

Creative Learning Space: A Re-shaping of KMUTT Landscape Master Plan Towards Sustainable University

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Abstracts

This research is about the re-shaping of spatial development to achieve sustainable future of King Mongkut's University of Technology Thonburi (KMUTT), a polytechnic institution as first initiated, which is to become a multidisciplinary university. KMUTT was ranked 17th in UI Green Metric Ranking of World Universities 2010 and 47th in 2011. Now, we are facing the challenge of the following issues: (1) How to keep up with our record, how to achieve better Green Index and how to sustain it? (2) Is the image of green within the perception of KMUTT community and considered as the KMUTT identity? (3) How to build *the Green Heart Leader* among our students? Thus, this paper aims to demonstrate the roles of integrated learning space which has been superimposed onto the university master plan in order to transform the campus space and infrastructure towards sustainable green and clean university. The reshape of landscape and functions will make the green concept visible. As an integrated learning garden, it will facilitate teachers and learners to bring knowledge out of classroom or laboratory, and to share and interact with others in public spaces. It will encourage and support KMUTT community members to carry out activities which promote green awareness. Hence, the development of Creative Learning Space will be used as a key driven mechanism to build green heart society and knowledge community, which is the core value of KMUTT.

Keywords: Sustainable Green and Clean University, Creative Learning Space, Green Heart Leader, Transformed campus spaces

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1. Introduction

King Mongkut's University of Technology Thonburi (KMUTT), Thailand was known as a skillful polytechnic institution since it was established in 1960. Its first objective was to train technicians, technical instructors and technologists (Planning Department, KMUTT, 2011). After 50 years, KMUTT developed its role to serve Thai society as one of the leading institutions in science and technology. KMUTT's educational role keeps changing according to the expectation of industries and society, so as to the teaching and learning methodology that support the activities of staffs and students. Its direction is to be a multidisciplinary university which collaborating among science, technology and creativity. The long term goal is to construct a lifelong learning behavior in our students. The desired change in students' learning behavior requires an environment which facilitates and enhances them in terms of physical and digital systems. Recently, KMUTT has announced its role as leader in green innovative research university with its focus on environmental technology contributes to the society. The effort outcome in environment and energy management is being ranked the 17th in UI Green Metric of World Universities 2010 and 47th in 2011 (UI, 2011). Despite its good record, KMUTT has been struggling to build its identity as green even among its own community. Now, we are facing the challenge of how to make it visible to all and sustain a green record and how can our students become change agents in sustainable development. This paper demonstrates Physical facility Management Unit (PMU)'s work of place making to provide an effective integrated learning space in green in order to tackle 2 tasks, to make sustainable green and clean campus visible and to encourage knowledge-based community.

2. Reviewing of the relationship between space and learning

The study of learning spaces has been increasingly discussed among educators and learners over recent years. Many schools, colleges and campuses have altered their classrooms, and offices to be more informal learning spaces such as learning coffee corners, informal seating areas, corridor alcoves or social hubs, equipped with technological support system. An attempt lies within the assumption that in providing more informal, flexible and social interaction spaces in institutions will shift or change the conventional teaching learning model that limits self-wisdom (JISC, 2006). In the book *21st Century skills: Rethinking How Students learn*, Bob Pearlman talked about "Designing New Learning Environments to Support 21st Century Skills" that schools are now be able to move away from teacher-directed to learner centered workplace for a collaborative culture because of technology skills. He underscored that 21st century knowledge and skills are not only built upon core content knowledge, but also they include information and communication skills, thinking and problem-solving skills, interpersonal and self-directional skills, and the skills to utilize 21st century tools, such as information and communication technologies. Eventually, this new pedagogy requires a change in physical learning environment (Pearlman, 2010). Learning innovators commonly argued about learning places beyond classroom that can accommodate casual learning such as extended studying areas and collaboration zones. Pearlman reviewed the new learning spaces in 5 institutions in U.S.A. and U.K. and concluded that though the design is different in all, the common facilities are the space for individual work, small-group work, cross-disciplinary group work, casual lectures and talks, presentations, breakouts, and cluster meetings.

In case of Thai higher education, high competition in globalization stimulated the search for local knowledge and wisdom. Paitoon Sinlaratr (Sinlaratr, P., 2008) mentioned the paradigm shift of higher education learning model that requires 7 necessary key points in post-globalization. Some of those are to train critical thinking skills and creative ideas, to encourage individualization as well as socialization, and to build new network of knowledge by collaboration and interaction.

In KMUTT case, we realized that a space facilitating self learning would strengthen the 21st century learning behavior and then would lead to lifelong learning of our graduates. Traditional classrooms and laboratories are still important to build core knowledge and research skills, but how to bring that knowledge out to share with others is equally important for sustaining the continuity of learning. Thus, this paper demonstrates a plan to transform the entire 52 acre KMUTT campus including most building first floor into creative learning spaces and to transform the campus core space to be a common learning garden. Through the integrated common open space approach, KMUTT is expected not only to utilize its limited space as shared space but also to construct the inside-out learning behavior among its communities.

3. Methodology of the study

The method of study has been conducted through the critical thinking process from data gathering and reviewing stages to planning and designing. The critical thinking process for the study of transforming KMUTT into creative learning space involves

- review and analysis
- goal setting
- proposing revised infrastructure master plan
- mapping the role
- reviewing the organizations related
- designing the physical development plan.

In order to determine the possibility of KMUTT's potential to transform its space towards sustainable learning spaces, 3 main factors have to be taken into account. They are physical environment, policy, and users. The study has been conducted through literature review, interview, measurement and stakeholder meetings. The role of learning space was mapped onto the existing school plan and structures according to potential of each zone. Finally, the learning space model as well as physical development plan is published to get feedback since it should be a common understanding of KMUTT communities to utilize space with the same direction as an overall policy.

4. Review of KMUTT policy towards sustainable direction: From philosophy to visibility

In 2006 KMUTT laid the roadmap for its vision in 2020 as follows:

1. Committed to the Search for Knowledge, "Lifelong Education"
2. Determined to be at the Forefront of Technology and Research
3. Maintaining the Development of Morally Correct and Proficient Graduates
4. Endeavoring for Success and Honor in order to be the Pride of Our Community
5. Striving to Become a World-Class University

Recently, KMUTT has announced its positioning as a pioneer in green innovative research university with its focus on environmental technology which is advantageous to the society. The strong emphasis is placed on knowledge integration between its members and collaboration with society.

4.1 Policy on Sustainability

KMUTT has announced the direction towards Sustainable Green University called KMUTT Sustainability Policy Plan since 2005. Its mission is to educate the students and encourage them to learn outside classroom and transform our campus as an ideal environment for developing awareness and innovative solutions to problem that will improve the world for current and future generations. The policy aims to support the development of sustainability leadership in all activities from operations, and teaching, to conducting research.

KMUTT commitments to sustainability are (EESH, KMUTT, 2012),

- To be a Green University providing a role model on Energy, Environment, Safety Management Systems, promoting the application of all these activities within the university.
- To strive for continual improvement in energy, environment and safety management systems to help achieve sustainability for all.
- To make our students and staff to be change agents for helping community & society in making a better quality of life by expanding the good Energy, Environment Safety management system to surrounding communities and societies.

The continuous policy has been constantly executed accordingly through the administrative and knowledge management system. However, the knowledge in green technology is still limited in specific groups of experts, so as to the green management. The perception in green or sustainability remains unrecognized by all to be KMUTT identity because the tangible campus environment has not yet reflected the matter. To bring green knowledge and innovation down to accessible green open space would make the sustainable university campaign visible to all. The school's serious action to build campus green space will bring back sense of belongingness and KMUTT pride of all stakeholders and will encourage them to participate and contribute more in the commitment towards sustainability.

4.2 Policy in Learning

Based on KMUTT Roadmap 2020, the mission to construct new approach to learning and network, and to utilize resources for learning is integrated into every level of action plans. KMUTT has set 6 targets plus 1 student core value called 6+1 flagships to be strategic approaches for Development Plan11 (2012-2016). After several meetings, some requirements of facilities were identified to support 6+1 flagships such as,

25 January 2011 Retreat: The Making of Plan11

- Educational display
- Learning media by students
- Knowledge museum
- Alternative learning Space throughout the entire University
- Space for multidisciplinary-task working
- Enrichment atmosphere
- Space for knowledge interchange
- Street performance (for social +KMUTT)

Social distribution (education+ green space)
Space management and effectiveness
Most utilized space (24 hour University)
Safety space
Digital learning space
International center

Hence, the university space needs to re-organize, alter and transform to support those activities. The design of learning garden should answer to those requirements and more.

5. In making of creative learning space

The policy on sustainability and learning has been put into action plan to transform the campus common ground into an ideal environment for developing environmental awareness and providing integral learning atmosphere. At present, the campus open spaces are scattered, lack of linkage and appropriate flow with low safety and sometimes conflict with other activities. Most spaces are not in good design and have not been assigned appropriate functions. PMU is appointed to do a revised master plan study for KMUTT at Bangmod as a creative learning space for KMUTT members, visitors and surrounding communities, which is commonly called learning garden or Education Park.

Refer to KMUTT philosophy (KMUTT, 2002), “**Education Park** means a beautiful shady place that provides peaceful atmosphere, encouraging enthusiasm for intellectual dialogs and new ideas, that support KMUTT to produce young graduate with greater knowledge and virtue for improving our society . The pleasurable park atmosphere will make users inside the garden feel fresh and comfortable, so as to have open-minded for new things and eagerness to exchange opinions”. KMUTT learning garden is creative environment that will respond to users’ behaviors and interaction, will foster knowledge by bringing out the research and innovation from classrooms to KMUTT communities and its neighbors.

In making creative learning space, 4 key components are needed,

- **Space**
- **Learning**
- **Design**
- **Driven mechanism**

5.1 Space: Reshaping the space towards sustainability

To construct the integrated learning space in campus common ground, the important tasks KMUTT management team has to agree upon are,

Restructuring the campus towards Green Index,
Re-shaping Campus master plan to win back public space,
Transforming the entire campus to be learning, living, sharing place,
Encouraging digital-learning and casual studying,
Creating a sense of belonging and identity of green.

From the infrastructure plan which was clustered with workshops, traditional classroom and laboratories. All those buildings were occupied by heavy tools, chemical or mechanical devices for specific groups. The review of existing condition was done to increase the amount of public space. Winning back the public open space is the concept to alter private occupied space to be shared common space. In KMUTT plan 9 (2002-2007), the revision of KMUTT

master plan at Bangmod campus has drawn a guideline for infrastructure and open space development. At the end of 2011, the central area of 20 acres was cleared to be public open space connected to semi-open space on the first floor of every building. Those common grounds will serve as the main pedestrian axis to increase a chance of interacting. The master plan 2006 guideline for open space (Limpaiboon, A., Opartpongsakorn A., 2006) stated that,

- University should have adequate safe green space
- University should have public space to support community activities
- University should have space for interaction and demonstration
- Every building should have personal space for reading, group working, relaxing
- Everyone must respect space for public
- All of these should be in easy and good maintenance



Fig. 1: A revised masterplan 2006 shows the demolishing of some old workshops to transform the central area to common open space

Restructuring campus route

Energy saving and environmental friendly is a main concern for planning. Since Bangmod campus is not big in size, alternative travelling by non-fuel mobility is appropriate and possible to be a major linkage. The shady 2 pedestrian corridors will provide convenient connection of the north-south, east-west zones in shortest distance to access every building. Slow travelling mode also provides a chance of observation and social interaction when they move through the park and pass by the activities along the way. Moreover, the continuous green corridor will unit plots of learning spaces local among campus buildings and demonstration sites together as living museum.

Traffic calming techniques such as sharing road space, loop road and limited entrance-exit are used to direct vehicles. Parking building is built on the front to reduce traffic volume in academic zone.

- The revised conceptual master plan has been proposed to be pedestrian approach, so the inner loop will be car, and bicycle free zone.
- Walking is first priority by direct axis, second is bicycling as inner loop, and the vehicle and service will access from ring road.
- East-west pedestrian axis is the linkage from surrounding neighbors to campus, North-south axis is main linkage from dormitory to academic zone

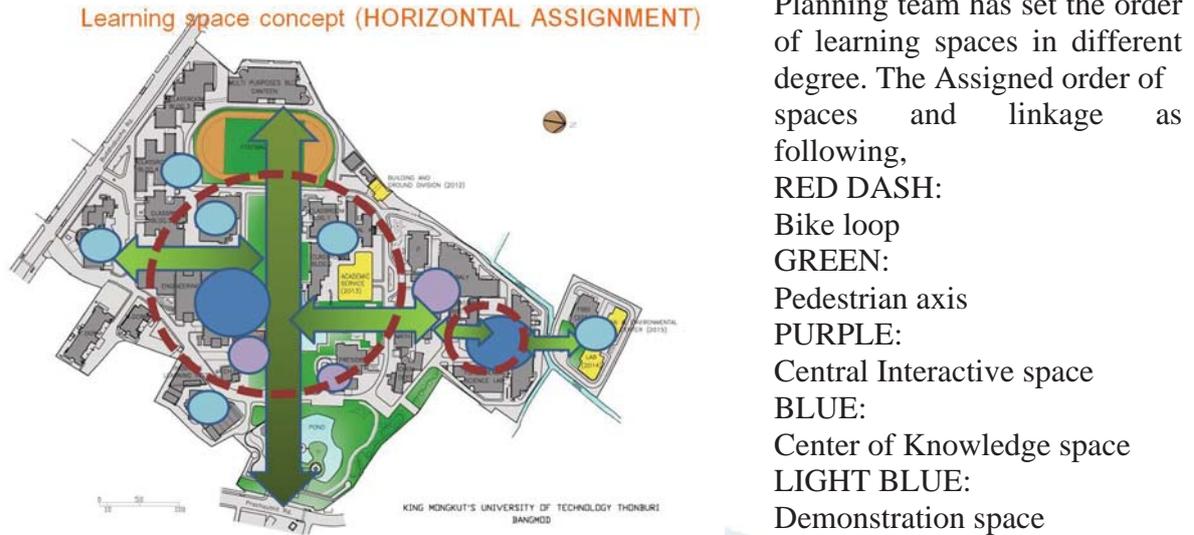


Fig. 2: A Learning space plan 2011.

Mapping the Learning Space

After KMUTT had announced to construct learning space throughout the entire campus, a plan to utilize all first floors as more public necessitated most buildings to reorganize and redesign their space. Primarily, the role of learning spaces has been assigned to create priority, varieties and dynamism that bring visitors move through the campus like they are walking in a living museum. We have to re-think of space usage from knowledge in Science and Technology to ignite the Imagination and Innovation. KMUTT Interpretation Center and its park create chances of social-interaction to develop soft skill as well as inspire intelligent activities.



Fig. 3: Assigned role of learning space to map the Space for Creative Learning in campus

5.2 Learning: Space needed for learning behavior

The model of physical spaces used in KMUTT learning space was adopted from The Seven Spaces of Technology in School Environments by Evan McIntosh (McIntosh, 2010), the type of physical spaces needed to encourage 21st Century learning habit. Those 7 learning spaces are, Individual Space, Group Space, Publishing Space, Performing Space, Participation Space, Watching Space, and Data Space.

He talked about how to map technological spaces to physical ones to adjust the physical school environments to harness technology even better. Whilst he compared interior spatial arrangement to technological spaces (facebook, google etc.), those space terms are also commonly used in behavior settings of built environmental design in landscape architecture.

In KMUTT case study, we reviewed the learning behavior in 1st floor library spaces after its renovation based on the 7spaces, and how users respond to each area. We found that the design varieties of seating and flexible furniture arrangement attracted more teenagers and modern instructors than conventional adults. The user friendly learning environment becomes a favorite place for group appointment or even casual class lectures.

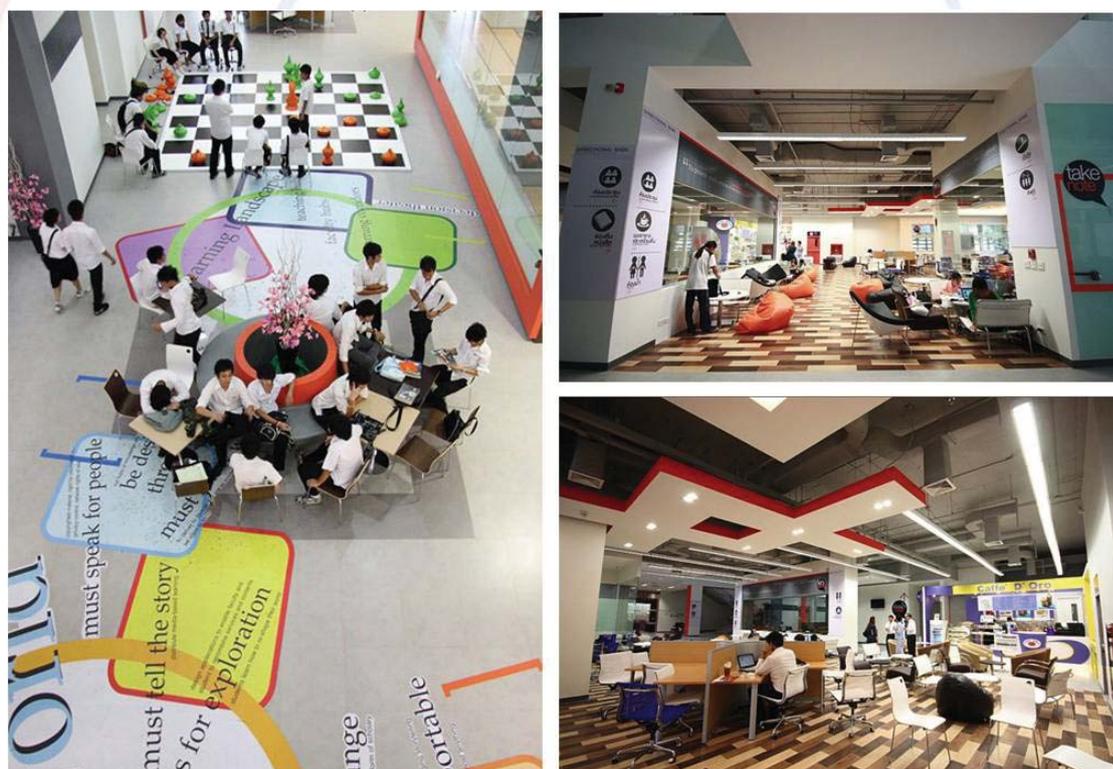


Fig.4: The example is the adaptation of KMUTT library space to be casual learning space which students enjoy working sharing in casual atmosphere.

PMU applies those seven learning spaces on the entire campus in order to transform our semi public and outdoor areas into common ground of lifelong learning. The inside-out model of learning will be developed naturally as well as the soft skills in interacting with others. The critical thinking skill will be integrated not only in their learning but also in their living. Thus, it becomes a behavior of learning anytime anywhere and any way. The self-wisdom which is the true knowing will urge them to expand their knowledge to others. The space that provides

chance of interaction and performance will inspire idea exchange and discussion to construct new knowledge. As a result, that knowledge is not limit only in lessons.

Learning anytime any way and anywhere

Learning should happen anywhere and anyhow. Students will develop the life-long learning habit, but then the environment should provide opportunity and raise their curiosity. The outside-in model is to create the spatial environment with the green innovative contents and facilities, so users will be inspired by the surrounding and will generate new ideas. Creative environment in green or *learning garden* is the environment that fosters opportunities, raises curiosity, encourages opinions and supports learning behaviors.

5.3 Design: Designing the Learning environment in green (*Learning garden*)

The well designed, effective planned space is very important to create the inside-out model of learning. What is important is that the spatial design should link to the institution's vision and strategic mission in teaching and learning. The KMUTT learning spaces should be a physical representative of its core value intersected with its diverse creativity and cultural resources that are built over time. The transformation of central space to be common learning garden will have high impact in creating a sense of belonging and unity as well as promoting healthy community and diversity in school. This will make the space itself sustainable and will become the valuable asset of the institution.



Fig.5: The Landscape master plan for KMUTT learning garden

Strategic Image: Green and Clean atmosphere

The image of the park is built upon these criteria,

- The park should reflect the identity and culture of the institution
- The activity should support community involvement in liberated and creative culture
- The atmosphere should inspire curiosity, creativity and casual learning
- The areas should be flexible and enterprising
- The zonings should strengthen sharing and public contribution
- The overall manner should be international learning atmosphere
- The holistic approach should be green and clean campus

Outside-in: Towards sustainable campus

The content of sustainable green is the main theme of learning garden. The place will support KMUTT community to bring green knowledge out of laboratory and classroom to demonstrate and share in outdoor and semi-outdoor spaces. The space will encourage a chance of casual learning in natural light. The infrastructure must provide convenient non-fuel mobility and digital-learning to reduce use of resources.

Content: Innovative Park

Creative Learning Space concept made visibility: Green approach/passive energy saving /Green image. The design of central space or learning garden is the integration of green knowledge and green technology into landscape design to allow users to have access to knowledge while they are walking through or while they are in the garden. The using of green technology in designing the spaces is the attempt to encourage users to think and to be involved in green advocacy.

Functions: Integration of Learning Spaces.

The 7 learning spaces are integrated to each zone in the park to support various learning behaviors. Fig.6 is the gallery of space examples in Wetland zone.



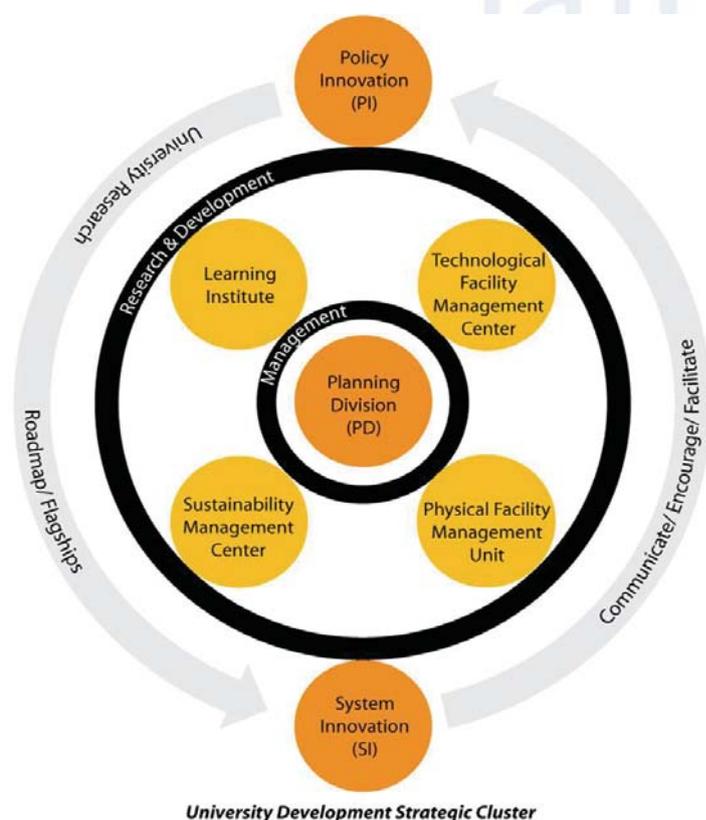
Fig.6: The example of idea in making the garden that response to learning behavior, 7 learning spaces are applied into designing each zone of the garden

5.4 Driven mechanism

The least but not last important component is the “driven mechanism”, the working collaborations among related strategic clusters. It is the most significance to make the learning space sustainable (Mengveha, 2012). From policy to plan, from plan to implementation and from implementation to action, every unit must be geared towards the same direction. Teaching learning methodology has to change and the management needs shift how it works, the communications should be delivered to all stakeholders.

The 4 clusters to assist Planning Division are,

- LI or Learning Institute: Develop research methods, learning tools and curriculums to facilitate learning efficiency of KMUTT staff, students and Thai citizens. This unit is in charge of the Learning teaching programs.
- Sustainability Management Center (former EESH): Develop and manage activities towards sustainable energy, environment, safety and health. Mainly, this unit mainly runs the green and clean program and activities.
- TM or Technological Facility Management Center: Develop learning environmental system in terms of technological support such as e-kmutt project.This unit is in charge of tecnological support.
- PMU or Physical facilities Management Unit: Develop spatial learning environment system and conduct physical design and planning. This unit is charge of physical facilities and infrastructure support.



System Innovation (SI) and Policy Innovation (PI) are 2 Units to gear the collaboration model.

PI is in charge of policy direction and SI is in charge of developing the system that manages and facilitates the school development

Fig.7: working diagram of University Development Strategic Cluster towards Sustainability of KMUTT proposed by Nimit Mengveha and Apinya Limpai boon (Mengveha, 2012).

