ability to transfer and apply their knowledge in practical ways on the job (Table 4.15). Only 30.4% of respondents confirmed a fit between knowledge received at university and ability to practice acquired knowledge on the job. Just over 69% reported that they disagree with such a fit.

This relative imbalance between think and do has direct implication for universities in terms of curriculum. The responses give rise to questions about the role of universities. In other words is the role of university to impart knowledge or to train individuals for jobs and for environmental activism. The effectiveness of the curriculum offered according to respondents is discussed below, while the purpose of education is out of the scope of this research and is left to education administrators. In turn recommendations in this regard are made in the appropriate place in this thesis.

Question 6.1 asked about the extent to which the respondent's job is related to their past study program. The data results in this section highlight that of all responses that could be considered environmentally related only about 12% were, while 9.9% indicated that they were not sure about such a relationship (Table 4.16). Overwhelmingly, 78.2% of respondents signaled that their jobs were not related to the

environment. Questions about education program and motivations for university course enrolment shed further light on this issue below.

Table 4.16: Alumni relationship between study program and job (S 2 Q 6.1 & 6.2)

Alumni relationship between environmental education acquired and current job	
	Percent
Job related to studies	11.9
Job not related to studies	78.2
Not sure	9.9

Note: n=184; related' refers to fit between environmental education acquired & current job

An overview of job by field shows that the following categories made up this alumni group: unknown 13%, blue collar management 3.3%, white collar clerical 35.3%, white collar management 34.8%, owner/ executive 10.9%, and 2.7% were teachers. Respondent's non environmental job types were dispersed across a number of fields such as education, service, government, manufacturing and IT.

The pertinent questions about the comparative relationship between environmental practices at work and in the home are questions: 8) To what extent do you practice conservation in the workplace; 9) To what extent do you practice recycling in the workplace; 10) To what extent do you practice conservation at home; and, 11) To what extent do you practice recycling at home?

For this group of questions a distinction is made in terms of practices in different environs such as workplace and in the home. Responses to two conservation behaviors are targeted in both venues: (i) conservation, and (ii) recycling of materials. The questions solicited response on Likert scale and responses are grouped according to the level of responses for conservation practiced: always, often, sometimes, rarely, and never.

Questions 8 and 10 inquired about conservation practices at work and at home (Table 4.17). For work responses show a high percentage for never (52.7%), followed by sometimes (38.0%) and then often (9.3%) of the total. As for conservations

practice in the home, alumni replied that they practiced often 20.1% of the time, sometimes with 63.0% and never with 16.9% respectively.

Questions 9 and 11 inquired about recycling at work and at home (Table 4.17). Alumni responses for recycling practiced at work show that 48.4% said they sometimes did and 12.5% that they often did. A high percentage (39.1%) said they never did. Whereas, for recycling in the home 64.7% replied that they sometimes practiced while 17.4% replied that they never did. Only 17.9% indicated that they often did and none chose always for either work or in the home.

Comparatively, responses to conservation practiced at work and in the home suggest that alumni have a higher opportunity to practice conservation in the home. On average alumni chose never for work compared to home conservation by a ratio of almost 3:1. At the same time, they were also more likely to choose often for the home (20.1%) compared to work (9.3%) and sometimes (63%) for the home compared to on the job to (38%). As for recycling, the most significant difference in responses was found in “never” replies (39.1% for work and 17.4% for home) and was preferred by a ratio of over 2:1. Likewise home recycling was prioritized for both sometimes (64.7%) and often (17.9%). High responses for sometimes and never in terms of on the job results can gain further meaning in responses to questions about organizational policy and culture and this is discussed below.

Table 4.17: Alumni conservation and recycling at work and at home

(section 2 questions 8-11)	Always	Often	Sometimes	Rarely	Never	Mean	S.D.
Conservation							
Work (Q8)	0	9.3	38.0	0	52.7	2.32	0.12
Home (Q10)	0	20.1	63.0	0	16.9	4.11	0.01
Recycling							
Work (Q9)	0	12.5	48.4	0	39.1	3.13	0.03
Home (Q11)	0	17.9	64.7	0	17.4	3.80	0.12

Note: n=184; Data in percent; Scale was coded 5 to 1 where 5 is strongly agree in descending order

(ii) Activism

Questions 12 and 13 looked at activism by respondent outside of home, work and education institution. Question 12 and 13 solicited a “yes” or “no” reply and asked for elaboration.

In reply to Question 12 (Do you keep up to date and informed about environmental issues in your private life?), 156 (84.8 %) replied that they kept informed and 28 (15.2 %) replied that they did not. Of those that did not keep informed (15.2 %) of the total, 17.9% indicated that they were updated by the media, it was not a priority at this time (61.0%) or that they were too busy (21.1%). Respondents that replied in the affirmative were asked three follow up questions: what issues are of interest, what impact these issues of interest had on their life, and why they are important to the respondent.

In terms of issues that are of interest to “yes” respondents, the replies fell into three categories: planetary effects, resource depletion, and pollution. Concern for the planet was a major source of concern (51.2%), followed by resource depletion (13.5%) and then pollution (35.3%). When asked to elaborate how these issues effect the respondent’s life 51.3% indicated that they were concerned, 35.9% that they were negatively effected, while 12.8% reported that they were not effected. When further asked to give meaning to the environmental issues that concern them

in terms of their importance, 51.9% of respondents attributed such importance to their world environmental consciousness, 32.7% on account of economic priority and 15.4% for personal value. In response to question 13 (Do you belong to any environmental organizations?) 48 respondents (26.1%) did and 73.9% did not. Of those that did belong, only 5 respondents volunteered a name for such membership which included 4 members in Greenpeace and one for a local elephant rehabilitation hospital. Of the 136 respondents who did not belong to any environmental group 34.6% cited time constraints as their reason, 33.1% said that they had alternative ways in which they contributed to the environment, 17.6% said that they contributed financially to environmental groups, and 14.7% who felt that membership was not a priority at this time.

(iii) Views about university education program

Questions 14 though 19 asked alumni respondents to provide information about the relative value of their acquired environmental education towards a purpose.

Question 14 asked respondents to volunteer information about the positive aspects of the environmental education acquired (What are the positive aspects of your university environmental study program?). The significant feature of group response to this question is that 84.8% of responses relate to value of environmental knowledge acquired, while 5.4% felt that this increased knowledge and awareness ultimately translated in empowerment to act for participants. Only 9.8% felt that there was little that was positive about their program.

Question 15 asked respondents to nominate ways in which the environmental education they participated in could be improved (In your opinion how could the university study program be improved?). In reply over 90% of respondents felt that additional tools to imparting knowledge used by educators were necessary and that these be of the ‘hands-on’ type and local. An additional 9.2% felt that assistance with finding a job in the environmental field should also be part of the curriculum.

Question 16 asked alumni to indicate what type of job they were hoping for when they graduated. The responses to this question show that 59.2% of the total were actively hoping for a job related to their study focus.

Question 17 asked respondents why they decided on the job that they did. The results emphasize that environmental concern were not the primary consideration for students with just under a third (32.6%) nominating the environment as influencing their choice. The motivating factors behind job choice that result from the answers to this question are supported by the results for question 16 that reported that 59.2% of environmental students were actively hoping for a job related to their study focus. Of particular interest however, is the view expressed by respondents to question 17 that in their view environmental courses are “soft” programs (40.2%) and therefore easier to get into because of less competition. This might also be further supported by the 9.2% who reported that family influence was a determinant in their job choice. Furthermore, 17.9% cited self-improvement as a motivating factor to study in this field. It would seem that for the most part environmental education appears to be in the respondent view a training field towards winning government jobs and the higher salary that comes with higher education entrance level.

Question 18 asked respondents about the value of their environmental degree on job prospects. The responses to question shed light on the relationship between job and environmental consciousness with only 14.7% of respondents reporting that they considered environmental education completed as something useful for job acquirement in the field. While there is expectation that the answer to this question might lead to opportunities for future job satisfaction that might come through work in a study related field of interest, just over 85% of respondents viewed their environmental degree as a means to an end. For them the importance was located in the “face-value” of the degree itself and for making it easier to get a job and the

increased salary that follows. This group reply is amplified in the results for question 17.

Question 19 asked alumni whether job expectations since graduation had been met in the current job. In reply 63% of alumni replied that their job expectations had not been met on the job, while 20.1% replied with “no, but somewhat”.

4.4.3 Environmental knowledge, attitude and practice

This section reports on alumni relationship between environmental knowledge, attitude and practice levels in order to more thoroughly understand the correlation between the in-group and against-group associations between these key environmental variables.

(i) Knowledge

Knowledge data results for alumni are presented both in their qualitative and quantitative dimensions in the interest of the widest possible meaning making for the returned data in terms of individual question response and according to age for the light it will shed on the alumni group profile.

Alumni environmental knowledge was at a moderate level (Table 4.18).

Table 4.18: Alumni knowledge data results - Environmental knowledge (section 3 Q 1-15)

Alumni environmental knowledge	Percent of correct answers	Percentage of wrong answers	$\overline{X}$	S.D.
1. We are nearing the limit of people the earth can sustain	82.1% (151)	17.9% (33)	0.77	0.147
2. Humans do not have the right to modify the environment	51.6% (95)	48.4% (89)	0.67	0.251
3. When humans interfere with nature, it produces disastrous results	81.0% (149)	19.0% (35)	0.76	0.154
4. Human ingenuity will not ensure we do not make the earth unlivable	44.0% (81)	56% (103)	0.64	0.247
5. Humans are severely abusing the environment	94.0% (173)	6.0% (11)	0.81	0.056
6. The earth does not have plenty of resources so we can develop them	35.3% (65)	64.7% (119)	0.61	0.229
7. Plants and animals have equal rights to humans to exist	85.4% (157)	14.6% (27)	0.78	0.125
8. The balance of nature is not strong enough to cope with the impact of industry	88.6% (163)	11.4% (21)	0.79	0.101
9. Despite out special abilities humans are still subject to the rules of nature	97.3% (179)	2.7% (5)	0.82	0.022
10. The so called 'eco disaster' facing humans has not been exaggerated	91.3% (168)	8.7% (16)	0.80	0.079
11. The earth is like a spaceship with limited room and resource	91.3% (168)	8.7% (16)	0.80	0.079
12. Humans were not meant to rule over the rest of nature	75.0% (138)	25% (46)	0.74	0.188
13. The balance of nature is delicate and easily upset	94.0% (173)	6.0% (11)	0.81	0.056
14. Humans will not learn enough about how nature works and how to control it	54.9% (101)	45.1% (83)	0.68	0.248
15. If things continue as they are, we will soon experience a major eco catastrophe	85.8% (158)	14.2% (26)	0.78	0.122
Total	(184)		0.76	0.141

Note: Numbers inside () indicate the number of people answering the questions. Knowledge scale was coded 1:0 where 1 was agree and 0 disagree

The above table shows alumni environmental knowledge at a moderate level with a mean of 0.76, while the degree of freedom was greater within compared to against group (Table D6, Appendix D).

What the data also shows is that unsure was preferred at 13.0%. This is an important factor in understanding the alumni group profile in qualitative terms, as quantitative data analysis alone can obscure such important detail that is consistent

with loss of focus and the impediments that real life presents, in the way that social impact theory has described it (Latane, 1981).

The alumni knowledge group profile gains further meaning when knowledge is considered in terms of age clusters. A comparative view between numeric question total mean (quantitative) and percent of total against age-group cluster (qualitative), shows consistency in decline in knowledge over time (to 56 years of age inclusive), in terms of questions answered correctly (Mean 11.4) out of 15 and as a percentage of total with 76% for both (Figure 4.2) that provides further elaboration for questions answered correctly by the 184 respondents in terms of time (distance from source) where in-question deviation was in all cases below S.D. 0.49.

Coding utilized in terms of the 15 knowledge questions was 1 for correct answer and 0 for wrong or unsure. Unsure was taken to mean wrong because of the unique position alumni occupy as informed environmental actors in the sense that Schutz (1962) has elaborated them in terms of behavioral research and Weber (1968) in terms of 'ideal types'. For both, an 'informed social actor' is thinking, acting and making considered choices in terms of appropriate 'zone(s) of relevance' to which they have privileged access, and this involves responsibility (Schutz, 1962:124-134) and also entails reciprocity (Weber, 1968).

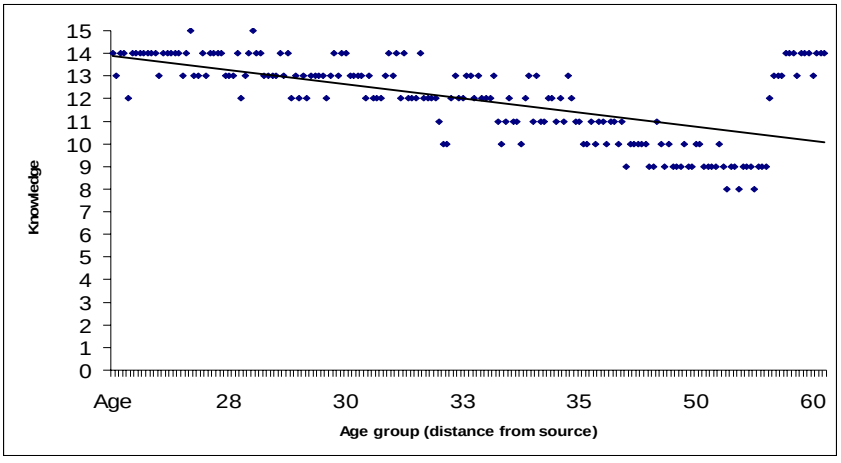


Figure 4.2: Alumni knowledge

The significant aspect of the data in terms of alumni knowledge (76%) shows

itself when seen over a period of time and this is reported together with practice below.

(ii) Attitude and practice

Alumni attitude and practice levels were measured across the following key environmental indicators: water, energy, pollution, recycling, and consumables.

Alumni environmental attitude was at a high level (Table 4.19).

Table 4.19: Alumni conservation attitude across category

Alumni environmental attitude	Agree	Not Sure	Disagree	$\overline{X}$	S.D.
1. Water	91.3% (168)	6% (11)	2.7% (5)	4.42	0.413
2. Energy	100% (184)			4.57	0.251
3. Pollution	82.6% (152)	14.7% (27)	2.7% (5)	4.28	0.626
4. Recycling	100% (184)			4.57	0.236
5. Consumables	100% (184)			4.57	0.241
Total		(184)		4.57	0.353

Note: Numbers inside () indicate the number of people answering the questions.
Attitude scale was coded 5-1 where 5 is strongly agree in descending order

The above table shows alumni environmental attitude at a high level with a mean of 4.57, while the degree of freedom was greater within compared to against group (Table D7, Appendix D).

Alumni environmental practice was at a moderate level (Table 4.20).

Table 4.20: Alumni conservation practice across category

Alumni environmental practice	Agree	Not Sure	Disagree	$\overline{X}$	S.D.
1. Water	62.5%	20.7%	16.8%	3.44	0.819
	(115)	(39)	(30)		
2. Energy	94%	6%		3.90	0.284
	(173)	(11)			
3. Pollution	53.3%	29.9%	16.8%	3.30	1.016
	(98)	(56)	(30)		
4. Recycling	76.1%	11.4	12.5	3.67	0.835
	(140)	(21)	(23)		
5. Consumables	85.4%	8.2%	6.4%	3.83	0.683
	(157)	(16)	(11)		
Total		(184)		3.73	0.727

Note: Numbers inside () indicate the number of people answering the questions.
Attitude scale was coded 5-1 where 5 is strongly agree in descending order

The above table shows alumni environmental practice at a moderate level with a mean of 3.73, while the degree of freedom was greater within compared to against group (Table D8, Appendix D).

To further explore alumni practice levels, X-bar and R-charts were prepared. The X-bar shows any changes in the mean value of the process, while the R shows any changes in the process dispersion.

Figure 4.3 X-bar chart shows the mean value process for the 184 respondents across the 5 conservation categories (n=5) sampled: water, energy, pollution, recycling and consumables.

It is possible that high environmental attitude can be explained in terms of the ethical issues that environmental debates raise. Similarly, it can also point to the view that attitude is not intrinsically linked to knowledge when time and place dimensions are considered.

The data results for conservation attitude show that no respondent strongly disagreed and just over 1% disagreed.

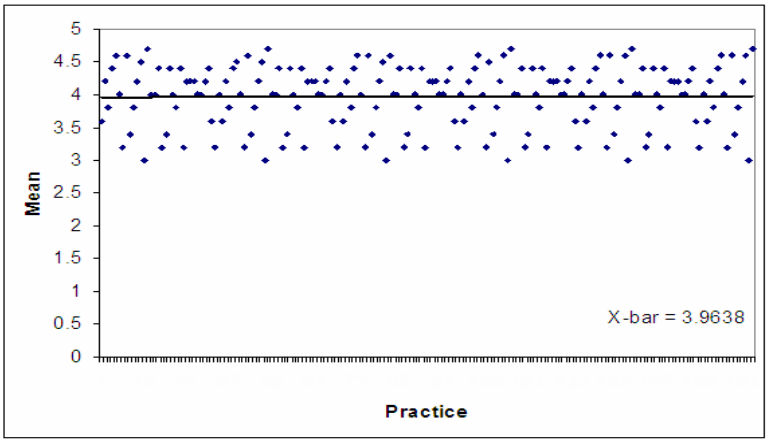


Figure 4.3: Alumni X-bar chart for conservation practiced

The mean was estimated from the centreline of the X-bar chart (3.9638). The standard deviation was estimated by calculating R-bar/d_2, here 1.585/0.837571 =1.892377 (Figure 4.4). From both, the natural process limits ± 5 were computed where lower natural process limit (LNPL) is 3.76561 and the upper natural process limit (UNPL) is 4.16199 (Figure 4.3).

From the above calculations, we can say that we would expect outcomes for alumni practice to range from 65% to 83% and average at ± 5% (79.2%) (Figure 4.4) i.e. 74.2% (Table D9, Appendix D).

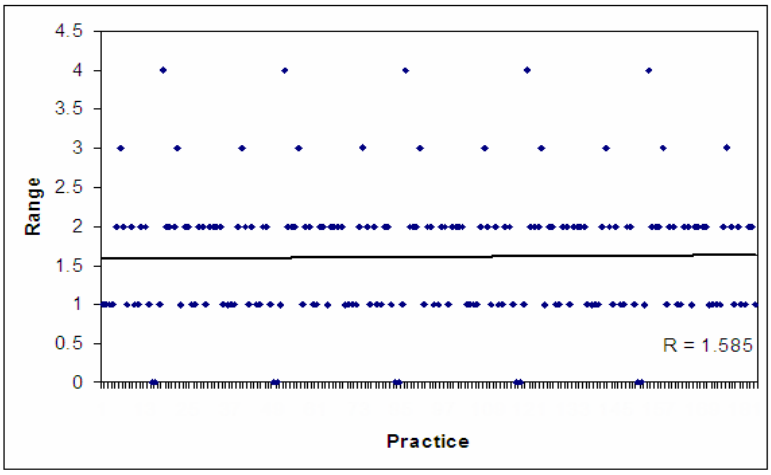


Figure 4.4: Alumni mean range for conservation practiced (R-bar chart)

In terms of practices alumni exhibit a weak fit between conservation attitude

(94%) and practice (74%) when strongly agree and agree are combined as indicators of practice (Table 4.19). Almost 12% of respondents from the total disagreed and 2.7% disagreed strongly. Fifteen percent were unsure about their views with regard to the statements presented. Disagreement was highest for both water and pollution with 13.8%, then recycling with 12.5% and consumables with 6.4% respectively.

4.4.4 Regression knowledge and practice

Two important aspects of the alumni data results are the consistency between knowledge (76%) and practice (74%), and their inconsistency when compared to attitude (94%). Both knowledge and practice declined over time, however, while attitude is related to both knowledge and practice in the literature (Fishbein, 1980), here, alumni high attitude did not translate into high practice. The relationship between knowledge and practice is explored below and attitude incompatibility in the following discussion chapter.

The knowledge and practice data sets contained values that exhibited the character of outliers. In the literature there are a number of ways to address outlier statistical violations such as removal or by substituting with mean values (Chase & Bown, 2000; Tabachnick & Fidel, 2001; Prasitratasin, 2002). In the following data analysis for related variables outliers are substituted with mean for a purpose. The purpose is to accommodate both false data considerations and to facilitate alternative interpretations. Either way, both calculations (removal and substitution with mean) are offered to explain the statistical relationships between variables.

To examine the relationship between time[2] since graduation (age as length of

[2] The Alumni questionnaire did not ask respondents for their year of graduation so it was necessary to find another measure for ‘distance in terms of time from the source of knowledge’. It is reasonable to assume that ‘age’ can be used as an indicator here since it can be seen from the current student cohorts that the age distribution is very small. Ninety percent of students who responded to

time) on other variables (knowledge and practice), regression analysis was conducted. Results indicate that time (duration) after graduation had a high correlation with both knowledge and practice in the inverse direction. However, a few outliers were observed for both knowledge and practice against time. The outliers were associated with sample cluster numbers 20, 21, 22 where samples were those who graduated more than 30 years ago. In order to eliminate the influences of these outliers, actual values were replaced with mean values that better expressed the linear relationships between time and knowledge and practice.

Multiple regression analysis was performed to determine and model influences of time (duration after graduation) and knowledge on practice where practice is a criteria variable expressed by the formula: $Y = b_0 + b_1X_1 + b_2X_2$ where Y is practice, b_o is a constant, b_1, b_2 are coefficients, X_1 is knowledge and X_2 is time (distance from source – see previous footnote).

Table 4.21 shows correlation coefficients of the variables that indicate the linearly positive correlation of practice and knowledge with mean substitution (r = .957; P = .000**, highly significant). On the other hand, practice and time is linearly negatively correlated (r = - .964; P .000**, highly significant)[3].

---

the student questionnaire are aged 22-25, while the remaining 10% are under 31. Assuming a similar distribution in previous cohorts, i.e. that most studied when they were in the age group 20-30, respondent's age can be used as an indicator for the length of time since graduation.

[3] With outlier removed: r = .838; P = .000**, highly significant). On the other hand practice is linearly negatively correlated (r = - .797; P .000**, highly significant.

Table 4.21: Objective 1 - Coefficient correlation analysis

Relationship time, knowledge & practices		Practice	Knowledge	Time
Pearson Correlation	Practice	1.000		
	Knowledge	.957	1.000	
	Time	-.964	-.943	1.000
Sig. (1-tailed)	Practice	.		
	Knowledge	.000	.	
	Time	.000	.000	.

Table 4.22 summary results of the multiple regression analysis conducted indicate that knowledge and time after graduation are significantly independent variables where the degree of practice can be predicted. The model shows a very high relationship between criteria variable (practice) and predictor variables (time and knowledge) with a correlation coefficient value of .974 and the R square of .949. This means that the value of the dependent variable (practice) can be described by the independent variables (time and knowledge) by 94.9%.

To determine practice levels a model was prepared to estimate dependent variable from the value of independent variables (Table 4.22): Y (practice) = 42.856 + 0.523 (knowledge) - 0.805 (time-duration after graduation) where R square 0.949; P = .000[4] (See footnotes 2, 3 and 4). What this means is that each time knowledge goes up or down, practice makes a corresponding shift, that is complementary, and measurable.

[4] With outlier removed: Y (practice) = 1.638 + .946 (knowledge) - ..025 (time-duration after graduate); R square .703; P = .000.

Table 4.22: Objective 1 - Multiple regression analysis

Variable	Regression coefficient (b)	t	Sig.t
Constant	42.856	2.533	.020**
Knowledge	.523	2.815	.011**
Time	-.805	-3.578	.002**
R square = .949, SEE = 3.090, Sig of F = .000; n=22			

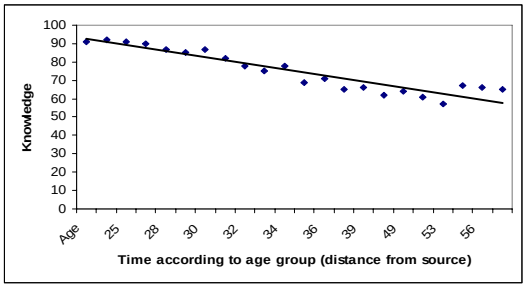


Figure 4.5: Alumni knowledge regression by time

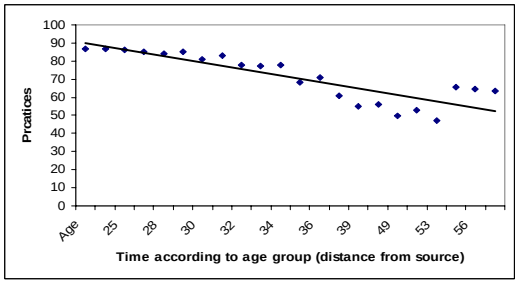


Figure 4.6: Alumni practice regression by time

Still, while regression analysis using both substitution and removal of data point to a relationship between predicting and criteria variables said to be related, other possibilities also come into view. For example, the relative consistency in data sets when all values are treated as valid is telling in “fit” over the wider period (Figure 4.7). In the same way as knowledge and practice levels relatively mirror each other in the pre 54 years of age period (approximately 30 years since graduation), they continue to do so. Beyond outliers, (See footnotes 3 and 4), the change might equally point to another phenomenon such as the complex relationship between the variable triad in its time dimension where changes in awareness, consciousness and availability of time in advanced years can lead to important changes in human behavior (Fishbein, 1980; Cable, Knudson, Udd and Stewart, 1987; Young and Kent, 1985; Stasson and Fishbein, 1990; Ajzen, 1987) and this is shown in Figure 4.7.

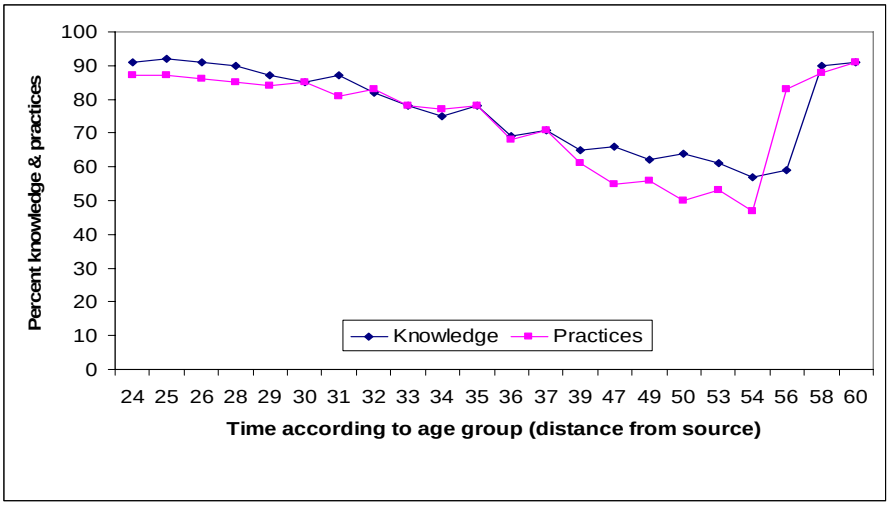


Figure 4.7: Alumni knowledge and practice regression over time

Note: see footnote 2

This work points to but does not argue in terms of landscape fit as shown in the above figure so far as research objective one is concerned. Instead, emphasis is placed on strength of regression relations both with substitution and removal methods. An, alternative interpretation is offered in the belief that it advances understanding of phenomena. However, method limitations do not permit for in-depth analysis and detailed respondent follow-up in confirmation of the proposed alternative view.

(iv) Cultural context for conservation policy

Questions that elicited responses about cultural context within which alumni operate are highly illuminating about the relationship between knowing and acting (Table 4.23).

Alumni respondents reported that they were aware of their organizational policy with 63.0%, had specific knowledge of their organization's conservation policy 61.0%, while policy agreement was reported at 76.7%.

Table 4.23: Alumni cultural context regarding institutional conservation policy

(section 3 questions 16-40)	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Mean	S.D.
Policy awareness (Q18,23,28,33,38)	15.9	47.1	18.8	20.1	3.6	3.2	0.03
Policy knowledge (Q19,24,29,34,39)	10.9	50.1	22.8	14.5	2.9	3.0	0.05
Policy agreement (Q20,25,30,35,40)	20.1	56.6	18.4	8.2	0	3.8	0.01

Note: n=184; Data in percent; Scale was coded 5 to 1 where 5 is strongly agree in descending order

The strong alignment between the organization having policy (63.0%), respondent knowing such policy (61.0%) and in agreeing with it 76.7% is noteworthy, nevertheless differences were noted in responses and they were issue specific. Pollution is a particularly striking example of issue specific differences where 44% were either unsure that the organization had a policy or disagreed (27.2%) that it had one and 35.3% were either unsure or disagreed (27.2%) that they knew that policy. Similarly, 41.3% were either unsure of what the organizational policies were or disagreed with it (12.5%).

Knowledge, attitude and practices differences, as well as differences between knowing policy (61%) and higher agreement with such policy (76.7%), can gain further meaning in their cultural context.

4.4.5 Conflicting values

Conflicting values axis positions that help explain alumni personnel in both current and preferred situations provide a cultural context within which respondent data for this group might be framed.

For the purpose of the study, instrument validity and reliability were established. In assessing the reliability of scales used in the questionnaire a coefficient of internal consistency was calculated using Cronbach's alpha methodology (Santos, 1999).

Six dimensions were analyzed by the organizational culture assessment instrument using the competing values framework: dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis, and, criteria for success (Figure 4.8).

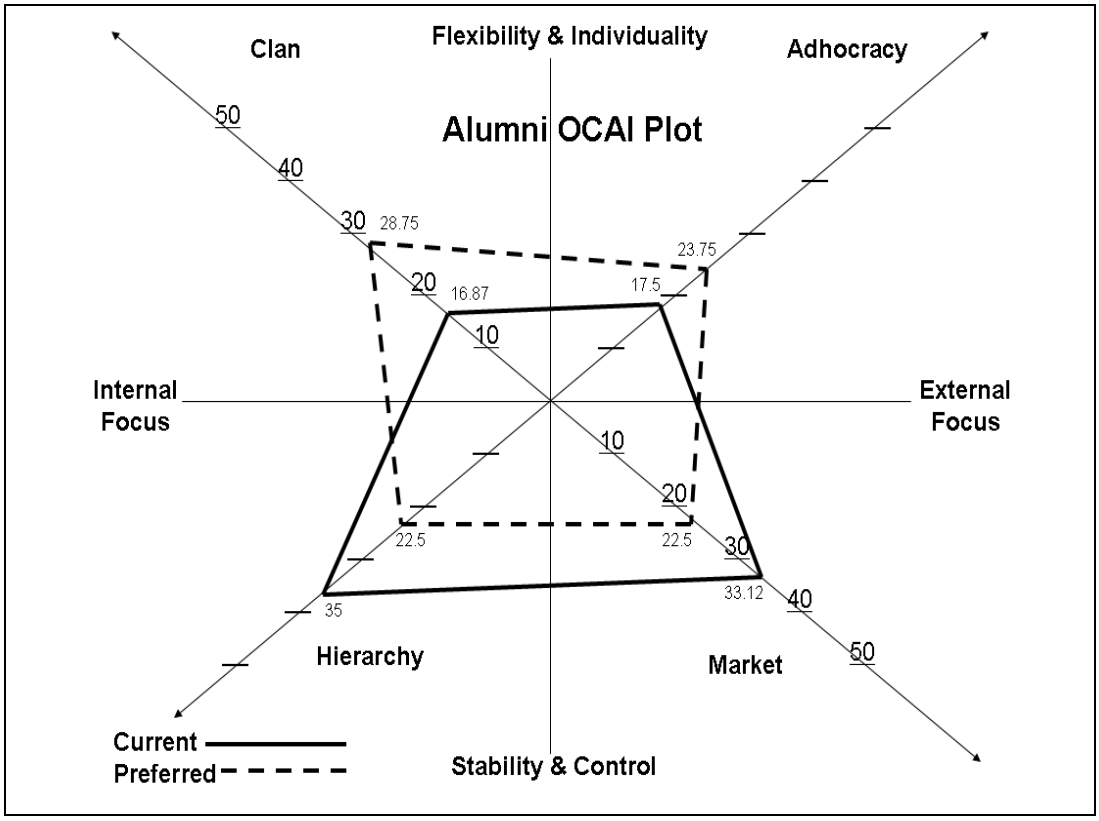


Figure 4.8: Alumni cultural situation in current and preferred situations

Note: All data presented as mean.

$p < .05$ mean scores could range from 0 to 100 representing a percentage out of 100

Figure 4.8 shows schematically the mean scores for each of the culture types across the six dimensions in both current and preferred situations for alumni: clan, adhocracy, market and hierarchy. In the current situation, the highest mean score exhibited by alumni was in the organizational leadership dimension for hierarchy (35%) where management was described as one that emphasized "coordinating, organizing, or smooth running efficiency", while the lowest mean score recorded was in the dominant characteristics dimension for clan (16.8%) where the

organization was described as least likely to be one that was “dynamic and entrepreneurial [where] people are willing to stick their necks out and take risks”.

Alumni organization culture position and culture strength may be described as one that is predominately hierarchy (35%) and market (33.1) followed by adhocracy (17.5%) and clan (16.8). By contrast it is noted that 66% of institutions in the US generally report a clan culture type with a mean of 28 ± 5% (Smart & Hamm, 1993; Smart & St. John, 1996).

In the preferred situation alumni reported that a clan culture type would be a preferred choice (28.7%) followed by the adhocracy (23.7) then market and hierarchy both with 22.5%. In the preferred group view it would seem that alumni would want ‘internal focus and integration’ (clan and hierarchy) as a preferred culture type at the expense of ‘external control and differentiation’ (adhocracy and market). The significance of this result is to be found in the expectation for clan preference type (28.7%) which is suitably aligned with international standards (Smart & Hamm, 1993; Smart & St. John, 1996).

The implication of the conflicting culture paradigm as it presently exists for alumni are many, and these are discussed in the following discussion (Chapter V). Briefly, alumni current cultural situation may be described as one that gives priority to stability and control at the expense of flexibility and control. It is highly inward looking in its hierarchical dimension, while at the same time dependent on external factors in its adhocracy and market aspects. This type of dominant culture type emphasizes the status quo, where subordination and following the rules would be paramount. A hierarchical profile (top-down) such as this is where change is most resisted.

4.4.6 Summary

The significance of the alumni data results is in the relationship between

university program chosen and job intention, the relationship between environmental knowledge, attitude and practice, as well as in the organizational culture type within which alumni exercise their informed environmental choices, make sense of their world and in how their participation in the real world is rationalized in these terms. These findings are analogously compared to student data in the discussion chapter (Chapter V).

4.5 Research objective two: Intervention

The intervention framework data results for objective two are reported below.

4.5.1 Introduction

Alumni data results showed that regression between knowledge and practice took place over time whereas for students this was not noted as they were at the source of knowledge. A progressive decline in knowledge and practice explicitly points towards the important role that focus plays in terms of the time and space within which human actors operate. Implicitly, it is suggestive that increasing knowledge does not guarantee positive environmental practices. This is a significant finding in this research as a number of researches have pointed to such a link in the literature (Fishbein, 1980; Cable, Knudson, Udd and Stewart, 1987; Young & Kent, 1985; Stasson and Fishbein, 1990; Ajzen, 1987). The important missing variable that influences positive human action this research argues is ‘focus’ in the role that motivation to act provides. The administered intervention framework aimed to raise focus so as to bring about positive change in respondent action. Additionally, it aspired to ‘fix’ the point at which focus declines and regression in human behavior sets in (Allport, 1967; John, 1990).

4.5.2 Demographics

There were 10 valid responses that are the subject of this data analysis. In terms of age, participants ranged between 24 and 35 years of age. There were 4 male

and 6 female respondents.

4.5.3 Pre-test post-test intervention results

The pre-test/ post-test intervention results reported below confirm the disassociation reported between knowledge and attitude as measured through action that the exploratory study pointed to for alumni and further place emphasis on the need for balance between empowerment, motivation and opportunity to act (Figure 4.9). While attitude remained at over 80% in all instances in the pre-test/ post-test questionnaire, practices that resulted from this high attitude, were not in conformity.

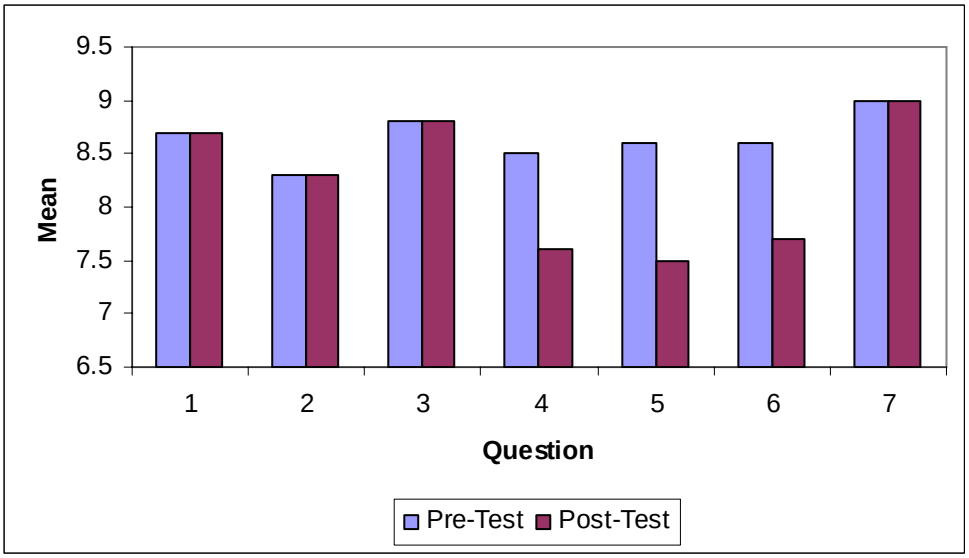


Figure 4.9: Intervention pre-test/ post-test results

Before and after differences in the pre-test/ post-test responses occurred primarily in terms of the questions that required individual motivation and empowerment to act and opportunities to practice. Questions 4 (What I do in my surroundings will help to protect the planet) yielded a decrease in the after results (mean 7.6) compared to before results (mean 8.5). Question 5 (I am responsible for protecting the things that I have control over) returned a high before result (mean of 8.6) whereas it did not at the end of the program (mean 7.5). While, for questions 6 (I am ready to do my part to protect the planet by doing what I know is right),

resulted in a decreases (mean 8.6 to 7.7). What the results suggest is that empowerment to act is contingent on opportunities to practice intention and focus intimacy. Additionally, it is also suggestive that measurable outcomes (observable) are also a necessary component to successful activism. Question 4 responses in particular, highlight the difficulties for individuals in reconciling effort when it lacks measurable outcomes when the things accomplished cannot be measured against the overall benefit. Whereas, responses to question 5 highlight the problems that can occur in a society where individuals might have the right attitude and intention, yet pragmatically they might have little control over the issues in question. The control over air conditioning management is a pertinent point with regards to control of working environment where many respondents had difficulties in completing (this is discussed below). While the results for question 6 highlight the disillusionment that can set in when both control over issues to be practiced (place) and loss of focus (time) can have on positive environmental outcomes.

4.5.4 Regression mood and activity

Intervention results in terms of activities accomplished during the 28 day trial period yielded important data in terms of targeted conservation practices for both daily and weekly practice levels. Additionally they shed light (comparatively) on intervention strategies for the role that focus (time and space) play in positive conservation outcomes.

While the intervention program was undertaken over a 28 day period, as office related conservation practices coincided primarily over a 5 day working cycle, data for home was adjusted accordingly to permit for direct comparison between the two conservation venues over the adjusted period of twenty days (20 days). Such an approach was deemed essential so that motivation to act (mood) can directly be compared (by day) to conservation activity over the period (Neuman, 2004).

Wilcoxon non-parametric signed-rank test was performed on the returned data, and thereafter regression analysis was conducted to explore relationships between the variables sampled.

Table 4.24 shows that when $n_{s/r}$ is equal to or greater than 10, the sampling distribution of W is a reasonably close approximation of the normal distribution.

Table 4.24: Alumni intervention Wilcoxon Signed-Rank Test

Alumni intervention Wilcoxon Signed-Rank Test			
Respondent (Pairs)	**Mood (Xa)**	**Practice (Xb)**	**S/R of [Xa - Xb]**
1	7.1	6.3	+ 4.5
2	7.1	6.3	+ 4.5
3	7.2	6.3	+ 9.0
4	7.1	6.5	+ 3.0
5	7.1	6.6	+ 2.0
6	6.5	6.2	+ 1.0
7	7.2	6.3	+ 8.0
8	7.2	6.2	+ 10.0
9	7.3	6.4	+ 6.5
10	7.1	6.2	+ 6.5
Mean =	7.1	6.3	
W =	55		
ns/r =	10		
Z =	2.8		
P(1-tail) =	0.0027		
P(2-tail) =	0.0054		

Note: n = 10

The appropriate z-ratio calculations for associated one-tail and two-tail probabilities ($n_{s/r}$ = 5 through 9) provide the obtained critical value of ±W that are considered significant for predictive and criteria variables (Table 4.25).

Table 4.25: Alumni intervention Wilcoxon signed-rank test (n=10) - Critical values of ±W

Alumni intervention Wilcoxon signed-rank test (n=10) - Critical values of ±W for small samples				
	Level of significance for a directional test			
	0.05	0.025	0.01	0.005
	Level of significance for a non-directional test			
ns/r	--	0.05	0.02	0.01
5	15	--	--	--
6	17	21	--	--
7	22	24	28	--
8	26	30	34	36
9	29	35	39	43

Note: n = 10

To examine the relationship between time (duration of intervention program) on other variables (mood and activity), regression analysis was conducted. The data showed correlation coefficients for the variables that indicate a linearly positive correlation for mood and practice (r = .979; P = .000**, highly significant). On the other hand practice (activity) and mood are both negatively correlated with time (r = - .588 and - .578 for activity and mood respectively; P .000**, linearly significant). However as the sample was too small, little weight is attached to these results.

4.5.5 Relationship mood and activity

Figure 4.10 highlights the relationship between mood and practice levels for the duration of the intervention program. While the program was of 28 days duration as practices coincided with the working week, data was sampled for 20 days (working days) to permit for direct comparison between mood and practice levels (1:1).

Mood and practice levels (activity) were in conformity so that they mirrored each and where motivation (mood) to act was primarily the higher than practices for the duration of the program.

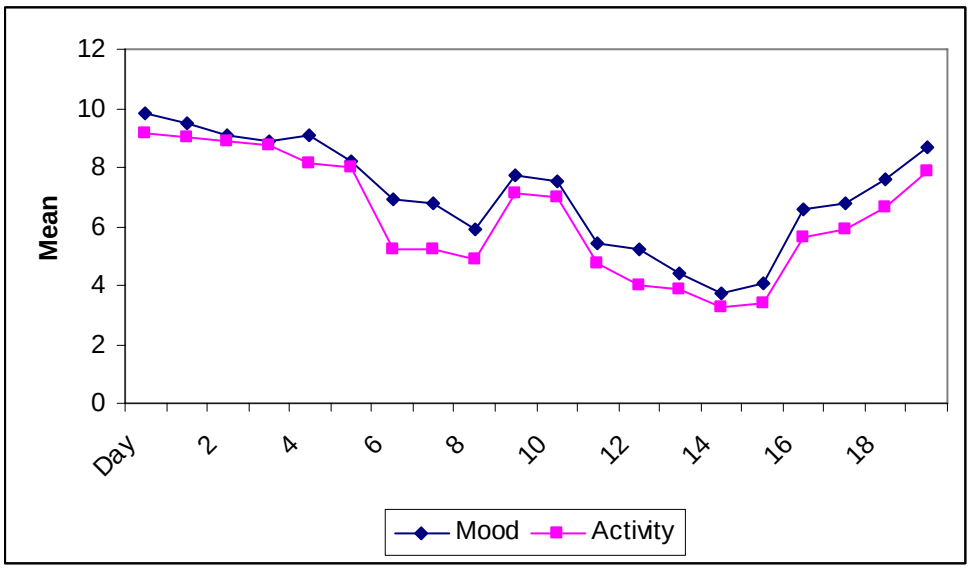


Figure 4.10: Intervention mood and practice relationship by day

As for individual practice activities, participants experienced most difficulty completing tasks where they had no or little control, over outcomes. For example, most had difficulty completing the activity to turn up the air conditioner by 1 degree (mean 4.1). Similarly, while most were able to complete the activity to carry and use the cotton shopping bag provided (mean 7.4), they were not always successful in refusing plastic bags at shops (mean 6.4) or disposable eating utensils while dining (mean 5.9). None elaborated a reason why refusal was difficult for them in the space provided. It is possible to speculate that this might be related to the importance of "saving face" in Thai society where individuals found it difficult to elaborate their meaning.

4.5.6 Intervention electricity results

The electricity data results show that electricity reduction is possible when focus and motivation is heightened in intervention participants (Figure 4.11). Respondents 0001, 0002, 0007-0010 were family dwelling occupants whereas the others were not. This helps explain the difference in electricity use. Importantly a reduction was reported in terms of mean across all 4 weeks (84.35, 80.22, 75.85 and

73.45) and across all individual respondents.

Figure 4.11 shows the relationship between time (week number) and electricity use (Kilowatt/hour) for intervention respondents where electricity reduction for all respondents was noted.

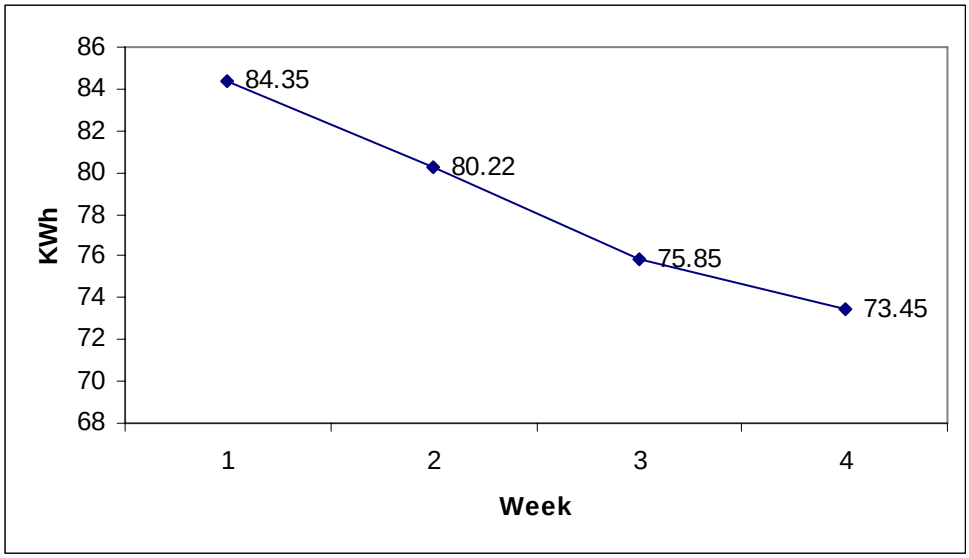


Figure 4.11: Activity – Intervention electricity use reduction results

Importantly, the first three weeks show a constant decline of between 4-5 KW per/week whereas by week 4 reported results decreased to 3 KW per/week. The bottoming out towards program end is suggestive of a lowering of focus and activity in line with the thesis hypothesis, although further data is necessary to confirm this view.

4.5.7 Intervention water results

Figure 4.12 shows the relationship between time (week number) and water use (m^3 – cubic meter) for intervention respondents where a decline was noted in water reduction for all respondents.

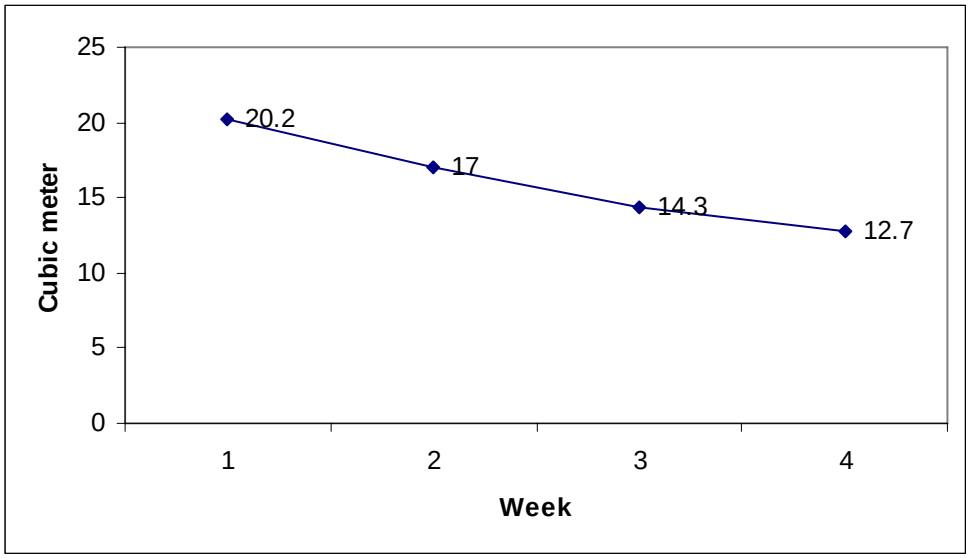


Figure 4.12: Activity – Intervention water use reduction results

Importantly, the first three weeks show a constant decline of between 2-3 cubic meters per/week whereas by week 4 it has decreased to under 2 cubic meters per/week. This is suggestive of a lowering of focus and activity in line with the thesis hypothesis, although further data would confirm this fact. A bottoming out towards the end of the program was also noted for water data results.

The relative consistency in downward trend (reduction of use) between water and electricity over the intervention period lends support to the view that interventions can effect changes in people's behaviour. This said, the extent to which such a program might be sustained is questionable given the limited time-scale of the intervention undertaken and the small sample size.

4.5.8 Respondent program feedback

Most feedback received across all respondents can be categorized into two main groupings: ongoing support structures (43%) and ongoing programs (53%). The balance concerned suggestions to improve the program such as more hands on activities to practice (4%). More specifically, respondents 0001, 0002, 0005, 0007, 0008 suggested that a program such as this "should be applied" for all

environmental students at FERS (Mahidol University) so that they understand “the level of appropriate expected behavior”, and respondent 0003 added that it should also be applied to “several levels of education such as primary and secondary” to measure what differences are reported between the present findings and those in the formative education years. The responses by respondents 0004, 0009 and 0010 called for more support during the intervention period and ongoing network to coordinate activities and for ongoing motivation. In the last instance, what respondents seek is an activism network.

Overall, the data results point towards motivation, focus and intimacy at the source as important variables in how individuals and groups act and the frequency of their actions in confirmation of the thesis hypothesis. However, while the intervention results are suggestive of positive environmental outcomes, equally compelling is the view expressed by respondents (96%) that ongoing support structures are necessary. This raises the pertinent point of the self-sustaining viability of programs that lack a ‘safety-net’ to maintain positive environmental gains. As well it calls for activism courses in university to teach for positive human environmental action.

4.5.9 Summary

The central hypothesis presupposed that providing environmental knowledge can lead to positive environmental outcomes in terms of attitude and practice for informed environmental actors. The main study results highlighted that time, place and focus were important variables that can impede or encourage positive environmental outcomes. Furthermore, that attitude and knowledge were not determining factors in alumni environmental practices. The intervention framework tends towards confirmation of the disassociation between knowledge and attitude that the exploratory study pointed to. Furthermore, the pre-test/ post-test highlighted

the important need for balance between empowerment and motivation to act and opportunity to act (Figure 4.9). What the results also suggest is that empowerment to act is contingent on opportunities to practice intention in terms of visible and measurable outcomes to effort. Moreover, the link between practices and motivation (mood) to practice is strong. As for electricity and water data results, both show that reduction is possible where the will and motivation are together present.

4.6 Chapter summary

This chapter focused on informed actors knowing and acting in terms of time and space as a case study. It employed the holistic perspective as a conceptual guide towards positive environmental practice analysis in light of the various knowledge and attitudes that informed those actions. An exploratory case study was conducted because this method stood out as an appropriate method to research situations involving contemporary phenomena in real-life contexts within a dynamic ever changing world. The intervention framework confirmed the disassociation between attitude and practice that the exploratory research pointed to. In particular, time and space were important variables that permitted or impeded effective environmental practice. Importantly, mood vested in self-motivation (immediacy of focus) can play, and does play an important part in realizing environmental outcomes. However, it requires support structures for ongoing success to build on gains made by the original initiative (driver).

This said, life is a complex web of competing interests that humans must negotiate, whose variables come as they are - right or wrong, individuals and groups are thereby drawn to consensus on issues of import regardless of the validity of the issues that weigh upon them. Both the qualitative and quantitative, as well as the individual and shared meanings derived from this chapter are discussed next.

CHAPTER V
DATA DISCUSSION

5.1 Introduction

Humans have differing views concerning their relationship with the planet. A comparison on this level is indicative of deeper differences between them. This difference helps explain their diverse social strategies and frameworks for action. It is not only the parallels and connections between them which help explain individual and group ideology, their differences do as well.

The study was designed to test the thesis hypothesis in light of the research problem and objectives elaborated in the introduction and methodology chapters.

Contextually, the children's narrative *Mouse Trap Story* (Anonymous) provides a moral that best accommodates understanding of current patterns of human action. Its 'ecocentrism' is unmistakable in the realization that each of us is a vital thread in another person's tapestry. Our lives are woven together for a reason and this is both explicit and implicit in numerous key environmental writings such as Vannote's (1980) concept of the "river continuum" and Lovelock's "Gaia" (2006) as well. Moreover, what this tale also shares with key environmental writings is the interrelatedness between theory and practice, humans and nature, and human dilemmas in balancing knowledge, attitude and practice in complex social and environmental systems.

The Mouse Trap Story starts with the following words:

> … A mouse looked through the crack in the wall to see the farmer and his wife open a package.

> What food might this contain?" The mouse wondered - he was devastated to discover it was a mousetrap. Retreating to the farmyard, the mouse proclaimed the warning. There is a mousetrap in the house! There is a mousetrap in the house!" [No one heeded the warning] (Anonymous).

As with the mouse, environmental experts too have proclaimed that the planet is in crisis (The United Nations Environment Programme, 2007), yet humanity as with the farmyard community has not always heeded the urgency of the warning. There is an incongruence between what people do and what they should. In this connection, the following sections discuss the data results in terms of the two pronged thesis objectives: exploratory and intervention.

5.2 Research objective one: Exploratory

This section explores the effect time, space and impediments have on knowledge, attitude and practices in informed environmental actors (students and alumni) that help explain the incongruence between the way they interact with the environment and the way they should.

5.2.1 Introduction

The research objective can be collapsed into relational groupings to permit a more cohesive presentation of results: key internal variables and key external variables.

5.2.2 Key internal variables

Job fit, under employment and over employment in the literature have been identified as a significant variable for people's job satisfaction (Smetherham, 2005; Brown et al., 2003; Connor, Tyers et al., 2004; Bowlby, 1999). As well, it can play an important role in people's motivation to act on issues of personal importance in environmental terms. The data reported in the previous chapter for both students and

alumni implicate the view that job intention and study motivation together are an important category for individual and environmental activism.

5.2.3 Variable 1: Influences and motivations to study in the environment

So far as influences and motivations to study in the environment the pertinent questions were questions 16, 17, 18 and 19 (Appendix B). Questions 16-18 are self explanatory, whereas question 19, had objectives of its own. By design question 19 was intended as a crosschecking tool and in addressing the direct nature of the phrasing used for questions 1-18 that can render questions such as this most susceptible to the Hawthorne effect (Franke and Kaul, 1978). In the following discussion "job" means job expectation for students at graduation whereas for alumni it is "current job".

Graduate job intention (question 16) data results show that 60.7% of students and about 59% of alumni on average were actively hoping for a job related to their study program at graduation (Table 5.1).

Table 5.1: Type of job hoped for after graduation for students and alumni (S 2 Q 16)

	Students					Alumni				
	Environ.		Non-environ.			Environ.		Non-environ.		
Gender	Count	%	Count	%	Total	Count	%	Count	%	Total
Male	55	65.4	29	34.6	84	36	59.0	25	41.0	61
Female	105	56	82	44	187	73	59.3	50	40.7	123
Total	160	60.7	111	39.3	271	109	59.1	75	40.9	184

While statistically three fifths can be considered significant in job expectation, the wider meaning can be elusive if not placed in context. Especially important in this regard is the value and objective of course type chosen. Unlike other study streams such as the arts, by comparison the environment, in the same way as engineering, medicine and similar also are, is mostly a specialist field (Reitan, 1998). Admittedly, there can be significant overlap between study disciplines. From a specialist milieu perspective, it is therefore significant, when

about 40% for both groups do not seek jobs related to their study interest.

Question 17 grouped responses further shed light on this issue when both groups highlight that "concern" for the environment was not the primary determining factor that mediated between course choice and job intention with just less than a third indicating that such an association was valid (32.5% for students and 32.6% for alumni) (Table 5.2).

Table 5.2: Reasons for choosing study program for students and alumni (S 2 Q 17)

	Students		Alumni	
	Percent	**S.D**	**Percent**	**S.D.**
Environment interest	32.49	1.12	32.6	1.12
"Soft program"	39.90	0.42	40.2	0.39
Family influence	9.60	0.51	9.21	0.62
Self improvement	18.01	1.34	17.9	2.45
Total	100.00		100.00	

Furthermore, the relationship in the results that 39.9% of students and 40.2% of alumni view environmental courses as a "soft" and therefore easier to get into is further demonstrative of underlying intent. Moreover, the conformity in data results between these two groups over a thirty year period since the oldest alumni graduated, are also indicative of a society that places intrinsic value on education. The responses to question 18 (Table 5.3) further implicate this view in the results that only 15.1% of students and 14.7% of alumni viewed environmental education completed as something useful to job acquirement in the chosen education field. In this connection, just under 60.0% for both students and alumni saw environmental education as a means (to graduate) towards an end (getting a job).

Table 5.3: Future expectations of education usefulness for job prospects (S 2 Q 18)

	Students		Alumni	
	Percent	**S.D**	**Percent**	**S.D.**
Useful for environmental job	15.10	0.85	14.70	0.84
Gain knowledge	10.50	1.44	8.31	1.89
Improve job prospects	4.60	0.38	6.39	2.81
Not useful	84.90	0.66	85.30	1.35
Value of degree	59.50	0.56	59.30	1.22
Higher salary	24.50	1.21	24.50	0.82
Did not elaborate	0.90		1.50	
Total	100.00		100.00	

This causal link is further supported in the result that 24.5% for both groups cited higher salary as the second most important consideration after value of degree (84% together) for studying the environment (Table 5.3).

Question 19 phrasing differed for both groups. However, the intent and results were in relative conformity across this group of questions. For alumni it asked “Have the job expectations you had while at university been met in your current job”, while for students it asked “Is there anything else you would like us to know regarding your study program” (Table 5.4). In response, almost 83% of alumni replied that they had not had their job expectations met. At the same time only 15.5% of students volunteered the view that they wanted more assistance with finding a job in the environment field. The findings that only 15.5 % of students needed help in finding a job is consistent with the 15.1% who also answered with “related to interest” in response to question 18. While for alumni, the 17% who had their job expectations met conformed with the 14.7% who answered “related to interest” in response to question 18.

Table 5.4: Student job concerns & alumni link between job & job expectations (S 2 Q 19)

	Percent	**S.D**
Alumni	100.00	1.44
Environmental job expectations met	17.10	2.11
Environmental job expectations not met	82.90	0.77
Students	77.00	2.23
Concern about curriculum content & teaching	16.30	2.68
Need help to find environmental job	15.50	1.23
Worried about own future	15.10	2.68
Worried about future of the environment	30.10	2.33
Did not elaborate	23.00	
Total	100.00	

Note: 77% of students volunteered information

Still, job intention of 59% (question 16) and job motivation 32% (question 17) for both groups are not reconciled. The directness of these questions and the relative implications that stem from their premise might further be mitigated through the Hawthorne effect so that a more representative figure might emerge at the lower end of the two data sets. The Hawthorne effect postulated that individual behaviors may be altered because respondents know they are being studied in a research project (Franke and Kaul, 1978). Of course, the view that observation might adversely influence response can be true for any question. At the same time the conformity between student and alumni responses for questions 18 (15.1% for students and 14.7% for alumni) and question 19 (15.5% for students and 16.8% for alumni) is unmistakable and further suggestive that a yet lower figure for intention and job motivation is credible. As alumni and student conformity in reply to this set of questions is high, question 6.1 from the alumni questionnaire can be taken as an indicator for both groups of future realities. This question asked “To what extent is your job related to your study program about the environment” to which only 12.0% of respondents found such a fit (20.4% when indirectly related is combined). This

response further tends towards the view that both 59% (question 16) and 32% (question 17) are both seemingly too high and a lower figure than either is possible. Nevertheless, despite the impasse that the data presents, all things considered a picture emerges that neither students nor alumni entered the chosen course stream on account of their environmental leanings. This ought to be of concern to educators and planners alike, whichever data set is the more reliable. Similarly, it ought to concern interested environmental activists as intention and job motivation can be serious impediments to environmental activism especially when placed in the wider context of the conflicting values embedded in wider society. This is discussed below.

5.2.4 Variable 2: Job fit

In institutions as in society there are two primary drivers, those who favor change and those who resist it (Levin, 1951). Change is expressed in many ways such as proposed amendments to rules, laws and regulations, customer demand and buying power and the like. Resistance is frequently an expression of fear, unfamiliarity, insecurity, uncertainty, trust and others (Dawson, 1994). There are additional variables such as over education and job-satisfaction in organizations that can be important determinants to positive environmental action. Additionally, they enliven the perennial debate on the role of education.

Question 6.1 solicited feedback about the relative fit between job and university education for alumni where 78% of respondents indicated that there was not a natural fit between the two (Table 5.5).

Importantly, the relationship between environmental education acquired and current job (actual) reported at 11.9% (Table 5.5) and job expectation met reported at 17.10% (Table 5.4) tends towards affirmation of the view that there is not a natural fit between environmental education and job. At its elementary level it points to a dislocation between environmental education for a purpose and actuality, while in its

more elaborated form, to the loss of transformative potential of specialist fields of education of the kind that Reitan (1998) has argued against.

Table 5.5: Alumni relationship between study program and job (S 2 Q 6.1 & 6.2)

Alumni relationship between environmental education and current job (Q 6.1 & 6.2)	
	Percent
Job related to environmental studies	11.9
Job not related to environmental studies	78.2
Not sure	9.9

Note: n=184; related' refers to fit between environmental education acquired & current job

The misfit between these categories is further compounded by two convergent themes, an individual environmental orientation that results from education acquired and job realities. This view is supported by the data results in this research where for environmental intention to practice on the job (think) alumni reported a high intention of 88.6%, whereas opportunity afforded towards effective practice (do) was only 30.4% (Table 5.6).

Table 5.6: Alumni relative fit between environmental "think" and "do" (S 2 Q 1 & 4)

Influence of knowledge - Think (Q1)				**Act on knowledge - Do (Q4)**		
	Percent	**Mean**	**S.D**	**Percent**	**Mean**	**S.D**
Agree	88.6	3.9	0.9	30.4	2.3	1.4
Disagree	11.4	2.0	0.9	69.6	3.6	1.4

Note: n=184

The discrepancy between think and do, as well as the relationship between job and education fit, tends to describe a picture of alumni circumstances as one of definite imbalance. This finding does not bode well for realizing environmental expectations and ambitions in the workplace. It is possible to argue that the circumstances alumni find themselves in, and which students potentially confront for the future, is one of their own doing which was discussed above. However, it might also be explained in terms of the conflicting values within the workplace environment itself (conflicting values). It might also be accounted for by the kind of responsive

educational strategies pursued by institutions in the perennial debate over the role of education – to educate for knowledge or for job.

5.2.5 Variable 3: Activism

Students and graduates do not of course operate in a vacuum. Their individual and collective actions are responses to system machinations. The predicament environmental alumni find themselves in is a product of a number of educational dilemmas that have been historically time specific. While the literature has time and again highlighted the important relationship between education and meaningful labor-fit on motivation to act (Smetherham, 2005; Brown et al.,2003; Connor, Tyers et al. 2004; Bowlby,1999), education has not always responded in kind. Where it has responded it has attempted to operate in similar ways to that of the competitive sector found in business. In doing so, education has had to adapt to the requirements of the single market (Balázs-Ivanics, 1998), a market that increasingly tends to train for jobs that are not present at graduation. This can lead to frustration for graduates who find themselves employed in jobs for which they have not been trained for and that potentially conflict with their education acquired belief systems. This predicament is made the worse when students themselves decide to study disciplines whose central premises they elect not to pursue in job choice. Equally, disconcerting is when the job does not permit for positive environmental ambition to be realized. However, as both educational institutions and workplace exercise a profound influence over its members the two can collide. Ultimately, a mismatch of the kind described above can have a direct influence on whether or not informed actors are able to effectively realize activism both in the workplace and in society generally.

The situation for both students and alumni is complex so far as activism is concerned (Section 2 questions 12 and 13), especially, when crosschecking

questions 6.1 and 6.2 from section 2 are considered collectively.

While 92.3% of students and 84.8% of alumni indicated that they keep up to date about environmental issues in response to question 12 (outside of class for students and work for alumni) (Table 5.7), only 7.0% of students and 26.1% of alumni belonged to an environmental organized group (Table 5.8).

Table 5.7: Students and alumni environmental issue engagement (S 2 Q 12)

	Students	Alumni
Q.12. Keep informed about environmental issues	**Percent**	
No	7.7	15.2
Updated by media	33.3	17.9
Too busy	33.4	21.1
Not a priority	33.3	61.0
Yes	92.3	84.8
Q.12a. Issues of interest		
Earth Damage	79.7	51.2
Pollution	20.3	35.3
Resource depletion		13.5
Q.12b. Impact of issues on life		
Feel concerned	93.4	51.3
Feel negative	6.6	35.9
Not effected		12.8
Q.12c. Importance of issues to respondent		
Environmental consciousness	86.7	51.9
Economic impact	6.6	32.7
Personal value	6.6	15.4
Total	100.0	100.0

Note: Students n=271 and Alumni n=184

Table 5.7 further illustrates that alumni were twice as likely to see environmental issues as not a current priority with 61% than were students with 33%.

So far as environmental organization belonging or membership is concerned

in response to question 12, alumni were more than three times likely with 26% to indicate belonging than were students with 7% (Table 5.8). At the same time it is also noted that Alumni response is in alignment with responses to questions 6.1 and 6.2 of section 2 where their job and education relationship is indicated at 11.9% (Table 4.15), while for students the same questions are not aligned with answers to question 13 (Table 5.8) in terms of either environmental interests outside of university reported at 18% or for membership 1% (Table 4.6)

Table 5.8: Students and alumni environmental organization membership (S 2 Q 13)

	Students		**Alumni**	
Q.13. Belong to environmental organization		**Percent**		
Yes	7.0		26.1	
Greenpeace				2.1
Elephant rehabilitation hospital				0.6
Did not nominate		100		87.3
No	93.0		73.9	
Time constraints		66.4		34.6
Have alternative ways to contribute		26.6		33.1
Contribute financially		7.0		17.6
Not a priority at this time				14.7
Total	100.0		100.0	

Note: Students n=271 and Alumni n=184; Data in percent

The lack of activism in both groups can be attributable to a number of factors such as institutional realities, time constraints and similar. Additionally, the phenomenon can also be explained by the Hawthorne effect (Franke & Kaul, 1978) which describes the return of false data for some questions where the respondent is acutely aware that they are being observed, and the responses may have implications on policy and relationship structures. This helps enlighten the relationship between the 7.0% of students and 26.1% of alumni who said they belonged to environmental organizations yet 87.3% of alumni and all students could not implicate their

belonging (Table 5.8).

As for, individual and group practice in the home and in the workplace (university for students) Table 5.9 shows that within group there was a strong correlation between the "yes" and "no" responses for both home and work (university for students) for both groups. For "yes" practice in the home students reported 78.2% and for alumni it was 82.8%, while for work (university for students) students reported 57.9% and for alumni it was 54.1%. For "no" in the home student response was 21.8% and alumni mean was 17.1%, while for work (university for students) the mean for students was 42.05 and for alumni 45.9. What the data points to is that groups are more likely to practice positive environmental behaviors at home than at work. Furthermore, it places emphasis on the relative importance of time and space dimensions on environmental activism in different settings in confirmation of the thesis hypothesis.

Table 5.9 Students and alumni environmental practice in different settings

	Students		**Alumni**	
Practice	**University**	**Home**	**Work**	**Home**
Yes	57.95	78.20	54.10	82.85
No	42.05	21.80	45.90	17.15
Total	100	100	100	100

Note: n=171 for students and n=284 for alumni; Data in percent

There have been criticisms directed at the education system, including universities, that students are not acquiring adequate employment skills or human capital for today's rapidly changing global economy (Bowlby, 1999). University data shows that education had been of value for graduates in three main respects: (i) the types of jobs they had acquired in the labor market; (ii) positive assessments of their university education acquired; and (iii) the range of skills that graduates said they had learned in their programs. However, about half of all graduates also remarked that their programs lacked a practical dimension and that some job-

specific skills should have been learned. Furthermore, Smetherham's (2005) analysis on graduate employment, underemployment and unemployment found that "a significant minority of workers are employed in jobs for which their current qualifications are not a requirement, that is, they are 'over-educated'" (Smetherham, 2005:5). According to Brown et al. (2003), accepting a job that does not require a graduate qualification is demotivating and graduate employability tends to intensify the mismatch between supply and demand. Therefore job satisfaction needs to be considered as a variable that might shed light on the relationship between job, education and behavior. For example graduate follow-up surveys in the UK show that just over two thirds were very or fairly satisfied with their present job, while those not satisfied tended to feel they were not using their skills or qualifications sufficiently, that their qualifications are wasted (Connor, Tyers et al. 2004).

According to the data returned for alumni and students, activism outside of the university and work environment is limited so far as these two groups are concerned. This is an issue that should be of concern when considering ways in which people might be mobilized towards environmentally focused conservation strategies for educators as well as for governments. Over education, underemployment and job mismatch can effect job satisfaction. Job satisfaction in turn affects people's attitudes and can be an influence on beliefs that translate or fail to translate into actions. This is especially pertinent where informed and trained students of the environment are gainfully employed in jobs or disciplines that are unrelated to their education and training. Still, the relationship between course choice and job might yet be a problem of actors pragmatically orienting themselves to life (vision) rather than the type of "mismatch" the literature has pointed to. Nevertheless, whether the problem arises on account of personal vision in response to life situations or proceeds from job mismatch in employment realized, the ongoing positive environmental practice potential of informed environmental actors has been compromised.

5.2.6 Key external variables

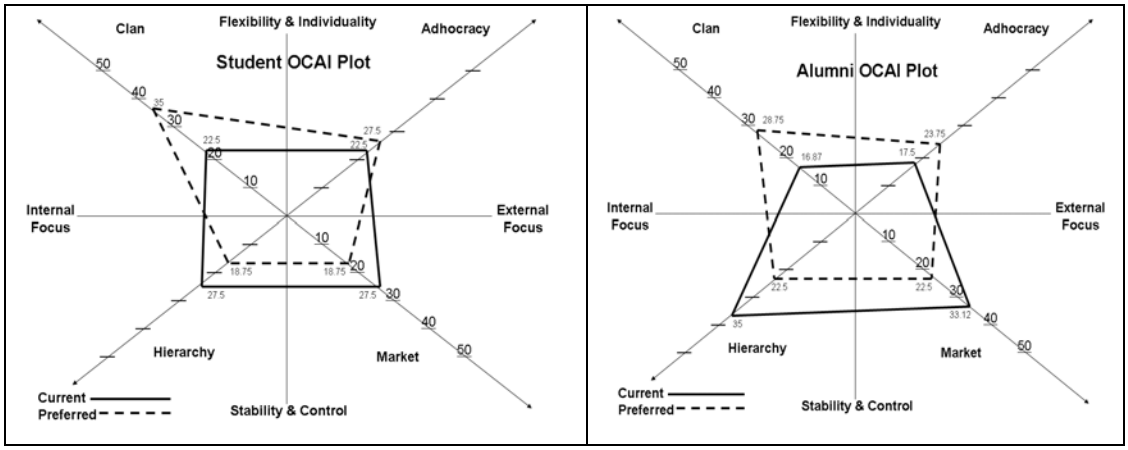
The operational culture under which individuals and groups operate is the purview and object of interest of the Organizational Culture Assessment Instrument (OCAI). The OCIA which helps locate the cultural context within which actors operate is an appropriate tool to study the dynamics of society as it moves. While there are important similarities and differences between students and alumni in this research, the wider context and meanings are given social dimensions here. The two variables that describe the cultural context within which actors operate: (i) current; and, (ii) preferred are discussed together as they are integrally connected in terms of the way in which they enable or constrain human action. Differences between the two point to wider socio-dynamic differences between knowledge, attitude and practice levels in informed environmental actors. Contextually, as a group they illustrate the sharp differences between the ideal and real world.

5.2.7 Variables 1 & 2: Cultural situation current and preferred

As a snapshot of life at a moment in time the OCAI depicts students and alumni as inhabiting two disparate worlds where there are commonalities and important differences that impact upon the data returned. The value of this tool is in its predictive dimensions because it offers a current snapshot as well as future desire in the views and responses of the participants themselves. The workings of the instrument will not detain here and has been explained elsewhere. Briefly, when compiling a culture profile, the mean scores of the cultural alternatives: clan, adhocracy, market and hierarchy are drawn on a four-quadrant plot. Average scores are computed and graphed for each in the “now” and “preferred” positions. The current position is drawn using a solid line and the preferred is dashed.

The solid rectangle for students shows that the cultural types that dominate are hierarchy and market followed by clan and adhocracy (Figure 5.1 - left). This

culture type is typically concerned with stability and control (hierarchy & market) and less so with flexibility and control (clan & adhocracy). It tends to be a culture equally balanced between internal and external focus whereby the existent culture is more readily reproduced. It is an environment that is not easily susceptible to change and is weary of free inflow of new ideas that might readily be given a forum and therefore acceptance.



Note: All data presented as mean.

$p < .05$ mean scores could range from 0 to 100 representing a percentage out of 100

Figure 5.1: OCAI - Student and alumni cultural situation comparison

While, alumni also operate in a cultural environment that is predominantly hierarchical followed by market then adhocracy and then clan, the picture elaborated is different (Figure 5.1 - right). Theirs is a world that places high regard on following the rules and maintenance of the system as it currently exists and is excessively inwardly focused (hierarchy). Competition, both internal and external is prized (market), however not to the extent where it comes into conflict with, and is at the expense of loss of stability and control. Flexibility and support for individuals is low (clan), and individualism valued only marginally higher (adhocracy). For both students and alumni new ideas, outside of popular group-will are hard pressed to gain acceptance and even more to win consensus. This helps explain the context of the predicament these two groups find themselves in with respect to job motivation and intention on the one hand, and job fit and activism on the other (above). It also

can aid to locate the appropriate contexts that mediate in the relationship between knowledge, attitude and practice.

In terms of what cultural type students and alumni would prefer both opted for a high clan and adhocracy culture at the expense of hierarchy and market. In the imagined world that they would like to inhabit, both groups wished for a supporting environment where individual expression is relatively high and where individual and group wishes might more easily be accepted. This would be a world that would be supportive of new ideas and more ethically in tune with positive environmental ambitions expressed by individuals and groups. In such a world consensus would be won and reproduced through the dominant individual and group drivers that engage them. Both groups call for a working environment where they would be able to express their environmental activism in any job that they found themselves in. Jobs would accordingly be reshaped by the people who occupied them. This is a call for a paradigm shift that moves all boundaries wholesale and not arbitrarily just individual markers.

5.2.8 Variables 1 & 2: Cultural situation current and preferred in context

The findings in the present study in the “pref(er)” position agree with the 66% of institutions in the US who report a clan culture type with a mean of 28% (± 5%) (Smart and Hamm, 1993; Smart and St. John, 1996). Likewise, the call for a paradigm shift in favor of a clan culture, also sits well with the findings of the questionnaire pilot test conducted for Thammasat University students who also called for increase in the direction of clan (Momiroski, 2007). It is possible that such a paradigm shift as being called for might significantly help address environmental concerns in institutions. Similarly it might be useful in addressing the kind of skill shortage that has been reported world wide in the labor force and most especially in

Thailand. That said, change in the job culture alone is not able to address all environmental dilemmas confronting humanity at present without a corresponding shift in the societal paradigm as well. This is discussed below.

The International Business Owners Survey (IBOS) 2006 examined the attitudes, plans and trends of over 7,000 businesses in 30 countries across six continents. Figure 5.2 shows in respect to Thailand that there is a significant shortage of availability of skilled workforce for Thai business with 49% which is significantly higher than both regional (36%) and global (32%) averages (Grant Thornton, 2006:3).

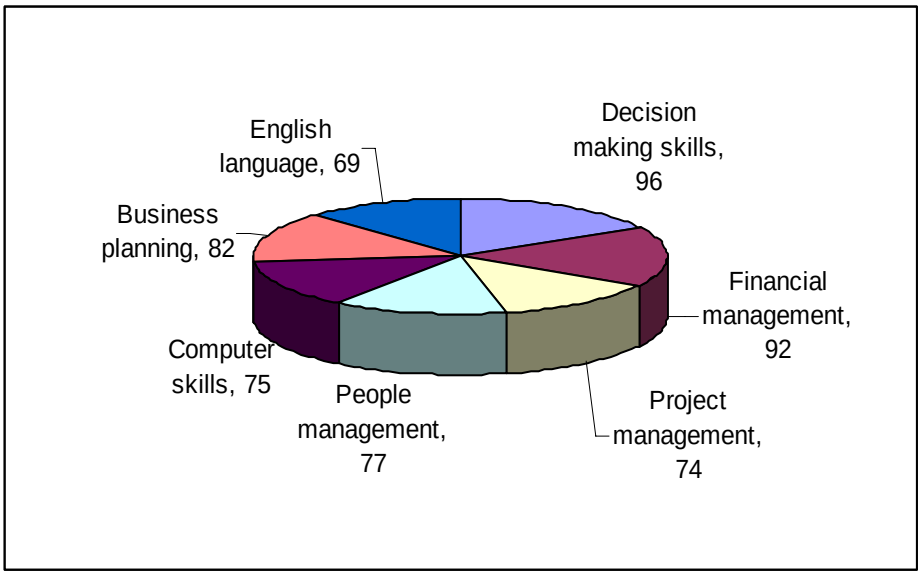


Figure 5.2: Critical skills development and shortage in Thailand
Made after: Grant Thornton (2006:7)

Moreover, people skills, decision-making and financial skills were noted as critical deficiencies reported by Thai business leaders in the survey. When asked to nominate the most critical skill deficiencies in need of in-house addressing, by far the biggest skills needing development were business management skills or business planning (82%), financial management (92%) and business decision-making (96%). One way to interpret these numbers is that "the Thai education system and universities are just not producing the kind of skills necessary to manage a business"

(Grant Thornton, 2006:7). Another way is to argue that this is not the principal role of universities. However, significantly, this raises the kind of issues that have a direct bearing upon job-match that was discussed above and amplified below.

While the skill shortage reported for Thailand is suggestive of realities on the ground, it is equally suggestive of the role that internal and external factors play that are embedded in the current system that might not readily be translatable to meeting such skill shortages. It further raises questions about the role of education (for knowledge or jobs). Significantly, it prioritizes and perpetuates the importance of existing economic models at the expense of others such as the environment. A continued reproduction of existing paradigms compounds the environmental deficit that currently exists in society, and can further help to explain the low activism reported in this research.

5.2.9 Variables 1 & 2: Cultural situation interconnections

Cultural setup can be an important factor for activism. It is especially revealing in the relationship between thinking, knowing and agreeing. In this regard students and alumni differed significantly in their responses for their respective institutional environmental policies. For students “thinking” whether their institution had such a policy only 18.8% thought it did (unsure 42.3%) while for alumni it was 63% (unsure 17.7%) As for “knowing” such policy only 18.2% (unsure 26.9%) of students responded they knew such a policy, whereas 61% (unsure 22.8%) of alumni did. In terms of “agreeing” with existing institutional policy 28.2% (unsure 42.7%) of students replied that they did, while 76.7% (unsure 18.4%) of alumni said they did. The relative against group difference between students (think 18.2%; know 18.2% and agree 28.2%) against alumni (think 63.0%; know 61.0% and agree = 76.7%) points to different institutional cultural setup and the importance of multi-theoretical approaches to understanding phenomena.

The low student relational affirmation for university policy can in part be explained by the intimate environmental orientation they have with respect to the source which is also confirmed by their high group knowledge, attitude and practices correlation (discussed below). In other words their benchmark for expectation is higher relative to alumni. In turn, the high alumni relational affirmation in terms of policy might be accounted for by the high exposure to various on the job environmental initiatives such as ISO certification and the requirements thereof. It is possible that these can translate to high levels of awareness about policy. Both groups also demonstrated higher levels of agreement with institutional policy (students 28.2% and alumni 76.7%) than either their thinking or knowing did and this contradiction lends itself to explanations offered by the Hawthorne effect (Franke & Kaul, 1978) which describes return of false data for some questions where the respondent is acutely aware that they are being observed, and the responses have direct implications upon policy and relationship structures. This explanation is particularly pertinent when looked at in terms of the high level of unsure responses to the “agreement” question for students (42.7%). It is possible that their singular location places them in an easily identifiable position where for alumni it does not.

5.3 Coming to consensus: Internal and external variables

The path to individual and group consensus is a complex one. It can involve compromises and action-strategies that need to be placed in the context of their wider influences to be properly understood. Nevertheless, humans have responded in ways that the system has allowed them given human limitations in terms of time and space and of pragmatic orientation to circumstance. The compromises we make as we negotiate the ideal and real world can be illustrated in the: (i) Relationship between knowledge, attitude and practice; and (ii) Knowledge and practice

regression as actors are invariably removed from the source.

5.3.1 Relationship between knowledge, attitude and practice

The knowledge, attitude and practice results for student and alumni resulted in important findings that help us to better understand the relationship between them. There are important similarities and differences within group and between them.

For students the significant aspect of the data is the consistency between knowledge, attitude and practice. For this group, it would seem that high knowledge has high potential to translate into high attitude in the absence of impediments such as time and context. Similarly, high knowledge and attitude gives rise to high effective practices given appropriate contexts. The data for students is in line with expectations for respondents at the source of that knowledge with 90.7% (Table 5.12) and an alignment between attitude reported at 92.4% and practices at 89.1% (Table 5.10) is maintained.

Conversely, alumni reported their environmental knowledge level at 76.0% (Table 5.12) with attitude at 94.7% and practice at 74.2% respectively (Table 5.10). More specifically, alumni attitude was consistent across all respondents with a mean of 4.74 (94.7%), for knowledge the mean was 11.4 (76.0%), while for practice X-bar chart (Figure 4.4) and X-bar process parameters (Table 4.21) show that the expected practice for all alumni respondents was mean 3.96 or estimated at ± 5% of 79.2% (74.2%) (Table 4.20). What this suggests is that it is possible to have a high attitude but low knowledge and practice as respondents are removed from the source of knowledge. On the one hand, the ethical nature of attitude questions can give rise to a strong stance that might fail to be translated into action over time. On the other, as people are influenced by the situation, general attitudes are not always good predictors of specific behavior so far as environmental questions are concerned

(Reitan, 1998). For a variety of reasons, a person may value the environment but not positively practice on a particular day (Perloff, 2003).

It was found that student and alumni environmental attitude was complementary (Table 5.10).

Table 5.10: Student and alumni comparison environmental attitude

Student and alumni comparison environmental attitude	**Student**		**Alumni**	
	$\overline{X}$	**S.D.**	$\overline{X}$	**S.D.**
1. Water	4.40	0.433	4.42	0.413
2. Energy	4.59	0.281	4.57	0.251
3. Pollution	4.68	0.292	4.28	0.626
4. Recycling	4.57	0.426	4.57	0.236
5. Consumables	4.48	0.536	4.57	0.241
Total	**4.62**	**0.394**	**4.57**	**0.353**

Note: Numbers inside () indicate the number of people answering the questions.
Attitude scale was coded 5-1 where 5 is strongly agree in descending order
Note: Students n=271 and alumni n = 184; Data in percent

It was found that student and alumni environmental practice levels differed (Table 5.11).

Table 5.11: Student and alumni comparison environmental practice

Student and alumni comparison environmental practice	**Student**		**Alumni**	
	$\overline{X}$	**S.D.**	$\overline{X}$	**S.D.**
1. Water	4.45	0.384	3.44	0.819
2. Energy	4.42	0.439	3.90	0.284
3. Pollution	4.37	0.627	3.30	1.016
4. Recycling	4.45	0.384	3.67	0.835
5. Consumables	4.42	0.403	3.83	0.683
Total	**4.44**	**0.447**	**3.73**	**0.727**

Note: Numbers inside () indicate the number of people answering the questions.
Practice scale was coded 5-1 where 5 is strongly agree in descending order
Note: Students n=271 and alumni n = 184; Data in percent

Social impact theory helps fill in the gaps in knowledge, attitude and practice differences in students and alumni. Students are aligned with respect to the center

and therefore knowledge, attitude and practices coincide, whereas in alumni, while knowledge and practice levels have fallen, attitude has not done so and remains high because it contains ethical and moral assumptions. The disconnect between ethical values (attitude) and knowledge and practices, finds expression in the phrase “protect the planet”, that is not dissimilar to the ethical position articulated by the phrase “though shall not kill” in most religions. Yet, certain circumstances and low focus gives rise to low level of reflective knowledge and low practices that the ethical stance embodies (Pape, 2005; Scheuer, 2005). In religion the knowledge component is neutralized by demonizing the enemy. We dehumanize them on racial (biological) and ethnic (religious) grounds and this makes it easier to kill them. Accordingly, the ethical stance towards the commandment would still be high, yet the perceived knowledge and practices that outflow from this high ethical stance would decline when focus upon it is low and would additionally be highly dependent on time and place (Pape, 2005). For the environment, the admirable ethical stance to protect the planet would in turn be mitigated by the dominant economic and cultural setup that prevail on institutions and gain additional referents in the wider world dynamics in general.

From a different viewpoint, the comparative data for knowledge for students and alumni when recoded, so that the qualitative responses agree and strongly agree represented an affirmative answer and were allotted 1 point for correct, and unsure, disagree and disagree strongly were accorded 0 value for incorrect, are illustrative of the differences in social reality between students and alumni in knowledge terms (Table 5.12).

Whereas student knowledge was reported at Mean 13.6 (90.7%) from 15 (S.D. 0.17) for alumni responses were Mean 11.4 (76%) from 15 (S.D. 2.94). The consistency in mean across questions for students revealed in the recoding process points to strong reliability for student knowledge returned data across all questions,

whereas the inconsistency for alumni points to a different phenomenon that finds expression when considered in terms of time dimension. A comparative view between numeric question total mean (quantitative) and percent of total against age-group cluster (qualitative), showed consistency in decline in knowledge over time (to 56 years of age inclusive), in terms of questions answered correctly (Mean 11.4) out of 15 and as a percentage of total with 76% for both.

5.3.2 Knowledge and practices regression

Alumni data results showed that regression between knowledge and practice took place over time whereas for students this was not noted as they are at the source. Similarly, attitude remained high for both groups and it was not a significant determining variable for either groups (students 92.4% and alumni 94.7%).

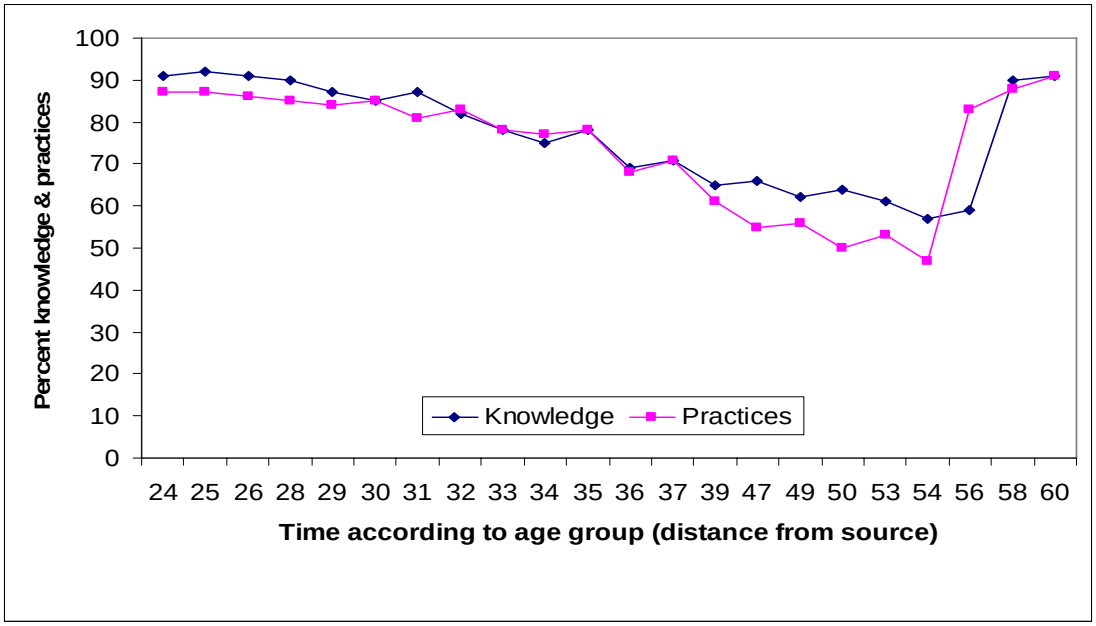
Table 5.12: Student and alumni knowledge comparison (S 3 Q 1-15)

Student and alumni comparison environmental knowledge	Students $\overline{X}$	Students S.D.	Alumni $\overline{X}$	Alumni S.D.
1. We are nearing the limit of people the earth can sustain	0.90	0.065	0.77	0.147
2. Humans do not have the right to modify the environment	0.91	0.046	0.67	0.251
3. When humans interfere with nature, it produces disastrous results	0.90	0.059	0.76	0.154
4. Human ingenuity will not ensure we do not make the earth unlivable	0.89	0.071	0.64	0.247
5. Humans are severely abusing the environment	0.90	0.071	0.81	0.056
6. The earth does not have plenty of resources so we can develop them	0.90	0.055	0.61	0.229
7. Plants and animals have equal rights to humans to exist	0.90	0.071	0.78	0.125
8. The balance of nature is not strong enough to cope with the impact of industry	0.90	0.052	0.79	0.101
9. Despite out special abilities humans are still subject to the rules of nature	0.90	0.065	0.82	0.022
10. The so called 'eco disaster' facing humans has not been exaggerated	0.90	0.062	0.80	0.079
11. The earth is like a spaceship with limited room and resource	0.90	0.065	0.80	0.079
12. Humans were not meant to rule over the rest of nature	0.90	0.052	0.74	0.188
13. The Balance of nature is delicate and easily upset	0.90	0.046	0.81	0.056
14. Humans will not learn enough about how nature works and how to control it	0.90	0.062	0.68	0.248
15. If things continue as they are, we will soon experience a major eco catastrophe	0.91	0.042	0.78	0.122
Total	**0.91**	**0.059**	**0.76**	**0.141**

Note: Numbers inside () indicate the number of people answering the questions. Knowledge scale

was coded 1:0 where 1 was agree and 0 disagree

For alumni multiple regression analysis using multiple strategies shows that the correlation coefficients of the data indicate a linearly positive correlation for both practice and knowledge (r = .957; P = .000** with mean outlier substitute and r = .838; P = .000** with outlier removed) at a highly significant level. On the other hand practice is linearly negatively correlated with knowledge (r = - .964; P .000** with mean outlier substitute and r = - .797; P .000** with outlier removed) and is also highly significant.



Note: see footnote 2 on page 196

Figure 5.3: Alumni knowledge and practice regression over time

The related literature provides for interpretations that mediate the complex relationship in human action strategies in new and creative ways (Fishbein, 1980; Cable, Knudson, Udd and Stewart, 1987; Young and Kent, 1985; Stasson and Fishbein, 1990; Ajzen, 1987). Such an interpretation would argue that the trajectory change commencing at age 54 for both knowledge and practice is consistent with human reorientation as people consider the legacy and world they leave behind. Their individual and collective actions are creative responses to the complexities of human and earthly systems.

5.4 Research objective two: Intervention

An intervention strategy was administered on informed environmental actors to bridge the incongruence between the way they interact with the environment and the way they should. The central hypothesis argued that interventions that bring the environment into sharp focus can realign the knowledge, attitude and practices relationship in informed environmental actors (Allport, 1967; John, 1990).

5.4.1 Introduction

Significant factors that can influence decline and by consequence engender reversal are: the environment within which individuals and groups operate (Cameron & Quinn, 1999; Rowan University, 2004), external factors that help to sustain some levels of message frequency and focus (Haan and Kuckartz, 1996; Latané, 1981; Trafimow, D & Borrie W.T., 1994), and the significance of both internal and external motivations (Cable, Knudson, Udd & Stewart, 1987; Stasson and Fishbein, 1990; Fishbein, 1980; Ajzen, 1987) are some of the considerations which were considered significant in the subject level cycle decline/reversal strategy. A secondary aim for the intervention framework was to fix the point at which decline starts so as to more readily understand the intricacies of the decline/reversal process so that this research can point towards more effective future change strategies.

5.4.2 Pre-test/Post-test results

The pre-test post-test intervention results confirm the disassociation between knowledge and attitude as measured through action that the exploratory study pointed to for alumni discussed above. While attitude remained at over 80% in all instances in the pre-test/ post-test questionnaire, practices that resulted from this high attitude were not in conformity. Differences occurred primarily in terms of the questions that required individual motivation and empowerment to act and opportunities to practice. Questions 4 (What I do in my surroundings will help to

protect the planet) yielded a decrease in the after results (mean 7.6) compared to before results (mean 8.5). Question 5 (I am responsible for protecting the things that I have control over) returned a high before result (mean 8.6) whereas it did not at the end of the program (mean 7.5). While, for questions 6 (I am ready to do my part to protect the planet by doing what I know is right), resulted in decreases (mean 8.6 to mean 7.7). What the results suggest is that empowerment to act is contingent on opportunities to practice intention and focus intimacy. Additionally, it is also suggestive that measurable outcomes (observable) are also a necessary component to successful activism. Question 4 responses in particular, highlight the difficulties for individuals in reconciling effort when it lacks measurable outcomes when the things accomplished cannot be measured against the overall benefit. Whereas, responses to question 5 highlight the problems that can occur in a society where individuals might have the right attitude and intention, yet pragmatically they might have little control over the issues in question. The control over air conditioning management is a pertinent point where many respondents had difficulties in completing (this is discussed below). While the results for question 6 highlight the disillusionment that can set in when both control over issues to be practiced (place) and loss of focus (time) can have on positive environmental outcomes.

5.4.3 Bridging time and space results

Significantly, intervention results showed that bridging time and space dimensions through appropriate education and intervention strategies was able to bring alumni level of positive environmental practice for home and office activities to that of students (91%) at the start of the program. Similarly, electricity and water conservation data results also showed a relative consistency in downward trend (reduction of use) between water (R Square = 0.9797) and electricity (R Square = 0.9858) over the trial period whose fit was extremely high comparatively. However,

'impediments' to positive social action as outlined in social impact theory, and the role that cultural influences can exercise on individuals and groups as explained by the competing values framework, a reversal took place for both home and office practices and for water and electricity use there was a tapering effect observed in the final week. A number of questions come into view in this regard, especially as to the effectiveness of the intervention strategy, and more specifically as to validity of data sets reported.

Figure 5.4 serves to address possible shortfalls in data sets through emphasis on the tightness of fit between mood and practice levels for the duration of the intervention program.

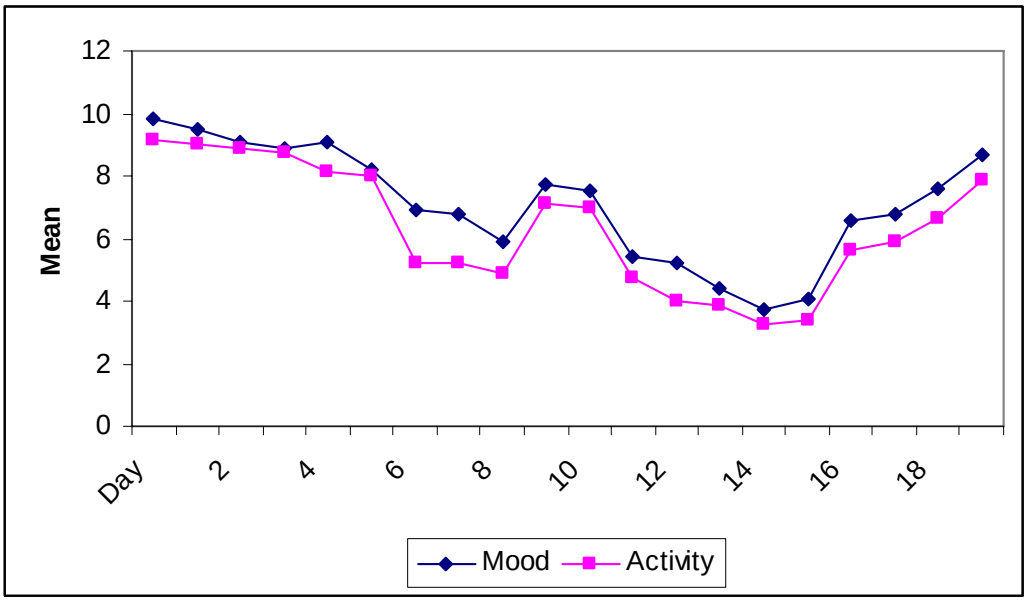


Figure 5.4: Intervention mood and practice relationship by day

Mood and practice levels over time shown in the above diagram place emphasis on a tight mirror fit between the two variables and significantly where practice was always the lower throughout the program duration. The relationship between mood and practice (activity) gains further meaning through multiple regression analysis. The correlation coefficients of the variables that indicate a linearly positive correlation for mood and practice (r = .979; P = .000**) are highly

significant. Similarly, practice (activity) and mood are both negatively correlated with time and linearly significant (r = - .588 and - .578 for activity and mood respectively; P .000**) (See Chapter 4).

As for effectiveness of the intervention strategy employed, in addition to aligning alumni with student practice levels at start of program for daily positive environmental practices, electricity and water conservation data (weekly activity) results overwhelmingly showed that positive environmental practice levels are possible when time and place dimensions are bridged. There was a relative consistency in downward trend (reduction of use) between water (R Square = 0.9797) and electricity (R Square = 0.9858) over the trial period whose fit was extremely high comparatively.

Moreover, the practice results further emphasize the important differences between home and office practice and on the cultural factors that impede or enable environmental activism in different environs. For instance while water (R Square = 0.9797) and electricity (R Square = 0.9858) reduction was the more consistent and durable over time, practice levels for the office declined rapidly in participants specifically located in those practices they had little control over such as office air-conditioning and plastic shopping bags and plastic eating utensils in public space.

Still, in both daily mood and practice levels an increase was noted from day 16 for mood (mean 4.1) and practice (mean 3.4) to a high of mood (mean 8.7) and practice (mean 7.9) on day 20 of the program. The pattern in both variables is illustrative of a deeper connection between them in conformity. The middle and end of program increase in level of practices is consistent with the research hypothesis that focus, self-motivated or external, is an important variable in environmental practice in refocusing participants to task objectives.

5.4.4 Summary: Raising focus and outcomes

Overall, the intervention data results lean strongly towards the view that motivation, focus and intimacy at the source can play a determining factor in how individuals and groups act and the frequency of their actions. However, while interventions can work, equally compelling is the argument expressed by the respondents (96%) that ongoing support structures are necessary. This raises the pertinent point of the self-sustaining viability of programs such as this that lack a 'safety-net' to maintain the gains made.

5.5 Summary research objectives one and two

The relationship between environmental job intention at graduation of 59% and job motivation 32% for students and alumni respectively (approximately 15-20% if lower data is accepted), together with the 78% of alumni who reported a job/education mismatch, is disconcerting and has wider implications. One of those implications can be observed in the alumni job relationship between high on the job environmental intention of 88.6% (think) and opportunity afforded towards effective practice of 30.4% (do). Another important consequence is manifest in low activism for both groups. While 92.3% of students and 84.8% of alumni indicated that they keep up to date about environmental issues outside of class for students and work for alumni, only 7% of students and 26.1% of alumni belonged to any organized environmental groups. Furthermore, 34.6% alumni and 66.4% of students cited time constraints while 33.1% alumni and 26.6% students replied that they utilized alternative strategies to membership. Of those that had alternative means 17.6% of alumni said that it included financial contribution, while 7% of students did so. The lack of activism can be attributable to a number of factors such as job realities, time constraints and similar. Over education, underemployment and job mismatch similarly effect job satisfaction and is yet another important marker in explaining

student/alumni differences. Of particular significance is informed and trained environmental students that are gainfully employed in jobs that are unrelated to their education and training. Such a mismatch can adversely translate into negative environmental activism in the short and long term. At the other end of the spectrum, it might also lead to an abandonment of their desire to engage in environmental activism of any kind that they have learnt and trained for in their formal education.

This cultural OCAI snapshot that helps place student and alumni actions in social contexts, sits in relative comfort with the knowledge, attitude and practices findings for both students and alumni, because it confirms the emphasis on stability and control. The data for students is in line with expectation for respondents who are at the source of the knowledge (90.74%) accordingly there is a neat fit between attitude (92.4%) and practices (89.06%) because impediments to practice are low when social actors are at the source. Conversely, alumni reported their environmental knowledge level as 76.1% with attitude at 94.7% and practice at 74.2% respectively. What this suggests is that it is possible to have a high attitude but low practice. While students reported a fit between all three categories for alumni this fit is only true for knowledge with 76.1% and practice 74.2%. To the extent that the data returned by students differs it does so because the culture type was one from the very start that more readily accepted environmental ideas and their realization, whereas for alumni that process and reproductive cycle was never there in the first place. As for the difference in alumni attitude and relatively low practices by ratio it is better explained by what cultural type respondents wish for (prefer).

As for interventions, the pre-test/ post-test intervention results confirm the disassociation between knowledge and attitude as measured through action that the exploratory study pointed to for alumni and further place emphasis on the importance of balance between empowerment and motivation to act and opportunity to act. While attitude remained at over 80% in all instances in the pre-test/ post-test

questionnaire, before and after differences in responses occurred primarily in terms of the questions that required relative fit between motivation and opportunities to practice. As for electricity and water data results, both show that reduction is possible where the motivation is high, and there are observable and measurable benefits for individuals and groups. Both mood and practices regressed as distance from source increased, although mood was in all instances higher than practice. The benefits of conservation for individuals and groups are substantial both in personal and global dimensions. On a personal level conservation can lead to economic benefits in monies saved and in the personal satisfaction gained through doing the right thing. Globally, it can help to alleviate the global crisis we face today.

5.6 Fitting the pieces: Pragmatism

The following discussion is at once a critique of existing society and an argument that pragmatism can best accommodate the data findings, and further provide an explanation of the inner working of such a society. From one perspective it argues that this is a society that bears the hallmarks of a ‘society gone wrong’. From another it argues that people make the best of what they have. Society's arrangement is systematic in how people come to consensus. However, in how people respond to system inner contradictions it is pragmatic. Pragmatism accommodates the contradiction between the ideal and the practical.

Conventional wisdom for human theories of action coalesce around the notion that positive attitude on issues of ethical and significant social magnitude can translate into positive action in practice. They further presuppose that increasing knowledge can lead to action. Conversely, not translating knowledge, attitude and action into meaningful paradigms towards appropriate societal action can lead to failure. Others have argued that a 'greed of selfishness' has descended like a fog upon the human horizon so that it has obscured any relationship between what we

know, the way we orient ourselves to what we know, and how we have acted on such knowledge and beliefs that we hold – knowing about knowing. All these various perspectives have merit and can find support in research data of human subjects as well as in the findings of the present study.

This research points to the various links in the relationship between knowledge, attitude and practice. However, all of these facts individually and collectively merely point to certain realities in human relations with the planet, but do not go far enough to explain what it means in terms of system mechanizations. Facts allude, yet the wider workings can help provide real contexts towards understanding why we have failed to act when our knowledge and beliefs point towards alternative scenarios of action. Pragmatism offers hope that a picture might emerge that the system as it presently exists cannot be changed by simply changing the paradigm of human action without a corresponding and complementary shift in the prioritized economic model that has brought us to the point at which we presently stand. People perpetuate existing models because they see benefit in doing so.

5.6.1 Knowledge, attitude and practice

Pragmatism argues that knowledge is at the same time inclusive of knowledge in itself and beliefs, although the two a different. Knowledge in its fullest sense is demonstrative and necessary - true reality, while belief is only opinion and relates to the world of change (Dewey, 1929). More specifically knowledge is a perception of those connections of an object which determine its applicability in a given situation (Dewey, 1916). In confirmation of the similarities and difference between knowledge and action this study found that that these two categories relatively mirrored each other for both students (knowledge 90.7% and practice 89.1%) and alumni (knowledge 76.0% and Practice 74.2%). Additionally, there was

variation in terms of age for alumni for both knowledge and practice but not for students. However, significantly attitude was consistent across both groups (92.4% for students and 94.7% for alumni). While this finding alludes to a certain difference in reality between two groups it does not explain it. Additionally, an important link was made between focus in terms of place but it too does not explain the difference comprehensively.

The OCIA instrument highlighted that place in which this knowledge was utilized was important. For students the current cultural place they occupy was reported as being predominately hierarchy and market culture type for both (mean 27.5) and adhocracy and clan both (mean 22.5). While for alumni their group situation may be described as one that is predominately hierarchy (mean 35.0) and market (mean 33.12) culture type followed by adhocracy (mean 17.5) and clan (mean 16.87). While the surface similarities of these findings point to a commonality they are different. The difference is related to system specifics. The system within which students operate is environmentally oriented while that of alumni is a struggle to reconcile two antithetical models: economy and environment. While, neither knowledge and practice relations, nor the importance of place shed light on why similarities and differences occur, they exist nevertheless. The antithesis arises through contemporary understanding and conceptualization of system dynamics, but is not inherently so.

A pragmatic response to the above conundrum would suggest that knowledge is variably useful and some knowledge has greater social value and it is therefore prioritized. Students at the source have a high knowledge base because they are at the source, whereas the world alumni inhabit may not. Alumni's operational sphere is different and they have found its usefulness, an environmental orientation variable and they have adjusted accordingly and this is reflected in the their combined lower mean scores. As for attitude, value in pragmatism as a term,

concept or paradigm, has two distinct meanings. One, designates the attitude of prizing a thing, finding it worth while, for its own sake, or intrinsically - to value in this sense is to appreciate. The second, is a distinctly intellectual act, a process of comparing and judging to evaluate – to value in this conceptualization is to consider which of the various possibilities of a situation is to be preferred in order to reach a full realization, or vital experience (Dewey, 1924).

This study found that attitude which is related to value stayed high for both students and alumni yet it did not translate into meaningful action or maintenance of the knowledge base in alumni. Again a pragmatic explanation would argue that in attitude as a term/concept both students and alumni have emphasize the “prizing” attribute of value, yet only students have internalized this value so that it has translated into consistent action.

5.6.2 Society’s contradictions

For pragmatism, at its simplest level learning is the transmission of knowledge that occurs by means of communication of habits of doing, thinking, and feeling from the older to the younger (Dewey, 1916). Learning is an active process that involves reaching out of the mind ever outward exploring possibilities. It involves assimilation of two antithetical processes whereby it originates within the self but also departs from it (Dewey, 1902). This helps explain the difference between knowledge and practice for alumni in the work setting. Education for alumni has not stopped, but has continued. Alumni have learnt the inner contradiction between pure knowledge and applied knowledge as they must. In the contradictions between the two they have simply adapted to the system. At the same time the motivations to study in the environment can also affect outcomes. The differences in this regard point to the way in which individuals have oriented themselves to existing systems. This orientation is evidenced in the returned data for

student and alumni motivations for entering the environmental field.

Students reported their intention to study the environment on account of job choice at 59.0% while for alumni it was 59.2%. While statistically three fifths can be considered significant, the wider meaning can be elusive if not placed in context. Especially important in this regard is the value and objective of course type. It is therefore significant, when about 40% for both groups do not seek jobs related to their study interest.

Additionally, both groups highlight that “concern” for the environment was not the primary determining factor that mediated between course choice and job intention with just less than a third indicating that such an association was valid (32.5% for students and 32.6% for alumni). Furthermore, the relationship in the results that 39.9% of students and 40.2% of alumni view environmental courses as a “soft” and therefore easier to get in is further demonstrative of underlying intent. Moreover, the conformity in data results between these two groups over a thirty year period since the oldest alumni graduated, are also indicative of a society that places intrinsic value on education. The responses in terms of how environmental education completed is viewed in terms of usefulness to job acquirement further implicate this view in the results that only 15.1% of students and 14.7% of alumni viewed environmental education for its own sake. In this connection, just over 60.0% for both students and alumni saw environmental education as a means (to graduate) towards an end (getting a job). This causal link is further supported in the result that that 24.5% for both groups cited higher salary as the second most important consideration after value of degree (84.5% together). The picture is complete however in alumni response whether their job expectations have been met where in response, almost 83% of alumni replied that they had not had their job expectations met. Similarly, the findings that only 15.5 % of students needed help in finding a job in the environment, is also affirmative of this line of argument.

5.6.3 Coming to consensus

Pragmatism argues that society conveys and accommodates all the ways in which by associating together men share their experiences, and build up common interests and aims (Dewey, 1957). The process of socialization is inherently educational. All groups educate their members, socializing is immersion of members into the group culture that marks off “us” from “them”. All institutions are educational in the sense that they operate to form the attitudes, dispositions, abilities and disabilities that constitute a concrete personality (Dewey, 1946). Naturally, as a society becomes more complex in structure and resources, the need of formal or intentional teaching and learning increases (Dewey, 1924).

Consensus is the result of the playing out of complex and competing interests as solutions to problems that are pursued in common group interest. Naturally, dominant values underpin the consensus that is pursued and differing opinions are treated as a factor in a problem needing adjustment (Dewey, 1902). An adjustment necessitates two-way communication. Firstly, experience has to be formulated (conceived and be seen as others would see it) in order to be communicated (Dewey, 1924). Secondly, to be a recipient of a communication is to have an enlarged and changed experience in the agreement towards the consensus that has been won (Dewey, 1916).

The conflicting values data reported in the previous chapter point to similarities and differences that are informed by diverse value systems in the two groups that help maintain existing paradigms. The difference is that for students it was an environmental paradigm that prevailed in the first place, while for alumni it was a pragmatic balancing act between the environmental paradigm acquired at university and the economic priorities paradigm of the job and in living in a complex society. Other interpretative possibilities might proceed from the faculty itself with the notion that an environmental education should lead to an environmental job. Such a narrow

focus might be a limiting factor in application possibilities as translated in job. Each group therefore can be said to be merely adapting to society's facts on the ground as they are presented. This view finds justification in the knowledge, attitude and practices data, as well in current job satisfaction for alumni where 78% of alumni reported a mismatch between education acquired and job. This is significant in pointing to important contradictions in the daily realities between students and alumni. Additionally, this view is supported by the results that while 88.6% (think) of alumni had intention to practice environmental activism on the job opportunity afforded to do so (do) was only 30.4%. The discrepancy between think and do, as well as the relationship between job and education fit, tends to describe a picture of alumni circumstances as one of definite imbalance. All things considered, in pragmatic terms, students and alumni have simply adapted to the system in which they find themselves in ways that have had a meaningful and resultant outcomes. They have adapted consistent with the ways that have permitted them to go on with the business of living in a complex world in which they find themselves in. The intervention makes this point strongly in how quickly regression sets in. People want to change and can do so. But the system is complex, and ultimately we yield to its inner workings in order to get on.

5.6.4 Summary

As an important socializing instrument towards positive environmental action, education can work, and this is evidenced in the high conformity between knowledge, attitude and practice for students. For alumni both in the exploratory study and in the intervention results, regression sets in. One explanation offered to explain this phenomenon is the existence of conflicting values (cognitive dissonance) and degrees of focus (social impact theory). Another way is to point to pragmatism and argue that the world is complex and actors orient themselves accordingly. The

system complexity permits for the view that individuals may value the environment and its preservation, but also value their current lifestyle despite negative impacts on the environment (Tertoolen et al., 1998:172).

Differences between beliefs and actions might also be accounted for by the higher level of difficulty associated with action as opposed to professed attitude (Andrich & Styles, 1998; Styles, 1993). Therefore, no matter how positive an individual is about particular behaviors, if there are significant external or internal barriers to completing the behavior, its incidence will be lower than may be expected. Pragmatism accommodates all of these views and further argues that we negotiate life by trying to interpret each notion by tracing its respective practical consequences. If no practical difference whatever can be traced, then the alternative means practically the same thing.

The present system within which we live does not have sufficient reflexivity to permit movement so that alumni in the real world have found little practical benefit in following an environmental perspective on the job and have as a consequence oriented accordingly. A pragmatic view further holds that an unlinking between knowledge and practice on the one hand and attitude on the other is necessary. It similarly argues for the bringing together of environmental paradigms and real world paradigms for real change to be effected. This view finds expression in the pragmatic argument that society succeeds on the grounds to which it contributes to the well-being of individuals and society (Dewey, 1938/1997). To which we add, and the world we live in.

5.7 Research question and objectives in context

This study focused on informed actors from environmental courses in Thailand. The objectives of this study were guided by the following research questions: (i) To explore the effect time, space and impediments have on knowledge,

attitude and practices in informed environmental actors (students and alumni) that help explain the incongruence between the way they interact with the environment and the way they should; and, (ii) To apply an intervention strategy on informed environmental actors to bridge this incongruence.

5.7.1 Internal and external relational patterns of action

Environmental knowledge, learning and practice differences: This research highlights the relative differences between informed actors at the source of environmental know-how (students) and those variably removed from that source (alumni) in terms of knowledge, attitude and beliefs. While for students knowledge, attitude and practices were integrally linked, this was not so for alumni. For alumni, knowledge and practices were linked, but this was not noted with attitude. Attitude was therefore not a significant determinant in environmental practices for those removed from the source.

Why informed actors fail to translate beliefs into actions: Time and space and the culture within which individuals operate in are important variables to effective environmental action. The real world is messy in psycho-sociological terms and must by necessity accommodate numerous competing interests. These interests concern competing real world values that ultimately determine effective environmental participation amongst other considerations. The competing values framework in terms of “now” and “prefer(red)” positions highlighted that informed environmental actors are limited by the corporate cultures within which they operate. The external world is both limiting and consensual. They would however, hope for a more supportive environment within which they might more readily realize their environmental objectives, hopes and dreams.

Another factor that is an important variable in this research and has a bearing upon successful environmental action concerns the motivations to study in this field.

While there is an expectation that environmental consciousness might readily translate into desire to acquire an environmental education that might at some future time be realized into environmental consciousness in action, this was not the case. The respondents in this research, over a 30 year period did not for the most part enter this field of study because they overwhelmingly had environmental concerns. Similarly most did not seek employment in this field. On the whole, environmental education had intrinsic value, but not for its environmental value translatable into action. This must in any consideration be a variable that does ultimately effect the realization of environmental activism in informed actors. Furthermore, it helps mitigate arguments about role of university education with respect to job fit and especially the demarcation challenge specialist courses such as the environment present in the wider social context.

5.7.2 Develop an intervention model to raise focus and intimacy

Raising focus as a means to removing the obstacles that prevent people from realizing their potential was deemed a necessary endeavor. This study adapted existing intervention approaches and developed and an intervention framework that aimed to motivate individuals by drawing attention and increasing message emphasis so that participants might achieve their environmental ambitions in the targeted behaviors.

Focus and intimacy are important variables towards action: The practices degradation that was noted in alumni removed from the source in the main study, was also noted in intervention participants soon after the awareness raising intervention undertaken that desired to bring environmental issues into focus. While degradation for alumni over time in the main study was shown through regression over an almost 30 year period, in intervention participants, regression too place within the first week. However, since regression for alumni in the main study took

place soon after graduation, the findings suggest that time and place are significant variables in environmental practices in informed actors. This finding points to the view that message focus needs be maintained as knowledge is provided. Additionally opportunities to practice and manage tasks need also go hand in hand.

5.7.3 Objectives in context - Actors pragmatically orient themselves

Social actors do not operate in a vacuum they are part of an integrated social system: Individuals and groups must orient themselves to existent systems in order to survive. The extent to which their actions are aligned is integrally connected to system's ability to accommodate the kind of change expected by individuals. Where such accommodation cannot be made humans are confronted with a dilemma – to adjust or not. Ultimately, one strategy leads to success and the other to failure in societal terms. Humans, in the way that the alumni data results have shown, have chosen to conform because it is pragmatic for them to dos so. Pragmatically they can be said to have seen little value in changing.

5.7.4 Research question further considerations

The goals that were set in this thesis in terms of research question and objectives have been met. Put minimally internal drivers were identified as inclusive of personal environmental objectives and motivations and opportunities to realize such goals by individuals and groups. While externally, it is the economic system within which people operate and live their lives in, that affords opportunities or limits their horizons. Pragmatically, system complexity would argue that the internal/ external dichotomy is one and the same and there is little in the real world that is intrinsically internal or external (Stables, 2004; Reitan, 2006; Dewey, 1897; 1902; 1916; 1924; 1929; 1938; 1946; 1954; 1957; 1958; 1964).

At the heart of existing environmental dilemmas for environmental students is the subsuming of the environmental paradigm that they have trained for in their

education, by the wider global economic paradigm under which they must live and negotiate in the outside campus world. Their individual and collective education experiences have provided opportunities to shift environmental paradigm boundaries with respect to the wider world in their daily actions on the job, in the home and in the wider community. However, such a shift has been, and continues to be within already defined operational limits by the economic paradigm within which we all must ultimately live and which calls upon us to make sacrifices in our environmental idealism for economic opportunism.

5.7.5 Summary

The key research questions revolved around discovery, confirmation of existing assumptions, refinement of method and finally testing the thesis hypothesis in order to help explain current patterns of human ecological relations in research participants.

At the heart of the human environmental dilemma for research participants was their relationship to time and space from source and how they negotiated the complexity of the system. The intimacy that students find in education systems have resulted in bringing their knowledge, attitude and practice levels into alignment whereas alumni have regressed in their knowledge and practice aspects. However, as attitude stayed high for both, but did not translate into maintenance of either knowledge or practice levels for alumni, this is suggestive of the view that ‘attitude’ is an independent variable in environmental human relations in terms of action strategies.

As for effectiveness of environmental intervention strategies, this study found that planned positive change in humans is possible. However, regression occurs in terms of time and space from source. This finding points to the view that a ‘safety net’ is required to maintain, monitor and reproduce gains made through

intervention programs. More research is recommended in this regard to fine tune intervention programs for full effectiveness.

5.8 Testing hypotheses

The exploratory study addressed hypotheses 1-4, while the intervention addressed hypothesis 4. The extent to which the hypotheses have been able to achieve the set goals is dependent on the way it has been able to address the central sub questions in this thesis and these are discussed below in turn.

5.8.1 Environmental focus changes as distance from source increases

For current students the significant aspect of the data is in the consistency between knowledge, attitude and practice and this can be accounted for by their location to the source. Briefly, their respective data is in line with expectation for respondents who are at the source of the knowledge (90.74%) so that it has resulted in a correlation between their attitude (92.4%) and also their practices (89.06%).

Distance from the source has resulted in important alternative realities for graduated students. Alumni reported their environmental knowledge level at 76.0% with attitude at 94.7% and practice at 74.2% respectively. This is a significant finding, when compared to current students because it places emphasis on important cultural contexts within which they operate. The cultural contexts are discussed below.

Alumni data demonstrated that it is possible to have a high attitude but low practice. Similarly it confirms the important link between environmental knowledge and practice. Additionally, it corroborates the complexities involved in the ethical aspects of attitude based practice models which is the precise reason that attitude was not a central variable for analysis in this research. The added complexities involved in negotiating real world situations outside university campuses is validated in the measured correlation in decline between knowledge and practices.

Current students did not exhibit the decline observed for alumni.

The combined group data for the knowledge component of this research is highly illustrative of the differences in social reality between students and alumni. Whereas student knowledge responses were fairly consistent across all responses (S.D. 0.7 - 0.7) such consistency in response was not noted for alumni (S.D. 0.5 - 1.3). Alumni data results were more in line with the range of opinions that are expected for experienced social actors who seek to balance knowledge and experience in terms of a host of moral and ethical questions. Accordingly, alumni also differed greatly across individual questions, where students did not.

The alumni knowledge results are consistent with individuals who are variably removed from the source of knowledge and intimacy from contemporary issues and the level of saturation and exposure to current environmental messages is lower. It is also consistent with a host of issues that have a bearing on social understanding that give rise to doubt that are by necessity drawn from experience. Unsure for alumni was preferred 13.0% of the time, whereas for students it was 5.9%. For students, unsure was evenly preferred, whereas for alumni it was question dependent. This finding is in range of the central hypothesis that intimacy and saturation, as well as increase in impediments (time and space) result in lower degree of knowledge when actors are removed from the source of that knowledge. Similarly, a measurable regression took place for alumni as distance increases from source.

Alumni data results showed that regression between knowledge and practice took place over time. Multiple regression analysis using multiple strategies shows that the correlation coefficients of the data indicate a linearly positive correlation for both practice and knowledge ($r = .957$; $P = .000^{**}$ with mean outlier substitute and $r = .838$; $P = .000^{**}$ with outlier removed) at a highly significant level. On the other hand practice is linearly negatively correlated with knowledge ($r = -.964$; P .000** with

mean outlier substitute and r = - .797; P .000** with outlier removed) and is also highly significant. At the same time, the relational distribution pattern of group data for both knowledge and practice against time also permits for alternative interpretation possibilities to outlier phenomena. Commencing at about age 54 both knowledge and practice data change trajectory that help place focus on the complexities that engage social actors (reorienting) as they negotiate real everyday situations in a dynamic world (See footnotes 2-4 on page 196-197). One way to explain this decline in environmental knowledge and practices is by pointing to distance and time from the source. However, since a reversal was noted in the trajectory of the regression with advanced age for both, this tends to point to important social contexts located in the role that 'impediments' play in social action (Fishbein, 1980; Cable, Knudson, Udd and Stewart, 1987; Young and Kent, 1985; Stasson and Fishbein, 1990; Ajzen, 1987).

5.8.2 Students & alumni operate within different operational culture space

The cultural space that people occupy in its operational location dimension is an important variable that enables or limits activism. It is at once a function of place dynamics and individual responses to system. It involves voluntary participation in events in time and place aspects (Sloane, 2004) and individuals are never mere observers, but are instead, active participants and shapers of the world they live in (Foucault, 1977). Place based experience is an important variable in the larger landscape of cultural and ecological politics where twin social and ecological objectives in informed actors come to a head (Gruenewald, May 2003; Bowers (2001).

The world that informed environmental actors operate within is one where conflicts between environmental knowledge and attitude, are desired to be balanced

with appropriate practice. This is not always an easy task, especially for alumni who are additionally called upon to daily accommodate and balance economic growth, environmental protection and social responsibility (Schaltegger, 2002). Similarly, students and alumni must negotiate the complex web of group 'knowledge spirals' to help strengthen group solidarity and to maintain group membership. For both, it involves complex interactions that engage field building, ongoing dialog, linking of explicit knowledge and learning by doing (Elms, 1966; Zimbardo, Ebbesen, and Maslach, 1977). Consequently, cultural differences that emerge between groups vested in 'place' can be significant enablers or inhibitors to positive environmental action and this was explored for the role that it plays.

For students the current cultural space they occupy was reported as being predominately hierarchy and market culture type (mean 27.5) and adhocracy and clan (mean 22.5). While for alumni their group situation may be described as one that is predominately hierarchy (mean 35.0) and market (mean 33.12) followed by adhocracy (mean 17.5) and clan (mean 16.87). While there are important similarities in the results, the significance is in difference individually and correspondingly. The similarity is in the emphasis placed on reproducing existing cultural types that stability and control bring (hierarchy and market). The difference is in the type of culture each group brings to the system. What cultural similarities and differences together point to, is the way maintenance and reproduction takes place in social systems.

The social system cultural maintenance and reproduction patterns are particularly illustrative in the result that an alignment between the variables environmental knowledge, attitude and practice occurred at around 90% for students, while for alumni it was attitude alone that was maintained in the high 90's (%). In turn alumni knowledge and practices levels both declined to around 75%.

Furthermore, the cultural space each group occupies speak to the cultural

competing values that each group must negotiate in context and the way the system can accommodate or impede the culture type individuals and groups bring to the system. While for students there is relative balance between internal and external focus this was not so for alumni. Theirs was a culture that was highly internally focused (hierarchy) and the more concerned with competition (market). Alumni culture is more consistent with maintenance of existing ways of doing because maintenance of existing relationships, both in conformity and in competition, is paramount to group solidarity and the important network-flows that need be maintained for getting on in the workplace. At the same time the lower clan and adhocracy for alumni is also indicative of a cultural type where possibilities for individually based action (in difference) are limited on account of a work-based competitive (market) climate and low on the job emphasis on innovation (adhocracy) manifest in delegated responsibility. Alumni cultural situation is the more ridged in expressing difference than it is for current students.

The similarities and differences noted in the current situation for students and alumni, was also observed in the preferred situation. Students reported that a clan culture type would be a preferred choice (mean 35.0) followed by the adhocracy (mean 27.75) then market and hierarchy (mean 18.75) respectively. While for alumni it was clan (mean 28.75), adhocracy (mean 23.75) and then market and hierarchy (mean 22.5) respectively. In the preferred position both groups indicated a preference for high clan and more freedom of expression (adhocracy). Clan was significantly higher for students than it was for alumni, while adhocracy was in similar demand and hierarchy and market were equally preferred, though it was the higher for alumni. What the relative conformity in terms of adhocracy, market and hierarchy for both groups suggest is that both groups seek a balanced environment where there is suitable linkage between individual and group culture. At the same time, a high clan demand tends to highlight the importance of

relationship building and for its maintenance, while adhocracy calls for higher opportunities to realize difference. Were a paradigm shift of the type called for to materialize, it might serve as a valuable tool to realign knowledge and practice levels for alumni with that of students. However, such change would additionally require a corresponding and complementary shift in the wider societal paradigm in favor of the environment.

5.8.3 Differences exist in informed actor's actions in different settings

This section reports on environmental knowledge translated into action in informed actors in terms of space (home and organization) in the context of the data findings that students reported a high environmental practices level (89.1%) while for alumni it was the lower (74.2%).

Student practice in the home was lower (mean 78.2) than for alumni (mean 82.8) while in organizations student practice levels were higher (mean 57.9) than for alumni (mean 54.1). For both groups the data points to a higher level of positive environmental practice in the home and this is enlightened by the cultural frame within which humans operate in terms of competing values and the social impediments and enablers that time and space from source occasion. Student lower practice level in the home are accommodated for by the relative lower control they have over their environment compared to alumni as the majority reside with their parents, whereas differences in practice levels in organizations can be accounted for by organizational setup that affords opportunities for practice to occur.

5.8.4 Interventions can positively affect human environmental behavior

This section reports on intervention results translated into action in informed actors when time and space dimensions are brought into closer alignment. The intervention is informed by high student environmental practices levels (89.1%) that were lower for alumni (74.2%) and seeks to address such imbalance by testing an

intervention framework.

The pre-test/ post-test intervention results confirmed the disassociation reported between knowledge and practice levels located in high attitude (94.7%) in the exploratory study for alumni. The high intervention attitude pre-test (86%) and post-test (82%) did not translate into high practices across the program duration. Differences in attitude responses occurred primarily in terms of questions that required individual motivation to coincide with opportunities to practice suggesting that the former was contingent on the later.

In terms of practice (activities completed) in the workplace and at home at program start (91%), these correlated favorably with the level reported for current students in the exploration study (90.7%), suggestive of the view that bridging time and space can realign environmental alumni with student levels. At the same time, regression in practice levels took place.

An overall downward trend for all respondents as a group in practice level was noted from mean 9.1 (91%) to just over 3.0 (33%) at day 16 and a rapid recovery was observed towards program end with mean 7.9 (79%). Significantly however, the change in regression and upturn was accompanied by a tight fit between activity (practice) and mood (motivation) for the duration of the program. The correlation in decline and upsurge showed that in all instances mood was the higher than practice pointing to an important relational connection between the two that has implications for more effective environmental intervention action strategies.

The effectiveness and value of the program finds expression in the important relationship identified between mood and practice for daily activity through multiple regression analysis. The correlation coefficients of the variables that indicate a linearly positive correlation for mood and practice ($r = .979$; $P = .000^{**}$) are highly significant. Similarly, practice (activity) and mood are both negatively correlated with time and linearly significant ($r = -.588$ and $-.578$ for activity and mood

respectively; P .000**). Similarly, weekly activities too were in conformity in confirming the possibilities that exist in bridging time and place so that positive environmental practices can be realized such as those that occurred in water (R Square = 0.9797) and electricity (R Square = 0.9858).

Intervention shortfalls include program sustainability, ongoing support systems as well as control over environment in which positive action is desired to take place. More disconcerting for intervention programs is the lack of control over the wider social environment within which positive action is to take place in the current social setup. Regression takes place for both mood and practice precisely because a change in one paradigm (social action) requires a corresponding shift in the other (social system).

5.8.5 Summary

While the goals set have been achieved so far as the hypotheses are concerned there are also important lessons learnt and observations that can be made about the findings of this research. Firstly, the motivations to study in the environment and the importance of linking study field to job held, can be important social drivers towards individual and group activism. Secondly, while students and alumni exhibited important similarities and difference in terms of knowledge, attitude and practice, these were invariably linked to time and space within which they operated. Significantly, in this regard, it was also noted that it is important to unlink the view that holds that changing workplace culture can by itself realize environmental goals. Culture can change, however, it takes time. It is made the more difficult when stability and control are preferred social and economic drivers. Lastly, while interventions can work, regression quickly takes place precisely because these two paradigms, place and environment are presently socially linked.

5.9 Wider implications and possibilities

The findings of this research point to a number of broad implications and possibilities in the wider context of the understanding gained in the way informed human actors make sense of their world and how they have acted on it in their terms. Some important contexts and generalizations come into view and can be expressed (Table 5.13):

Table 5.13: Recommendations that stem from this research

Recommendations
1. Consider unlinking 'attitude' in environmental action as a determinant to action.
2. The valuable link between 'knowledge' and 'practice' presents opportunities and important possibilities for environmental education.
3. Field of study completed (environmental education) is an important factor in societal action strategies and opportunities need to be provided for specialists to realize their potential from the perspective of their study specialization.
4. While interventions can work and can play a positive role in environmental activism, reversal takes place, is measurable and needs maintenance for sustainability.
5. While empirical data returned, analyzed and interpreted is a valuable source towards understanding the human condition it needs an appropriate cultural context.
6. Understanding the cultural factors that humans consider and employ in action and their inner dynamics in their respective contexts can be a valuable tool in understanding the various social impediments and enablers towards human action.
7. Bottom-up and top-down environmental initiatives towards action are not mutually exclusive but complementary. Top-down can be valuable for maintenance of positive action gains made, while bottom-up can provide precious opportunities with the impetus for change driven from the grass-roots.

5.9.1 Where to from here?

Some possibilities present themselves as alternatives to contemporary practice and ways of doing from an education perspective in order to alleviate the global environmental impacts we have collectively created and currently face. We could for example bridge knowledge, attitude and practice in terms of time and

space by reducing the impediments that have led to an incongruence between the way humans interact with the environment and the way they should (Table 5.14):

Table 5.14: Educational possibilities and alternatives to contemporary practices

Possibilities and alternatives
1. Teach for practice "orientation" but not specificity that leads to job mismatch.
2. Teach environment in every discipline as compartmentalization can ultimately lead to, and is portrayed in the literature as against its transformative goals (Yearley, 2005).
3. Build support structures for environmental gains made by 'changed' individuals through: ongoing interventions and maintenance and bringing the environment into sharp focus in everyday realities by bridging time and space dimensions.

Whenever possible, we might additionally bridge environment and economic paradigms. However for real and continued sustainable change we might consider going the extra length and unlink the environment from the economic paradigm.

Radically, we might consider the unthinkable in terms of the contemporary social setup by reevaluating conventional thought that can be traced to the time of the industrial revolution. We could start for example by debunking and shaming the three modern myths of: capitalism (Weber, 1959; Marx & Engels, 1977), free enterprise and free trade (Chalmers, 2007; Chomsky, 1999), and democracy (Momiroski, 2005; Plato, 1991) as we have conceived them and practiced them in favor of the environment.

However, if we can conceive of and strive towards radicalism, can we not also think in terms of smaller, ameliorating steps such as encouraging business to frame jobs in terms of environmentally responsive and responsible practices and planet oriented patterns of shared beliefs towards real transformative action. Business can for example reward cleaning staff for using environmentally safe products. Equally, they might reward secretarial staff for saving paper and managerial staff for using public transport and serving as appropriate environmentally focused role models.

The present path that we travel on promises continued eco-system degradation especially in the context of the fine-tuning that informed environmental actors undergo when entering the workforce in pragmatic terms.

5.9.2 Economic paradigm we're caught up in

The economic-rationalism paradigm we are currently caught up in has informed recent human action and can be explained through a systems-thinking model (Figure 5.5).

The model at once, explains existing patterns towards human action and at the same time provides future possibilities. The model is comprised of the pertinent cultural factors that makeup the human cultural situation today in terms of: theory, practice, validity and legitimacy.

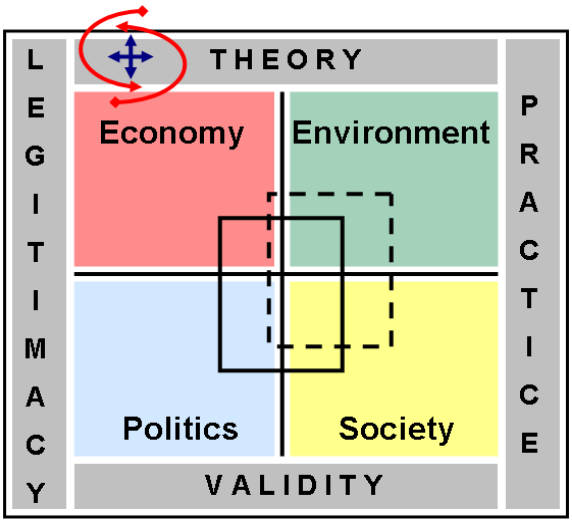


Figure 5.5: The economic paradigm we are caught up in

Counterclockwise the existing relationship between knowledge, beliefs and action is shown to be determined by the dominance of the economic model that derives its legitimacy through the political setup and where consensus is won in society for its validation, maintenance and reproduction. Such a setup when realized, conflicts with wider environmental concerns and brings everyday social action in sharp contrast (in negative environmental impacts) with the planet's needs because

the consensus so won, serves to maintain the degradation cycle of the status quo. Clockwise however, if we prioritize the environment at the theoretical expense of the economy there are environmental opportunities and important gains to be had for the future of humankind and for the planet. In such a scenario, environmental concerns would be validated in the interaction between environment and society in the mutual convergence of interests and benefits to be had in social and environmental contexts. Such consensus would be won over and legitimized in the dynamic interaction between society and the political system at the expense of the economy. Admittedly, such gains in the short term may well be detrimental to the existing economic setup and people's social and economic mobility potential. That's understandable, change is difficult. The alternative is continued environmental deprivation. This research argues from an ecocentric perspective that this is a price worth paying, as it is inconceivable that economic benefits would accrue in the absence of planet health in the long term.

5.9.3 Summary

The view that social change with respect to the environment is necessary finds expression in the data results of this research when placed in their appropriate social frame. What we find today in an economy dominated system (Figure 5.5) is that the exterior paradigm boundary-walls are static and environmental positive change and gains occur by repositioning within the existing system internally. The economic paradigm prevails and the existing system subsumes environmental concerns. Within existing patterns of action there is an imbalance between theory and practice, as well as between environment and wider life. Humans have adapted to the system and though their actions have helped reproduce and validate existent systems. In pragmatic terms wearing their economic hat, humans have cost analyzed their individual and collective situations and have found that change is not cost

effective as meanings and results are endlessly deferred (de Saussure, 1916/1974) and ultimately the result is the same when there is little environmental observable and measurable benefit in going along with change. At the same time, their resistance to change is validated in the continued well being of others who follow and perpetuate existing modes of conduct.

5.10 Chapter summary

This chapter provided a deeper understanding of the key internal and external factors that influence the adoption and application of environmental responsible practices in Thai informed environmental actors. While informed actors have levels of environmental knowledge that can lead to appropriate environmental attitudes and practices they do not always do so. In particular as distance increases from source of knowledge so do practices decline.

While there are many similarities between students and alumni, there are important differences too, and these have been elaborated above. The main differences concern the way in which knowledge and practice both decline in the example of alumni respondents over time and in particular contexts. It is for this reason that an intervention strategy was administered to profile the contours of what form such regression takes and what the significant variables that have a bearing are. Similarly, the shortfalls of predictors such as high attitude that failed to translate to effective practice were highlighted in terms of the ethical nature of attitude questions that tend to give rise to strong stance that might fail to be translated into action over time and on the important role played by context in influencing people in the example where a person may value the environment but not elect to recycle a can on a particular day (Perloff, 2003).

In the main, the intervention findings confirm the disassociation that presupposed that providing environmental knowledge can lead to positive

environmental outcomes in terms of attitude and practice for informed environmental actors. The main study results highlighted that time, place and focus were important variables that impeded or encouraged positive environmental outcomes. The intervention results in turn confirmed that mood and practice relatively mirrored each other in intervention subjects.

There are environmental and societal benefits to be derived from successful migration of environmental knowledge, attitudes and practices by environmental students to the outside world. Environmental benefits include better management of resources and pollution amongst others, while societal benefits include paradigms that more accurately reflect out position in the world with respect to the environment – the transformation from an anthropocentric to an eco-centric values environmental thinking systems in education-culture for a purpose.

CHAPTER VI
CONCLUSION

This thesis provided a deeper understanding of the key internal and external factors that help influence the adoption and application of environmentally responsible practices by Thai informed environmental actors. While informed actors have levels of environmental knowledge that can lead to appropriate environmental attitudes and practices they do not always do so. In particular as distance tends to increase from the source of knowledge so does corresponding practice decline. This is understandable given human patterns of interaction with the real world (Horne, 1986).

Of course, things are not always what they seem when we speak of appropriate and preferred modes of human action. The children's "adult" story *The Magic Pudding* (1918) by Norman Lindsay teaches that in ironic style. Human interaction with the environment is frequently a magic pudding. The "magic pudding" is at one level used here as a metaphor for change and illusion. At a deeper level it is indicative of the means by which humans have created an ideological platform for action in pragmatic terms in response to living in a complex world. Such a world is inscribed at all levels by the personalities and individuality of the characters (humans) themselves and the system ideology (western capitalism).

6.1 Overview

This research aimed to determine the existing location of environmental practices in informed actors for the purpose of comparison and location. Similarly, it explored if motivation based interventions which stimulate a deeper level of

awareness, and encourage self-regulated learning and reflective practice are more likely to achieve positive behavior change than institutional learning based approaches alone do. Contextually, the intervention explored whether at the heart of the change problem might be the necessary change in the institutional learning based approach as well. The results of the research showed that institutional learning about the environment went some way towards effecting an alignment between environmental knowledge, attitude and practices in students at the source of that provision. However, it was also observed that for alumni environmental knowledge decreased with time in its strength and in application in practice. While intervention strategies were able to bridge student and alumni variables, regression took place.

Ultimately, any long term and sustained change must rest on the shoulders of all citizens through a new and radically different way of seeing the problem (lens) towards more environmentally friendly action (Horne, 1989). Education can be an important catalyst for change by providing a new lens that bridges theory and practice so that problem and solution might be realigned. However, such a new way of seeing needs to bridge university campus and real world paradigms and at the same time overcome the resistance to change that frequently occurs.

6.2 Research question and objectives revisited

This study focused on informed actors from environmental courses in Thailand. The objectives of this study were twofold: to explore the effect time, space and impediments have on knowledge, attitude and practices in informed environmental actors (students and alumni) that help explain the incongruence between the way they interact with the environment and the way they should; and, to apply an intervention strategy on informed environmental actors to bridge this incongruence.

6.2.1 Exploratory study

So far as knowledge, attitude and practice related issues are concerned this research highlights the relative differences between informed actors at the source of environmental know-how (students) and those variably removed from that source (alumni). While for students knowledge, attitude and practices were integrally linked, this was not so for alumni. For alumni, knowledge and practices were linked, but this was not noted with attitude. Attitude was therefore not a significant determinant in environmental practices for those removed from the source.

As to the question why informed actors failed to translate beliefs into actions, time and space and the culture within which individuals operate were found to be important variables to effective environmental action. This can be explained in terms of the various cultural contexts within which individual and groups operate and the constraints they set on human action. For social actors the real world is both limiting and consensual. While campus life is dynamic in an academic sense, the competing values framework in terms of “now” and “prefer(red)” positions highlighted that informed environmental actors are limited by the corporate cultures within which they operate to realize the know-how towards action they have brought with them.

Another factor that is an important variable in this research and has a bearing upon successful environmental action concerns the motivations to study in this field. While there is an expectation that environmental consciousness might readily translate into desire to acquire an environmental education that might at some future time be realized into environmental consciousness in action, this was not the case. The respondents in this research over a 30 year period did not for the most part enter this field of study because they overwhelmingly had environmental concerns. Similarly most did not seek employment in this field. On the whole, environmental education had intrinsic value, but not for its environmental value translatable into action. This must in any consideration be a variable that does ultimately effect the

realization of environmental activism in informed social actors. Additionally, it can point to poor recruitment and student induction by the faculty.

6.2.2 Intervention outcomes

In terms of the second objective of this research to apply an intervention model to raise focus and intimacy as a means to removing the obstacles that prevent people from realizing their environmental potential, it was found that time and space were a significant factor in participant responses. In the same way as practice degradation was noted in alumni removed from the source in the exploratory study, this was also noted in intervention participants. While degradation for alumni over time in the main study was shown through regression over an almost 30 year period, in intervention participants, regression took place within the first week. This finding is suggestive of the view that message focus needs be maintained as additional knowledge and tools for action are introduced on an ongoing basis to be more effective. Additionally, opportunities to practice and manage tasks must also go hand in hand.

6.2.3 Objectives in context - Actors pragmatically orient themselves

Social actors do not operate in a vacuum. They are part of an integrated social system that ecocentrism has stressed time and again. They must accordingly orient themselves appropriately with respect to the system in order to survive in the wider context. The extent to which their actions are aligned is integrally connected to the system's ability to accommodate the kind of change expected by individuals. Where such accommodation cannot be made humans are confronted with a dilemma – to adjust or not. Ultimately, one strategy leads to success and the other to failure in societal and planetary terms. Humans, in the way that the alumni data results have shown, have chosen to conform to the wider economic paradigm because it is pragmatic for them to do so. Pragmatically, they

can be said to have seen little value in changing.

6.2.4 Summary

The goals that were set in this thesis in terms of research questions and objectives have been met. Put minimally, internal drivers were identified as inclusive of personal environmental objectives and motivations as well as opportunities to realize such goals by individuals and groups while externally, it is the economic system within which people operate and live their lives in, that affords opportunities or limits their horizons. At the heart of existing environmental dilemmas for informed environmental actors is the subsuming of the environmental paradigm that they have trained for in their education, by the wider global economic paradigm under which they must live and negotiate successfully for survival in the outside campus world. Their individual and collective education experiences have provided opportunities to shift environmental paradigm boundaries with respect to the wider world in their daily actions, on the job, in the homes, and in the wider community. However, such a shift has been, and continues to be, within already defined operational limits by the economic paradigm within which they and we all must ultimately live. Such a system calls upon us to make sacrifices in our environmental idealism in the name of economic opportunism.

6.3 Thesis hypotheses revisited

The thesis hypothesis tested the assumptions that: (i) student and alumni's environmental focus changes in terms of knowledge, attitude and practices as distance from source increases (time); (ii) students and alumni operate within different social spheres (space); (iii) the different social spheres within which students and alumni operate influences their alignment of knowledge, attitude and practices (impediments); and, (iv) interventions that bring the environment into sharp focus can realign the knowledge, attitude and practices relationship in

informed environmental actors. The first three hypotheses were exploratory and the fourth was an intervention.

In terms of respective environmental change with regard to the source, current students results pointed to a consistency between knowledge, attitude and practice and this can be accounted for by their intimacy to the 'center'. However, distance from the source resulted in important alternative realities for graduated students. Alumni reported that their environmental knowledge and practice levels were in alignment whereas their attitude was not. This is a significant finding in this research as it places important emphasis on important cultural contexts within which alumni operate in the wider world. The importance of the cultural space that people occupy in its operational location dimension was noted in the literature as an important variable that enables or limits activism. It is at once a function of place dynamics and individual responses to system. It involves voluntary participation in events in time and place aspects (Sloane, 2004) within which individuals are never mere observers, but are instead, active participants and shapers of the world they live in (Foucault, 1977).

To locate the operational culture under which individuals and groups operate, this research used an organizational culture assessment instrument (OCAI) to locate their relative positions. For both, their cultural position was identified as being predominately hierarchy and market then adhocracy and clan. While there are important similarities in the consistency between the two, the significance is in difference. The similarity is in the emphasis placed on reproducing existing cultural types that stability and control bring in hierarchy emphasis. The difference is located in the reproduction of the initial cultural type that each group has introduced to the system. Where environmental knowledge, attitude and practices are high this is maintained, where it has regressed with time and with space it is maintained at that level.

Additionally, in group and against group similarities and differences for environmental practices according to venue, the findings point to important ways in which the wider social environment, the various social contexts and social stimulants (time from source) and arena (place) have on individuals and groups. The data results point to the view that groups are more likely to practice positive environmental behaviors at home than at work. The relative importance of time and space dimensions, as well as control over environment in environmental activism, is accordingly considered a significant factor for an ecocentric environmental orientation in confirmation of the thesis hypothesis.

As for relative benefits of intervention strategies, it was shown that environmental practice reversal was possible in the strategy utilized. At the same time, decline in practice levels occurred soon after participant focus changed in terms of time. This phenomenon can be accounted for by external factors that serve as significant cultural impediments to action (Allport, 1967; John, 1990). Moreover, it was noted that high environmental attitude (pre-test 86% and post-test 82%) did not translate into high practices across the program duration in confirmation of the exploratory study (94.7%) findings for alumni. This is suggestive of an important disassociation between environmental attitude from both knowledge and practice.

In terms of practice (activities completed) in the workplace and at home at program start (91%), these correlated favorably with the level reported for current students in the exploration study (90.7%), suggestive of the view that bridging time and space can help realign environmental alumni with student levels across all variables.

The effectiveness and relative value of the intervention program finds expression in the important relationship identified in ‘fit’ between “mood” and “practice” and in confirming the possibilities that present themselves when bridging time and place takes place so that positive environmental practices can be realized.

This relationship was especially illustrative in the practice result reduction for water (R Square = 0.9797) and electricity (R Square = 0.9858) use.

The thesis hypothesis was tested and found to be true. However, the important ways in which human subject dynamically adjust to system complexity is a source of concern that has significant implications for both environment and education. Perhaps, it is the economic paradigm which is in need of reshaping.

6.4 Implications

The findings in this study focused upon the significant differences between campus environmental consciousness in students and that of alumni in the real world. It found that alumni as participants of the wider world, increasingly found it difficult to negotiate the terrain and find a comfortable balance between environmental knowledge acquired, a strong attitude they hold, and ability to practice in real world situations. In most cases the difficulties in finding balance were attributable to external factors located in organizational structures they found in their working lives. However, there were individual considerations noted as well, such as self motivation to practice that impacted on practice levels. Where motivation was high, and individuals had direct control over their environment, practice was equally high. Still, as noted in the intervention results regression took place. This phenomenon can be accounted for by limited message reinforced by the existing system. Were the message to be reinforced daily in the media, on the streets and in workplaces, then perhaps the results might have been altogether different. Thereby, highlighting the relative importance of message focus in its time and place dimensions as well as its significance in workplace situations where positive environmental behaviors are desired to be realized.

6.4.1 Business

Climate change is one of the most important challenges confronting mankind

today. Politically, agreement on existing environmental approaches has reached a stalemate whereby consensus on the Kyoto protocol is yet to be reached by all, and significantly not by the major polluters. Business in turn, has increasingly recognized the importance of developing strategies that are both seen to be and are actually environmentally friendly. However, while top-down environmentally friendly business strategies go some way towards environmental sustainability, it is also important that any environmental initiatives are more than window dressing and are able to be transferred outside company walls. Otherwise, business environmental good-will, might amount to no more than environmental education good-will has been, that in the large has failed to be translated into societal practice.

6.4.2 Governments

As humans, we daily yield to social pressure to conform to existing paradigms because governments exercise considerable influence over the thinking and behavior of its citizens. Where environmental laws and regulations have favored the environment in civil, civic and business planning, there have been results. Globally successes have come through ecologically safe urban transport systems and the various ISO regulations for business. However, there have also been failures in planning, regulations and enforcement. Locally, this has translated into priority for roads at the expense of public utility systems and the environment. Governments would do well to heed the words of social theorists such as Horne (1986) who have argued that in typical capitalist society successes in societal transformation have come mainly through “fear” and “hope”. Fear here is not tantamount to coercion, though it might be. In environmental terms “fear” might be expressed in failure to protect the national environment. While “hope”, might translate in hope of meeting national, local, institutional and personal environmental goals. Governments would do well to use incentives such as “awards for excellence” in environmental

achievement, to motivate individuals and groups to reach common consensus on environmental issues of common concern. They might additionally, also use fear as a means to shame those that have not participated effectively in initiated environmental programs.

6.4.3 Education

Education is charged with unveiling important moral dilemmas, yet at the same time is afforded a unique responsibility to teach towards a better way. The research methodology employed in this study can be a useful tool for academic institutions in preparing curriculum that meets the goals of society's desire for environmental change. Current education design might readily translate to a neat fit between theory and practice in that setting, however, the real world is messy and there are no easy answers to existent problems when informed actors change social settings.

Educators and curriculum planners might consider how curriculum might be adapted to incorporate a hands-on approach to learning that might more easily be adapted to real world situations through support networks. They might additionally consider how activism might be encouraged through curriculum and beyond it. The intervention strategy in this study clearly showed that motivated individuals will practice what they believe and hold to be true. However, long term motivation is contingent on factors beyond individual and institutional factors. Long term practice ultimately requires support networks – network flows. This is suggestive of the view that environmental education need not stop at graduation, but must by necessity continue beyond that milestone in practical ways. Certainly, it must venture beyond alumni annual meetings to celebrate affinity with the group and fleeting achievements of past milestones (graduation). It must additionally provide networks of actions for individuals who are connected by a common network thread of

environmental concern.

The extent to which educational goals have broached environmental concerns in action is yet another index upon which educational achievement succeeds or fails. At the recent APEID International Conference (2007) UNESCO recommended that Thailand improve its curriculum for students from kindergarten to higher education level. The improvements called for include quality assessment and researches, reducing the number of unemployed graduates, and providing adequate libraries. Additionally, it calls for Thai higher educational to reach out more to communities (APEID International Conference, 2007). It is worth noting that the UNESCO recommendations are accommodated in the latest as well as the previous Constitutional arrangements in Thailand; the problem then for Thailand that it needs to address is one of practice rather than essence. This is both implicit and explicit in the findings of this research.

Education need venture into the territory that Spencer (1861/1932) wrestled with when he uttered the words: “The great aim of education is not knowledge but action”. And it must bridge the two fundamental evolutionary principles that permeate Spencer’s analysis of education: The first, is that education evolves in a way similar to that in which individuals and society evolve and are accordingly imperfect; Secondly, the increased heterogeneity and complexity of education systems in the process of their evolution run against natural human evolutionary principles (Spencer, 1861/1932). The connection between the two principles turns on the analogy that external coercion to learn is antithetical to biology where the seed and the embryo grow to maturity without external aid (Spencer, 1850/1970). With these words Spencer alludes to the view that born of man’s imperfections education would in time become unnecessary. This study in turn suggests, that born of man’s imperfections, education is even more necessary than ever to save the world that we have helped destroy through our imperfections and haphazard

theorizing and practice on the run.

6.4.4 Summary

In respect to business, governments and education there are a number of initiatives in need to be undertaken. For business, clearly environmental concerns need to be incorporated in the business cycle. Governments need to listen to what the electorate needs and wants and act on it. Whereas, education must keep highlighting the patterns of inequity in respect to the environment and keep pointing to a better way forward.

6.5 Limitations

Research data returned seldom ever fits into the neat categories we have created for them when researching human subject or complex systems. While a number of significant results were reported in this study, there were limitations that need to be addressed as well.

This study explored environmentalism in informed actors, it is therefore arguable the extent to which the findings are attributable to the general population. The importance is located in understanding the transition that takes place as students migrate into the real world. Additionally, this study researched the essential knowledge, attitudes and practices of groups of individuals from a university in Thailand. The extent to which these findings are true of any university in another time and place are likewise unsettled. At the same time, it is also noted that distance from source of relevance and the resultant behaviors connected to it are a universal phenomenon that need not necessarily be anchored to one time and place. It is possible that the interconnectedness in themes and social variables between this research finding and other social environmental situations, places and findings might at the very least converge on the issue of regression in knowledge and practice levels in human subjects in terms of time and space.

The exploratory study explored environmentalism in informed actors. Integral to the research was respondent current condition in terms of the variables explored. Since the questionnaire did not ask respondents for their year of graduation it presented a challenge when considering graduated students. It was necessary to find another measure for 'distance in terms of time from the source of 'knowledge'. It was reasonable to assume that 'age' can be used as an indicator here since it can be seen from the current student cohorts that the age distribution is very small. Ninety percent of students who responded to the student questionnaire are aged 22-25, while the remaining 10% are under 31. Assuming a similar distribution in previous cohorts, i.e. that most studied when they were in the age group 20-30, respondent's age can be used as an indicator for the length of time since graduation.

The intervention was an attempt at positive environmental behavior modification in individuals and groups from a bottom up approach. It is worth noting the limitation embedded in a process when the researcher is himself a member of the population being researched. This also raises question of socially desirable responses in respondents of the kind highlighted by the Hawthorn effect (Franke & Kaul, 1978). Similarly, participation in the intervention was voluntary and this is itself a limitation that needs to be acknowledged. Additionally, the sample size (10 participants) somewhat undervalues the results, whereby this does not take away from the fact that the sample size was enough to make a statement regarding human change strategies and offers an area for future research. While appropriate tests were conducted to mitigate bias, there was significant bias embedded in the intervention process. However, importantly the intervention pointed to real possibilities in bottom-up approaches that utilize refocus and self-empowerment to effect change. While, this research agrees with views that stress the role of leaders and the influence of corporate culture upon individuals and groups play (Watchaneeporn, 2006; Boiral & Sala, 1996). This work, departs from

prioritizing top-down approaches because the extent to which group values are able to be internalized by individuals and utilized outside the company walls is questionable (Somporn, 2007).

6.6 Areas for future research

Humans are integrally connected to the system within which they must operate and their daily orientation involves adjustment to everyday circumstances and events as they get on with the business of living in a complex world. Within such a world research is an ongoing process that is demand driven to provide the omitted pieces in the puzzle.

It is therefore recommended that future research might look favorably at behavior modification interventions as the present one that utilized bottom-up self driven strategies using focus and intimacy by casting a wider and more representative net. It is similarly encouraged that ways be explored through which ongoing refreshment of the knowledge and practice base can be built into interventions to add to the positive gains made. In this connection Latane's (1981) social impact theory points to important ways in which our world views are constantly reshaped by ongoing dialog between message enabling and the impediments that restrict message intensity.

The importance of pragmaticism (Dewey et al.) on how individuals and groups come to consensus cannot be underestimated. It is therefore recommended that future research look to the competing values map by Quinn & Rorbaugh (1983) as a valuable tool within which to ground individual action within a social context for wider understanding of the system dynamics within which people operate. In this regard, further and wider studies in human and planet systems relations are called for that are conducted on informed environmental actors. In particular, research that takes in multiple educational institutions is advised, for the light it can shed, on this

important change process as informed actors move from the campus to the real world.

6.7 Final word

If we are to survive as a species it is important that we find solutions to existing environment and human relations. It can no longer be denied that the world is experiencing major ecological changes and a wide number of environmental problems (The United Nations Environment Programme, 2007). Global warming, melting of the polar ice caps and Greenland and the wide scale of pollution of the planet are just a few issues that gives rise to much concern for the future of the planet. All of us have a role to play in addressing the problems we ourselves have created. At the same time, it is also noted that social interventions to effect human and planet change have also brought us to the point at which we are today. The eco-system is integrally connected and any haphazard change does ultimately result in other unpredictable planetary changes. As Wearne (1995) has pertinently argued, the way out of present dilemmas is that students should be encouraged to look at issues they are not normally asked to consider or address questions they do not usually ask themselves. So far as work is concerned, they might additionally ask how changing work values might also raise critical questions about the “internal decay” represented by nihilism, implicit in the method of “productive diversity” (Wearne, 1995).

It is hoped that the findings of this research will help to contribute to a more sustainable future. Beyond hope, we have a responsibility to make this a reality. An ancient Indian proverb has captured our responsibilities to our planet and to our children in this way:

> Treat the earth well. It was not given to you by your parents; it was loaned to you by your children. We do not inherit the earth from our ancestors, we

borrow it from our children (Ancient Indian Proverb).

Our planet is important and our children are important too. And we have a great responsibility to leave both in good shape to the future. In this regard, we must cast away cumulative problems that we have created that derive from how we typically understand the world in which we live. We are presently called upon to find a path:

> … that will allow us to make a contribution to public justice while also critically uncovering the taken-for-granted political dogmas that we have inherited and by which we, in repentant retrospect, confess we have been compromised (Wearne, 2007:1).

And where our actions have indeed been compromised, we cannot any longer proceeded though life as though we would still be content with the compromise we have made with respect to the world, humanity and nature as though "God Himself hadn't spoken into our lives His love and reassurance" (Wearne, 2007:1) in the correctness of our individual and collective actions.

At the heart of the environmental dilemma we face and to the planet's detriment is the marrying up of two antithetic metaphors that of the environment and that of market. In so doing the market-metaphor has been absolutised, gaining an exclusive, or privileged, position in public debate, to the exclusion or subordination of other metaphors, other ways of seeing the social landscape. According to this view, all discourses have been measured against market place outcome. Where no market outcome by social actors has been able to be conceived, then people have continued to perpetuate existing systems because it is vital to their survival within a market-metaphor society to do so. The culture that has permitted this perspective to flourish is that of social pragmatism in "action", whereas in explaining, this research

has utilized the pragmatist theory of “uncovering” the inner contradictions that have led us to a particular negative environmental consensus. As Wearne (1989) has argued persuasively, the problem with so-called economic rationalism is not that the market metaphor is used, but that it is used as the base-line normative (fated) consideration for all other ways of viewing complex social reality (Figure 6.1).

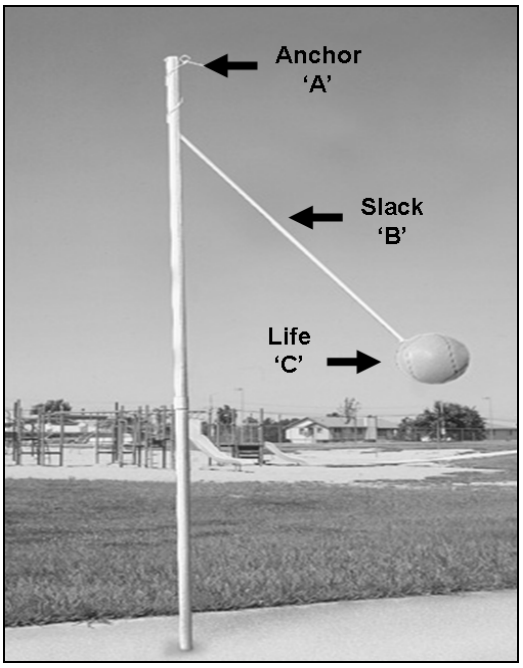


Figure 6.1: Environmental tetherball

Made after: Wearne (1989)

The dynamics of the system as it presently exists within which we all must live can be explained through the metaphor drawn from the children’s game tetherball. The system is anchored to a market paradigm (A) wherein operationally positive environmental change occurs in the slack (B) that the market has allowed in everyday life (C). This research would accordingly argue for separation between market dominated normative environmental interpretations and environment proper. Each is a distinct competing sphere and cannot be subsumed by the other. The present social arrangement runs in the face of and against the grains of an ecocentered systems understanding of human and planetary relations. While positive

change in environmental terms is possible and does occur, such change takes place in the “slack” and not at the source (anchor), and this is a significant limiting factor to long term change success. This means that when change is realized it is within existing paradigm boundaries rather than by shifting them. In these terms, existing environmental gains parade as environmental eco-centered change thereby limiting the ultimate transformative potential of this world view.

It is similarly noted that the system as it presently exists cannot be changed by simply changing the paradigm of human action without a corresponding and complementary shift in the prioritized economic model that has brought us to the point at which we presently stand. People perpetuate existing models because they see benefit in doing so. When informed environmental actors follow suit, then this can be taken as corroboration of the need for separation.

Still, even as we progressively shift towards an eco-centered world view e.g. the isolation of the US on the Kyoto Protocol with the ratifying by Australia, those inside the shift - politicians, activists and citizens alike still tend to perceive the world through an economy-centric frame of reference, and this has limited their point of orientation that a meaningful eco-centered world view cannot pragmatically or actually operate within this frame (AFP, 2007; Coleman, 2007).

As we contemplate action within the existing setup, the world is progressively deteriorating and severely limiting its ability to sustain us. It is important that we prioritize an ecocentric societal transformation, but not just in words but in action. The role of education in highlighting the way forward in such adjustment by teaching for action, showing alternative possibilities and in arguing for change cannot be underestimated in any future change-models and it is indispensable to the hope for humans and the planet. In the words of Herbert Spencer (Spencer, 1820 - 1903):

The great aim of education is not knowledge, but action.

Spencer's words have a particular relevance to the field of environmental sustainability, where it is those people with the deepest knowledge and understanding of the complex environmental issues upon whom the world must depend on to address the most significant questions of sustainability and environmental protection that we face.

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APPENDIX

APPENDIX A
FUTURE CLIMATE PROJECTION

The figures that follow show future climate projection for Thailand and surrounding countries. They were part of a Power Point presentation entitled 'Future Climate Projection and Climate Change in Thailand over the 21st Century' by Dr. Anond Snidvongs (START) on 2nd November, 2007.

The first two images show the heat increase (warm days) across Thailand, while the last two show the number of hot days across Thailand (between 2010's and 2090's). While scientific method was used in compiling these images, the images themselves are not for scientific at this time. They are not representative of fact (explicitly) but intended to serve as illustrations of what is likely to happen if we continue on the present course of action without appropriate changes in attitude and behavior.

These are preliminary findings serve to illustrate and to explain future climate projection in Southeast Asia in general. The images have been kindly provided courtesy of Southeast Asia START Regional Center at Chulalongkorn University courtesy of Mr. Suppakorn Chinvanno.

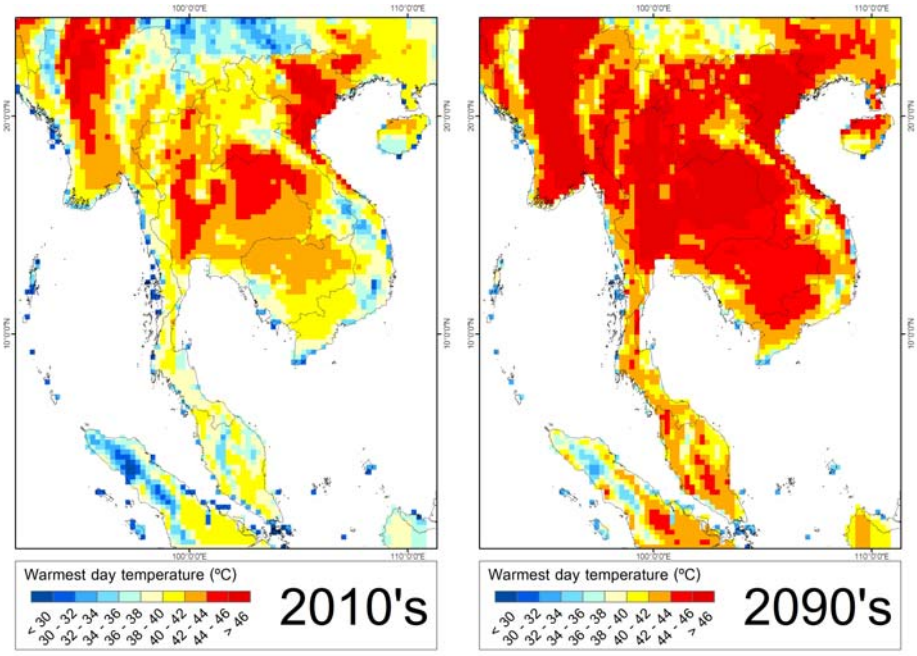

Figure A1: Warm days per annum projections for Thailand 2010's and 2090's
Source: Sanidvongs, S. (2007)

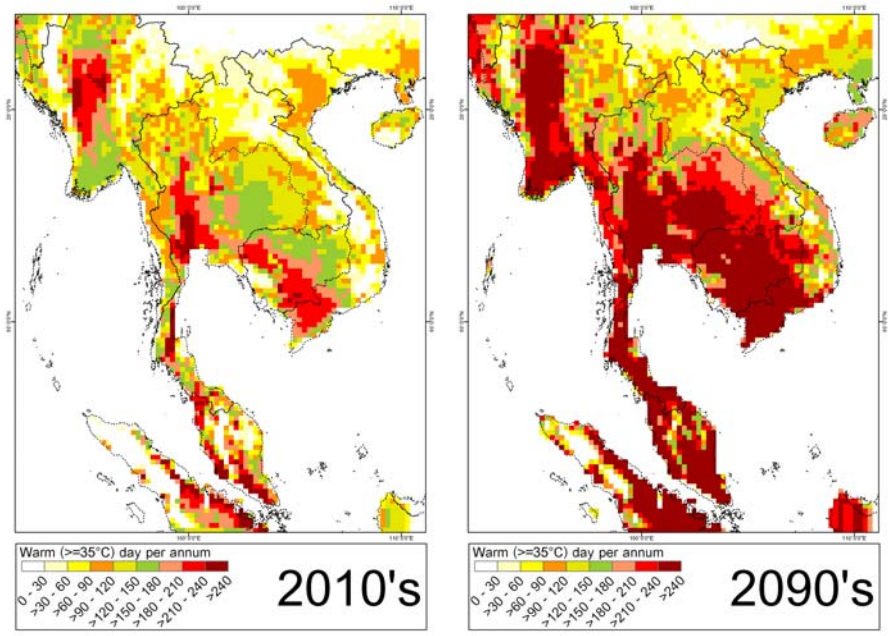

Figure A2: Hot days per annum comparison projections for Thailand 2010's and 2090's
Source: Sanidvongs, S. (2007)

APPENDIX B

STUDENT AND ALUMNI EXPLORATORY QUESTIONNAIRE

This serves to introduce Toni Momiroski a candidate in the faculty's international doctoral program.

Toni's research into environmental education will provide valuable knowledge on how the local and global environments can be improved through an improved education system.

A critical analysis of the returned data might help shed light on any gaps in the relationship between knowledge acquired and knowledge applied. It might also help highlight the possibility that Conflicting Values exist in education, society and in the workplace – and between them.

I hope that you will participate in this valuable research by completing the provided questionnaire and where possible offer to participate in any subsequent follow up programs following this questionnaire.

Yours sincerely,

Asst Prof William Ross Ph.D.
Faculty of Environment and Resource Studies
Mahidol University at Salaya
Nakorn Pathom

1st June, 2007

ส่วนนี้จะแนะนำ โทนี่ โมมิโรสกี ซึ่งเป็นนักศึกษาปริญญาเอกหลักสูตรนานาชาติ ในคณะ

งานวิจัยสิ่งแวดล้อมศึกษาของโทนี่จะให้ความรู้ที่มีค่าเกี่ยวกับความสามารถที่จะพัฒนาสิ่งแวดล้อมในระดับท้องถิ่นและระดับโลกผ่านการพัฒนาระบบการศึกษา

การวิเคราะห์ละเอียดของข้อมูลที่ตอบกลับมาอาจจะช่วยเสริมช่องว่างในความสัมพันธ์ระหว่างความรู้ที่ได้รับและความรู้ที่สามารถนำไปประยุกต์ใช้ ซึ่งอาจจะแสดงถึงโอกาสที่จะเกิดความขัดแย้งทางค่านิยมที่อาจเกิดขึ้นในด้านการศึกษา สังคม และที่ทำงาน และระหว่างปัจจัยเหล่านั้น

ผมหวังว่าคุณจะมีส่วนร่วมในการวิจัยอันมีค่านี้โดยตอบแบบสอบถามนี้และเข้าร่วมในโครงการการศึกษาที่จะตามมา

ขอแสดงความนับถือ

ผศ. ดร. วิลเลียม รอส
คณะสิ่งแวดล้อมและทรัพยากรศาสตร์
มหาวิทยาลัยมหิดล วิทยาเขตศาลายา
นครปฐม

1 มิถุนายน 2007

Alumni Questionnaire advice:

- It is expected that this questionnaire should take you about 30 minutes to complete
- Where a question seeks your comment, please reply in English whenever possible
  กรุณาตอบเป็นภาษาอังกฤษในคำถามส่วนที่ต้องการให้แสดงความคิดเห็น (ถ้าเป็นไปได้)
- A stamped self-addressed return envelope is included for your convenience
  จดหมายพร้อมที่อยู่และแสตมป์รวมไว้ให้เพื่อความสะดวกของท่าน
- Please return completed Questionnaire at your earliest convenience. Closing date 31st July, 2007
  กรุณาคืนแบบสอบถามเร็วที่สุด หมดเขตรับแบบสอบถาม 31 ก.ค. 2007
- Information and feedback provided by you is strictly confidential. The answers you provide to questions are used for research purposes in order to aggregate data by groups only and are not tied to your individual feedback. Your personal data is kept private and confidential at all times and only a unique "control" number - Survey Number is used for your identity

Thank You for taking the time to complete this Questionnaire – Toni Momiroski

QUESTIONNAIRE ALUMNI

ENVIRONMENTAL EDUCATION, KNOWLEDGE & ORGANIZATION	
This questionnaire is composed of 4 sections	Number of Questions
1. General information about participant (you)	9
2. Feedback about education	19
3. Environmental knowledge	40
4. Organizational location	6

Survey Number					
A					
Official Use Only					

Section 1. General information about participant (you)	ส่วนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม
In order to provide comparative feedback, please provide the following information about yourself. Please complete in full and use an "X" to mark your response whenever specified. Mark ☒ only one response per question.	เพื่อที่จะได้รับข้อมูลเปรียบเทียบสำหรับการศึกษาในอนาคต กรุณากรอกข้อมูลส่วนบุคคลในช่องว่างต่อไปนี้ให้สมบูรณ์และใช้เครื่องหมาย "X" ในช่องที่เหมาะสม กรอก ☒ ครั้งเดียวต่อหนึ่งคำถาม

S1.1	1. Name	First Name: _____ Surname: _____
S1.2	2. Address	Soi: _____ Road: _____ Sub-district: _____ District: _____ Bangkok Metropolis: _____
S1.3	3. Age	_____ Years (specify)
S1.4	4. Gender	☐ Male ☐ Female
S1.5	5. Marital Status	☐ Single ☐ Married ☐ Other
S1.6	6. Education (Highest level completed)	☐ Secondary ☐ Diploma or Equivalence ☐ Bachelor Degree ☐ Masters ☐ Doctoral (PhD) ☐ Others _____ (specify)
S1.7	7. Current job (if employed)	☐ Student ☐ Employed ☐ Unemployed ☐ Others _____ (specify)
S1.8	8. Current Position (if employed)	Organization _____ Department _____ Title _____ Length of service _____ Years (specify)
S1.9	9. Program Name	University Program Code: EN _____

Section 2. Feedback about education	ส่วนที่ 2 ข้อคิดเห็นเกี่ยวกับการศึกษา
Please answer the following questions by circling the response that best describes your own personal opinion. There are no right or wrong answers, answer based on how you actually feel.	กรุณาตอบคำถามต่อไปนี้โดยวงกลมคำตอบที่อธิบายความคิดเห็นส่วนตัวของคุณได้ดีที่สุด ในส่วนนี้คำตอบขึ้นอยู่กับความรู้สึกของคุณ โดยคำตอบไม่มีถูกหรือผิด

EXAMPLE QUESTION 1: The earth is the center of the universe.
Here is how you might answer the Example Question by circling your preference.

Strongly Agree	***Agree***	***Unsure***	***Disagree***	***Strongly Disagree***

1. The environmental knowledge I acquired in university classes has helped me in how I think about my actions on the job.

S2.1 ความรู้เกี่ยวกับสิ่งแวดล้อมที่ฉันได้รับจากการเรียนที่มหาวิทยาลัยช่วนให้ฉันตระหนักถึงการปฏิบัติตนที่ทำงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

2. I discuss the environmental problems confronting the world at work.

S2.2 ฉันสนทนาปัญหาสิ่งแวดล้อมที่โลกกำลังเผชิญอยู่เวลาอยู่ที่ทำงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

3. At work, we act on our environmental knowledge in our everyday work activities.

S2.3 เวลาอยู่ที่ทำงาน เราปฏิบัติตามความรู้ทางสิ่งแวดล้อมที่เราเรียนรู้ในกิจวัตรประจำวันที่ทำงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

4. I am able to transfer the environmental knowledge I learnt at university to what I do at work.

S2.4 ฉันสามารถนำความรู้ทางสิ่งแวดล้อมที่ฉันเรียนรู้ในมหาวิทยาลัยมาใช้ที่ทำงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

5. My workplace practices sustainability and conservation approaches that I learnt about in my university class.

S2.5 ที่ทำงานของฉันปฏิบัติตามวิถีทางที่ยั่งยืนและวิถีการอนุรักษ์ที่ฉันได้เรียนรู้จากมหาวิทยาลัย

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S2.6.1 6. To what extent is your job related to your study program about the environment?
ในระดับใดที่งานของคุณเกี่ยวข้องกับการศึกษาสิ่งแวดล้อมที่คุณเรียน

Strongly Related *Mildly Related* *Unsure* *Indirectly Related* *Not Related*

S2.6.2 Please explain your answer _____

_____

_____

S2.7 7. The lectures and materials provided at my university have helped me understand about "Environmental issues" and to be a more effective environmentally aware member of society.
การฟังบรรยายและเนื้อหาที่ได้รับจากมหาวิทยาลัยของฉันได้ช่วยฉันเข้าใจเกี่ยวกับปัญหาสิ่งแวดล้อมและทำให้
กลายเป็นสมาชิกที่ตระหนักถึงความสำคัญของสิ่งแวดล้อมในสังคม

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S2.8 8. To what extent do you practice conservation of materials in the workplace?
คุณมีส่วนช่วยในการอนุรักษ์ทรัพยากร/สิ่งของต่างๆ ในที่ทำงานในระดับใด

Very Often *Often* *Sometimes* *Rarely* *Hardly Ever*

S2.9 9. To what extent do you practice recycling of materials in the workplace?
คุณรีไซเคิลทรัพยากร/สิ่งของต่างๆ ในที่ทำงานในระดับใด

Very Often *Often* *Sometimes* *Rarely* *Hardly Ever*

S2.10 10. To what extent do you practice conservation of materials at home?
คุณอนุรักษ์ทรัพยากร/สิ่งของต่างๆ ในที่บ้านในระดับใด

Very Often *Often* *Sometimes* *Rarely* *Hardly Ever*

S2.11 11. To what extent do you practice recycling of materials at home?
คุณรีไซเคิลทรัพยากร/สิ่งของต่างๆ ในที่บ้านในระดับใด

Very Often *Often* *Sometimes* *Rarely* *Hardly Ever*

Please answer the following questions by writing down your involvement in environmental issues if any.

S2.12.1 12. Do you keep up to date and informed about Environmental issues in your private life?
คุณเดิดตามข่าวสารและทันปัญหาสิ่งแวดล้อมในชีวิตส่วนตัวของคุณหรือไม่

☐ Yes ☐ No

If you answered no:

S2.12.1.1 1) Please explain your answer
กรุณาอธิบายคำตอบของคุณ

_____

_____

If you answered yes:

S2.12.1.2a 2a) What issues are of interest to you?
ประเด็นใดที่คุณสนใจ

_____

_____

S2.12.1.2b 2b) How do they affect your life?
ประเด็นดังกล่าวมีผลกระทบกับชีวิตของคุณอย่างไร

_____

_____

S2.12.1.2c 2c) Why are they important to you?
เหตุใดประเด็นดังกล่าวจึงมีความสำคัญต่อคุณ

_____

_____

S2.13.1 13. Do you belong to any environmental Organizations?
คุณเป็นสมาชิกองค์กรเกี่ยวกับสิ่งแวดล้อมใดหรือไม่

☐ Yes ☐ No

S2.13.1.a Please explain your answer _____

_____

Please answer the following questions by writing down your own ideas.

S2.14 14. In your opinion what were the positive aspects of your study program at university?
ในความคิดของคุณ อะไรคือข้อดีของหลักสูตรที่คุณได้ศึกษาในมหาวิทยาลัย

Please explain _____

_____

S2.15 15. In your opinion how could your university program be improved to reflect environmental issues outside the university more closely?
ในความคิดของคุณ หลักสูตรที่มหาวิทยาลัยของคุณควรจะพัฒนาอย่างไรจึงจะสะท้อนปัญหาสิ่งแวดล้อมนอกมหาวิทยาลัยได้ใกล้เคียงขึ้น

Please explain _____

_____

S2.16 16. What type of job were you hoping for after graduation?
คุณได้เคยคาดหวังว่าจะได้ทำงานลักษณะใด ภายหลังสำเร็จการศึกษา

Please explain _____

_____

S2.17 17. What made you decide on this job choice at the time?
อะไรทำให้คุณตัดสินใจเลือกงานดังกล่าว ณ เวลานั้น

Please explain _____

_____

S2.18 18. How did you consider your environmental degree would help you get the job you want?
วุฒิการศึกษาทางสิ่งแวดล้อมได้สามารถช่วยให้คุณได้งานที่คุณต้องการได้อย่างไร

Please explain _____

_____

S2.19 19. Have the job expectations you had while at university been met in your current job?
งานที่คุณเคยคาดหวังเมื่อคุณอยู่มหาวิทยาลัยตรงกับงานที่คุณทำอยู่ในปัจจุบันหรือไม่

Please explain _____

_____

Section 3. Environmental knowledge	ส่วนที่ 3 ความรู้เกี่ยวกับสิ่งแวดล้อม
Please answer the following questions by circling the response that best describes your own personal opinion. There are no right or wrong answers to these questions. "Organization" where applicable means University or Workplace depending on whether you are currently Student or Alumni.	กรุณาตอบคำถามต่อไปนี้โดยวงกลมคำตอบที่อธิบายความคิดเห็นส่วนตัวของคุณได้ดีที่สุด คำถามเหล่านี้ไม่มีคำตอบที่ถูกหรือผิด องค์กร ในที่ที่เกี่ยวข้องหมายถึง มหาวิทยาลัย หรือ ที่ทำงาน ซึ่งขึ้นอยู่กับสถานภาพของคุณในปัจจุบันว่าเป็นนักศึกษาหรือผู้สำเร็จการศึกษา

1. We are nearing the limit of the number of people the Earth can support sustainably.

S3.1 เราเข้าใกล้ขีดจำกัดของจำนวนประชากรที่โลกสามารถรับได้อย่างยั่งยืน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

2. Humans have the right to modify the natural environment to suit their needs.

S3.2 มนุษย์มีสิทธิที่จะปรับเปลี่ยนสภาพแวดล้อมตามความต้องการของเขา

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

3. When humans interfere with nature it often produces disastrous consequences.

S3.3 เมื่อมนุษย์เข้าแทรกแซงธรรมชาติ มันมักจะก่อผลลัพธ์ที่เลวร้ายตามมา

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

4. Human ingenuity will ensure we do not make the earth unlivable.

S3.4 ความสามารถในการคิดค้นของมนุษย์จะรับรองว่าเราจะไม่มีวันทำให้โลกไม่น่าอยู่

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

5. Humans are severely abusing the environment.

S3.5 มนุษย์กำลังล่วงละเมิดสิ่งแวดล้อมอย่างรุนแรง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

6. The earth has plenty of natural resources if we can learn how to develop them.

S3.6 โลกมีทรัพยากรธรรมชาติมากมายหากเราเรียนรู้ว่าจะพัฒนามันอย่างไร

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

7. Plants and animals have equal rights to humans to exist.

S3.7 พืชและสัตว์มีสิทธิที่จะดำรงชีวิตอยู่เท่าเทียมกับมนุษย์

Strongly Agree Agree Unsure Disagree Strongly Disagree

8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.

S3.8 ความสมดุลของธรรมชาติมีความแข็งแกร่งเพียงพอที่จะรับมือจากผลกระทบจากประเทศอุสหกรรม

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.9 9. Despite our special abilities humans are still subject to the laws of nature.
ถึงแม้จะมีความสามารถพิเศษ มนุษย์ก็ยังต้องอยู่ภายใต้กฎเกณฑ์ของธรรมชาติ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.10 10. The so called "ecological disaster" facing humankind has been greatly exaggerated.
ความเข้าใจในเรื่องหายนะทางนิเวศวิทยาเป็นเรื่องเกินความเป็นจริง/กล่าวเกินจริง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.11 11. The Earth is like a spaceship with limited room and resources.
โลกเปรียบเสมือนยานอวกาศที่มีพื้นที่และทรัพยากรจำกัด

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.12 12. Humans were meant to rule over the rest of nature.
มนุษย์ได้ถูกกำหนดมาเพื่อควบคุมธรรมชาติที่เหลือ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.13 13. The balance of nature is delicate and easily upset.
ความสมดุลทางธรรมชาติเป็นสิ่งที่ละเอียดอ่อนและง่ายต่อการทำให้เสียสมดุล

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.14 14. Humans will eventually learn enough about how nature works to be able to control it.
ในท้ายที่สุดมนุษย์จะสามารถเรียนรู้เกี่ยวกับการทำงานของธรรมชาติมากพอที่จะควบคุมมันได้

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.15 15. If things continue on the present course, we will soon experience a major ecological catastrophe.
ถ้าทุกอย่างดำเนินไปตามอย่างที่เป็นอยู่ในปัจจุบัน เราจะพบกับหายนะทางนิเวศน์วิทยาครั้งยิ่งใหญ่เร็วๆนี้

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.16 16. Conserving water is an important step towards ecological sustainability.
การอนุรักษ์น้ำเป็นขั้นตอนสำคัญที่นำไปสู่ระบบนิเวศที่ยั่งยืน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.17 17. My household generally tries to limit its water consumption.
บ้านของฉันมักพยายามจำกัดการบริโภคน้ำ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

18. My organization has policies and procedures to minimize water consumption.
S3.18 องค์กรของฉันมีนโยบายและแผนงานลดการบริโภคน้ำ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

19. I know what my organization's policies and procedures to minimize water consumption are.
S3.19 ฉันทราบนโยบายและแผนงานลดการบริโภคน้ำขององค์กรของฉันว่ามีอะไรบ้าง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

20. I agree with my organization's policies and procedures to minimize water consumption.
S3.20 ฉันเห็นด้วยที่องค์กรของฉันมีนโยบายและแผนงานลดการบริโภคน้ำ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

21. The amount of energy that society consumes needs to be reduced.
S3.21 ปริมาณพลังงานที่สังคมใช้ควรที่จะลดลง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

22. Efforts are made in my household to reduce the amount of energy that is used.
S3.22 มีการพยายามที่จะลดการใช้พลังงานที่ใช้ในบ้านของฉัน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

23. My organization has policies and procedures to minimize energy used.
S323 องค์กรของฉันมีนโยบานและแผนการลดการใช้พลังงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

24. I know what my organization's policies and procedures to minimize energy used are.
S3.24 ฉันรู้นโยบายและแผนงานลดการใช้พลังงานขององค์กรของฉันว่ามีอะไรบ้าง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

25. I agree with my organization's policies and procedures to minimize energy used.
S325 ฉันเห็นด้วยกับนโยบายและแผนงานลดการใช้พลังงานขององค์กรของฉัน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

26. To reduce urban air pollution, private car use needs to be reduced.
S3.26 เพื่อที่จะลดมลพิษทางอากาศในชุมชนเมือง ควรลดปริมาณการใช้รถยนต์ส่วนบุคคล

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.27 27. My household generally makes an effort to use public transport, cycling and walking rather than driving.
สมาชิกในบ้านของฉันมักพยายามใช้การขนส่งมวลชน ปั่นจักรยาน และเดินมากกว่าขับรถ

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.28 28. My organization has policies and procedures to minimize car use.
องค์กรของฉันมีนโยบายและแผนงานลดการใช้รถยนต์

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.29 29. I know what my organization's policies and procedures to minimize car use are.
ฉันรู้นโยบายและแผนงานการลดการใช้รถยนต์ขององค์กรของฉันว่ามีอะไรบ้าง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.30 30. I agree with my organization's policies and procedures to minimize car use.
ฉันเห็นด้วยกับนโยบายและแผนงานลดการใช้รถยนต์ขององค์กรของฉัน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.31 31. It is important that we recycle as much waste as we can.
การนำขยะกลับมาใช้ใหม่ให้ได้มากที่สุดมีความสำคัญมาก

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.32 32. In my household, an effort is made to minimize the amount of waste that is not recycled.
ในบ้านของฉัน มีการพยายามที่จะลดปริมาณขยะที่ไม่สามารถนำกลับมาใช้ใหม่ได้

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.33 33. My organization has policies and procedures to minimize the amount of waste that is not recycled.
องค์กรของฉันมีนโยบายและแผนงานลดปริมาณขยะที่ไม่สามารถนำกลับมาใช้ใหม่ได้

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.34 34. I know what my organization's policies and procedures to minimize the amount of waste that is not recycled are.
ฉันทราบนโยบายและแผนงานลดปริมาณของขยะที่ไม่สามารถนำกลับมาใช้ใหม่ได้ขององค์กรของฉันว่ามีอะไรบ้าง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.35 35. I agree with my organization's policies and procedures to minimize the amount of waste that is not recycled.
ฉันเห็นด้วยกับนโยบายและแผนงานลดปริมาณของขยะที่ไม่สามารถนำกลับมาใช้ใหม่ได้ขององค์กรของฉัน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.36 36. It is important that we minimize use of consumables such as paper and plastics.
การลดปริมาณการใช้ทรัพยากรที่ใช้แล้วหมดไปเช่น กระดาษและพลาสติก มีความสำคัญมาก

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.37 37. In my household an effort is made to minimize use of consumables such as paper and plastics.
ในบ้านของฉัน มีการพยายามลดการใช้ทรัพยากรที่ใช้แล้วหมดไปเช่น กระดาษและพลาสติก

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.38 38. My organization has policies and practices to minimize use of consumables such as paper and plastics around the office.
องค์กรของฉันมีนโยบายและแผนงานลดการใช้ทรัพยากรที่ใช้แล้วหมดไปเช่น กระดาษและพลาสติกในสำนักงาน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.39 39. I know what my organization's policies and procedures to minimize use of consumables such as paper and plastics around the office are.
ฉันทราบนโยบายและแผนงานลดการใช้ทรัพยากรที่ใช้แล้วหมดไปเช่น กระดาษและพลาสติก ขององค์กรของฉันว่ามีอะไรบ้าง

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

S3.40 40. I agree with my organization's policies and procedures to minimize use of consumables such as paper and plastics around the office.
ฉันเห็นด้วยกับนโยบายและแผนงานลดการใช้ทรัพยากรที่ใช้แล้วหมดไปเช่น กระดาษและพลาสติก ขององค์กรของฉัน

Strongly Agree *Agree* *Unsure* *Disagree* *Strongly Disagree*

Section 4. Organizational location	ส่วนที่ 4 ตำแหน่งขององค์กร
1. In this part "your organization" means the place where you study or work. 2. Rate each of the statements by dividing 100 points between A, B, C, and D depending on how similar the description is to your organization. 3. 100 is very similar and 0 is not at all similar to your organization. 4. Ensure the total points for each question must equal 100. 5. Rate for both how you feel now (NOW) and how you would (PREFER) it.	1. ในส่วนนี้ องค์กรของคุณหมายถึงสถานที่ที่คุณเรียนหรือทำงาน 2. จัดระดับข้อความเหล่านี้โดยแบ่ง 100 คะแนน ระหว่าง A, B, C, และ D ซึ่งขึ้นอยู่กับความคล้ายคลึงกับองค์กรของคุณ 3. 100 คือ คล้ายคลึงและ 0 คือ ไม่คล้ายคลึงกับองค์กรของคุณ 4. ดูว่าคะแนนรวมของแต่ละข้อเท่ากับ 100 5. จัดระดับว่าคุณรู้สึกอย่างไรในปัจจุบันและคุณอยากให้มันเป็นอย่างไรในอนาคต

Organizational Culture Assessment Instrument (OCAI)

- In question 1, assume that you gave 75 points to A, 10 points to B, 15 points to C, and 0 points to D in the "NOW" column. This would indicate that your diet in your view is mostly about healthy lifestyle [A] and not at all controlled and structured by rules and regulations [D].
- Assume that you gave 25 points to each one in the "PREFER" column. This would indicate you would prefer diet attributes to be exactly equal. You may use only four numbers that total to 100 in each column. Thank you!

EXAMPLE QUESTION 1:
Here is how you might describe your diet "NOW" and how you might "PREFER" it to be sometime in the future.

1. MY VIEWS ABOUT DIET AND EATING HABITS ARE … มุมมองของฉันในการไดเอทและพฤติกรรมการบริโภคคือ...		NOW		PREFER
A. I eat food that is healthy for me. The most important thing is caring for my body. ฉันกินอาหารที่ดีต่อสุขภาพของฉัน สิ่งที่สำคัญที่สุดคือการดูแลร่างกายของฉัน	S4.1a.1	75	S4.1a.2	25
B. Food is for sustenance. The most important thing is to find better and more convenient ways to fit food into my busy lifestyle. อาหารเป็นสิ่งเพื่อการอยู่รอด สิ่งที่สำคัญที่สุดคือการหาวิธีที่ดีกว่าและสะดวกกว่าที่จะทำให้อาหารเหมาะกับชีวิตประจำวันที่ยุ่ง	S4.1b.1	10	S4.1b.2	25
C. Eating competes for my time. If food interferes with my schedule I can get by on less. การกินแข่งกับเวลาของฉัน ถ้าอาหารขัดขวางตารางเวลาของฉัน ฉันสามารถบริโภคน้อยลงได้	S4.1c.1	15	S4.1c.2	25
D. There are rules and regulations that assist with diets. The most important thing is following the rules. มันมีกฎและการควบคุมที่ช่วยการไดเอท สิ่งที่สำคัญที่สุดคือการปฏิบัติตามกฎ	S4.1d.1	0	S4.1d.2	25
Your responses must add to100 in each column		100		100

1. DOMINANT CHARACTERISTICS ลักษณะเด่น		NOW		PREFER
A. The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves. องค์กรเป็นสถานที่ที่เป็นส่วนตัวมากๆ มันเสมือนครอบครัวใหญ่... ทุกคนเสมือนว่าสามารถแบ่งปันกันได้	S4.1a.1		S4.1a.2	
B. The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks. องค์กรเป็นสถานที่ที่มีพลวัตรและมีการมีส่วนร่วม ทุกคนจะยอมเสี่ยงเพื่อที่จะได้ผลกำไรตอบแทน	S4.1b.1		S4.1b.2	
C. The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented. องค์กรมีการเน้นผลงานอย่างมาก สิ่งหนึ่งที่ต้องคำนึงคือการทำงานให้สำเร็จ ทุกคนแข่งกันอย่างมากและมุ่งไปสู่ความสำเร็จ	S4.1c.1		S4.1c.2	
D. The organization is a very controlled and structured place. Formal procedures generally govern what people do. องค์กรเป็นสถานที่ที่มีการควบคุมและมีโครงสร้างอย่างมาก ระเบียบที่ถูกวางไว้ล่วงหน้ามักจะคุมสิ่งที่ทุกคนทำ	S4.1d.1		S4.1d.2	
Your responses must add to 100 in each column		100		100

2. ORGANIZATIONAL LEADERSHIP ความเป็นผู้นำในองค์กร		NOW		PREFER
A. The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing. ภาวะผู้นำในองค์กรโดยมากมักพิจารณาจากการให้คำปรึกษา การสนับสนุน หรือการทะนุถนอม	S4.2a.1		S4.2a.2	
B. The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking. ภาวะผู้นำในองค์กรโดยมากมักพิจารณาจากการร่วมทุน ค้นคว้าสิ่งใหม่ๆ หรือ เลือกที่จะเสี่ยง	S4.2b.1		S4.2b.2	
C. The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus. ภาวะผู้นำในองค์กรโดยมากมักพิจารณาจากความเหลวไหล ความก้าวร้าว การเน้นการเข้าสู่ผล	S4.2c.1		S4.2c.2	
D. The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency. ภาวะผู้นำในองค์กรโดยมากมักพิจารณาจากการประสานงาน การวางระเบียบ หรือประสิทธิภาพที่ดำเนินราบรื่น	S4.2d.1		S4.2d.2	
Your responses must add to 100 in each column		100		100

3. MANAGEMENT OF EMPLOYEES การบริหารผนักงาน		NOW		PREFER
A. The management style in the organization is characterized by teamwork, consensus, and participation. แนวการบริหารในองค์กรได้ถูกมองจากเรื่องการทำงานเป็นทีม ความสอดคล้องกัน และการมีส่วนร่วม	S4.3a.1		S4.3a.2	
B. The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness. แนวการบริหารในองค์กรได้ถูกมองจากเรื่องการที่แต่ละบุคคลยอมเสี่ยง มีมุมมองใหม่ๆ มีอิสระ และมีเอกลักษณ์	S4.3b.1		S4.3b.2	
C. The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement. แนวการบริหารในองค์กรได้ถูกมองจากเรื่องการแข่งขันที่ดุเดือด ความต้องการที่สูงและการประสบความสำเร็จ	S4.3c.1		S4.3c.2	
D. The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships. แนวการบริหารในองค์กรได้ถูกมองจากเรื่องความมั่นคงในหน้าที่การงาน การปรับตัวเข้าหา การที่องค์กรสามารถคาดการณ์ได้ และความมั่นคงในความสัมพันธ์	S4.3d.1		S4.3d.2	
Your responses must add to 100 in each column		100		100

4. ORGANIZATIONAL GLUE สิ่งที่ยึดเหนี่ยวองค์กรไว้		NOW		PREFER
A. The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high. สิ่งที่ยึดเหนี่ยวองค์กรเอาไว้คือความจงรักภักดีและไว้วางใจซึ่งกันและกัน มีการทุ่มเทให้องค์กรสูง	S4.4a.1		S4.4a.2	
B. The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge. สิ่งที่ยึดเหนี่ยวองค์กรเอาไว้คือการทุ่มเทสู่สิ่งใหม่ๆ และการพัฒนา มีการเน้นการเป็นที่สุด	S4.4b.1		S4.4b.2	
C. The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes. สิ่งที่ยึดเหนี่ยวองค์กรเอาไว้คือการเน้นการประสบความสำเร็จและการบรรลุเป้าหมาย การทุ่มเทอย่างเต็มกำลังและการเอาชนะกันนั้นเป็นเรื่องปกติ	S4.4c.1		S4.4c.2	
D. The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important. สิ่งที่ยึดเหนี่ยวองค์กรเอาไว้คือกฎที่ได้ถูกระบุไว้ล่วงหน้าแล้วและนโยบาย การดำเนินงานขององค์กรที่ราบรื่นคือสิ่งสำคัญ	S4.4d.1		S4.4d.2	
Your responses must add to 100 in each column		100		100

5. STRATEGIC EMPHASIS **การเน้นยุทธศาสตร์**		NOW		PREFER
A. The organization emphasizes human development. High trust, openness, and participation persist. องค์กรเน้นการพัฒนามนุษย์ ความน่าเชื่อถือ ความเปิดเผย และการมีส่วนร่วมถูกย้ำอยู่เสมอ	S4.5a.1		S4.5a.2	
B. The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued. องค์กรเน้นการค้นหาทรัพยากรและความท้าทายใหม่ๆ การทดลองสิ่งใหม่ตลอดจนแสวงหาโอกาสเป็นสิ่งมีค่ายิ่ง	S4.5b.1		S4.5b.2	
C. The organization emphasizes competitive actions and achievement. Meeting Deadlines and winning in the marketplace are dominant. องค์กรเน้นการปฏิบัติในการแข่งขันและการประสบความสำเร็จ การบรรลุเวลาที่กำหนดและชัยชนะในตลาดการค้าคือข้อเด่น	S4.5c.1		S4.5c.2	
D. The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important. องค์กรเน้นความถาวรและความมั่นคง ประสิทธิภาพ การควบคุม และการดำเนินงานที่ราบรื่นเป็นสิ่งสำคัญ	S4.5d.1		S4.5d.2	
Your responses must add to 100 in each column		100		100

6. CRITERIA OF SUCCESS **เงื่อนไขความสำเร็จ**		NOW		PREFER
A. The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people. องค์กรให้คำจำกัดความของความสำเร็จโดยดูจากการพัฒนาของบุคลากร การทำงานเป็นทีม การทุ่มเทของพนักงาน และการคำนึงถึงทุกคน	S4.6a.1		S4.6a.2	
B. The organization defines success on the basis of having the most unique or the newest products. It is a product leader and innovator. องค์กรให้คำจำกัดความของความสำเร็จโดยดูจากความมีเอกลักษณ์ที่สุดหรือมีผลิตภัณฑ์ที่ใหม่ล่าสุด มันหมายถึงผู้นำทางผลิตผลิตภัณฑ์และเป็นผู้ค้นคว้าสิ่งใหม่	S4.6b.1		S4.6b.2	
C. The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key. องค์กรให้คำจำกัดความของความสำเร็จโดยดูจากชัยชนะในตลาดการค้าและการนำคู่แข่ง การเป็นผู้นำในตลาดแข่งขันคือกุญแจสำคัญ	S4.6c.1		S4.6c.2	
D. The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low cost production are critical. องค์กรให้คำจำกัดความของความสำเร็จโดยดูจากประสิทธิภาพ การจัดส่งที่เชื่อถือได้ ตารางงานที่ราบรื่นและมูลค่าการผลิตที่ต้นทุนต่ำคือปัจจัยสำคัญ	S4.6d.1		S4.6d.2	
Your responses must add to 100 in each column		100		100

Mahidol University
Faculty of Environment Research Studies (FERS)
Mahidol University at Salaya
Nakorn Pathom

Thank you for completing this Questionnaire

- There will be a follow up Pilot-Intervention Study that might require internet access by you. This includes email and web access.
- The study will take place over a period of fourteen (14) days.
- It is anticipated that internet access required by you will be for the first and last day of the fourteen (14) day period.
- Please indicate below by placing a checkmark ☒ if you would like to participate.

S5.1.1 1. Would you like to participate in a Pilot-Intervention Study?
คุณอยากจะมีส่วนร่วมในการศึกษานำร่องในการแทรกแซงหรือไม่

☐ Yes

S5.1.2 Please provide a valid email _____
กรุณาระบุอีเมลล์

==========

Questionnaire and Comments Return Address คืนแบบสอบถามและความเห็นตามที่อยู่	
• Hardcopy Questionnaire • Comments and feedback	• Return using stamped self-addressed return-envelope provided by the 31st July, 2007 กรุณาส่งโดยซองจดหมายพร้อมที่อยู่และแสตมป์ที่ให้ไว้ ภายใน วันที่ 31 ก.ค. 2007 • tonifersmahidol@gmail.com

Research & Questionnaire Mailing Address ส่งแบบสอบถามงานวิจัยโดยไปรษณีย์
Dr. William Ross Faculty of Environment Research Studies (FERS) Mahidol University at Salaya Phuttamonthon Sai 4 Nakorn Pathom

APPENDIX C
INTERVENTION WORKSHOP

 Save the Planet Now	Workshop Journal Mahidol University – FERS ecoSave Now Project Toni Momiroski (PhD Candidate) Survey Number A *Official Use Only*

Introduction

1. Conservation Techniques

2. Activity Journal

3. Mood Journal

4. Questions about the program

5. End of Program - Final Questions about Environmental Practice

Conclusion *- Appreciation for participation*

Introduction

Dear participant:

- Protecting the Earth is important to our survival as a species on this planet and for ecological sustainability and for diversity of species.
- We can all do our part in some small way.
- The Journal below is a way that we can try to do our part by practicing conservation techniques.
- The Checklist below is a formal request to participate in a 28 day **Activity and Mood Journal**
- Please complete the checklist for each day of the participating period.
- Your name and particulars are not required – You will be alocated a Survey Number and only group results by aggregate will be analysed

Participating period:

- The 28 day (4 week) participation by you starts on **11th, Ocober, 2007** and runs through to **8th, November, 2007.**

Please observe:

- There are no right or wrong answers or appropriateness of behavior, or motivations or mood – each of us is different
- Please check for each day only that which you did and the way in which you felt on that particular day to practice
- Thank you for you participation

Take home Participation :

- There are five sections to this program: 1) Conservation Techniques, 2) Activity Journal, 3) Mood Journal, 4) Questions about the Program and 5) Questions about Environmental Practice

1. Conservation Techniques

The following are some conservation techniques that environmental experts have identified and recommended as being some of the activities individuals can practice in the office and at home in order to play a small part in protecting the planet.

2. Activity Journal

The following (attached) are conservation techniques that it is requested that you practice in the office and at home over the next four (4) weeks.

3. Mood Journal

The following (attached) is a checklist to help you monitor your motivation to practice over the four (4) weeks.

4. Questions about the program

The following are some final questions about the program and any successes or difficulties you might have experienced.

4.1 - Please indicate how you think an environmental program such as this might be improved.

.....
.....
.....
.....
.....

Thank you for completing the 28 Day Program

5. End of Program - Final Questions about Environmental Practice

Please complete these questions at the end of the 28 day period.
Please answer the following questions by circling the number that reflects your opinion.

To what extent do you agree with the following?
(Where 0 is disagree and 1 is lowest and 9 highest).

W1.1 1. The environment is worth protecting for the future benefit of **all** life

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.2 2. Every individual can play a part in protecting the planet

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.3 3. I can play a part in protecting the planet through my actions

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.4 4. What I do in my surroundings will help to protect the planet

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.5 5. I am responsible for protecting the things that I have control over

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.6 6. I am ready to do my part to protect the planet by doing what I know is right

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

W1.7 7. I have the right knowledge & attitude to practice conservation

Level of Agree									
0	1	2	3	4	5	6	7	8	9
Disagree	**Low**			**Medium**			**High**		

Appreciation for participation

- Thank you for your participation in this 28 day project.
- The Cotton Shopping Bag issued to you is yours to keep
- Please email your responses on this form by sending your save file to tonifersmahidol@gmail.com
- Alternatively, you might hand the completed Checlist package to Khun Malinee at FERS Administration
- Please remember your names will not be used in the analyzed data. Instead a number will be allocated against your response.
- Only group data will be analyzed by aggregate.
- Check this box ☐ if you would like to receive a copy of the Group Research Results when they are **completed.**

Toni Momiroski (PhD Candidate)

1. Important Check ☒ your activity for each and every day (Electricity and Water Meter Reading is Weekly)
2. Check ☒ conservation tasks you complete each day from the list for each of the 28 days
3. If no tasks were completed, then leave blank ☐
4. Check ☒ only items that result from considered effort by you and which differ from choices you would normally make

	ACTIVITY FOCUS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Office	Print double sided	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Photocopy double sided	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Reuse used paper	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Turn Air conditioner one degree UP	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Home	Carry and use cloth carry bag	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Refuse plastic bags at shops	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Reuse Plastic water bottles	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Refuse disposable eating utensils when dining	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Electricity	Reduce Electricity use	Week One	<Enter last Day of week Reading Here>	Week Two	<Enter last Day of week Reading Here>	Week Three	<Enter last Day of week Reading Here>	Week Four	<Enter last Day of week Reading Here>
	Start Day Reading: <Enter Start Day Meter Reading Here>								
Water	Reduce Water use	Week One	<Enter last Day of week Reading Here>	Week Two	<Enter last Day of week Reading Here>	Week Three	<Enter last Day of week Reading Here>	Week Four	<Enter last Day of week Reading Here>
	Start Day Reading: <Enter Start Day Meter Reading Here>								

Figure C1: Intervention activity (practice) checklist

Mood Journal (Total 28 days)

- Important Check ☒ your mood for each and every day
- Indicate your motivation value for each day by placing a Check ☒ mark between 0-9 where 9 is High and 1 is Low. Zero (0) is "Don't Feel like it"

Scale		Motivation Attitude																											
Mood		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	17	18	19	20	21	22	23	24	25	26	27	28
High	9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Medium	6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Low	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Don't Feel like it	0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Figure C2: Intervention mood (intention) checklist

APPENDIX D

CONFLICTING VALUES DATA RESULTS

Table D1: Student conflicting values axis data results - (section 4 questions 1-6)

Clan-Now		*Clan-Prefer*		*Adhoc-Now*		*AdhocPrefer*	
Mean	22.5	Mean	35	Mean	22.5	Mean	27.5
Standard Error	3.273268	Standard Error	4.330127	Standard Error	2.112886	Standard Error	5.900968
Median	20	Median	40	Median	22.5	Median	25
Mode	20	Mode	40	Mode	25	Mode	20
Standard Deviation	9.258201	Standard Deviation	12.24745	Standard Deviation	5.976143	Standard Deviation	16.69046
Sample Variance	85.71429	Sample Variance	150	Sample Variance	35.71429	Sample Variance	278.5714
Kurtosis	0.91875	Kurtosis	-0.72857	Kurtosis	-1.456	Kurtosis	-0.06627
Skewness	0.810093	Skewness	-0.69985	Skewness	-4.5E-17	Skewness	0.030725
Range	30	Range	35	Range	15	Range	50
Minimum	10	Minimum	15	Minimum	15	Minimum	0
Maximum	40	Maximum	50	Maximum	30	Maximum	50
Sum*	6097.5	Sum*	9485	Sum*	6103	Sum*	7452.5
Count*	271	Count*	271	Count*	271	Count*	271
Largest(1)	40	Largest(1)	50	Largest(1)	30	Largest(1)	50
Smallest(1)	10	Smallest(1)	15	Smallest(1)	15	Smallest(1)	0
Confidence Level(95.0%)	7.74005	Confidence Level(95.0%)	10.23912	Confidence Level(95.0%)	4.996181	Confidence Level(95.0%)	13.95357
Market-Now		*Market-Prefer*		*Hierarchy-Now*		*Hierarchy-Prefer*	
Mean	27.5	Mean	18.75	Mean	27.5	Mean	18.75
Standard Error	2.834734	Standard Error	4.091585	Standard Error	1.636634	Standard Error	5.153882
Median	30	Median	20	Median	27.5	Median	25
Mode	30	Mode	20	Mode	30	Mode	0
Standard Deviation	8.017837	Standard Deviation	11.57275	Standard Deviation	4.6291	Standard Deviation	14.57738
Sample Variance	64.28571	Sample Variance	133.9286	Sample Variance	21.42857	Sample Variance	212.5
Kurtosis	-0.31111	Kurtosis	-0.64512	Kurtosis	-1.8E-15	Kurtosis	-1.95591
Skewness	-1.10864	Skewness	-0.24195	Skewness	5.29E-17	Skewness	-0.50153
Range	20	Range	35	Range	15	Range	35
Minimum	15	Minimum	0	Minimum	20	Minimum	0
Maximum	35	Maximum	35	Maximum	35	Maximum	35
Sum*	7459	Sum*	5081.25	Sum*	7457.5	Sum*	5083.75
Count*	271	Count*	271	Count*	271	Count*	271
Largest(1)	35	Largest(1)	35	Largest(1)	35	Largest(1)	35
Smallest(1)	15	Smallest(1)	0	Smallest(1)	20	Smallest(1)	0
Confidence Level(95.0%)	6.70308	Confidence Level(95.0%)	9.675062	Confidence Level(95.0%)	3.870025	Confidence Level(95.0%)	12.18699

*** Sum & Count data reported factor 1:6**

Table D2:Alumni conflicting values axis data results - (section 4 questions 1-6)

Clan-Now		*Clan-Prefer*		*Adhoc-Now*		*AdhocPrefer*	
Mean	16.875	Mean	28.75	Mean	17.5	Mean	23.75
Standard Error	1.6194962	Standard Error	2.4549513	Standard Error	1.6366342	Standard Error	1.8298126
Median	15	Median	30	Median	17.5	Median	25
Mode	15	Mode	30	Mode	15	Mode	25
Standard Deviation	4.5806269	Standard Deviation	6.9436507	Standard Deviation	4.6291005	Standard Deviation	5.1754917
Sample Variance	20.982143	Sample Variance	48.214286	Sample Variance	21.428571	Sample Variance	26.785714
Kurtosis	0.4208239	Kurtosis	-0.5530864	Kurtosis	-1.776E-15	Kurtosis	-0.448
Skewness	0.4877155	Skewness	0.1600183	Skewness	-5.287E-17	Skewness	-0.3864367
Range	15	Range	20	Range	15	Range	15
Minimum	10	Minimum	20	Minimum	10	Minimum	15
Maximum	25	Maximum	40	Maximum	25	Maximum	30
Sum*	3184	Sum*	5290	Sum*	3220	Sum*	4370
Count*	184	Count*	184	Count*	184	Count*	184
Largest(1)	25	Largest(1)	40	Largest(1)	25	Largest(1)	30
Smallest(1)	10	Smallest(1)	20	Smallest(1)	10	Smallest(1)	15
Confidence Level(95.0%)	3.8294999	Confidence Level(95.0%)	5.8050373	Confidence Level(95.0%)	3.8700249	Confidence Level(95.0%)	4.3268193
Market-Now		*Market-Prefer*		*Hierarchy-Now*		*Hierarchy-Prefer*	
Mean	33.125	Mean	22.5	Mean	35	Mean	22.5
Standard Error	2.6621521	Standard Error	1.6366342	Standard Error	1.6366342	Standard Error	4.0089186
Median	32.5	Median	22.5	Median	35	Median	27.5
Mode	30	Mode	20	Mode	40	Mode	30
Standard Deviation	7.5297031	Standard Deviation	4.6291005	Standard Deviation	4.6291005	Standard Deviation	5.7440512
Sample Variance	56.696429	Sample Variance	21.428571	Sample Variance	21.428571	Sample Variance	128.57143
Kurtosis	0.6575981	Kurtosis	-2.665E-15	Kurtosis	-2.1	Kurtosis	1.1861111
Skewness	-0.1516305	Skewness	0	Skewness	0	Skewness	-1.5188572
Range	25	Range	15	Range	10	Range	30
Minimum	20	Minimum	15	Minimum	30	Minimum	0
Maximum	45	Maximum	30	Maximum	40	Maximum	30
Sum*	6095	Sum*	4140	Sum*	6440	Sum*	4,140
Count*	184	Count*	184	Count*	184	Count*	184
Largest(1)	45	Largest(1)	30	Largest(1)	40	Largest(1)	30
Smallest(1)	20	Smallest(1)	15	Smallest(1)	30	Smallest(1)	0
Confidence Level(95.0%)	6.2949893	Confidence Level(95.0%)	3.8700249	Confidence Level(95.0%)	3.8700249	Confidence Level(95.0%)	9.4795862

*** Sum & Count data reported factor 1:6**

Table D3: ANOVA - Student environmental knowledge

ANOVA - Student environmental knowledge

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.473086	14	0.033792	0.567609	0.891888	1.694221
Within Groups	240.2185	4035	0.059534			
Total	240.6916	4049				

Table D4: ANOVA – Student environmental attitude

ANOVA – Student environmental attitude						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	16.28487	4	4.071218	10.33138	3.05E-08	2.37852
Within Groups	531.9852	1350	0.394063			
Total	548.2701	1354				

Table D5: ANOVA - Student environmental practice

ANOVA - Student environmental practice						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.593358	4	0.648339	1.447317	0.216098	2.37852
Within Groups	604.7454	1350	0.44796			
Total	607.3387	1354				

Table D6: ANOVA – Alumni environmental knowledge

ANOVA – Alumni environmental knowledge						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	104.5812	14	7.470083	52.91042	3.5E-131	1.695373
Within Groups	387.5489	2745	0.141184			
Total	492.1301	2759				

Table D7: ANOVA – Alumni environmental attitude

ANOVA – Alumni environmental attitude						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	35.31087	4	8.827717	24.92427	1.3E-19	2.38166
Within Groups	324.0761	915	0.354182			
Total	359.387	919				

Table D8: ANOVA – Alumni environmental practice

ANOVA – Alumni environmental practice						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	86.79783	4	21.69946	29.81086	2.46E-23	2.38166
Within Groups	666.0326	915	0.727904			
Total	752.8304	919				

Table D9: Alumni X-bar process parameters for conservation practiced

X-bar process parameters	
R-bar	1.585
S.D. (R-bar/D2)	1.892377
Lower natural process limit (LNPL)	3.76561
Upper natural process limit (UNPL)	4.16199

BIOGRAPHY

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