Tourism Geoscience: A New Subdiscipline in Geoscience Education

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Abstract

Tourism Geoscience is a new subdiscipline of geoscience education. It is also a paradigm for understanding the earth environment for long-term nondestructive utilisation of its heritage. The subdiscipline focuses on geoscientific assets management, land use planning and development of the human habitat. These are the main components of its elaboration. The other major trust of Tourism Geoscience is resource evaluation. It converges on the interrelationships between geoscape foundation, biotic system and human culture. We can visualise the premise as anthro-bio-geo-ecosystem. This leads us to appreciate ideas such as 1-Intrinsic value, 2-Non-destructive Resource Utilisation, 3-Dynamic Equilibrium and Continuum of Ecosystem, 4-Human Habitat Planning and Earth Environmental Foundation Management, and 5-Touristic Development Abstraction as the Precursor of Tourism Development. The Tourism Geoscience subdiscipline can now be described as a fusion process for achieving sustainability. It involves evaluating, planning and managing geoscape resources. The main goal is towards sustainable development of a human industry. The career of a tourism geoscientist would span the entire life span of geoscape utilisation. It covers a wider range of responsibilities from exploring, discovering, planning and managing. This is in response to new emerging industrial trends, rising standard of living and greater leveraging of knowledge. It is imperative that initiatives for a broader approach to geoscience training are explored. As the science for understanding the earth, geoscience can become a popular science. Only then can the prospect for statutory recognition and a greater role of geoscientist in society can be realised. At the School of Environmental and Natural Resources Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Tourism Geoscience has now been offered as an option. All students of the school can register for a package or a module in Geology and Environmental Science programmes, respectively.

Geosains Pelancongan: Satu Subdisiplin Baru Dalam Pendidikan Geosains

Abstrak

Geosains Pelancongan merupakan satu subdisiplin baru dalam pendidikan geosains. Ia juga menjadi satu contoh yang baik dalam memahami sekitaran bumi jangka panjang tanpa merosakkan warisan yang tak boleh diperbaharui ini. Subdisiplin ini memfokuskan pada pengurusan aset geosaintifik, perancangan guna-tanah dan pembangunan habitat manusia. Ini merupakan komponen utama pengolahan. Satu lagi kepercayaan utama Geosains Pelancongan adalah penilaian sumber. Ia melibatkan perhubungan rapat antara asas geoskap, sistem biotik dan budaya manusia. Kita boleh bayangkanianya sebagai ekosistem antro-bio-geo. Ini membolehkan penghayatan idea seperti 1- Nilai Intrinsik, 2-Penggunaan Sumber Tak Boleh Diperbahrui, 3- Keseimbangan Dinamik dan Kekekalan Ekosistem, 4- Perancangan Tempat Tinggal dan Perancangan Asas Persekitaran Dunia, dan 5- Kesedaran Pembangunan Pelancongan sebagai Pembangunan Pelancongan Awalan. Subdisiplin Geosains Pelancongan bolehlah dikatakan sebagai proses penggabungan untuk mencapai kemampanan. Ia memerlukan penilaian, perancangan dan pengurusan sumber geoskap. Objektif utama ialah ke arah pembangunan mampan industri kemanusiaan. Kerjaya geosainstis pelancongan akan menjangka hayatkan penggunaan geoskap. Ia meliputi julat yang lebih besar dalam penjelajahan, penemuan, perancangan dan pengurusan. Ini merupakan maklum balas daripada kemunculan tren industri, peningkatan taraf kehidupan dan perkembangan ilmu. Adalah mustahak inisiatif untuk pendekatan yang lebih luas dalam latihan geosains didalami. Sebagai sains untuk memahami bumi, geosains boleh menjadi sains terkenal. Dengan itu, taraf dan tanggungjawab geosaintis dalam masyarakat akan lebih dihargai. Di Sekolah Sains Alam Sekitar dan Sumber Asli, Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia, Geosains Pelancongan sekarang ditawarkan sebagai satu pilihan. Semua pelajar di institusi ini boleh mendaftarnya sebagai satu pakej atau modul samada dalam Program Geologi dan Sains Alam Sekitar, masing-masing.

INTRODUCTION

Geoscience education is adaptive in character. Its steady evolution is analogous to earth internal and external processes in that it represents a nonlinear system. Goldstein (1994) describes the system as having the capacity for transformation and the tendency toward change, growth and development.

History of geoscience education has evolved from curiosity, fascination, and the sense of belonging of many people. They were naturalists, philosophers, religious clergymen and economists to name a few. Fascinations with world phenomena have had a profound influence on the development of geoscientific thinking. Initially the thinking process had encapsulated in the faculties of many early thinkers seeking reasons and explanation for the

unknown and the unexplained events on earth. Gradually it has become more coherent in presentation and geoscience has become a formal discipline. Adaptation of geological knowledge to new emerging industries has been the tradition of geoscience education.

The main objective of this paper is to highlight that geoscience education in Malaysia has evolved significantly. It has reached a point where geoscience discipline has to embrace and integrate other disciplines in its curriculum development. This must be seen as enhancing the science and the arts for understanding the earth as quality living space. Tourism geoscience, as a new subdiscipline, embraces this paradigm. It is being developed at the School for Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia. This initiative is pioneering in nature. The Tourism Geoscience subdiscipline has until now not been formally incorporated into geoscience education.This paper also reports on the development of geoscience education at Universiti Kebangsaan Malaysia.

CONCEPTUALISATION OF TOURISM GEOSCIENCE

The original idea or the seed of Tourism Geoscience was a spinoff from the geological research and nature based collaboration work in Sabah in the 80s. An example is the establishment of Danum Valley Research Centre in Sabah in 1986 (now a privately run nature resort centre). The Centre was managed jointly by the Sabah Foundation, the Sabah Forest Department, Royal Society, London and the Sabah Campus, Universiti Kebangsaan Malaysia (Marsh, 1991). In such collaborations, clearly the geoscientific assets have never been the focus of planning and management considerations. This was despite the fact that the Danum Valley area provides a window to 'Pangean' historical records and the foundation of biodiversity. Two issues are obvious. They are about availability and popularity of geoscientific information for planning and management decision making processes.

Tourism Geoscience was suggested in 1990 as a planning paradigm, in particular for the CTAB (Combined Tourism and Agriculture Based) idea for rural development (Kadderi, 1990). Similar thought was also incorporated as an approach for tourism development (see Ibrahim and Kadderi, 1989; Kadderi and Ibrahim. 1989).

To promote Langkawi as tourist destination, the Kedah State Government initiated a seminar in 1989. The theme of the seminar was Tourism Development of Langkawi: Its Natural History. Among papers from several disciplines, two geoscience-based papers were presented during the oral and poster presentation. Both papers highlighted the then new idea of intrinsic value of physical materials and a mechanism for experiencing the intrinsic value paradigm (Ibrahim and Kadderi, 1989; Kadderi and Ibrahim, 1989). Figure 1 illustrates the initiative that involves The Kedah State Government as a stakeholder and Universiti Kebangsaan Malaysia as a research entity. It was envisaged then that both the stakeholder and the research organization would collaborate, playing a coupling role in evaluating and managing geological heritage of Langkawi for tourism development.

From this, Ibrahim and Hamzah (1993) built up a definition of Tourism Geoscience as a proposed new branch of applied geoscience that deals with applications of geological knowledge in developing ecotourism through systematic characterisation of new areas and enhancing the appeal of existing tourist destinations

The early initiative has led to a concerted effort in research. Since 1995, the Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia has embarked on systematic research. The new paradigm of the research is nondestructive utilisation of earth resources, and the propagation of the intrinsic value idea for ecotourism development. To date two books have been published, summarising progress on this research initiative (see Ibrahim and Shafeea, 1999: and Ibrahim *et al.*, 1997), and two pioneering theses on this area in Malaysia was completed (see Marilah, 1999 and Dana, 1999). Later, the conservation paradigm then became the focus of development. Ideas from the more accepted biodiversity initiatives have been investigated (see Marilah, 1999).

The conservation movement has started to regain momentum among geoscientists. For example The Malvern International Task Force for Earth Heritage Conservation was established in July 1993 (Wilson,1994). In Malaysia, similar post world war initiatives have started much earlier. For example, Aw (1977) stresses the importance of geological conservation. A list of important geological sites for conservation and preservation purposes was made available. Similar effort by Lee (1992), on fossil localities in Malaysia, forms part of National Conservation Strategy. See also Yong (1989) for an elaborated effort entitled Conservation of Geological Features in Peninsular Malaysia. In research and development for the conservation of geological resources, Malaysia has been successful in articulating the agenda around the intrinsic value of physical materials. A summary on the progress in Malaysia is given by Ibrahim and Shafeea (1999), Marilah (1999), Marilah *et al.*, (1997), and Ibrahim *et al.*, (1997).

In the US, the conservation movement probably had its roots from events leading to the establishment of the first National Park in the world in 1872. An area 3,350 square miles in Myoming, Idaho, and Montana was placed under federal protection (Bauer and Bauer, 1993). More recently, Springer (1997) suggests that conservation geoscience as a framework for understanding, restoring and maintaining nature. He defines Conservation Geoscience as the application of geological sciences to the care and protection of the resources of the earth that are necessary for all species.

ABSTRACTION OF TOURISM GEOSCIENCE THOUGHT

In geoscience education, we can study the evolution and adaptation of the training programme. It has reached a level where processes, practices, methods and technologies can distinguish, for example, mining geoscience from that of petroleum geoscience. These disciplines have evolved primarily due to the high demand for materials and energy. In only a few decades geoscience education has responded to serve wealth creation initiatives such as mining, petroleum and construction industries either directly or indirectly.

However, the exploitative behaviour of the above industries is obvious. These industries exploit the earth resources destructively. We would prefer to group these wealth creation initiatives as machine industry. The term machine industry is chosen to suggest Newtonian influence that subsequently paved the way for the famous industrial revolution predominance in infusing the separation of human and machine. The geoscientists have been a party to this school of thought, in supporting the machine industry. Our role as pioneers of wealth creation is legendary. Discovery and processing of new lodes, oil reservoirs and construction materials occur every day. These are testimonies of our collective efforts. The net outcome of our initial contributions causes some degree of earth environmental degradation. Unfortunately, after the discovery of the earth's valuable resources, we have no control over the manner in which these resources are exploited.

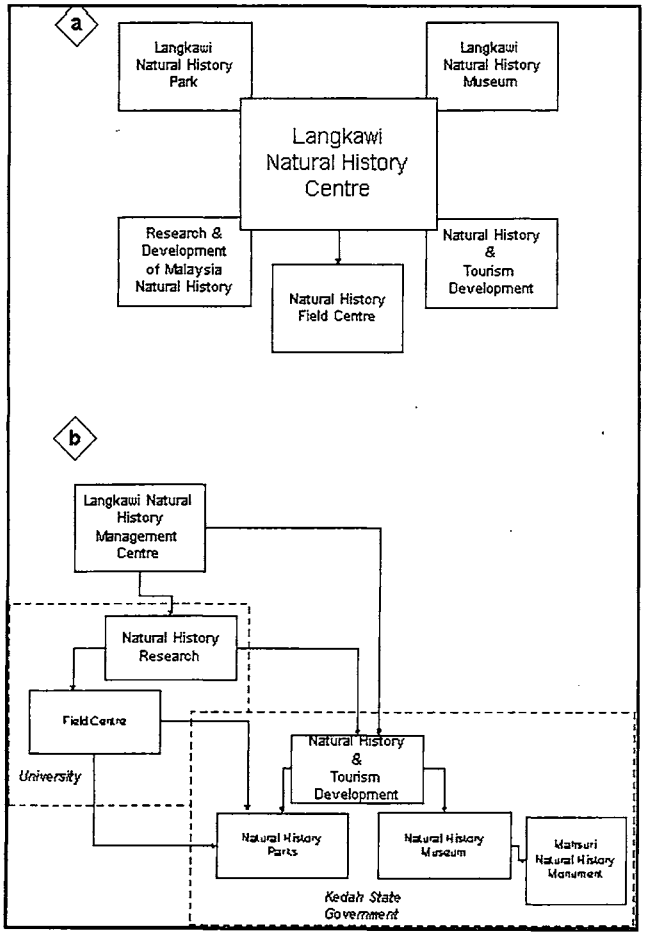

Figure 1: An initiative linking the natural history and tourism development of Langkawi based on the rich natural heritage of the Isles. a) Framework of Langkawi Natural History Premise, b) Management structure for the integration of knowledge and tourism development (after Kadderi & Ibrahim, 1989).

At the transition stage for the new millennium, we must take pleasure and analyze our contributions and responsibilities. On the initiation, apparently we have a far greater role to play. A balanced evaluation mechanism of earth resources is one example. We would prefer to have alternatives on how we assess earth resources. The idea is to reduce environmental degradation resulting from high demand for material and energy supply from the earth. Albert Einstein's statement "we can't solve problems using the same kind of thinking we used when we created them," provides the clue to move forward. We need a different mindset to initiate complimentary geoscience training besides the established subdisciplines.

One paradigm is consideration for ideas toward wealth creation initiatives and subsequently toward creating a human industry. Ideally this would involve a balanced treatment of the earth resources. The exploitative and destructive nature of the machine industry could be balanced by sustainable utilisation of the human industry. This is the way forward and should provide a viable balancing paradigm as the nation's economic development puts greater and greater emphasis and supports, as always, the machine industry.

If we look from another angle, economic growth is a prerequisite for quality living. We can anticipate how the standard of living relates to awareness towards conservation among people of a nation. While the conservation movement provides the philosophical framework, a new kind of industry that support the sustainable economic growth agenda should be pursued. The issue here is how we use valuable earth resources intelligently.

The challenge comes when initiating new motivation. One step forward is the establishment of Tourism

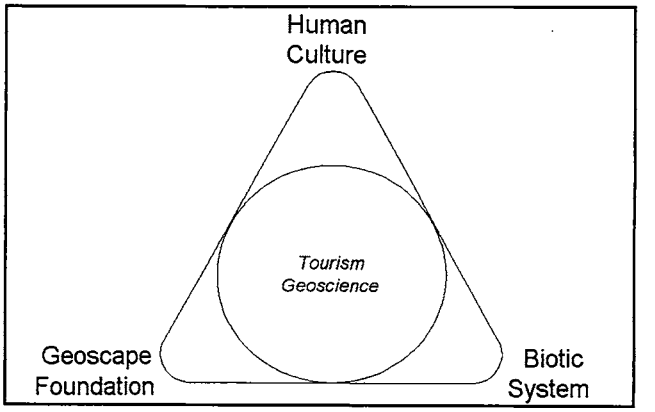

Figure 2: The evaluation paradigm in Tourism Geoscience centres on interrelationships between geoscape foundation, biotic system and human-culture. The above triangular diagram reflects an anthro-bio-geo-ecosystem (Modified from Kadderi, 1995)

Geoscience as a new subdiscipline in geoscience education. The first structure has been established for tourism geoscience undergraduate training at the School of Environmental and Natural Resource Sciences, Universiti Kebangsaan Malaysia (Kadderi, 2000).

FOCUS OF TOURISM GEOSCIENCE

In Tourism Geoscience, the main trust of resource evaluation is the interrelationships between geoscape foundation, biotic system and human culture (Kadderi, 1995). Figure 2 depicts such a relationship as tripartite anthro-bio-geo-ecosystem.

The inclusion of human culture and geoscape ecology (an anthro-bio-geo ecosystem) into the evaluation model of earth resources is essential. It marks the importance of Tourism Geoscience as a new subdiscipline. In this regard, the human factor, or the coupling of human and their geoenvironment rather than tourism development gives credence to the new subdiscipline. Kadderi (2000) further summarises the following ideas about the development of Tourism Geoscience as asubdiscipline.

1. The concept of intrinsic value
2. The concept of nondestructive utilisation
3. The concept of dynamic equilibrium and continuum of ecosystem
4. The concept of human habitat planning and earth environmental foundation management.
5. The concept of touristic development as a precursor for tourism industry

The first concept of intrinsic value will be touched upon during this conference using the Geoscape Conceptual Framework. From the list above, it appears that tourism development takes less than one fifth of the general ideas. Furthermore, tourism development is only an extension of the touristic development concept in the tourism geoscience subdiscipline. This means that an incubation phase of touristic development is mandatory before tourism development follows. As we dwell upon the above concepts we can now redefine the new subdiscipline of Tourism Geoscience. "Tourism Geoscience is a new subdiscipline in geoscience education that emphasises fusion of evaluating, planning and managing of geoscientific assets and resources in an ecosystem for sustainable development of a quality human habitat."

THE TOURISM GEOSCIENCE CURRICULUM

The curriculum of Tourism Geoscience includes touristic ideas as a development paradigm, which is most about rapidly developing nations such as Malaysia. As evaluating paradigm in tourism geoscience differs from the subdisciplines of mining and petroleum geosciences, a new training programme must be put in place at the tertiary level education. The programme would balance the perspective on how we evaluate earth resources.

At the School of Environmental and Natural Resource Sciences, Universiti Kebangsaan Malaysia, Tourism Geoscience is being offered as a subject to all students majoring in Geology, Environmental Science, Marine Science, and Biology. In the Environmental Science Programme it is offered as a course in the Environmental Geoscience Module. It is also being offered as a package in the Geology Programme. The status of the package equals that of Mining Geoscience, Engineering Geoscience, Environmental Geoscience, Quaternary or Petroleum Geoscience subdisciplines (Figure 3).

SUMMARY

A human industry is an industry that involves nondestructive utilisation of earth resources for the consumption of the human mind. Tourism industry has many attributes that overlap with an ideal model of a human industry. Following the previous tradition of geoscience education in serving various new emerging industries, development of the tourism geoscience subdiscipline will focus on the attributes of the tourism industry.

The tourism industry is a rapidly growing industry in the 21st Century. In the next five years it is estimated that the emerging travel and tourism industry will grow very rapidly at about 46%. The latest estimate suggests that it could generate about 3.5 trillion US Dollars in GDP and

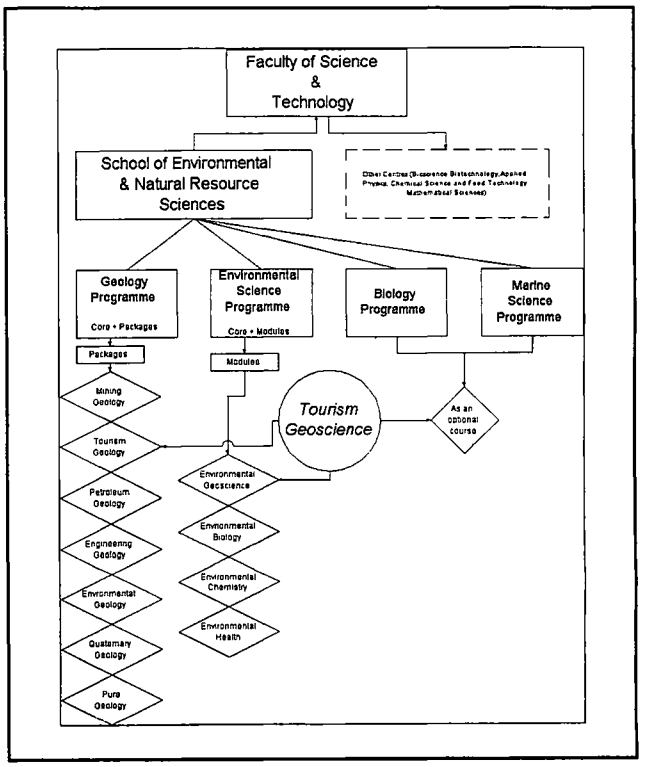

Figure 3: The position of the tourism geoscience subdiscipline in geoscience education at the School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia.

employ 200 million people by the year 2005 (Travel and Tourism, 1999).

In Malaysia, the tourism industry ranks high among foreign exchange revenues. It is an industry comparable in size to that of the manufacturing or other important economic sectors and will continue to contribute significantly towards long-term wealth creation in Malaysia.

An industry of this size requires a holistic approach in resource inventory, categorisation, management and utilisation. The tourism industry also obligates a higher degree of creativity for sustainable resource utilisation in both the natural and built environments. As such, it demands an integrated planning and careful scenario building of future requirements to cater for the rapidly growing and, globally, very competitive industry. There is a need to safeguard existing resources and to create new class of resources. This calls for a liberal and holistic approach in research emphasis.

One area of research in Tourism Geoscience that is vital to be pursued would be "Integrated Geoenvironmental Management for Touristic Development". The emphasis would be on touristic development not tourism development. Tourism development has not been emphasising the significance of geoscientific assets, the foundation for touristic development. The basic concepts will be incorporated into the new Tourism Geoscience subdiscipline. It will be introduced as a package at the School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, UKM.

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