

Adolescent Students' Conceptions of Different Environments Through Photographs

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Introduction

In contemporary societies, people experience and understand their environments through different forms of information and personal experiences. Information about the environment is conveyed to people using a range of different forms including print and visual media. While textual information has been the main type conveyed to people, graphic forms of communication are becoming increasingly popular (Gerber 1989). Amongst these graphic forms of information, photographs are used widely to present data about the environment. Personal experiences involving the direct observation of their natural and cultural environments also play an important role in people's understanding of the world. Such experiences enhance their understanding of the environment occur through their indirect observation of the natural and cultural environments of familiar and unfamiliar places (Gerber & Kwan 1994).

People's understanding of their environment is influenced by the nature of their personal experiences directly in interacting with the physical environment and indirectly by viewing this environment via graphic images. Their understanding of familiar places is dependent on their activities in these places, e.g., their movements through these places (Golledge 1992), their use of areas (Hermann & Chaffin 1988) and their interaction with other people whilst at these places (Stokols & Shumaker 1981). A recent study by Robertson (1994) demonstrated how the nature of a person's home environment influenced how s/he viewed other environments. The strong link between the personal experience of environment and the environment itself mediates the ways in which people come to interpret other environments (Kwan 1996). Here, they draw upon their experiences in familiar environments to act as a bridge in their interpretation of wider environments. People's direct experiences, therefore, qualify their broader environmental experiences; e.g., their interpretation of the experience of living in a snow-covered landscape may be quite limited if they have never experienced such a landscape. In such cases, they have to rely on indirect observations of these environments to develop an appreciation of their qualities. Such an appreciation may be quite inadequate and it is the

A B S T R A C T

Photographs of familiar and unfamiliar environments are used extensively in studies about areas around the world. The study reported here describes a pilot investigation of how 27 Australian secondary school adolescent students understood and interpreted a familiar environment (represented by Australia) and unfamiliar environments (represented by Singapore and Hong Kong) through 18 coloured photographs. Few of these adolescent students had visited Singapore or Hong Kong, but most of them have travelled in their home country, Australia. They have viewed more of the Australian environment than the Asian environments through media such as television.

The results from this pilot study revealed considerable variation in their understanding of Australian as opposed to Asian environments. The familiar Australian environments were described in physical and human terms whereas the less familiar Asian environments were described in human and cultural terms. Qualitatively different conceptions were also derived from the adolescent students' interpretation of land use and environment from these photographs.

duty of educators to know what their students understand about environment before they frame up learning experiences about different environments.

Photographs convey environmental perceptual understanding

It is through people's own perceptual direct or indirect experiences that they formulate conceptions about places. On that basis it is easier for them to understand close and familiar places and environments because they have actually been there. But for unfamiliar places and environments, we do not understand clearly how they will perceive and acquire such conceptions of the environment. To echo Walford and Haggett (1995), the use of a photographic image is a very common medium by which people's indirect observation of different environments is achieved. It also helps to convey environmental perceptual understanding when the observers are unable to visit the precise environment.

Eisenstadt and Braun (1985) suggest that photographs can be a particularly valuable resource for teaching at all levels and abilities. Their main aim, according to Eisenstadt and Braun, is to bring out children's thoughts by exploring what the photographs mean to them and how they interpret what is being represented. Eventually through such perceptual interpretation, conceptions about the environment as captured in the photograph can be derived through careful interpretation of the children's experience. Through such a pedagogic learning experience the students can match directly observed information with that included in photographic images.

We now live in a world of representation. Said (1993, p. 66) sees such representations as their production, circulation, history and interpretation which are basically the very elements of culture. Barnes and Duncan (1992) conclude that people decide how things are represented. According to Harrison (1995, p. 285, 288), photographs can emphasise specific features and have the power to bring the unfamiliar places in front of the eyes of the students and represent authority. Almost every day people living in the Western world receive information about events, activities and places in different

parts of the world via the media. Positive and negative images are often used to portray and represent the human (cultural) and natural (physical) environment and such images could leave lasting impressions. The interpretation or decoding of such images and representations is highly problematic. Creating images is highly individualistic and the same is true for the interpretation of images. Deconstruction is a selective process. Readers and viewers may see what they want to see and ignore what does not agree with their preconceptions and existing spatial knowledge. Matthews (1992, p. 65) raises the matter of the naivety to assume that those who encode information impart a clear and unambiguous message to be taken in by the viewers. Burgess (1990, p. 155) thinks that the way people decode media text and images depends on the different contexts in which they read such information and the position (experience) of the individual in relations to such media.

In addition to pedagogic experiences using environmental photographs, adults realise that adolescent students read magazines and watch recreational movies and videos that contain many environmental images. Informally, they are being sensitised to different environments and they attempt levels of environmental interpretation that are commensurate with their levels of conceptual understanding. For example, they are able to differentiate arid environments from rainforest areas. Photographic images are central to their environmental understanding. The pilot study, described below, investigated the level of understanding of environments by 27 Australian adolescent students as these were portrayed on coloured photographs of Australian and two contrasting overseas environments - Singapore and Hong Kong. It focussed on these adolescent students being able to describe the contents of the environments in the photographs and their capacity to reflect on the uses that people made of the different environments. The investigation considered what the adolescent students understood by the concept of environment based on their knowledge of environments from these photographs. This led to considerations of adolescent students' understanding of the environments that are represented by photographs. No attempt, however, was made in this paper to focus on the link between personal experience and understanding of physical or cultural environments.

This study builds on the literature that is presented here by considering how well adolescent students are able to interpret environments from their own country and from other places. Since these images are all presented as photographic images the conceptual knowledge that these adolescent students hold about physical and cultural environments will be important to their understanding and interpretation rather than their direct experience in the actual environments that are represented in the photographs. It is important to know which elements of the environment that adolescent students focus on when they view physical and cultural environments.

Research methodology – materials

A set of 18 photographs (six from each of Australian, Singaporean and Hong Kong environments) was included to represent the familiar local Australian environment and the unfamiliar overseas Asian environments (Singapore and Hong Kong). They were selected by six environmental scientists in each country to identify distinctive physical and cultural environments in their own country. This list of the 18 photographs is summarized in Table 1 below, which reflects the variety of different environments in the three countries as declared by expert geographers. Examples of three photographs are presented in Figure 1 below.

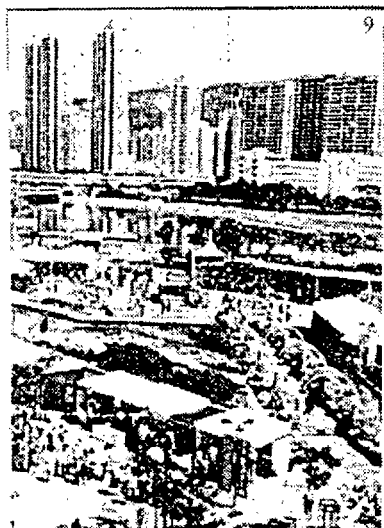
Table 1 The range of environmental photographs used in the Study

| Country | Photographs |
|-----------|---|
| Australia | Sydney Harbour and Business District Arid Australia - Termite mounds Ayer's Rock (Uluru) Canberra - Parliament House Arid Australia - eucalypt tree and rugged ranges Gold Coast - Surfers Paradise and hinterland |
| Singapore | Little India - Hindu Temple CBD and Boat Quay Sentosa Island Resort Changi Airport Tower Merlion Statue CBD and Raffles Statue |
| Hong Kong | Repulse Bay Goddess Statue Sha Tin New Town Mong Kok – intensive residential area Kowloon commercial area New Territories – fish ponds and villa houses CBD on Hong Kong Island |

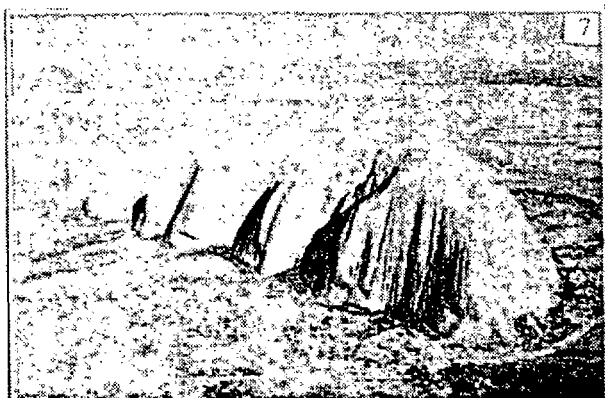
Figure 1. Examples of photographs from the three countries' environments



Singapore: Raffles Statue in the CBD



Hong Kong: Sha Tin City



Australia: Arid inland Ayers' Rock (Uluru)

Research methodology – design and subjects of study

This pilot study is framed in a qualitative research paradigm in which adolescent students were asked to articulate their understanding of different environments through the provision of representative photographs. Since this study is contextually based, there is no need to engage in sampling techniques that are normally associated with experimental study designs. According to the guidelines for a qualitative clinical study, there is a ready admittance to using the students' experience and the notion of 'typicality' which accommodate quality and richness of the qualitative data as expressed by the small cases of subjects of study (Miller & Crabtree 1994). As a result, a group of 27 Australian secondary adolescent students who lived in a metropolitan coastal city were recommended by their school geography teachers to take part in this pilot study. A few of these adolescent students had not traveled to Singapore and/or Hong Kong, but they had all traveled within Australia. They had an extensive experience of environments as they were portrayed in magazines, television, in the movies and on video. These 27 adolescent students who had an average age of 15.2 years and consisted of similar numbers of males and females undertook the following tasks:

1. For each photograph, the adolescent students were required to write down a clear title, which described its contents and location – What do the photographs represent of the environment in the three countries? The intention of this task/question is to reveal the adolescent students' knowledge and association of places with these selected environments.
2. Upon completion of the initial task, each adolescent student retained the eighteen photographs whilst participating in a reflective interview that obtained their description of their experience of the environments in the three countries. Specifically, the adolescent students were asked to respond to the following questions:
 - a) What do the photographs tell you about the three environments - Australia, Singapore and Hong Kong?
 - b) What use do people make of the environments?
 - c) What do you understand by the term 'environment'?

The adolescent students took around 45 minutes to complete these tasks. The first task was completed on a summary sheet that was supplied by the researchers and the second one was audio recorded and subsequently transcribed for analysis.

Research methodology - analyses

The analyses of the data consisted of the following strategies:

1. What do the photographs represent of the environments in the three countries?

The 18 photographic titles suggested by the adolescent students were scored using the following five-point scale. These scores were summarized by photograph and by country to develop summary profiles of the

adolescent students' responses. In addition, individual responses were recorded so that specific profiles could be generated for individual adolescent students:

- A = Correct place and correct environmental features
- B = Correct place only
- C = Correct environmental features only
- D = Incorrect place and incorrect environmental features
- E = No response.

2. What do the photographs tell the adolescent students about the three environments? How do people use these environments?

The adolescent students' responses to these two questions in the interview were analysed in two ways: firstly, a frequency count was made of the key words that were mentioned for each country; and secondly, a phenomenographic analysis (Johansson *et al.* 1985, Marton 1986) was completed to establish the variations in the ways that the adolescent students interpreted the land uses of the environment as they were perceived in the photographs. Through such an analysis, the researchers used the approach of Dahlgren and Fallsberg (1991) to establish the qualitatively different understandings by the adolescent students of the different environments and their uses. General descriptions are derived from the analysed data to indicate the adolescent students' perceptions or understandings of the environments that they have viewed in the photographs. These descriptions are supported by carefully selected excerpts from the interview transcripts.

3. What does the term 'environment' mean to you?

Here, another phenomenographic analysis was completed using the adolescent students' responses to the second question in the interview. This analysis used the same approach as in #2 above revealed the adolescent students' conceptions (i.e., their different understandings) of the environments as portrayed in the photographs.

4. Adolescent students' knowledge of Australian and Asian places

Across those analyses, comparisons can be made between the adolescent students' responses to the photographs of the Australian environments as opposed to those of the Singaporean and Hong Kong environments. These comparisons are intended to draw conclusions about the adolescent students' understanding of environments of local and overseas places as represented in photographs.

Results

The results of this pilot study are reported using the four types of analyses that are mentioned above. They demonstrate the

variations in the adolescent students' understanding of environments through photographs.

1. What do the photographs represent of the environments in the three countries?

The adolescent students' knowledge of environments in the three countries is summarized in Table 2 below. Their knowledge of the different Australian environments was quite good with 30-50 per cent of them knowing both the place and the environmental features that were represented. Most of the adolescent students knew either the place or the features or both. This performance contrasts sharply with their knowledge of environments in Singapore and Hong Kong where they were only able to identify the environmental features. These results indicate that these Australian adolescent students were reasonably comfortable in knowing their Australian environment, but that they possessed inadequate knowledge of largely unfamiliar Asian environments such as those in Singapore and Hong Kong.

Table 2 Summary scores of Australian adolescent students' knowledge of environments in three countries

| | E | D | C | B | A |
|---|---|----|----|----|----|
| 1. Australia | | | | | |
| Sydney | 0 | 2 | 2 | 12 | 11 |
| Arid Australia-Termites | 0 | 6 | 6 | 7 | 8 |
| Ayer's Rock | 0 | 4 | 1 | 9 | 13 |
| Canberra-Parliament House | 0 | 2 | 9 | 3 | 13 |
| Arid Australia - eucalypt tree | 0 | 5 | 8 | 4 | 10 |
| Gold Coast | 0 | 2 | 9 | 7 | 9 |
| 2. Singapore | | | | | |
| Hindu temple - Little India | 0 | 11 | 13 | 0 | 3 |
| CBD and Boat Quay | 0 | 13 | 14 | 0 | 0 |
| Sentosa Island Resort | 2 | 13 | 9 | 1 | 2 |
| Changi Airport Tower | 0 | 10 | 12 | 2 | 2 |
| Merlion Statue | 0 | 12 | 8 | 4 | 3 |
| CBE and Raffles Statue | 0 | 4 | 22 | 0 | 1 |
| 3. Hong Kong | | | | | |
| Repulse Bay Goddess Statue | 0 | 7 | 16 | 1 | 3 |
| Sha Tin New Town | 0 | 17 | 7 | 2 | 1 |
| Mong Kok - intensive residential area | 0 | 10 | 14 | 1 | 2 |
| Kowloon commercial area | 1 | 10 | 12 | 2 | 2 |
| New Territories - fish ponds and villa houses | 0 | 15 | 7 | 2 | 3 |
| CBD on Hong Kong Island | 0 | 9 | 17 | 0 | 1 |

- A = Correct place and environmental features
- B = Correct place
- C = Correct environmental features
- D = Incorrect place and environmental features
- E = No response

2. What do the photographs tell the adolescent students about the environments and how do people use these environments?

The keywords used by the adolescent students and the frequency of their usage are summarised in Table 3 below.

The twenty-seven adolescent students used between 415 and 499 key words in their description of each of the three environments that were represented in the eighteen photographs. While the total number of key words varied moderately across the three countries, the incidence of different types of key words varied much more. Specifically, in the Australian environment the occurrence of words associated with the physical environment and openness dominated. However, in Singapore and Hong Kong environments, words associated with the cultural environment, high density and pollution were the dominant descriptors used. A greater variety of land uses was evident in the words used to describe the environments in Singapore and Hong Kong. Tourism was seen as important in both Australian and Singaporean environments.

These results suggest that environmental educators cannot presume that adolescent students will view photographs of different landscapes in similar ways. They did not seem to reflect on the physical environment in a landscape that is dominated by human occupation and development.

Table 3 What photographs tell Australian adolescent students about environments in Australia, Hong Kong and Singapore (Frequency of Responses) (N = 27 adolescent students)

| Australian Environments | Singapore Environments | Hong Kong Environments | | | |
|-------------------------|------------------------|------------------------|------------|---------------------|------------|
| Natural landscape | 90 | Cultural heritage | 50 | Densely populated | 56 |
| Natural vegetation | 58 | Harbours/boats | 49 | City buildings | 55 |
| Beaches/Coasts | 32 | Gardens | 33 | Housing | 36 |
| Widely spaced | 32 | Religion/Shrines | 32 | City | 34 |
| High-rise buildings | 26 | High-rise buildings | 23 | Temples/Shrines | 31 |
| Tourists | 25 | Dirty/polluted | 20 | Signs/Lights | 25 |
| Cities | 23 | Tourists | 18 | Markets | 25 |
| Planned city | 18 | Densely populated | 17 | Dirty/smelly | 23 |
| Climate | 17 | Cities | 17 | Harbour | 22 |
| Live near coast | 16 | Hotel/restaurant | 17 | Polluted | 19 |
| Dry/Arid | 16 | Climate | 16 | Agriculture | 18 |
| Desert | 15 | Housing | 16 | Transport | 18 |
| Parliament House | 13 | Cleanliness | 14 | High-rise buildings | 15 |
| Harbour | 9 | Airport | 13 | Natural landscape | 15 |
| Clean, blue water | 8 | Fountains | 13 | Industrial | 14 |
| Leisure | 8 | Rivers | 11 | Fishing boat/ships | 14 |
| Soils | 7 | Natural vegetation | 10 | Commercial | 13 |
| Blue sky | 6 | Cultural landscape | 10 | Stuns | 11 |
| Housing | 6 | Commercial | 7 | Hotel/restaurant | 11 |
| High population density | 5 | Transport | 5 | Tourism | 10 |
| Commercial | 4 | Industrial | 5 | River | 6 |
| Unplanned city | 3 | Recreation | 4 | Night club | 6 |
| Variety in landscape | 2 | Roads | 3 | Shopping | 5 |
| Variety in animal life | 2 | Markets | 3 | Coastal | 5 |
| Industrial | 2 | Poverty | 2 | Gardens | 4 |
| Ugly | 1 | Natural landscape | 2 | Cultural landscape | 3 |
| Agriculture | 1 | Cultural differences | 2 | Climate | 2 |
| Grazing | 1 | Models nature | 1 | Traffic congestion | 2 |
| Large scale | 1 | Sky | 1 | Cultural heritage | 1 |
| | | Extinct animal | 1 | | |
| Total | 447 | Total | 415 | Total | 499 |

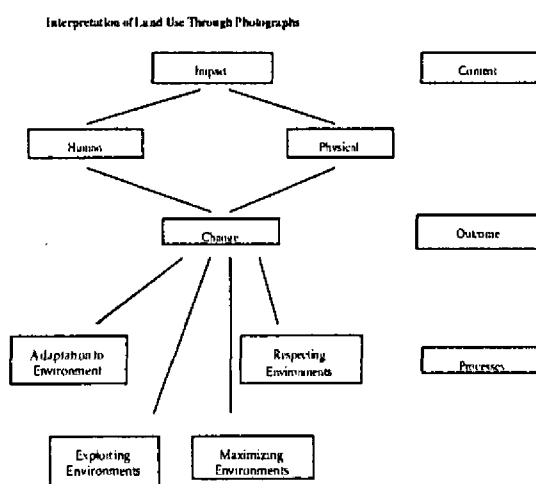
The ways by which land use was interpreted in the photographs by the adolescent students revealed an interesting set of variations, which are summarised in Figure 2. Here, the main variations focus on three environmental aspects - content, outcomes and processes - which are inter-related and which operate as distinctive lens for interpreting the environments

in the photographs.

The context of land use refers to the key concepts that are used to describe different land uses exhibited by humans in different environments. It is explained by the adolescent students consisting of the perceived degrees of impact in people - environment interactions. These degrees of impact are related closely to the extent to which there is human pressure on the environment. Where there is less pressure on the land, e.g., in many parts of Australia, it is possible to keep it more natural. However, where there is heavy pressure, e.g., in Singapore, then a human or commercial focus is promoted. These sentiments were expressed by adolescent student (AS) 1 as follows:

(AS 1): *In Singapore you can only swim in the swimming pools whereas we have the beach. You could swim in Sydney Harbour but the beach, I just couldn't give up the beach. Walking along the East Coast Parkways in Singapore is the main recreational part of Singapore. They get enjoyment from their few recreation areas, but there's so many people there. I don't think there'd ever be a time when they could go somewhere along, really, whereas we just go everywhere. There's just so much land in Australia compared to people. We don't like to spoil our land. We try not to. We like to keep the natural side of it compared to Singapore and Hong Kong which try to develop the commercial side of it.*

Figure 2 Relationships amongst the adolescent students' conceptions of land use from environmental photographs



The content of such impact is explained by the adolescent students in terms of either its human or physical focus. The human impact on land use was expressed most frequently in regard to the urban environments that were represented in the photographs. While some reference was made to the representative Australian environments of Sydney, Canberra and the Gold Coast, the most telling comments were made about the Asian environments concerning the density of advertising in the Mong Kok area, the carefully structured housing developments and the commercial districts in Hong Kong. These comments reflect an adolescent student has

concerns for human impact on environments in different parts of the world. Inherent in these comments are personal concerns for the quality of the environments that result from these interactions. The statements make this point:

(AS 2) : *Like if you were there, you'd just feel like you were drowning in all these signs. It's just so overwhelming.*

(AS 19) : *That shows just how much they're trying to pack into one small area. That one's [photography of Kowloon commercial area] pretty amazing because I've never seen so many houses stacked in a small space.*

(AS 6) : *I'd say that it's probably very developed because of the tight, geometrically designed housing, like they're all the same, like Lego block toys and the rice paddies for growing food up the back.*

The physical impact on land use is characterised by focussing on the impact of physical processes of different environments, e.g., the impact of coastal processes on an area such as the Gold Coast along the central eastern coast of Australia. Here, the perceived effect of coastal erosion has been to reduce both the quality and extent of sandy beaches in a tourist centre such as the Gold Coast. Such erosion was believed to threaten the existence of beachfront buildings. As the following adolescent students said:

(AS 20) : *Erosion, like take that dune away and the buildings [on the Gold Coast beachfront] would just collapse.*

(AS 6) : *No. 16 [Gold Coast beach area]. I think that's very fake. I saw a video a few weeks ago about how dunes migrate inland or during storms all the sand gets eroded away and then it comes back. It builds up gradually over the years, and how the soil has, how the sand has cut into the beach and taken up to 100 metres off the coastline and because these buildings are very close, if that happens, they just fall away into the ocean and, but the river here, which is probably not a real river because it doesn't actually go anywhere, or unless it goes behind the buildings.*

The processes that affect the land uses in the different Australian and Asian environments were seen by these adolescent students to be four in number - adaptation to environment, exploiting environments, maximising environments and respecting environments. These four processes were prominent throughout the adolescent students' responses. This range reflects the extent to which people or nature was seen to control the process of land use. It also reflects the varying attitudes of the adolescent students towards land use, ranging from outright use and abuse of the available resources through to a consideration of sustainable management of available resources.

The process of adaptation, for example, is seen to be a natural response by people when they practice living in different environments. This process, in theory, is one in which people implement land uses which suits the environment. However, this does not always work and some form of abuse occurs, e.g., we pollute the oceans with waste or we overcrowd waters that are located within large urban areas. Therefore, adaptation to particular environments is often over done by different social groups. As adolescent student 7 states:

How people use their environment. They use it for their own benefit such as fishing, to make a living. They use the environment, or water as an example, we stupidly put waste into the ocean to pollute it because we don't know what to do with certain wastes. We live in the environment. We try to adapt to wherever we go to suit that environment and what it is, but like in #3 [Singapore CBD and boat quay], the people on boats, I feel there must be markets or fishing or something - like that near the city so that they can deliver. We overcrowd our waters.

The process of respecting the environment when using it is quite different from that of adaptation. Such respect may be viewed positively and negatively. In a positive sense, respect for the environment is demonstrated in the desire by people to protect their environments. Protection may be evidenced in the commitment to the natural environment through the designation of areas as national parks. Alternatively, it may be evidenced in the need to clean up the environment, e.g., to reduce water pollution in rivers, or the need to reduce the population densities of heavily populated urban and rural environments. The adolescent students concluded that a better quality environment resulted from protecting it from human excesses. The following three statements by adolescent students 3, 23 and 7 highlight these points:

(AS 3) : *It shows that the country doesn't really respect the environment around the canal especially [Singapore boat harbour]. It looks all dirty and sooty and stuff.*

This lack of respect for the physical and cultural environment was a powerful force in indicating obscurely that we should care for our environments.

(AS 23) : *Well from the photographs, it looks Australia protects its environment through National Parks and in Asia we didn't see National Parks or wilderness areas and there was not much vegetation. It's not really good for the environment. I think the Asian countries are just too over populated.*

Here, the respect for environment is construed through the development of national parks which are believed to occur away from heavily populated areas. In a limiting sense, national parks are believed to occur only in sparsely populated areas.

(AS 7) : *I think that Brisbane isn't too bad with pollution, but I see the river being dredged for soil and things like that. Where we try we could have a blue river. That would make a big difference. It looks nicer than having a brown river.*

The final two processes - maximising and exploiting environments - have some similarity in their demonstration of humans' desire to control or extract maximum benefit from the resources in respective environments. However, that is where the similarity ceases. The concept of maximising the land use in an environment relates to the extracting of maximum economic benefit from the environment without intentionally abusing the environment physically. The example of coastal development along the Gold Coast focuses on maximising the tourist potential of the region by building sufficient numbers of large hotels and other forms of accommodation along the coast. It is not a focus on protecting the coastal zone because of its natural environment. For example, adolescent student 3 says:

Shows that Australians, in this case Queenslanders, use the environment to their benefit by putting all their high rise buildings and everything along the coastline there. It's the tourists who come to stay in the hotels with the good views. They use the environment to benefit.

The idea of exploitation of the environment as the basis for land use was not viewed in a positive way by the adolescent students. Rather, they saw it as an irresponsible act as people over used their environment and misused it. The result of such misuse is environmental degradation, especially of the physical environment. Economic exploitation of resources was not prominent in this sense of abuse. This perception indicates that the adolescent students were able to inject their personal environmental values into their understandings about the use of these environments. As the following adolescent students note:

(AS 27) : *Not very well [use of their environment]. It looks like everything's exploited, everything's so dirty and the city's not visually appealing.*

(AS 14) : *When you look at photograph #18 (the CBD of Hong Kong Island), you don't see any trees and the only natural thing you see is water, which is probably polluted anyway. And there's pollution in the sky.*

The lack of natural vegetation was construed by these adolescent students to mean that the local people do not care for their environment.

The dominant outcome from the above-mentioned content and processes on the land use in the environments represented in the photographs is change. The idea of change has two perspectives - variations or changes in land use across an environment and the changes that occur within an area over time. Both perspectives offer reasonable approaches to

understand the outcomes of land uses on environments.

The idea of variation across landscapes was seen to be a basis for exploring these changing environments. It was a definite basis for comparing Australian and Asian environments. The Australian environment was judged to be full of variation and interest whereas the Asian environments were presumed to be monotonous and boring. The basic reason for these comparisons was the extent to which Australia was underpopulated and Asian countries were overpopulated. As adolescent student 1 stated:

Flying over Australia and looking out the window of the plane, we see just an endlessly changing landscape whereas flying over #15, which is Hong Kong, you see the same buildings with a few mountains, but our landscape is endlessly changing and an endless amount of variety for people to explore. You'd never be bored if you explored Australia totally. You'd never see everything that our country has to offer whereas Singapore, the first two times I was there, I'd basically seen all that they had to offer. I think basically it comes down to our natural environment compared to Singapore, Hong Kong and all the Asian countries, overpopulated countries. I know it's because of the dense population and because they just crowded everything in.

The idea of changes in a landscape reflects its dynamic nature. The results of human impacts and natural processes at work are continuous and so the resulting land uses change. For example, when urban areas take over rural environments, the resulting change can be the development of an urban. However, the urban areas, themselves, are likely to undergo changes as demands for urban land use change.

3. What does the term 'Environment' mean?

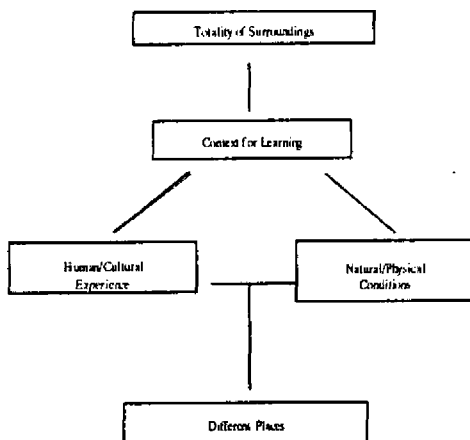
A culminating task for the adolescent students was to ask them to reflect on the meaning of the concept of environment as they had experienced it in the set of photographs from Australian, Singaporean and Hong Kong environments. The extent of the variations in the adolescent students' experience is summarised in Figure 3 below. Five qualitatively different variations were evident. They ranged from different types of places, e.g., places of resources, places to enjoy, facilities and groups of things; human/cultural understandings or experiences, e.g., cultural artefacts, cultural and personal environments, human adaptation, human lifestyles and extent of people; natural or physical conditions, e.g., natural environments and physical elements; a context for learning, i.e., a place in which living things can learn to live in their world, and the totality of one's surroundings. The relationships between these variations demonstrate a hierarchical form with the focus on places being the narrowest lens with its target being individualised types of places and the widest lens being the focus on the totality of surroundings, i.e., adopting a holistic approach to environment. Figure 3 highlights that specific places may be used to explain either human/cultural experiences and/or natural or physical conditions. These

variations provide a meaningful context for learning about environments and ultimately a basis for understanding the totality of one's surroundings. They indicate that adolescent students do hold different understandings about environments in differing levels of comprehension and degrees of generality.

4. Adolescent students' understanding of different places

This group of 27 Australian adolescent students has certainly demonstrated considerable variation in their understanding of differing places as the result of their interaction with eighteen photographs of distinctive environments in Australia, Singapore and Hong Kong. As the interpretation of the data showed, a few of the Australian adolescent students were familiar with Singaporean and/or Hong Kong environments. However, most of the adolescent students were only familiar with environments in their home country. This was reflected in their better understanding of the Australian environments. On the other hand, the adolescent students gave more negative comments to reflect their perceptual impression of less familiar Asia environments. However, the few adolescent students who were familiar with Singaporean or Hong Kong environments held similar levels of understanding of all three country environments that were represented in the photographs.

Figure 3 Relationships amongst the adolescent students' conceptions of Environment from environmental photographs



Their understanding of familiar environments was characterised by an understanding of the location of the environment and the predominant features evident in it. This was true for environments that were dominated by physical or human features. Where inconsistencies occurred in viewing photographs of familiar environments, the adolescent students were generally able to locate the place in the photograph, but were partially correct in their interpretation of the pertinent environmental features.

This was generally not the case when the adolescent students encountered photographs of unfamiliar environments whether they were located in Australia, Singapore or Hong Kong. Here, they could not locate the place in the relevant country. At

best, some of them were able to identify relevant environmental features. Mostly, they offered either incorrect locational and environmental information or no response at all. Those who were able to identify appropriate environmental features usually did so with photographs of Australian environments.

Both the Australian and Asian environments that were represented in these photographs contained physical and human environments. In the Australian environments, both physical and human aspects were emphasised by the adolescent students. However, in the less familiar Asian environments the emphasis was squarely on human and cultural aspects. Their greater familiarity with the Australian physical environment and their heightened interest in the cultural differences in unfamiliar, overseas environments could account for the nature of these responses.

Conclusion

Walford and Haggett (1995) point out that most environmental studies' students undertake a great deal of their studies by observing and investigating photographs of different places and areas around the world. These photographs will invariably be of places that are familiar and unfamiliar to the adolescent students. Many of these photographs will be found in textbooks or atlases and the teachers usually assume that the students can interpret each of these photographs similarly. Additionally, many magazines contain environmental photographs that project images of certain environments. Adolescent students peruse these photographs in their leisure activities and develop their own images of different parts of the world.

However, what this study has indicated is that adolescent students will vary quite markedly in the accuracy of their knowledge of environmental significance of photographs of places on the basis of their capacity to interpret these photographs.

This capacity is reflected in the adolescent students' capacity to understand key concepts concerning land use, the processes that affect different land uses, the impacts are outcomes of these land uses, including the changes that are produced by different land uses. The extent of human occupancy was viewed to be an important guide in the adolescent students' interpretation of the nature of human impacts in the environments that were represented in the eighteen photographs. These outcomes reflect the extent of adolescent students' knowledge about environments that were represented in environmental photographs. They also provide some insights into the skills that the adolescent students are able to use when interpreting environmental photographs. Such skills include the capacity to analyse the different elements of each landscape, the forces that shape the landscapes and the resultant features which change overtime and occupance. Further, within these interpretations of environments, one can detect evidence of the environmental values that the adolescent

students hold and which are applied to the different environments in the set of photographs. Some of these values are pro-environment and some are anti-conservation. Collectively, they offer insights about the adolescent students' feelings towards environments.

In addition, these adolescent students' understanding of the concept of environment reveals the different levels of environmental perception that they value. These extend from very focused perceptions, eg., different places, through to Gestalts of environment that are based on possessing a 'total picture' perspective of environments. Adolescent students who hold these extreme views will likely hold quite different perspectives about the environment. These differing views are likely to affect the way that adolescent students interact with their environments and may be useful in identifying which adolescent students have an empathy for environments and which ones who do not.

Since much of the literature focuses on how adolescent students construct and de-construct environments as they are represented in coloured photographs, this study introduces the idea of taking seriously what adolescent students view or interpret in such photographs, what skills they use in such interpretive tasks, and what feelings that these adolescent students have towards the environments that are portrayed in the photographs. This acknowledges that adolescent students do view environmental photographs in formal and informal educational experiences. It also acknowledges that adolescent students will have differing degrees of familiarity with the environments represented in the photographs.

Collectively, these statements suggest that environmental educators have at least two roles to play in facilitating adolescent students' learning about environments using photographs. Firstly, in formal education, they need to select photographs very carefully for use in learning tasks. To do this, they need to have an understanding of adolescent students' capacity to interpret photographs; some idea of these adolescent students' knowledge of different environments; and the adolescent students' attitudes and values concerning environments. Then, building on their pedagogic skill and experience, these educators can engage adolescent students in learning about, in, and for environments using photographs. Secondly environmental educators have little control over the photographs of environments that adolescent students use in their leisure time or during non-formal learning activities. However, they can hope for some transfer of learning from the formal learning to the non-formal learning activities. These are challenges for effective environmental education. After all, we really should believe that a photograph is worth a thousand words through its holistic representation of different environments around the world. 🌍

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