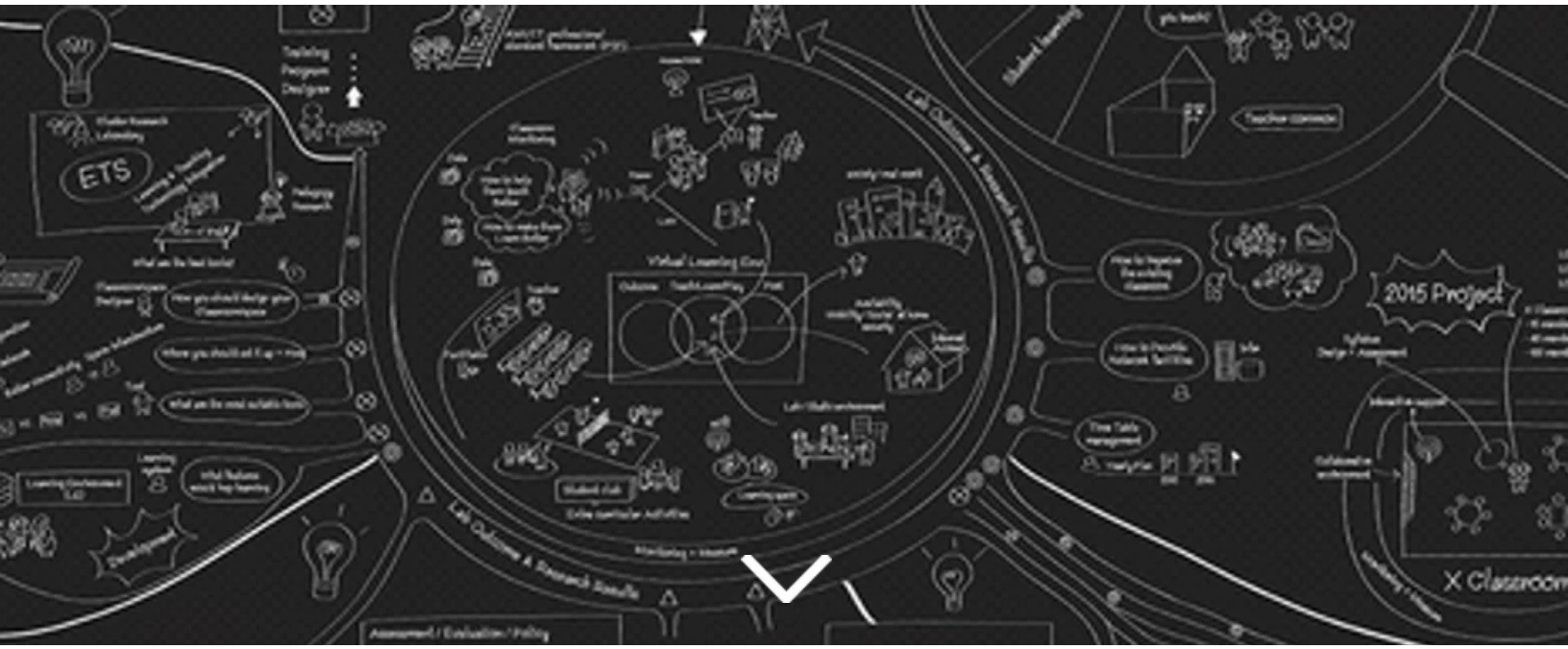
BACKGROUND

A LONG JOURNEY TO KMUTT 3.0



For the past 50 years, KMUTT has had a reputation as one of the most established and most practical engineering colleges in the country. Since the early days as a technical institute, staff were committed to laboratory, workshop and classroom based methods in delivering both scientific theories and in-depth engineering applications to graduates. Like most practitioner-based engineering schools in the late 1960s, the initial focus and guiding principle in engineering education has been on hands-on experience and vocational training, each of which contributes to graduates' strong technical skills, essentially built based on the pressing demand of traditional engineering industries. This first era of KMUTT graduates (KMUTT 1.0) soon gained a reputation as 'hands on' professionals equipped with a set of engineering knowledge and skills ready for the 20th century industrial requirements.

KMUTT was one of three technical institutes established by the Thai government (the other two being North Bangkok and Ladkrabang). Due to success in producing quality graduates for the workforce at a time when Thailand was entering a period of industrial expansion, KMUTT gained status

The driving forces

The 21st century has brought in different frontiers of constraints and challenges for higher education. In today's rapidly changing market, employers are already focusing on the importance of what graduates will be able to 'do' on the job. With many 21st century skills (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. Fast growing changes in the global landscape and the technology revolution 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 the learning environment where students can socially engage and interact with teachers and peers when and where they need it. This requires new ideas on pedagogical methods, technologies

autonomous university in 1998. As a result, KMUTT had better flexibility to direct its focus on community issues, real industrial research and, most importantly, quality of service to graduates. In response to the demands of a knowledge based society, KMUTT also placed 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, biotechnology, Earth system science, NanoScience, Bio-engineering, to name a few.

In the past 10 years, KMUTT has risen to be among the top science and engineering universities in Thailand through following the belief in hands-on approach, research excellence, imbuing morals and ethics and responsibility to society. Realizing the need to create more effective approaches to standout in today's competitive environment, slow but steady movement in the KMUTT education landscape has started to show signs of the readiness of people who notice and understand the implications of the changing world. With engineering attitudes at the core of the university culture, KMUTT has proven that it can persevere through adversity by thinking outside-the-box, working around the traditional processes and not giving up on things that remain the core principles. With ideas from many well established programs and projects — such as the establishment of research schools, practice schools, work integrated learning, Darunsikkhalai School, Engineering-Science Classroom (ESC), ScienceBased Technology School (SBTS), Junior Science Talent Project (JSTP) and a residential college — which are now widely adopted by the educational community, the university is convinced that it is ready to embrace the next big changes and to position itself to meet the greater challenge of the new era.

effectively teaching higher level thinking and some soft skills development that are 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 support and collaborative experiences between virtual and physical worlds. Ubiquitous access of information and the short shelf life of knowledge also mean that the roles of teachers will need to expand outside of merely content delivery; allowing more time to focus on designing learning experiences, facilitating learning and coaching students in order to motivate and inspire them to take control of their own learning.

Continuous and steadily increasing online learning in the past decade has raised many challenges for universities worldwide to adapt themselves to 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 of the traditional mode of learning for brick-and-mortar institutions or as the only mode of education environment offering, it is important to think clearly about what comes next in terms of pedagogical strategies and management for the emerging demand of visual engagement and other learning support.

With such driving forces, it is not difficult to see that a whole lot of new thinking is required to transform the traditional model of higher education to better serve the needs of future learners and society. While there are many perspectives of change that need to be considered, the fundamental challenges for 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 addition for the students; and (2) the production model of how the value is created _.

The data from KMUTT graduate surveys in recent years_ has revealed several insights challenging traditional assumptions on the values created for the students. On top of sound knowledge in disciplinary fundamentals, a solid foundation in mathematics, an ability to apply theories into practice, the survey results show that businesses today also seek 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 skills, computational thinking, analytical thinking, ICT literacy, cultural, global and business awareness of the implication/impact of their decisions.