AC 2008-1621: EXPLORING THE ECO-PEDAGOGY OF AN URBAN ECO-TOURISM HILL PATH DESIGN

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Abstract

The eco-tourism hill path engineering design located in a metropolitan area always faces the conflict between the need to satisfy strong recreation needs and the need to protect the ecology from a negative impact as well as the question of how it can be comprised across different kinds of value systems. In order to uncover the different value systems hidden in different disciplines, and to determine how it affects sustainable design judgment, an experimental exercise was designed in the course of construction technology education. An urbanized eco-tourism hill path design near Taipei 101 was designated as the exercise topic, and the team’s members engaged in the exercise came from different disciplines included: landscape architecture, urban design, and civil engineering. Results of the exercise showed that there are two driving forces related to the value judging base: recreation needs and ecological concerns of environmental bio-diversity, which affected the engineering design decision. By examining the dilemma of these two elements in the value judging base, the paper argues that we need to re-examine the procedure and methodology of the urbanized hill eco-path engineering design. To achieve the optimal solution for an eco-engineering project, the concept of multi-disciplinary participatory design processes with a generalist base of engineering pedagogy, was finally proposed.

Introduction

Landscape architectural design and site engineering construction require mutual interaction during professional practice in order to perform the built-environment in a complex natural setting. Landscape architecture includes the planning, design, management, and preservation of human-made constructs. The engineering design concerns the process of originating and developing a plan for an engineering product, structure, system, or component. In practice, landscape engineering designers tend to work for clients who wish to commission construction work, so the focus is more on the engineering techniques. In order to bridge the gaps between the design product and the end users, more and more community design is being focused on a participatory design process, in advance.

Recently, the issues of sustainable development have become more and more important, driving planners from passive action to active preservation. The concepts of sustainability planning focus more on the bio-diversity of the constructed environment. From the viewpoint of bio-diversity and ecological sustainability, we need to maintain an attitude of equality and respect regarding other species [1, 7, 8, and 9]. More and more disciplines are using the same buzzword “sustainable” in their professional action; the emphasis in a sustainable engineering design always differs because of hidden value systems within different professional trainings [3, 5]. These contradictions always accompany most eco-engineering design processes, especially those eco-sensitive environments such as high density urban areas. For example, an
eco-tourism hill path located in a metropolitan location faces the dilemma of needing to cater to recreation needs while also mitigating any resulting ecological impact.

In order to uncover the different value systems hidden within different disciplines and determine how they affect the sustainable design judgment, an experimental exercise was designed in the course of “Construction System for Planning and Design” for the Graduate Institute of Building and Planning, NTU. An urbanized eco-tourism hill path design near Taipei 101 was designated as the topic of the exercise. The team’s members of the exercise came from different disciplines; their backgrounds included: landscape architecture, urban design, and civil engineering.

Near Taipei 101 and the new metropolitan CBD, Elephant-Hill is located in the Hsin-I District, Taipei, Taiwan. An eco-tourism pedestrian path of the hill provides eco-recreation primarily for people who live in the area. Elephant-Hill possesses rich resources in terms of ecological, geological, and landscape features. Regarding an eco-tourism path on Elephant-Hill, the planner faces the dilemma of balancing user value and environmental impact in the site engineering design processes, involving different value systems generated by different kinds of end users and varied professional backgrounds of the team members.

Accordingly, we describe an inter-disciplinary eco-design that utilizes concepts and methodologies intended to create a comprehensive approach through collaborative learning and eco-design. In the processes of carrying out the eco-engineering design exercise, inter-disciplinary collaboration can be worked out, as well as how different kinds of value system can be re-examined. The optimal way of realizing inter-disciplinary collaboration and its respect methodology can be proposed. As a pedagogical model for integrating the sustainable design issues, the course curriculum: “Construction System for Planning and Design” then can be open to students in the fields of engineering, construction, design, and landscape planning.

In the following paragraphs, we will first describe the case of the engineering planning process of the Elephant-Hill eco-tourism pedestrian path. After redefining the concept of sustainable planning, design, and engineering professionals via co-working, we confirm a fundamental hidden dilemma: the value systems of different disciplines, and the need for interdisciplinary collaboration. Finally, a participation planning model incorporating a generalist pedagogical base is proposed for planning and design professionals of future eco-engineering projects.

**Eco-Tourism Path: The Case of Elephant-Hill**

Located at southern boundary of Hsin-I District, the highest elevation of Elephant-Hill is only 184 m, but with abundant natural resources (Figure 1). Elephant-Hill is a low elevation aboriginal forest, and can be traced to Taiwan acacia forestation. The activities in Elephant-Hill were quite different before and after the Hsin-I planning project was executed in 1974. Before the Hsin-I planning project was approved, people cultivated bamboo, tea, fruit and acacia for agricultural production. After the Hsin-I District development, the open space and environment quality in Taipei gradually deteriorated. But there still remained abundant aboriginal forests in Elephant-Hill; hence, determining how to preserve the ecological resources by a pedestrian path eco-engineering design in Elephant-Hill reflects one of the main themes for urban development.
Figure 1: Environmental attributes and the planning practices of the Elephant-Hill case

Because Elephant-Hill is located in an area with convenient mass transportation system, this eco-tourism path is also the most popular recreation setting in Taipei. Such an eco-tourism path in Elephant-Hill belongs to the ‘megalopolis path’, and had been given several design guidelines by planners: for example, “It should meet the needs of hiking and viewing”; “It must be safe, convenient, and easy to access”; “To provide safe eco-exposition facilities”; and “The path
should be easily accessibility to the public.” An eco-tourism path plays an important role linking people and natural resources, supplying the people and nature with a delicate interactive interface. A well designed eco-path will provide people with a high quality of living with nature. Contrarily, an unsuitable design may harm the ecological environment. So, in the planning/design process planners always face the dilemma of balancing user value and ecological needs.

Elephant-Hill is not only located within a convenient traffic system, but it is also close to urban communities, so the residents can get to Elephant-Hill easily. Exercise and excursions are the most popular activities in Elephant-Hill. For this reason, Elephant-Hill Eco-Tourism Pedestrian Path is a natural recreation spot so the planning process should benefit everyone, foster an open attitude and leave the resources for future generations to enjoy. Insidiously, this Eco-tourism path of Elephant-Hill has consumed a lot of financial and ecological costs due to the revision process of the past two decades.

In the planning practice of our eco-tourism path construction, two dimensions were examined: recreation requirements and eco-environment sensitivity. Figure 2 shows the framework of the concepts for implementing the professional planning practice. To decide how the eco-path could be segmented, providing design variation, and physical construction detail design, we considered seven factors throughout the project: material, engineering, elevation, height, and slope direction, slope degree, long-run maintainability. To analyze the recreational needs and the ecological requirements of a sensitive environment (Figure 3); these factors help us to determine what functions the eco-tourism path should be provided with for a satisfying, non-destructive interface between citizens and nature.

![Figure 2: Seven factors in balancing values of Elephant-Hill](image_url)
Using role playing technique, the exercise revealed that different values systems underlay different kinds of professionals. For example, those with an engineering background might emphasize the life cycle value of the economic phase, while those with a participation planning background would focus not only on material and technique, but would also users’ safety. Ecological concerns could force the whole team to go back to the starting point, over greater concern for the bio-diversity and environment conservation.

Elephant-Hill provides services for communities nearby and Taipei citizens. According to the requirements of community residents, there are plenty of facilities which they set up by themselves during the earliest Elephant-hill planning stage. Instead of perceiving the values behind space design, users of the physical setting often make changes in space based on self
interest. The problem is that Elephant-Hill is saturated with recreation facilities and pavilions along the path. For example, users of the hill always choose the crest line, because its gradient is more gentle when walking, there are few big trees, and a wider view. However, the crest line is the most sensitive place of the mountain area from the viewpoint of ecological concern. Only if professionals and the public can accommodate each other will the correct solution be found.

Although every team member knows that inappropriate decisions concerning future development might cost more time and manpower to restore the ecological riches. However, as mentioned above, different viewpoints, come from value systems, are rooted in different disciplines. Following the concept of sustainable development, the need for eco-design education pedagogy continues to challenge the traditional planner, designer and engineer, over and over again. How to keep balance among the contradictions inherent in different disciplines has become a new issue when designing an eco-sensitive hill-path engineering construction. In the following paragraphs, we examine the value system dilemma of the eco-engineering planning/design processes first, and then the concept of incorporating a generalist pedagogy into participatory planning, is proposed for the planning professional.

Generally speaking, multidisciplinary approaches always incurred multi-desires which impact the planning process; some time is needed to satisfy the variety of values. Campbell (1996) used the concept of the planner’s triangle to discuss the three priorities and three conflicts in sustainable planning: (1) environmental protection, (2) equity and social justice, and (3) economic development. With the goal of sustainable development, the triangle of conflicting goals comprises the three dimensions of economic development, environmental protection and social equity. The center of the triangle is the goal of sustainable development. First, there is the resource conflict between environmental development and economic development. Second, there is the property conflict between economic development and social equity. Third, there is the development conflict between social equity and environmental development. These can be summarized as follows:

- **Environmental Ecology vs. Economic Development**
- **Social Justice vs. Economic Development**
- **Social Justice vs. Environmental Ecology**

In order to reach the goal of sustainable development, we have to balance these three conflicts. By the process of reducing conflicts, there is movement to the center of the planning triangle; the closer we get to the center, the more we reach the goal of sustainable development. Campbell (1996) argued that planners had to go beyond environmental protection, economic development and social justice, but rather encompass fundamental priorities in planning, what he termed the triangle of conflicting goals. Sustainability is at the center of this planner’s triangle [4]. The only way to get closer to the center of the planner’s triangle is by indirectly balancing conflict over the long term.

In case of Elephant-Hill Pedestrian Path, different professional background of the team may treat above three priorities have different level of weighing. Thus with different value systems respect to recreation need and ecological environment are some time with different viewpoint,
even the sustainable design concept is the common sense prevailing in fields of engineering and technology education [6]. The users of Elephant-Hill Pedestrian Path come from different kinds of interest group and different background also with the conflicts and the contradictions of competing value systems.

**Could we unify the Value System of Different Professional Discipline**

The combination of the design theory and ecological planning should consider the technical, environmental and economic dimensions. We expect that a reasonable process and achievement can result from correct judgment. However, confusion often arises concerning the structural factors involving ecological resources and socio-economic political influence. In this case, we just tend to disregard the problem in the professional process of planning and design, and treat the work as purely technical, or aesthetically personal. The spatial profession is infected with pursuing maximum profits under the pressure of a capital-based market.

Nevertheless, with the rising environmental consciousness and pluralism, we should redefine the aspects of the spatial profession value which were not considered in the past and rebuild the process of spatial planning and design on the foundation of a free democratic political system. Under the prerequisite of accommodating the environment, the redefinition of spatial profession values will synthesize the different conflicting driving forces of profits, development and recreational needs, so that humanity can be preserved and the social welfare promoted [4].

![Diagram](image)

**Figure 4: The redefining and evolving of spatial profession values**

Due to the consuming burden of humans on earth, we are losing many kinds of nature resource capacities right now. The use of natural resources changes needs to move beyond mere capital accumulation towards benefiting citizens with convenient living. In other words, we are using more and more resources from our environment without an end in sight. Therefore, if we want to deal with the loss of natural resources, it is imperative to discuss profits, adding value and the common welfare. By considering those dimensions, we can prevent natural resources from serving humans only or specially designated groups of people. The treatment of natural resource must be reversed from one-way usage to two-way recycling. People, as only one kind
species in the world, should respect the living rights and resource needs of the other species on earth [2, 7].

The developing direction of technology in the past was strongly directed by market benefit. The innovation of new technology always demands a larger scope or more value in the market. In this case, adding values which are not related to the market will be ignored by the driving force for profits. Consequently, after redefining the value of the spatial profession, the importance of other kinds of environment value should be recognized when developing new environmental technology. The reason of developing new technology is not only for keeping costs down but also for raising values.

For example, to measure the carrying capacity of recreations in urban peripherals, we must place importance on maintaining the quality of the environment with proper use, and the ecology carrying capacity, to arrive at a balance between recreational needs and ecological value. To adjust the planning standpoints, we may need to make a qualitative change to traditional environment concepts: from passive use to active preservation. Humans are not the only species, so instead of just taking care of our needs in planning projects, we need to maintain an attitude of equality and respect regarding other species. For this reason, different attitudes must be emphasized in the planning education, as determining how to apply the planning process is the challenge facing environment planning and design education.

From viewpoint of environmental protection and eco-diversity priority principle, in case of Elephant-Hill eco-tourism path, the eco-engineering design, the environmental values should be the priority in the planning process if sustainable eco-biodiversity is our common core value system. The values redefining the economic dimension must be the focus for protecting natural resources. First, in order to avoid the burdens arising from the abuse of natural resources, we need to internalize the environmental externality. Second, we have to review the efficiency of resource usage by reducing natural resource wastage and promoting the welfare of the environment. Third, the estimation of environmental benefits should be considered along with the sustainability of nature resources over the long term.

By doing this ideally, we should get rid of the single minded pursuit of profits in the short term and make the right decisions. But how these can be done in reality is difficult, because we can’t always give a straight answer priori for a specific eco-engineering project. Rather, the answers only come from the planning, design, and engineering process. By which each agent of the professional discipline will negotiate in project with each others.

**Intertwining Generalist Pedagogy into Participatory Planning**

Let’s retrospect the situation we face right now. As a planner, designer or engineer, how can we find the actual position or correct orientation in the triangle and deal with the conflict by different dimensions? That is a big challenge which we have to face. To take an overview of the triangle of conflicting goals for planning in the world which we live, the economic development by market forces has to encompass both environmental development and social equity. What standpoint should be taken by the professional planner and designer in dealing with the conflict between them? There are lots of different value systems included in planning, designing and
engineering, which need be reexamined concerning man-made settings around us. The professional divisions lead to different viewpoints and value systems; thus, people from different disciplines can’t always understand each other or make compromises.

Even a small path in the Elephant-Hills planning involves both ecological value and recreational needs, and requires diverse professional knowledge, thereby encompassing many different value systems. How can they work on these? Are they to be mainstream followers, value protectors or innovative creators? Meeting the needs of professional practice thus requires a procedural techniques and a consensus base to mediate the dilemma encountered in the planning process. So generalist pedagogy and building a consensus concerning a value system, via participatory process and coordination, will be necessary.

To achieve a not-prior-unified value system, we need a procedural theory now. Participative planning creates a channel for communication between professionals and users. First, professionals who possess the abilities of negotiation and decision making not only coordinate with other professional, but also understand the true requirements of users; hence they can obtain more subtle values in the planning project. Second, the public can make sense of the different standpoints of professionals. That mean we need a consensus base via multidisciplinary collaborative planning processes. A core knowledge base as participatory agent’s common sense now is a need. So generalist pedagogy should be proposed for all different professional discipline.

These consensus base and training focuses should include but not limit: the coordination mechanism, the dialogue on bio-diversity, and the new common value systems of the planning, design and engineering professional. In addition to possessing complete and deep knowledge in the training process, the values of a generalist education should maintain the academic ability to coordinate different science fields. These leads to the necessity to include a non-profit eco-environmental conservation group if the participatory eco-design processes need be work out in actual practice.

**Conclusion Remarks**

This paper explores the eco-pedagogy of an urban eco-tourism hill path design, which can be open to the students come from landscape planning, design, engineering, and construction within the “Construction System for Planning and Design” curriculum in NTU. An experimental design exercise of an eco-tourism hill path near Taipei 101 was designed in the course to uncover the different value systems hidden within different disciplines and determine how it affects the sustainable design judgment. Using role playing technique for the team members come from different disciplines; their backgrounds included: landscape architecture, urban design, and civil engineering, the exercise revealed that different values systems underlay different kinds of professionals. By examining the dilemma of recreation needs and ecological imperatives, the paper argues that we need re-examine the procedure and methodology of the urbanized hill eco-path engineering design. Communicating with different standpoints and values is the true meaning of a generalist education. To achieve the optimal solution for an eco-engineering project, the concept of multi-disciplinary participatory design processes with a generalist base of engineering pedagogy, was finally proposed. Professional generalists will possess the abilities
of introspection, toleration and coordination regarding all of the professions, to perceive the problem which the single profession training couldn’t perceive. Then, based on the procedural concept of participative planning, the planning team members from different disciplines can complete the valid opinions required via planning process.

**Bibliography**