13 January 2016

KMUTT 3.0 -

Because great things take time

For the past 50 years, KMUTT has known for one of the most established and most practical Engineering Colleges in the country. Since our early days as a technical institute, we committed ourselves to laboratory, workshop, and classroom based methods in delivering both scientific theories and in-depth engineering applications to our graduates. Like most practitioner-based engineering school in the late 1960s, our initial focus and main principle in engineering education have been on hands-on experience and vocational training, each of

which contributes to our graduates' strong technical skills, essentially built based on the pressing demand of traditional engineering industries. This first era of KMUTT graduates (KMUTT 1.0) are 'hands on' professionals equipped with a set of engineering knowledge and skills ready for the 19th century industrial requirements.

Marked its second era (the 2.0) by being the first Thailand government institute to become an autonomous university in 1998, KMUTT had better flexibility to direct its focus on community issues, real industrial research, and most importantly quality service to our graduates. In respond to the demand of knowledge based society, KMUTT also put a strong emphasis on knowledge integration, professional skill development, and real world issues as seen in the landscape of KMUTT research clusters expanding to cover a variety of pressing problems in Energy and Environment, the Earth system science, NanoScience, Bio-engineering, etc.

In the past 10 years, KMUTT has risen among the tops science and engineering universities in Thailand through our believes in hands-on approach, research excellence, and the responsibility to our society. Realising that we need to create more effective differentiations to standout in today's competitive environment, slow but steady movements in KMUTT education landscape also start to show signs of the readiness of people who notice the implications of the changing world. With engineering attitudes at the core of our culture, KMUTT has proven that we could preserve through adversity by thinking out-side-the-box, working around the traditional processes, and not giving up for things that are really matter. With the ideas from many well established programs and projects — such as practice schools, WIL, Darunsikkhalai School, ESC, SBTS, JSTP, RC-Residential college, etc—are widely adopted by the community, it is convinced that the university opens up enough to

embraces the next big change and to position itself for a greater challenge of the new era.

The Driving forces

21st century has brought in different frontier of constraints and challenges for higher education. In today's rapidly changing market, employees are already been focusing on the importance of what graduates would be able to 'do' on the job. With many skills of 21st century (such as complex/creative problem solving, multi-disciplinary knowledge application, life-long learning and adaptability) on the top of their lists, it is essential that universities provide opportunities for higher-order thinking skill development as well as for knowledge integration across content areas. The fast-growing change in global landscape and technology revolution also slowly drives the demand for high quality, engaging, and seamless experiences both for online and face-to-face learning. Abstracted virtual learning, and a variety of personalised, mobile, and adaptive technologies are emerging to provide instant access to learning environment where leaners can socially engage and interact with teachers and peers when and where they need it. This requires new ideas on pedagogical methods, technologies, and facilities that can readily adapt to individual learning preferences.

Since face-to-face interactions will remain crucial in effectively teaching higher level thinking and some soft skill development that difficult to do remotely, physical learning spaces and their designed experiences are required to be highly engaging and interactive to provide an integration of learning supports and collaborative experiences between virtual and physical worlds. Ubiquitous access of information and *short shelf life* of knowledge also mean that the roles of teachers would need to expand outside of merely content delivery; allowing more time to focus on *designing*

learning experience, facilitate learning and coaching students in order to motivate and inspire students to take control of their own learning.

Continuously and steady increasing in online learning in the past decade has raised many challenges for university worldwide to adapt themselves for the massive market of online mode of learning that offers great flexibility for different lifestyles of learners. When class sizes are not limited by physical classroom space, the learning experience can be tailored to as small as a tutorial and as large as a few thousands learners. Whether online learning will be viewed as *an extension* on the traditional mode of learning for brick-and-mortar institutions or as *the only* mode of education environment offering, it is important to think more clearly about what comes next in terms of pedagogical strategies and management for the emerging demand of visual engagement and other learning supports .

With such driving forces, one can easily identify that a whole lot of new thinking is required to transform the traditional model of higher education to better serve the need of future learners and society. While there are many perspectives of change we need to consider, the fundamental challenges of KMUTT, and other universities elsewhere, remain within the two interwoven domains influencing how the deep structure and operating models of the university are formed: (1) the value added for the students; and (2) the production model of how the value is created [1].

The data from KMUTT graduate surveys in the recent years[2] has revealed several insights challenging our own assumptions on *the values* we created for our students.

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[1] Don T. and Anthony D. W., *innovating the 21 century, it's time*, EDUCAUSE Review Jan/Feb 2010

[2] KMUTT graduate survey report 2011-2013, KMUTT Strategic planning division, KMUTT, Thailand

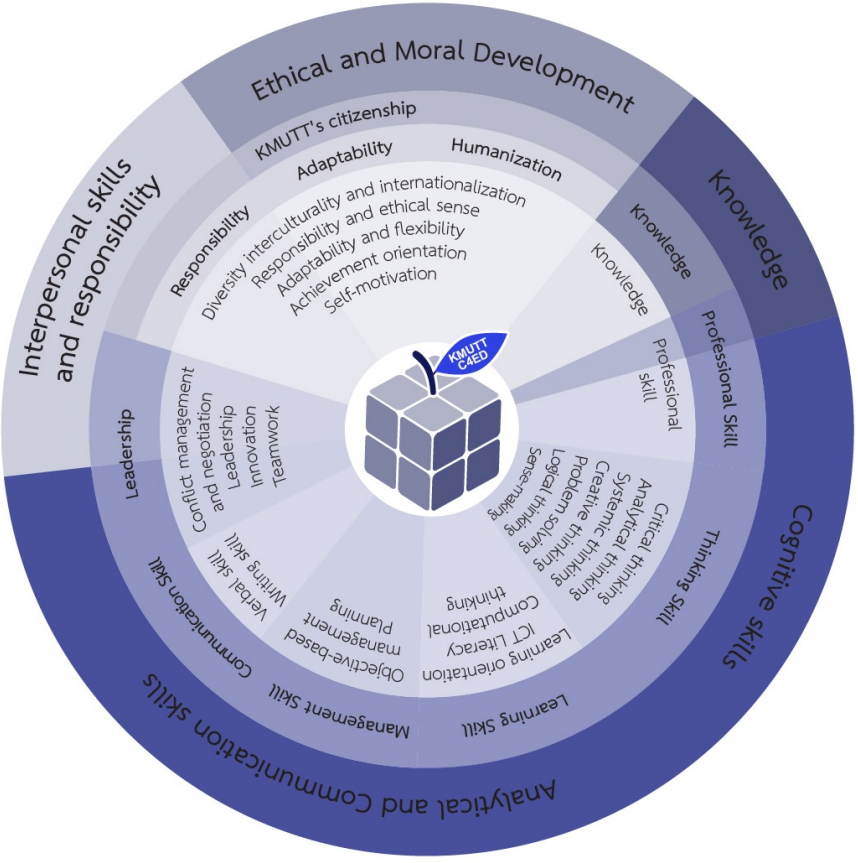
On top of sound knowledge in disciplinary fundamental, a solid foundation in Mathematics, an ability to apply theories into practice, the survey results show that businesses today also seek for another set of 'abilities' allowing graduates to work effectively in *complex* and *unknown* environments. Among the top abilities required special focuses are communication skills, interpersonal skill, computational thinking, analytical thinking, ICT literacy, cultural, global and business awareness of the implication/impact of their decisions.

What are the values we created?

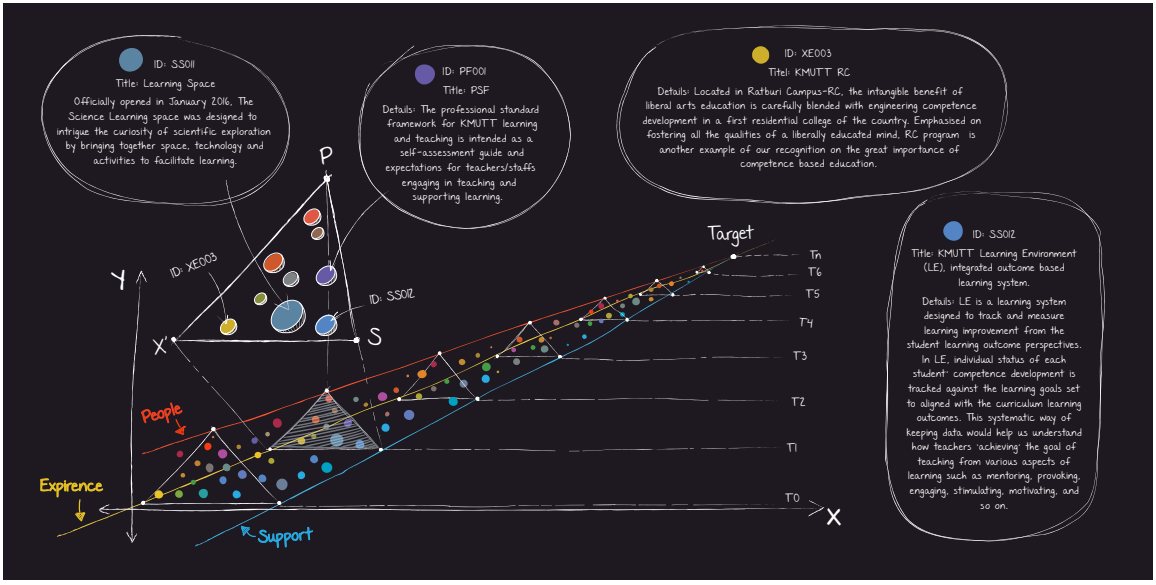
In 2014, a university-wide initiative called KMUTT 3.0 was proposed to stimulate curious discussions and university wide self-evaluation on learning quality and the *values* we shall create for our graduates today and tomorrow. The first image of KMUTT 3.0 was presented in a framework of our future graduates - KMUTT Student qualification framework (*KMUTT QF*) also known as *social change agent framework*, suggesting a list of competences for the future graduate' employability.

Representing the *ideal graduate* of the future, KMUTT QF was developed from existing researches on 21st century skills and the future employability skill issues from both local and global expectations. Together with inputs from KMUTT teachers, education experts, and business leader perspective, the framework also reflects KMUTT's unique images and visions on the the competences KMUTT graduates need to success in the future.

Divided into 8 focuses aligned with the Thailand Qualification Framework (TQF), KMUTT QF defines and describe a graduate equipped with the right set of competences required to be a *change leader* ready to operate across disciplinary



boundaries with broad-based multidisciplinary knowledge in science, the most creative thinking in engineering application, and in-depth understanding on the social implications of their decisions.



How to get there?

Being communicated throughout the university, the 3.0 has sparked many productive conversations —about our bigger than ever 3.0 era— throughout KMUTT and outside higher education community. Several issues were identified, investigated, and responded to address the challenge we face and, essentially, to answer the 2 big questions of *what are our values* and *how we create them*. By putting a big flag at the point where we want KMUTT to be in the future, 3.0 has now become a university-

wide vision and mission to start **everyone** thinking about the importance question of *how to get there*.

Because conversation along would not be enough to address the challenge we face, another underlying goal of KMUTT 3.0 is to encourage KMUTT community to collaboratively develop *dynamic frameworks* and *roadmaps* to describe phases, process, steps and other strategies required for sustainable development that would bring us closer to the 3.0 era. This has been translated into enormous efforts from policy, process, organisational management and basically 'everyone' to allow for harmonised structures, process, and policies flexible enough to recognise and support such a transformation.

Knowing that it's not possible to get to 3.0 without understanding the nature of such adaptive change and recognising the importance of the collective impacts from our 'people', KMUTT deliberately place the 3.0 initiative at the heart of KMUTT *Cluster for Educational Development - C4ED* to delicately facilitate and provide the right environment where KMUTT people can collaborate and influence each others.

What's your dot?

With KMUTT 3.0 as the main mission, C4ED is formed as a virtual organisation where people can start working together with no boundaries of traditional organisation to generate ideas, adjust processes, and most of the time, reinvent the new way of working toward the same vision. The *cluster* has a loose structure divided based on the main functions of what we believe as the essential foundations for the success of the future: **People**, **Experience** and **Support** - formally and traditionally known as

Faculty Development (FD), Instructional Development (ID) and Organisational Development (OD) accordingly.

View as the 3 core axises toward KMUTT 3.0, People (P), Experience (X), and Support (S) provide a connected triangle frame to guide the way for a revolutionary lead into the 3.0 era. Acting both as a rough guideline and framework for areas of *actions* required, the 3 axises help KMUTT focus on areas of activities that matter most for the long term success with much flexibility. For each *action*, we give it a 'Dot ID' to recognise its impact and contributions. Each 'Dot' contains deliberate efforts to design, build, implement, analyse, redesign, and most of the time, challenge the way we are now.

Extended beyond the faculty members, the P axis is aimed at all learning facilitators, and other staffs supporting learning - both in face-to-face and in online scenarios. Along the P axis, it is very obvious to us that ***High quality teachers*** are the lifeblood of 3.0 era. To influence our people to be passionate in learning and teaching and to maintain their productiveness in a highly distributed environment, we need to make several deliberate policy choices and build up a comprehensive system of selecting, training, compensating, and developing teachers. Core mechanisms of the People axis lie under the responsibility of KMUTT faculty development unit named Centre for Effective Learning and Teaching —CELT, which is founded to provide a new professional development models, process, and system to support and sustain the professional and personal development of our people. To support their balance lives as well as ambitious efforts necessary for cultivating those 21st century skills in our students, CELT gathers and forms multiple relationships with other 'dots' within C4ED environment to collaborate and design effective strategies to advance its service offering.

Providing a direction for curriculum and experience design development, the X axis guides how KMUTT experiences are designed and redesigned from the scale as large as massive online experience to micro classes tailored for specific learning goals of students. It is highly likely that KMUTT would need to develop/seek for staffs we called *learning experience designers/specialists* with an ability in both learning scientist and technologist to help faculty (as a team) design strategies to engage student learning, to assess evidence of learning, and to design digital experiences for both online and face-to-face modes. With the fast paced of knowledge cycle and many unknown jobs have yet to be developed, more and more employees have changed to focus on competency based hiring rather than on the major of graduates' degrees, such shifting in perspective would bring up ***core competency development*** *(similar to KMUTT QF mentioned)* to the spotlight of curriculum design. With such benefits of developing a well-rounded person now an essential value of being an educated person, many more 'dots' can be done to develop a new model for core competency development or re-design a general education curriculum to address the emerging skills and attributes such as leadership, creativity, or the appreciation of complexity and ambiguity.

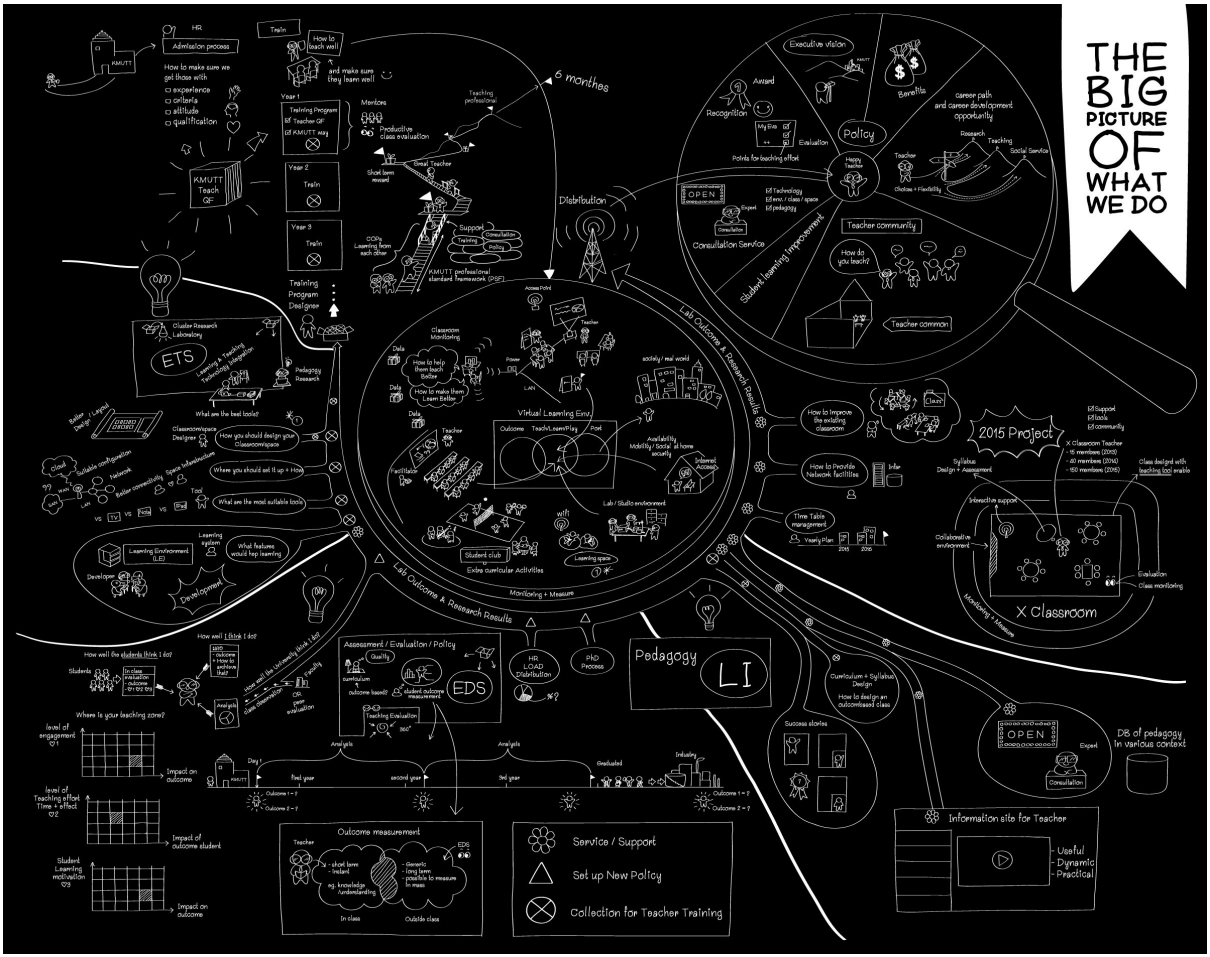
Along the S axis, it is essential to work along the way organisational structure, policies and processes are formed to allow efficient and effective supports for faculty, student, and learning. Moving closer to KMUTT 3.0, many Dots are created to provide **the right support in** career development paths, reward/recognitions, and systems to enrich collaborations and allow innovative actions and their relationships to form across the university. For example, a system enable adjunct-led courses to collaboratively reach high-level learning outcomes and to access real time information required for personalised education. Much can be done by designing a system to incorporate intelligent agents, automatic assessment engines, or feedback tools to

maintain consistent quality and education experience across the modes/platforms offering.

Looking from a cross-section area, one could view people centric *dots* such as *Community of Practices* or *faculty training courses* together with support *dots* such as the *policy on professional development* as well as the experience dots such as an *experiment on various instructional strategies* on the same plane, meaning that they require **tight collaborations** and need to complement each other at the right place and time. In another sense, each dot is essentially required to *sing the same tune* for us to move along the axises toward our goal *together*.

In this early stage of the long journey toward 3.0, many milestones have been put in place and endless number of 'dots' are generated within the community, showing evidences of many 'jigsaws' for the futures. Although often viewed as a bold undertaking and, for many critics, as too difficult to accomplish, KMUTT transformation toward 3.0 is not just a good idea. It's imperative —not only because what we do now will determine the future of our economy, but also because whether we are ready or not, tomorrow will come.


ID: SS011
Science Learning Space


THE BIG PICTURE OF WHAT WE DO
HR
Admission process
KMUTT
How to make sure we get those with
experience
criteria
attitude
qualification
KMUTT Teach QF
Train
How to teach well
and make sure they learn well
Year 1
Training Program
Ed Teacher QF
Ed KMUTT way
Mentors
Productive class evaluation
Teaching professional
6 monthes
Great Teacher
Short term reward
Year 2
Train
Year 3
Train
COPs
Learning from each other
Support
Consultation
Training
Policy
KMUTT professional standard framework (PSF)
Training Program Designer
Distribution
Executive vision
Benefits
Award
Recognition
Career path and career development opportunity
Research
Teaching
Social Service
Policy
My Eva
Evaluation
Points for teaching effort
Happy Teacher
Teacher
Choice + Flexibility
OPEN
Expert
Consultation
Consultation Service
Ed Technology
Ed env. / class / space
Ed pedagogy
Student learning improvement
Teacher community
How do you teach?
Teacher common
Lab Outcome & Research Results
Access Point
Classroom Monitoring
Data
How to help them learn better
How to make them Learn Better
Power
LAN
Teacher
society / real world
Virtual Learning Env.
Outcome
Teach/Learn/Play
Part
Availability
Mobility / Social at home society
Internet Access
Participate
Lab / Studio environment
with
Student club
Extra curricular Activities
Learning space
Monitoring + Measure
ETS
Cluster Research Laboratory
Learning + Teaching Technology + Innovation
Pedagogy Research
On-Cloud
What are the best tools?
Classroom/space Designer
How you should design your classroom/space
Where you should set it up + How
What are the most suitable tools
Learning Environment (LE)
What features would help learning
Developer
Development
How to Improve the existing classroom
Clean
How to Provide Network facilities
Info
Three Table management
Yearly Plan
2015
2016
2015 Project
Ed Support
Ed tools
Ed community
X Classroom Teacher
15 members (2015)
40 members (2016)
150 members (2016)
Class designed with teaching tool enable
Syllabus Design + Assessment
Interactive support
Collaborative environment
Evaluation
Class monitoring
X Classroom
Monitoring + Measure
How well the students think ? do?
How well I think ? do?
Students
In class evaluation + outcome
Analysis
How well the University think ? do?
Assessment / Evaluation / Policy
Quality
curriculum + outcome based?
student outcome measurement
Teaching Evaluation
360°
EDS
HR LOAD Distribution
PhD Process
Pedagogy
LI
Curriculum + Syllabus Design
How to design an outcomebased class
Success stories
OPEN
Expert
Consultation
DB of pedagogy in various context
Where is your teaching zone?
level of engagement
Impact on outcome
Analysis
Day 1
first year
second year
third year
Graduated
Industry
Outcome 1 - ?
Outcome 2 - ?
level of Teaching effort Time + effort
Impact of outcome student
Student Learning motivation
Impact on outcome
Outcome measurement
Teacher
EDS
- short term
- instant
- Generic
- long term
- positive to measure in mass
eg. knowledge fundamenting
In class
Outside class
Service / Support
Set up New Policy
Collection for Teacher Training
Information site for Teacher
- Useful
- Dynamic
- Practical

“We need to know where we want to be in order to make conscious and deliberate choices in that direction”

-B. Thipakorn (VP for Educational Development)

Dots examples as showed in the 3.0 diagram

P: People, X: Experience, S: Support (F-Framework, E-experiment, O-Organization, C-Community, S-service, R-Research)

ID: PF001

Title: PSF

Details:

The professional standard framework for KMUTT learning and teaching is intended as a a self-assessment guide and expectations for teachers/staffs engaging in teaching and supporting learning.

ID: SS012

Title: KMUTT Learning Environment (LE), integrated outcome based learning system.

LE is a learning system designed to track and measure learning improvement from the student learning outcome perspectives. In LE, individual status of each student' competence development is tracked against the learning goals set to aligned with the curriculum learning outcomes. This systematic way of keeping data would help us understand how teachers 'achieving' the goal of teaching from various aspects of learning such as mentoring, provoking, engaging, stimulating, motivating, and so on.

ID: SS011

Title: Learning Space

Officially opened in January 2016, The Science Learning space was designed to intrigue the curiosity of scientific exploration by bringing together space, technology and activities to facilitate learning.

ID: XE003

Titel: KMUTT RC

Located in Ratburi Campus- RC, the intangible benefit of liberal arts education is carefully blended with engineering competence development in in an environment recognised as the first residential college of the country. Emphasised on fostering all the qualities of a liberally educated mind, RC program is another example of our recognition on the great importance of competence based education.