The development of Green University's Curriculum of Maejo University –Chumphon

Phatthanakan Tiapibool* ,Boonsin Jittapraphan** and Chondarong Tongsong***

Abstract

A sustainable social development requires education as a mechanism for operation. Education is used as a tool for sustainable development. There are three major components for this mechanism: 1). The curriculum is the knowledge to create wisdom in solving family and community problems, it will be the basis for creation of new knowledge and knowledge from the change of the current world**;** 2). Teachers or professionals should be a good model for learners to have analytical thinking and attempt to improve themselves for their future. 3). And the goal must follows the university guidelines. Therefore, the curriculum development for Green University of Maejo University at Chumphon focuses on sustainable development of education according to the strategy of Maejo University and the vision of Maejo University at Chumphon which is outcome -based education (OBE). It is necessary to create a network and link to departments, and organizations involving with environment, economic, society, have an education administration in practice, and more cooperate with agencies, especially, the content knowledge for education. Focusing on educational management is to develop, and to give opportunity for everyone to participate and realize of problems and needs of locals and communities in order to improve learners with participating process according to the Thai social context for sustainable development.

The awareness of climate change has become the pressure issue of the world society in all organizations to take more responsibility on environment. Likewise, in academies, the main activities is the educational management process which is composed of the instruction
implementation, laboratory support, academic service support, building management, and the use of audio visual media. In this process, resources and energy such as papers, chemicals, office supplies, electricity, fuels, and water will be used in the organization.

*Maejo University, Chumphon Campus, Thailand

Proactive education management will lead to the production of effective graduates from the instruction management. In addition to the educational management concerned the production of quality graduates, a management minimizing the environment impact from its operation is the most important for all universities to focus on. In the past decades, many universities have implemented environmental management to improve, develop the process to take more responsibility on the environment. This also enhances the image for their universities. (Samsuwan, 2011)

Green University refers to a university having an effective administrative management under the concept of the participating in environmental conservation and energy saving, using resources effectively, promoting alternatively energy, having an energy conservation, and environment integrating instruction. Research and in all universities activities are for safe working and friendly environment and energy saving which will be beneficial to environment and community. (Rodtasana, 2015)

Green University is one of the most popular concepts in environmental management of universities. Many of them have adopted this concept to reduce environmental problems and enhances their images of being a model university for environment care. (Samsuwan, 2011) The principle of Green University partially comes from the concept of sustainable development aiming to develop in three main areas: society, economy, and environment and keep them balancing.

In the society area, it focuses on participation and development in quality of life of students, educational personnel or publics. In economy, it focuses on the long-term continuity beneficial to most people. In the last area, environment, it focuses on the effective use of resource concerning with the environmental impact. (Bauwkhao and Petchara, 2000)

Piboonsongkram Rajabhat University has defined the boundaries of Green University as a university working in development, restoration, conservation and participation including knowledge integration with activities of energy, environment, and natural resource conservation, self-reliance development on the balance of ecology and wellness, instruction system development, research, academic service and all activities on energy, environmental conservation, and wellness for people in organizations and communities on the basic of participation of all personnel and all sectors. There are various dimensions of Green University.

1. **Green Environment** is to develop and restore the environment, energy, and natural resources, keep the buildings and their

surroundings in an organization to a good environment. The development of this green environment makes a beautiful landscape and a balanced ecosystem.

2. **Green Service** is to create and develop the managerial system in service provision and the instructional system of an environmentally friendly university which can contribute to reduce the pollution on global warming.

3. Green activity is to promote the activities to people in an organization and local communities to have awareness and promote natural resources, energy conservation and sustainable environmental development**.**

4. **Green Economy** is to promote and create green economy in a university which contribute to sustainable development, to increase efficiency use of resources and energy, to promote the patterns of the production, technology, and innovation in environment care problems and to create a green market for sustainable production and consumption.

5. **Green democracy** is to create and give opportunity for all levels including stakeholders to participate in driving and setting policy in practice.

6.**Green heart** is to have a heart respected on natural way through attitudes, feelings, thoughts, perceptions, having consciousness the value of the environment, and awareness of environmental threats, love and care for energy, environment and nature of universities and local communities through the creation of attitudes, feelings, thoughts, perceptions, consciousness, awareness of the value of the environment through creating attitude, emotions perception, consciousness and awareness of the value of Environment and environmental threats, being in love and care of natural and the environment, and energy in a university and the local community

7. **Green Generation** is a new generation of students, working people and groups interested in the conservation of nature, energy , environment, and ecology of the community, who cooperating to restore and develop the energy, environment, and ecology of the university and community for sustainable development.

8. **Green Creativity** is to cultivate and encourage personnel and students being able to create or present new ideas, find new approach, new innovation and adapt or develop the existing one.

As mentioned above, the concept of green university is to manage environment of a university and to adapt this concept reducing environmental problems. It also enhances a good image of model of being an environment friendly university for sustaining development. For natural and environmental conservation,

students and educational personnel can learn and participate in action. However, there are differences in practice of being a green university depending on problem issues and its visions in each university management to adjust itself according to the university regulation which has different environment, location, people and budget and all will need to cooperate and think for the suitable implementation framework.

Criteria for Green University

Green metric Ranking World University in 2012 organized by the University of Indonesia or UI, is a mechanism to encourage the global educational institutions to establish green policy and manage environmental system for sustainability contributing to reduce the global warming effects. Energy conservation, good environmental management, increasing green space, and promotion of alternative energy are also taken into consideration. The judging criteria includes the management of policy, the development of managing system encouraging consciousness, the operation system in practice. The university must follow the 3E's principles: Environmental Economics, Equity and Education. There are six criteria for evaluating ranking and it has been used since 2010, and the total score is 1,000 points. In 2017, 619 universities of 49 countries were in the world ranking. The highest score ranked universities was Wageningen University &Research of the United State, the second rank is University of Nottingham of the Great Britain and the third rank is University of California Davis of the United State. The rank is shown in Table 1.

Table 1: Green metric Ranking World University in 2017 by UL Green metric Ranking World University (2017)

Ranking	university	country	Total
1	Wageningen University &Research	Netherland	7552
2	University of Nottingham	UK	7464
3	University of California Davis	UK	7365
4	University of Bradford	UK	7290
5	Nottinngham Trent University	UK	7210
6	University of Oxford	UK	7199
7	University of Connecticut	UK	7148
8	Bangor University	UK	6881
9	University College Cork	Ireland	6861
10	Hochchule Tier-Umwelt- Campus Brikenfeld	Germany	6806

(Source: Green metric Ranking World University in 2017, overall ranking 2017: online)

In Thailand, in 2017, 27 universities were in the green ranking. It was found that the highest rank university was Mahidol University, followed by Chulalongkorn University, and Kasetsart University respectively. The rank is shown in Table 2.

Table 2: Green metric Ranking World University in 2017 by UL Green metric Ranking World University (2017), the universities in Thailand

Ranking	university	Total
86	Mahidol University	5782
90	Chulalongkorn University	5754
96	Kasetsart University	5706
122	Rambhai Bhanni Rajabhat University	5472
143	Naresuan University	5309
156	Mae Fah Luang University	5230
168	Siam University	5171
176	King Mongkuts University of Technology North Bangkok	5113
183	Mae Jo University	5113
195	Dhurakij Pundit University	5032

(Source: Green metric Ranking World University in 2017, Overall ranking 2017: online)

There are six criteria for evaluation ranking and each of which will has different score proportion.

Setting and Infrastructure (SI) (15%) The campus setting and infrastructure information will give the basic information of the university policy towards green environment. This indicator also shows whether the campus deserves to be called Green Campus. The aim is to trigger the participating university to provide more space for greenery and in safeguarding environment, as well as developing sustainable energy. The indicators are:

1. energy efficient appliances usage are replacing conventional appliances;
2. smart Building implementation;
3. the ratio of open space area towards total area;
4. area on campus covered in forest;
5. area on campus covered in planted vegetation;
6. area on campus for water absorbance;
7. the total open space area divided by total campus population; and
8. University budget for sustainable effort.

Energy and Climate Change (EC) (21%)

The university's attention to the use of energy and climate change issues takes the highest weighting in this ranking. In our questionnaire we define several indicators for this particular area of concern, i.e. energy efficient appliances usage, renewable energy usage policy, total electricity use, energy conservation program, green building, climate change adaptation and mitigation program, greenhouse gas emission reductions policy. With this indicator, universities are expected to increase the effort in energy efficiency on their buildings and to take more about nature and energy resources. The indicators are:

3. number of renewable energy sources in campus;

4. the total electricity usage divided by total campus population (kWh per person);
5. the ratio of renewable energy produced towards energy usage;
6. elements of green building implementation as reflected in all construction and renovation policy;
7. greenhouse gas emission reductions program; and
8. the ratio of total carbon footprint divided campus population.

Waste (WS) (18%) Waste treatment and recycling activities are major factors in creating a sustainable environment. The activities of university staff and students in campus will produce a lot of waste, therefore some programs and waste treatments should be among the concern of the university, i.e. recycling program, toxic waste recycling, organic waste treatment, inorganic waste treatment, sewerage disposal, policy to reduce the use of paper and plastic in campus. The indicators are:

1. recycling program for university waste;
2. program to reduce the use of paper and plastic in campus;
3. organic waste treatment;
4. inorganic waste treatment;
5. toxic waste handled; and
6. sewerage disposal.

Water (WR) (10%) Water use on the campus is another important indicator in Greenmetric. The aim is that universities can decrease water usage, increase conservation program, and protect the habitat. Water conservation program, piped water use are among the criteria. The indicators are:

1. water conservation program implementation;
2. water recycling program implementation;
3. the use of water efficient appliances (water tap, toilet flush, etc); and
4. Treated water consumed.

Transportation (TR) (18%) Transportation system plays an important role on the carbon emission and pollutant level in university. Transportation policy to limit the number of motor vehicles in campus, the use of campus bus and bicycle will encourage a healthier environment. The pedestrian policy will encourage students and staff to walk around the campus, and avoid using private vehicle. The use of environmentally friendly public transportation will decrease carbon footprint around campus. The indicators are:

1. the Ratio of total vehicles (cars and motorcycles) divided by total campus population;
2. shuttle service;

3. zero Emission Vehicles (ZEV) policy on campus;
4. the ratio of Zero Emission Vehicles (ZEV) divided by total campus population;
5. ratio of parking area to total campus area;
6. transportation program designed to limit or decrease the parking area on campus for the last 3 years (from 2015 to 2017);
7. number of transportation initiatives to decrease private vehicles on campus; and
8. pedestrian path policy on campus.

Education and Research (ED) (18%) In 2012 questionnaire, one new criterion added to the questionnaire: education. This criterion has 18% of the total score. This criteria is based on the thought that university has an important role in creating the new generation concern with sustainability issues. The indicators are:

1. The ratio of sustainability courses towards total courses/subjects
2. The ratio of sustainability research funding towards total research funding
3. Number of scholarly publications on environment and sustainability published
4. Number of scholarly events related to environment and sustainability
5. Number of student organizations related to environment and sustainability
6. Existence of a university-run sustainability website
7. Existence of published sustainability report

In addition, Maryan & Faghihimanu (2010) of the University of Oslo stated in the Best Green University Practice Version that Steering group for study examines the commitment of 20 University around the world to environmental sustainability in the where is functions of universities. Setting a key keyword for Green University is a matter of Environmental sustainability (ES). To define environmental sustainability, we should look at a broader frame of sustainable development. The concept of sustainable development according to the 1978 World commission on environment and development means "development which meets Do you needs of the present without compromising the ability of future generations to meet to three mutual reinforcing pillars which are economical Social and environmental development their own needs". It refers to three mutual reinforcing pillars which are economical social and environmental development.

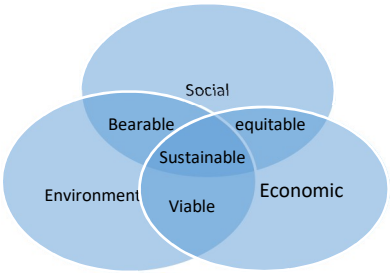

Figure 1: Environmental Sustainability (source: Borrowed from UCN, 2006)

Maejo University has set the direction of development for 15 years from 2012 to 2069 aiming to be an organic university and an Eco University under the development concept of "Maejo, a University of Life". It's 'a life using agriculture is as a basis of development on living, respects for nature and the environment, bonds with traditions and culture in the real world, knows the technology and its change and regards the good governance and goodness. The university has also set on strategic development

Maejo University at Chumphon has an equivalent status to one of the faculty of Maejo University, located at 99 Moo 5, Lamae, Lama, Chumphon, Thailand. For the undergraduate, (a four- year course) it provides 5 programs: 1.Bachelor of Arts (Tourism Development) 2. Business Administration Program (Management) 3. Fisheries Science (Fishery) 4. Bachelor of Science (Technology Management for Plant Production) 5. Bachelor of Arts Program (Political Science) Maejo University in Chiang Mai and Maejo University, Maejo University Phrae Campus, both have shared the curriculums since 2016. Maejo University has set the policy for Maejo Maejo Phrae Campus and Maejo University at Chumphon, and University to develop their new curriculum according to the context in those areas, social needs and changes in the modern

paths (flagships) into three development stages: Organic University, Green University and Eco-university. These three stages are under the same concept studying on STEM Education which is the stage of education integrating in the Interdisciplinary such as science, Technology, Engineering and Mathematics, and focuses on bringing the knowledge to solve problems in real life. Moreover, development of new processes or products will be beneficial to life and work. Therefore, it is necessary to develop the integrating curriculum and link to "Go Eco" or a safe agriculture, and culture.

world. In 2016, it is reaching the period of developing the curriculums shared in 2018. Those curriculums includes Bachelor of Science Program in Fisheries, Bachelor of Arts Program in Tourism Development, and Bachelor of Business Administration in Management, Bachelor of Science in Political Science and Bachelor of Science Program in Plant Production Technology.

Curriculum Development Frameworks on Green University

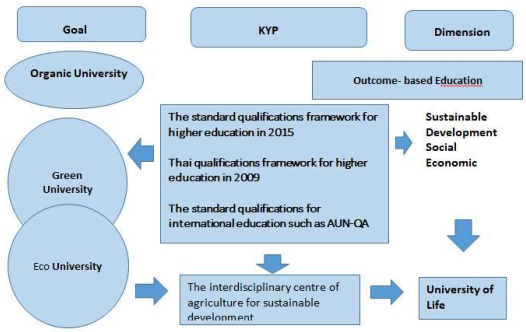

Figure 2: the qualifications framework for higher education for Green University

In Figure 2, the qualifications framework for higher education for Green University for Green University of Maejo University at Chumphon. The guidiance to implement are as follows:

Organic University is to develop the university, return to natural agriculture, Lianchamroon(1996) and the International Federation of Organic Agriculture: IFOM states that organic agriculture refers to the agricultural production system avoiding the use of synthetic chemical, fertilizers, pesticides, stimulating growth hormones for plants and animals for the sustainability of environment, social, climate and economic. This system focuses on soil improvement and try to apply the mechanism and natural cycles to increase productivity according to social, economic climate, and local culture conditions.

Green University is a developing university balancing with nature and focuses on natural and environmental treatments, having a good culture, and good mental development, and creating consciousness for students and education personnel in developing, restoring, and participating. It also includes the knowledge integration and conservative activities for natural resource, energy, and environment, self-reliant development on the ground of balancing of ecosystem and a well- being.

Furthermore, the development of teaching, research, academic service, and university activities for environmental and energy conservation, and well-being are good for the people in the organizations and the communities in all levels and all sectors on the basis of the participation.

Eco University has the perfect balance between human and nature in living regarding to the true happiness of human. Department of Health Promotion Environmental Quality has stated the “The School for Environmental Education for Sustainable Development”, project or shortly called “the Eco School" in 2008. It aimed to develop the school system for education and to encourage students to be responsible citizens, being aware of environmental issues and local development, having knowledge and understanding from learning and practice. They will be ready have a role in the prevention, restoration and utilization of the environment. It emphasizes on Community-based learning, and problem-based learning. Chamorndusit (1995) stated that the concept of development is under the principle of a balance creating of economic, social and environmental dimensions, focusing on concrete outcome of eco-efficiency and reducing the disparity for positive results in the social dimension resulting from the better quality of life of people living in cities. The numerical development model relies on the mechanism of creation. Equilibrium in three dimensions of development is also important. However, there

are some differences depending the context and urban development policies in each area. At present, the emphasis is on the economic dimension of urban development.

Outcome -based education is a Students- Centred learning. Teachers will organize this learning process. Lecture-based learning is learning from teachers' lecturing. Activity-based learning. There are many different methods and techniques for learning style including Problem-based learning, Project-based learning, Service learning all are like activity-based learning or Active learning. These styles are the process of Outcome-based education which must follow the standard qualifications framework for higher education of the Ministry of Education, the Announcement Board of higher Education in 2014 on the guidance for the Thai qualifications framework for higher education in2009 or standard qualifications framework for international education such as Asian university -Quality assurance (AUN-QA).

In the study for sustainable development, the Dhammapitaka (PA. Puyetto, 1996) stated that sustainable development is the development that encompasses all dimensions: economic, social, natural resources and the environment. It is a man-centre development and the goal is to keep man happy and well-being. In 2016, Kanjana Ngaurunsri stated that ESD (Education for Sustainable Development) is a process of thinking to future in balancing the current world situation and the quality of life. In addition, the development of sustainable curriculum in higher education, it is essential for curriculum management to have these elements into learning content. 1. The three components of sustainable development.it is necessary to Look at the importance of the difficulty of the research study. 2. The curriculum with development for green and sustainability economic and society will contribute knowledge creation in all levels. 3. Learning of the culture diversity of the world population would help to understand and cooperate in living together and have no conflict. Besides, Pinsuda Sririrangsri(2012) said that educational management would lead to the desired characteristics of the curriculum. This will lead students to achieve learning with their full potential. They will be qualified and happy. This learning style will responds to the needs of parents, and communities. Apart from learning of general and professional subjects, to understand the roots of religion and their culture, students should know about the current world, behave well, and keep peace. This behaviour will lead to the grater achievement of them.

A sustainable social development requires education as a mechanism for operation. Education is used as a tool for sustainable development. There are three major components for this mechanism. 1. The curriculum is the

knowledge to create wisdom in solving family and community problems, it will be the basis for creation of new knowledge and knowledge from the change of the current world**.** 2. Teachers or professionals should be good modal for learners to have analytical thinking and attempt to improve themselves for their future. 3. The goal must follows the university guidelines. Therefore, the curriculum development for Green University of Maejo University at Chumphon focuses on sustainable development of education according to the strategy of Maejo University and the vision of Maejo University at Chumphon which is outcome -based education (OBE). It is necessary to create a network and link to departments, and organizations involving with environment, economic, society, have an education administration in practice, and more cooperate with agencies, especially, the content knowledge for education. Focusing on education management is to develop, and to give opportunity for everyone to participate and realize of problems and needs of locals and communities in order to improve learners with participating process according to the Thai social context for sustainable development.

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