APPLIED STUDY OF 'GREEN DESIGN' CONCEPT OF GREEN SCHOOL INTERIOR DESIGN IN SIBANG KAJA VILLAGE, BADUNG

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ABSTRACT

Impaired environmental quality; pollution and pollution that cross the health threshold; global warming; damage to marine habitat; new diseases whose power is so fast and the power of killing is high; are some examples of signage the emergence of serious environmental problems and threaten changes in demographic structure of the population around the world. For the international community, this indication of serious environmental problems has sparked a desire to restore themselves to nature, and create a holistic, heal thy environment. This phenomenon eventually triggered the presence of various designs ecology concept 'green design'. In Bali the issue of 'green design' lately is also evolving along with the aware ness of the world community to repay attention to the potential of nature. This is evidenced by the presence of Green School at the Kul Kul Campus in Sibang Kaja Village that carries the conceptt of environmentally sound buildings. Based on the description, this research will examine the applied form of the concept of 'green design' in the interior of the classroom and some supporting spaces. The results will answer whether the concept of 'green design' is applied is completely in line with environmental criteria. The research will be elaborated through descriptive method of analysis. The assessment is based on an analysis of the compatibility between scientific theorists and the observation of several samples presenting each population. The results showed almost all elements of classroom interior in the school building is in line with the concept of environmentally friendly. Starting from the tread processing, space lay out, space forming elements, doors, windows, and facilities is a design that is able to adapt to the potential and carrying capacity of the surrounding nature. Every aesthetic decision taken in the design process is based on moral judgment and ecological ethics.

Keywords: 'green design', interior and environment issue.

BACKGROUND

The conference of *The Club of Rome* on April 1968 that initiated by Dr. Pilliao Pacce produces a series of reports known as "*Reports to Club of Rome* "which is futuristic. The report is a prediction about how difficult and dangerous of future human life. Principally, they claim that industrial activities or any productive efforts to fulfil human needs as the cause of soaring carbon dioxide emissions that increase concentrations of greenhouse gases, and in the end, it will result global warming and environment degradation. (Grazyna P., 1995; 45). Moreover, inappropriate way of solving this problem is predicted to endanger the future life. Multiple reports from "*The Club of Rome*" change the world view toward the ecosystem. Some share groups and organizations that care about environmental sustainability problems such as: Greenpeace movement, Intergovermental Panelon Climate Change (IPCC), and United Nations Environtment Programme (UNEP) react to this problem.

The awareness to the environment produces groups of people who were looking for and hunting ecological concept or eco-conservation products ('green consumerim '). As a result, it creates a variety of *'Eco-Design'* product to answer the market needs (Papanek.1995: 28). Until now, Eco-Design

concept can be seen in various products of automotive, household equipment, architecture, and interior.

Principally, the *'green design'* concept is designed to consider the sustainability of human and environment. Green design is created based on a human nature consideration that human come and must be integrated with nature. The occurrence of the terms *eco-design, eco-interior, eco-architecture, back to nature, ecovillage* are concepts that show exploring the nature without exploiting it.

The indications of the existence of *green consumerism* in tourism industry can be seen through *'eco-tourism'* programs as human want to close to the nature. Hecktor Ceballos in *'Tourism The International Businesses*' defines *'eco-tourism'* as a travel program which are held responsibility to nature, where the goal is not only enjoying the nature but also involving educational aspects, understanding, and support for nature and environment conservation.

The issue of Eco-tourism was developed in Bali lately in accordance with the awareness of world community to nature potentials. On 2007, Bali was chosen as a palace to held *International Climate Change Conference (ICCC)* in relation to environmental issue. The existence of *eco-tourism* issue in Bali tourism industry creates Green School at the Kul Ku lCampus in Desa Sibang Kaja that carrying environmental concept. The management confirms that the Green School is a school based on ecological basis, with special curriculum that concerned with '*green movement*'.

Based on that fact, it is interesting to do a research about 'eco-tourism' concept in interior design of Green School. The problem raised in this research is how 'green design' concept applied in classroom interior of Green School in Desa Sibang Kaja. Are the concept of 'green design' was exactly applied to the environment.

The research is oriented to the interior design of classrooms and some supporting spaces of students learning process. Those spaces are the main rooms for learning activities so the 'green design' concepts are mostly applied in those rooms.

BENEFITS OF RESEARCH

The research produces a study of 'ecological design' utilized as supporting material in eco-design subject matter that offered by several Design Department in some colleges. This research can also be used for the development of special knowledge in design subject matter, as well as can be utilized to provide knowledge to society in understanding the products of environmental design. For the government, this research can be used as a guideline for regulation which supports sustainable development programs (Sustainable Development). By applying this knowledge and concept, it will develop various designs which consider to the ethical as the aesthetic foundation.

THE MEANING OF "GREEN DESIGN"

The term "green design" begins after the destruction of the global environment was discovered. This term is always related to environmental issues. The use of this term together with the

exception of the community who started using a variety of products that lead to sustainability of the environment. The meaning of word 'green' in 'green design' could be defined in a simple way. According to Peter Buyard in his book entitled "The Green Alternative" says that 'green' is something that is related to the life in the earth. This is not family or friend, society or whole humanity, but the corresponding is the process of life itself and everything that is strives for maintenance factors, and sustainability process. The word 'design' comes from English word which is '*designo*' ' in Italian language means picture. On 17th century, the word started to use to form School of Design in 1836. Agus Sachari in "Metodelogi Penelitian Desain" says that in Indonesian art, the word 'design' are often used for wording shape, design, framework planning, sketches, ideas, solving problems, and creating. Moreover, Acher also says that the word 'design' equals to a process of solving problems that are intended specific objectives (Sachari, 1999; 03).

Hereby, design can be interpreted as an environmental problem-solving process based on association between human and nature through the principles of continuity, use of resources to live the life without reducing the opportunity for the next generations to meet their own needs.

ECOLOGICAL CONCEPT IN DESIGN

Principally, Green Product is the way to minimize environmental problems, based on the resource limits and harmony of human life with nature through the principles of 'sustainable' approach. Sustainable means using natural sources to fulfill today's needs without reducing the opportunity for the next generations to meet their own needs. Dorothy Mackenzie in *Green Design: 'Design for The Environment* ', says that the principle of sustainability in process of designing can be reach by optimizing the criteria design which is environmentally based, since taking the building materials ----- the production process----- use of the product ----- until the product has been made into waste (Dorothy Macenzy, 1991; 89). Those stages hopefully don't have any impact to the nature.

Some of the strategy approaches offered by Mackenzie to optimize design criteria are Eco-efficiency, Biodegradable, Recycling, Longevity, and Ecolabel. Eco-efficiency is to make efficient or not to waste materials, energy consumption, and other natural sources. For interior designers, efficiency of the energy can be done by using heating or lighting system approach.

Biodegradable means using good materials which can be natural or unnatural source that cannot harm the nature. Harsono says that an ecofriendly building demands the use of material that does not contaminate the environment and endanger human. Some materials which are suitable to Biodegradable concept are wood, bamboo, branches, leaves and more. Those materials are recommended in building 'Green architecture', besides the material that is reused and recycle. Material from plants are materials that absorb CO2 from the air. It is in contrast to non-organic materials which are discharge CO2 to the air because it needs fuel. Nevertheless, a number of inorganic material which not energy consuming and does not pollute environment, is still recommended in the concept of green architecture (Harsono,2010; 127).

Recycling is a process to recycle waste product to be a new product (recycled) and ready to use. This attitude is very wise because it can seizure the bad impact of the waste problem beside improves the efficiency of material. Some other types of approaches are *'reuse', 'replacement'* or *'remanufacture*'. In relation to the principles of the architecture of the 'green' architecture, Harsono emphasizes that those materials are used materials from demolition of structure or building. The use of used materials can reduce the energy consumed in the production process of material manufacture. It can be said that the material used as if it were made without using energy.

Longevity is lengthening the *use* of products. It relates to efforts to conserve the environment, efficiency of energy and saving of material, and even reducing the accumulation of waste. Designs that are concerned with environmental should more prioritizing to the durability of the products than 'trend' or 'style', which tends to change rapidly and influence the durability of the product.

The *last* strategy is ecolabel which means attaching a label on a product that explains the product has been passed and cannot harm the environment.

Related to ecofriendly architecture design, Heinz Frick in his book entitled 'Eco-Architecture' summarizes some points related to architecture and interior design holistically:

1. Adjusting to local areas. Architecture design should consider the surrounded ecosystem and biodiversity.
2. Saving sources of energy that cannot be renewed.
3. Maintaining the environment.
4. Using simple technology.
5. Using ecological building materials (Heinz Frick, 1998; 45).

In a bulletin 'Environmental Building News' Vol. 04 No.5 on September 1995 affirmed some priorities in planning building that environmental based:

1. Save Energy ---- *Design and build energy-efficient buildin*g. Design buildings should be able to save energy usage. The efficiency of energy should be thought when starts to design because it will be part of the surrounding environment for long period of time and always consume energy.
2. Create Community ---- *Design communities to reduce dependence on the automobile and to foster a sense of community*. Planning an environmental community that seems to lead to reduce dependence of using on a polluting device environment, such as vehicles that produce emissions.
3. Select Low-Impact Materials ---- *Specify low-environmental impact, resource efficient materials*. Hopefully, by selecting an eco-friendly building materials, it will reduce pollution, not harm the ecosystem while taking, producing, and even delivering the material building.
4. Maximize Longevity ---- *Design for durability and adaptability*. By selecting along lasting building material, it is easy to take care and prevent from damage. Planning a long-lasting design is always popular and flexible to the era (time less architecture).

5. Recycle Building ---- *Utilize existing buildings and infrastructure instead of developing open space*. Old buildings have a better air circulation as well as natural lighting system which is more environmentally friendly. That is why, restoring buildings are much better than constructing new building that cause more open spaces.

ANALYSIS

The ordinary of nature in Sibang Kaja Village such as: the freshness of air, the expanse of rice fields and local agriculture, Ayung river and background of Agung mountain become supporting points to realizing the 'close to nature' concept (eco-interior).

The results show that the buildings are located in a right place and not exploiting the nature. Buildings are built independently or not connected to each other and located in different heights. There is almost no natural exploitation so that the natural of the surrounding area is still kept. The conservation of surroundings is aim to filter the air, prevent pollution, and increase the productivity of oxygen. That is why, the air that enter the interior buildings are remain clean and healthy. The building area is designed for everyone not to ride vehicle if they want to reach another location. Based on that findings, Green School's building design meets the *'Create Community'* principle. It means by exploiting the area effectively, it strengthens the relationship among community and creates a good relationship between human and nature.

The interior designers of Green School decided to choose local material and natural colors for materials and floor finishing materials. The materials selected are bamboo parquet, terracotta, and teraso.

The wall design is dominated by a wide open surface. Therefore, it allows the sun to enter the classes and supports the lighting while in the daytime. Windows are also very important to maintain the circulation of the air. Open spaces around the classes might easily help to create freshness of the surrounding area. The use of cooling machine (AC) could be minimize and it reduces the use of energy that should not be necessary.

The beauty of the surroundings view could be seen directly throughout the wide open windows. It seems to become part of the building design. The surrounding view and building design support the 'green image' harmoniously.

Ceilings are designed to optimize the natural lighting system. A white skylight (semitransparent) are attached on the ceilings to produce a good lighting protection from the sun. Skylight will lighten or reduce the heat of the sun and produce perfect temperature to the rooms. In the daytime, natural lighting system is always preferred. Electrical lighting system is only used when night time or cloudy day.

Saving energy in planning lighting system is always taking care seriously. Interior design in each rooms are designed to save energy consumption as much as possible. Energy consumption is calculated in every single plan decision. Biogas technology is one of the approaches in saving non-renewable

energy resources (petroleum and coal). It is clear that Biogas technology is created not to destroy the natural environment when compared to limited energy sources.

Almost all of the materials from the classroom Green school are using bamboo. Bamboo is one biological materials that is easily found in Indonesia especially in Bali. In Sibang Kaja area, Bamboo plants can be easily found in backyard and around river. Bamboo is one of recommended materials as an organic material and fulfilling the concept of Biodegradable. Organic material is a material which absorbs CO2 from the air in a natural process. Bamboo is one of the building materials that can cultivated (regenerative). When some bamboo sticks are cut, then the bamboo will grow fast and rapidly. As building material, it will stayfor long time compare to time for Bamboo to grow. It means cultivating Bamboo is fast and easy. When Bamboo is finish to use, it will be easily to be decimated by the nature. Obviously, by knowing those facts that bamboo meets the biodegradable criteria.

CONCLUSION

Green school is a school that is able to generate an educational system that care to the environment (educational environment). The results prove that almost all of the classroom interior elements are harmonized to the eco-friendly concept. Through the location of the site, material selection, and style or shape of the buildings, indicate that the designer is trying to adapt to the natural potential and supportof the surroundings. It also shows the consistency of the design to the concept. Consequently, every decision that is embedded in designing process are established on moral judgment and ecological ethics.

Green school interior design can be categorized into environmental friendly design. The interior design is success to utilize the ecological principles in artificial environment. Environmental friendly design refers to mutual relationship between human and the environment. The interior design which including human activities on it becomes part of the ecosystem and relate to the nature circulation.

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