Sustainable Campus in Taiwan

A movement from \textit{HEART},
A march toward a [sustainable Taiwan]

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A reflection from “Earthquake 921”, 1999

Campus as a rescue center?
-Safety
-Community
-Education
-Ecology

1999.09.21 Executive Secretary for Environmental Protection and Education, Ministry of Education, TAIWAN

Challenge 2008 Taiwan National Development Plan

Eco-City
Eco-County
Eco-Country

Execution and Supervision
Building a Sustainable Campus

1. Campus environmental strategies
2. Campus buildings and environment management
3. On campus environmental education opportunities for curriculum designs
4. Living linked w/ sustainable environment techniques/principles

Funding items for hardware renovation

- Sustainable site mediation
  - Top soil improvement
  - Non-obtrusive barriers
  - Multi-layers eco-sensitive planting
  - Education oriented (landscaped) eco-gardens

- Ecological recycling
  - Home-made humus made with fallen leaves and left-over food
  - Demonstration farmland
  - Animal livestock co-habitation

- Healthy buildings
  - Natural/ recyclable building materials
  - Interior environment improvement
  - Interior dry building constructions using component methods

Resources and energy recycling

- Resource recycling and reuse
  - Permeable surface paving
  - Rainwater and tap water recycling
  - Artificial wetland purification system
  - Renewable energy use
  - Energy-saving methodologies
  - Water-saving devices

- Resources and energy recycling
  - Construction of wetland purification system
  - Rainwater and tap water recycling

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  - Interior environment improvement
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  - Renewable energy use
  - Energy-saving methodologies
  - Water-saving devices

Sustainable building technology
1. Green architecture evaluation system
2. Green architecture construction technique
3. Healthy architecture solution
4. Energy reuse/ regeneration
5. Material recycle/ reuse
6. New technology and production industry upgrade

Sustaining ecological environment
1. Bio-diversity
2. Preservation of native species
3. Gray water reuse/water cycle management through remediation
4. Co-exist habitats and etc.

Upgrading technology in related industry

Natural/recyclable building materials
1. Using component methods
2. Healthy buildings

Interior environment improvement
1. Natural/ recyclable building materials
2. Interior dry building constructions using component methods

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Sustainable Campus
Resources and energy recycling
Renewable energy use

Resources and energy recycling
Energy-saving approaches

Site remediation
Top soil re-plantation

Sustainable site mediation
Non-obtrusive barriers

Sustainable site mediation
Multi-layers eco-sensitive planting

Sustainable site mediation
Education-oriented (landscaped) eco-ponds
Sustainable Campus

Ecological recycling
Compost with fallen leaves and left-over food

Ecological recycling
Teaching gardens

Ecological recycling
Animal livestock co-habitation

Healthy buildings
Natural/recyclable building materials
Indoor environmental quality improvement
Recycled and healthy materials used inside of an elementary school in east coast of Taiwan

The MOE formed a “Technical Committee for Sustainable Campus” to review operational progress and to advice appropriate strategies.

Workshops and Visits by International Experts
In the year 2002, 23 schools were funded out of 76 proposals, and the number of competing proposals increased to 564 in 2004, almost 16.8 % of all elementary and secondary schools in Taiwan.

### Cases in year 2002

<table>
<thead>
<tr>
<th>District</th>
<th>Number of campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>7</td>
</tr>
<tr>
<td>Central</td>
<td>6</td>
</tr>
<tr>
<td>Southern</td>
<td>8</td>
</tr>
<tr>
<td>Eastern</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
</tr>
</tbody>
</table>

### Total Number of campus : 93

### Cases in year 2003

<table>
<thead>
<tr>
<th>District</th>
<th>Number of campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>45</td>
</tr>
<tr>
<td>Central</td>
<td>29</td>
</tr>
<tr>
<td>Southern</td>
<td>38</td>
</tr>
<tr>
<td>Eastern</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
</tr>
</tbody>
</table>

### Cases in year 2004

Total Number of campus : 93

### Cases in year 2005

(not including "certificate" awardees)

Total Number : 112

### Cases in year 2006

Total Number: 89

94年度：467所（包含92個整合案以及169個個別案）提出申請案。

95年度：

23個整合案

包含99所學校；

個別案12校；

獎勵案14校；

推薦案2校

Total Number : 112
% of sustainable campus in individual city/county (2002-2008)

Number of sustainable campus in individual city/county (2002-2008)

% of sustainable campus in respective level of schools by city/county (2002-2008)
What have we accomplished?

The percentage of green-covering area increased from an average of 23.4% to 35.8% for those participating campuses. The permeable ground surface was 12.8%.

22.6% of the schools funded have successfully integrated compost from foliages and kitchen waste into the use of their organic farm.

Renewable energy (2003)
33.2% of the funded projects have demonstrated their opportunities in utilizing “renewable energy” for actual use and teaching purposes.

Change of educational environment (2003)
More than 80% of the funded projects have successfully creating a more versatile teaching environment through the Program, and the meaningful process and outputs have been shared among the schools and the neighboring communities.

Community participation
Community participation

Wun-Shan elementary school

Concurrent development of teaching modules and curriculum reform

Development of teaching modules:
Engineering activity coupled with Curriculum design

Teaching plan designed to be integrated with the execution of Sustainable Campus renovation

Teaching plan | contents
---|---
Teachers involved | 
Renovation subjects funded | 
Area to be integrated | 
Teaching contents | 
Learning stage | 
Intended duration and time for the material | 
Resources application | 
Other unique strength | 

Effectiveness Assessment

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching contents design</td>
<td>20%</td>
</tr>
<tr>
<td>Number of hours and students participated</td>
<td>15%</td>
</tr>
<tr>
<td>Dissemination of the core values</td>
<td>20%</td>
</tr>
<tr>
<td>Archive of the learning records</td>
<td>20%</td>
</tr>
<tr>
<td>Self-reflection by the teachers</td>
<td>10%</td>
</tr>
<tr>
<td>Learning effectiveness of the students</td>
<td>15%</td>
</tr>
</tbody>
</table>
Analysis of Teaching Modules for "Sustainable Campus"

Learning Fields

Analysis of Teaching Modules by Themes

Analysis of Teaching Modules by Strategy

Analysis of Teaching Modules by Learning Stages

Continuing evolution of “sustainable campus” programme

Integrated Program (Group) Project
Unique characteristics

(Platform to merge and integrate expertise of environmental sciences/engineering and environmental education)

Learning in the environment by doing
Increased exposure to the nature
Resource sharing
Participation by the community

Study and grow in the nature

Visit to neighboring campuses
Participation by the community

Interaction between schools and communities

農產品網站website

Organic fruit

Timber Bugs

Press conference on the "commercial products" from sustainable campus (2005-03-11)
Continuing evolvement of the project

- University level
- Summer program
- Eco-tour

Pilot programs for “sustainable campus” program in the Universities

National Taiwan University

Tainan National University of the Arts

Tainan National University of the Arts

Green Building

National University of Kaohsiung
Pilot program for “sustainable campus” program in the Universities
National Ping Tung University of Science & Technology

Pilot program for “sustainable campus” program in the Universities
National Taiwan Normal University

Roof-top farmland

Summer scholarship program
大專生協力地方推動永續校園計畫
東海大學建築研究所學生團隊
完成後居民使用現況

大專生協力地方推動永續校園計畫
台南藝術大學建築藝術研究所學生團隊

帶領小朋友製作永續校園模型

Eco-tour
2005年永續校園伙伴成果分享交流會

頒獎表揚

2005年永續校園伙伴成果分享交流會

研習情形

南東區永續校園參觀案例

中區永續校園參觀案例

北區永續校園參觀案例

Sustainable Campus

Bi-annual gathering on national scale
There can be few more pressing and critical goals for the future of humankind than to ensure steady improvement in the quality of life for this and future generations, in a way that respects our common heritage – the planet we live on. As people we seek positive change for ourselves, our children and grandchildren; we must do it in ways that respect the right of all to do so. To do this we must learn constantly – about ourselves, our potential, our limitations, our relationships, our society, our environment, our world. Education for sustainable development is a life-wide and lifelong endeavour which challenges individuals, institutions and societies to view tomorrow as a day that belongs to all of us, or it will not belong to anyone.
Sustainable Campus

Ecological campus
Architecture Systems
Microclimate
Physical Environment
Ecology Remodeling
Integrated System

Sustainable Architecture
Structure
Materials/Performance
Life-cycle consideration

Ecological Campus/Community Foundation facilities
Ecological Footprint

Community/Campus Sharing
Sustainable campus
Starting from HEART
Shared by all

http://www.esdtaiwan.edu.tw/
What have we accomplished? (2004)

- The percentage of green-covering area increased from an average of 23.4% to 35.8% for those participating campuses.
- The permeable ground surface raised 12.8%, 15641.41m² in 2004.
- 22.6% of the schools funded have successfully integrated compost from foliages and kitchen waste into the use of their organic farm.
- 33.2% of the funded projects have demonstrated their opportunities in utilizing “renewable energy” for actual use and teaching purposes.
- 10.6% schools have incorporated the use of drained and recycled water in their daily functions.
- More than 80% of the funded projects have successfully creating a more versatile teaching environment through the Program, and the meaningful process and outputs have been shared among the schools and the neighboring communities.