CDIO THAILAND: COMMUNITY OF GOOD PRACTICES FOR THAI ENGINEERING EDUCATION

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ABSTRACT

In order to strengthen the reformation of engineering education in Thailand, the faculty of engineering, Chulalongkorn University (CU) and Rajamangala University of Technology Thanyaburi (RMUTT) formed CDIO Thailand since 2014. For five years, both CU and RMUTT CDIO practitioners have reached out to more than 2,000 scholars from more than 20 institutions. This paper aims to share how CU and RMUTT implemented CDIO framework into their institutions. In addition, this paper describes how CDIO Thailand supports both engineering and non-engineering educators in the process of implementing CDIO framework at a course level, program level and institutional level. The objectives of this network are (1) to serve as a community of good practices and pedagogical competence towards the educational reform (2) to provide CDIO knowledge and guidelines for implementing CDIO, and (3) to contribute to CDIO Asian Region and CDIO Worldwide Initiatives. Furthermore, the benefits of program level CDIO implementations compared to piece-meal improvement were demonstrated, as well as the discussion of effectiveness of the accreditation requirement in providing motivation for educational changes in Thailand.

KEYWORDS

Faculty development, community of practices, pedagogical competent, standards: 1, 10, 12.

INTRODUCTION

CDIO has reached Thailand in 2013 when Singapore Polytechnic International, Faculty of Engineering, Chulalongkorn University (CU) and Rajamangala University of Technology Thanyaburi (RMUTT) launched a project titled “Temasek Foundation – Singapore Polytechnic: Conceive, Design, Implement, and Operate (CDIO) Framework for Re-Thinking Engineering Education Thailand”, which was supported by Temasek Foundation. Faculty members of both institutes adopted and implemented the CDIO framework during a series of workshops that covered the CDIO Syllabus, in addition to 12 CDIO standards. The project ended in 2014 where 10 CDIO master trainers were titled. CU, the first Thai university, represents a research university, while RMUTT characterizes a more technical university. CDIO Thailand was founded in 2014 to assist in the reformation and strengthening of engineering education in Thailand. The platform embraces the CDIO standard 10, Community of Practices (CoP), and Adult Learning Model for Faculty Development.

This paper aims to share how CDIO Thailand:

(1) serve as a community of good practices and pedagogical competence towards the educational reform
(2) provide CDIO knowledge and guidelines for implementing CDIO, and
(3) contribute to the CDIO Community

LITERATURE REVIEW

CDIO Standard 10 (2010) encourages CDIO programs to enhance faculty competence by providing integrated learning experiences (Standard 7), using active and experiential learning (Standard 8), and assessing student learning (Standard 11). These faculty development practices may vary depending on the nature, scope, programs and institutions (Crawley et al., 2007). The visualizing 17 years of CDIO influences published by Meikleham et al. (2018) revealed that more discussions on faculty development and learning assessment are critically important factors that play a role in continuing the sustainability of CDIO initiatives. A development of holistic faculty development systems, continuous support from the senior management team, promoting a network for sharing and evidence-based approaches are recommended (Thompson and Clark, 2018). Leong et al. (2016) presented a well-structured approach for teaching competence development at Singapore Polytechnic (SP). This model consists of supporting the needs of newly-hired faculty members, implementing ongoing developments for teaching lecturers, encouraging teaching & learning Initiatives and providing the necessary platforms for sharing and learning. KTH Royal Institute of Technology initiated a systematic approach for faculty development where the pedagogical developers facilitate wider, effective co-operation and knowledge exchanges among faculty members (Berglund et al., 2016, 2017, 2018)

The community of Practice (CoP), developed by Wenger (1998) is widely used in higher education institutions. Wenger (2015) concludes CoP in a nutshell as follows:

“Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.”

A CoP has three characteristics:

(1) A shared domain of interest where members show commitment and possess a shared competence.
(2) A community where members participate in activities, discuss, support other members and share information.
(3) Practices where members share a repertoire of resources and practices.

The community of practice can lead to sustaining changes. It involves a group of educators/lecturers who meet regularly to share expertise and work collaboratively towards improving teaching skills and the academic performance of students. These specific activities and goals of learning community may vary depending on each institution (Lee et al., 2018)

Professional developers nowadays are facing a demand for incorporating technology into learning, a challenge of funding, a diversity of learners and educational settings and a paradigm shift from teaching-focus to learning-focus.

Lawler and King (2003) have presented an integrative approach to professional development involving adult education, learner-centered perspectives, transformative learning styles, needs towards motivation and technology learning.

A current trend in professional development programs is the Adult Learning Model for Faculty Development where faculty members are viewed as adult learners. Adult learners are considered a diverse group, with different lives, education experiences and perspectives. They expect personalized learning which is meaningful, adjusts to their physical and psychological attributes and is suitable for their social and cultural context. The 6 adult learning principles (Lawler and King, 2000) can be referred as guidelines for professional developers: creating a climate of respect, encouraging active participation, building up on experience, employing collaborative inquiry, learning for action, and empowering the participants.

With the knowledge of CDIO framework, CoP and the Adult Learning Model for Faculty Development, CU and RMUTT have implemented CDIO concept regarding their contexts as research and technical universities. CDIO Thailand provides a platform for two universities to learn and share their experiences. Each institution has established its own system of faculty development. Occasionally, CDIO master trainers co-organize and co-teach the participants in CDIO workshop and tutorials at various faculty development programs.

IMPLEMENTATION AT CHULALONGKORN UNIVERSITY

CDIO and Innovation society

The very first standard of 12 CDIO standards is the context. Standard 1 can be read as interpreting **engineering professions as an innovative process.** In recent years, the nature of innovation – its place in 21st century industry, its importance in the global socio-economic landscape and its effects on engineering professions raises more questions than answers in Thailand.

Innovation society is a global phenomenon and it affects global and Thai engineering landscape. As a result, despite such a quirky name (that Thai professors often ask about its meaning), the concept of dealing with the innovation process at its core is relevant to the development and implementation of engineering programs in response to changes in the industry. It should be noted that CU called its implementation of CDIO concept as CEE4.0 (Chula Engineering Education 4.0) since 2014, while the government dubbed its push for a new model of development based on creativity and innovation as Thailand 4.0 in 2016.

The biggest change from introducing the context of innovation comes in the form of **design thinking**. A new course, Creative Design for Community 2100-303 was initiated in 2015. Alumni with knowledge and experience in design thinking from Stanford University was invited to team up with faculty members to develop this course as a general education course. The course was developed to devote to experiential learning of design thinking in practice. The setting of this course is interdisciplinary with students from engineering as well as other disciplines such as economics, commerce, psychology and arts. In the same way that CEE4.0 preceded Thailand 4.0, the introduction of design thinking at the time preceded popular training on design thinking on offers everywhere today.

On the other hand, the very concept of innovation takes time to understand especially when it is described as engineering practices (that although well-founded is still regularly disrupted nowadays). **The first attempt** to deploy the CDIO framework school-wide (all 12 programs at CU) was not a success. These difficulties in understanding and working on program-level CDIO framework were well documented (Lee et al., 2015)

The renewed strategy for CU's implementation of CDIO is made up of two parts. The first part is to support and recognize existing programs that already support the policy. The second

part is to develop central facilities common to all programs. These facilities lessen the burden for the CDIO programs and demonstrate benefits to the programs not yet taken on CDIO. The facilities include common courses and common learning spaces.

Common facilities – instilling core competency for the entire class

In implementing the CDIO framework into existing curriculum, one of the key success factors in inviting changes from the faculty is to **involve key stakeholders** – the students and industry in this case.

To prepare students for the mindset-changing-concept of design thinking, the **introduction to engineering** course called *Exploring Engineering World* in the first year was revamped (Sripakagorn, 2014). The experiential learning of the design thinking was arranged in team learning in a period of 5 weeks. The learning was focused on 6 major problems that Thailand was facing which were shared by participations of faculty members from all programs in the style of multidisciplinary discussions. The course works with over 20 faculty members from 12 programs and handles about 400 students per semester.

Not only are mindsets need changing, **the professional skills** are also to be installed as well (as per CDIO standard 2). Apart from skills specifics to a particular program/discipline, certain skill sets were identified to be common to many programs. In an attempt to expedite rapid change and assure common outcomes, a course called *Engineering Essentials* was offered as a common core course for programs to choose from. It was managed by Engineering Education Initiative, EEi unit where different teams from various companies were invited to coach students in developing different skills. EEi co-developed the course outcomes as well as the assessment with interested programs. The results of the assessment were reported back to the programs accordingly. Later on, EEi arranged a train-the-trainers sessions which allowed faculty members to become more gradually engaged in skill developments with skills and confidence.

To wrap up the CDIO implementation, EEi lay out another course, **multidisciplinary senior project,** as a final year course focusing on the full implementation of C-D-I-O process in design and built projects. Active learning (CDIO Standard 8) was supported by a newly conceived learning space called iSCALE (denoted i-Student-centered-active-learning-experience). The CDIO workspace (CDIO Standard 6) was supported by a newly conceived Mi (denoted Making Innovatist) working space. All of these facilities are located in the Centennial building where EEi office also located. A major part of CDIO implementation activities being situated in one location makes it easier for visitors to become inspired and informed. Recently, EEi together with CDIO learning facilities received regular visits from engineering, as well as non-engineering schools such as medical, pharmaceutical, education and nursing.

CDIO – program level implementation – insight to inherent resistance

Although the concept of outcome-based education is not new to higher levels of Thai education, the concept of **program-level implementation** is surprisingly neglected. The improvements within educational practices are usually associated with correct documentation of program outcomes, assessments and the use of active learning along with educational technology. These efficient and temporary improvements are necessary with finding quick solutions but are not enough to scale up to university level curriculums. Incidentally, high-level management would find these elements in CDIO standards and might find it fulfilling. Nevertheless, in order to apply sustainable and profound changes in a program reform, the program-level implementation is needed.

The CDIO framework provides 3 crucial ingredients for the full awareness of program-level implementations. The first ingredient is the 12 CDIO standards, the 5 Standards (1, 3, 7, 11 and 12) which are specific to these program-level implementations. This provides awareness

for top management to act on the effectiveness of the program level implementation. The second ingredient is the availability of rubrics for each of the standards. This allows the use of an effective tool for easy adoptions and adaptations. On the other hand, the rubrics all benchmarking that reveals the ineffectiveness of the implementation for future action. The last ingredient is the global community of knowledge and experience. When the program committee decides to proceed with a program-level implementation (sometimes after **negligence and/or denial**), support units such as EEi can provide extra assistance with local as well as international knowledge from the outside.

Although a major challenge in CDIO implementation is usually attributed to buy-in from faculty members, the experience at CU pointed to another aspect – the nature of the program committee. It makes a lot of sense to say, it is best to work on one thing with people with motivation on. And once it is clear that CDIO is always about program-level, effective implementation needs to go through the program committee. From many reasons, it is usually found that the members of the program committee are either senior faculty members that are rather detached from innovation/changes/21st century skills or junior faculty members that are full of energy but have full workload from academic and research works. Between the two groups of people, the junior faculty members are more passionate about educational reform and try to have some experience of their own in practicing teaching technique or educational technology. As a result, with such business-as-usual scenario, educational reform at the program level – with or without CDIO framework – is not possible. Recommendations are; employ a Professional Standards Framework (Higher Education Academy, 2011) to nurture future program committee and reward the program committee to reflect its importance in educational reform regarding time, budget and recognition.

EEi - Local Ed Tech Influencer

Although the concept of program-level implementation takes time to catch on, active participation of EEi in the local community of practitioners allows EEi to influence the policy and the funding from the university in supporting education improvement in other schools within Chulalongkorn University. Working in partnership with the Learning Innovation Center, EEi expands and deepens interest in active learning, flipped classroom and a new style of learning space (iSCALE) that is usually called a smart classroom. Activities include arranging workshop and visit, issuing calls for classroom-action-research proposal and providing co-funding to schools to develop its own smart classroom. Until recently, the partnership resulted in smart classroom development in 10 faculties in CU.

IMPLEMENTATION AT RMUTT

RMUTT has fully adopted and implemented CDIO Framework at three levels: (1) Course/Subject Level, (2) Program Level, and (3) Institutional Level. At course/subject level, the lecturer can apply CDIO standard 4, 5, 7, 8 to improve student's learning outcomes. For the program level, the program committee plays a vital role in designing a student's university experience with full implementation of CDIO Syllabus and CDIO standard 1-12. The institutional level requires a full commitment of top management such as deans, directors, president, as well as, financial supports.

To achieve educational change at RMUTT, the top management realize the important of mindset change of the faculty members. Since CDIO project in 2013, the university set annual budget approximately 15 million Thai Baht (equivalent approximately to 500,000 US dollars) for faculty development. Table 1 summarizes the numbers of faculty members who attended the CDIO training. Currently, 46% of the total number of RMUTT faculty members understand CDIO-based education knowledge.

At the same time, there are other models that RMUTT also explore and support the training, namely, Competency-based education, STEM Education, Design Thinking, University Pedagogy, and Thai Meister. One faculty member can belong to more than 1 CoP regarding their interests. Until now, there are 5 CoPs at RMUTT running by trainers of each faculty development models. Different titles are awarded to the trainers; namely, CDIO master trainer, STEM ambassador, University Pedagogy mentor, Design Thinking facilitator, and Thai Meister. Flarup and Wivel (2018) stated that the trainers as change agents who drive cultural change of mindset in implementing CDIO. RMUTT, too, value these key persons to sustain the change at their faculties. RMUTT strongly commits in establishing a community of pedagogical competent of the community. To provide a good quality of higher education, three features are reviewed and implement related to CDIO standards.

Excellent Curriculum

As stated in the author's previous work (Lee et al., 2018), now RMUTT is using Design Thinking in Curriculum Design and Development along with four phases of Advancing CDIO Curriculum Development: Mapping – Enhancing – Innovating – Sustaining. CDIO Syllabus and CDIO Standards 1 – 3 provide a key concept of how to identify future competencies, set program outcomes, and outline student attributes. An implementation of CDIO Standards 4 – 5 resulted in two new mandatory courses; namely, Introduction to Profession and Multi-disciplinary Project (MDP) courses to all programs reviewed and redesigned in the 2018 cycle. In 2018, RMUTT organized two workshops for program committees from 40 programs. CDIO master trainers act as a facilitator for extra explanation, discussing and sharing their experiences with the participants. Table 2 shows programs in which using CDIO-based Education as a guideline for developing a curriculum. The event was noticed as a remarkable change in the curriculum development process at the institutional level. These re-designed programs will be active in the academic year 2020. The participating programs have a clearer view of their graduate attributes and program outcomes. With the long-term vision to be an Innovative University, the introductory to profession and MDP courses provide a design-build-test learning experiences to the students. Professional competencies, personal and interpersonal skills are integrated into the program systematically.

Table 1. Number of Faculty Members Participated in CDIO Workshop at RMUTT

Year	Faculty / College												Total
	AGT	ARC	BA	ENG	FA	HET	LA	MCT	N	ST	TED	TMC	
2013				30							4		34
2014	2		5	15			1	32		6	7		48
2015	3	8	11	11		3	5			1	2	17	61
2016		24	12	40	11	13	25	5		9	7	9	155
2017	10	10		18	5	5	10	15	5	6	5	7	91
Total number of participants	15	34	21	111	16	21	41	52	5	22	25	33	396
Total number of faculty members	63	54	93	195	83	48	106	52	14	118	92	33	951
%	24	63	23	57	19	44	39	100	4	19	27	100	42

Note: AGT – Agricultural Technology, ARC – Architecture, BA – Business Administration, FA – Fine and Applied Arts, HET – Home Economics Technology, N – Nursing, ST – Science and Technology, TED – Technical Education, TMS – Thai Traditional Medicine College

Learning Environment and Processes

To raise student's motivation, learning environment and learning processes are essential. CDIO Standard 6, 7, 8 and 11 are implemented. RMUTT has received a series of budget to innovate learning and workspaces, for example, maker spaces at the faculty of Mass

Communication Technology, STEM lab at Faculty of Science and Technology, FabLab at the main library and at the faculty of Engineering. For pedagogical development, lecturers who attended the CDIO workshops and University Pedagogy training programs continue improving their teaching courses through pedagogical projects. Theories that are widely adopted for pedagogical projects are motivation, constructive alignment, flipped classroom, problem-based learning, project-based learning, and blended learning, formative and summative assessment. To provide students with integrated experience, every program offers work-integrated learning, 4-month cooperative education or 2-month on-the-job training with partner industries.

High Quality of Learning Outcomes

To assure a high quality of learning outcomes, CDIO standard 12 is utilized for program evaluation. Currently, the early CDIO-adopted programs; Industrial Engineering, Multimedia, Digital Media, Television and Radio Broadcasting, Photography and Cinematography, Advertisement and Public Relations, and Digital Printing and Packaging Technologies have performed self-assessment using CDIO-assessment-rubric annually. The review data has been utilized to set the next fiscal year action plan, budgeting, and goals for continuous improvement.

Table 2. RMUTT Programs using CDIO-based Education for Curriculum Development

Faculty / College	No. of Programs	Program Names
Agricultural Technology	3	Fisheries, Food Science and Technology, Landscape Technology
Business Administration	8	Business English, Computer Business, Economics, Finance, International Business, Logistics and Supply Chain Management, Marketing, Management
Engineering	9	Agricultural Machinery Engineering, Computer Engineering, Industrial Engineering, Electronics and Telecommunication Engineering, Environmental Engineering, Food Engineering, Irrigation Engineering and Water Management, Material Engineering, Textile Chemical and Fiber
Fined and Applied Arts	9	Innovation Contemporary Product Design, Interior Design, Graphic Arts, Music, Painting, Product Design, Sculpture, Thai Arts, Visual Communication Design
Home Economics Technology	3	Food Industry and Services, Food and Nutrition, Fashion Design and Clothing
Mass Communication Technology	6	Photography and Cinematography Technology, Digital Printing and Packaging Technology, Radio and Television Broadcasting Technology, Advertising and Public Relations Technology, Multimedia Technology, Digital Media Technology
Liberal Arts	2	Tourism, Hotel Management
Total	40	

CONTRIBUTIONS TO CDIO COMMUNITY

With permission from CDIO founder, Professor Johan Malmqvist, CDIO Thailand has translated CDIO Syllabus and CDIO Standards in Thai language for deeper understandings for CDIO practitioners in Thailand. Table 3 shows CDIO Thailand activities from 2014-2018 reaching to thousands of lecturers in Thailand and some other countries. There are several types of how CDIO Thailand share their knowledge and guidelines to the participants with selected successful cases. Note that this variety of activities offer CDIO practitioner 3 types of activities that are knowledge, values and activities from different levels of participation. This is consistent to UK PSF professional standard framework (Higher Education Academy, 2011)

CDIO IMPLEMENTATION AND ACCREDITATIONS

Among threats or motivations for a program-level development, accreditation is the first priority for many programs. In Thailand, the council of engineering, COE holds the responsibility to push for international accreditation with the goal to get a substantial equivalent accreditation to the Washington Accord (WA). The framework that has been set up is TABEE (Thailand Accreditation Body for Engineering Education). Accreditation is promoted as a tool to enhance the educational standard and allow workforce mobility among APEC and ASEAN regions. Some programs have targeted ABET initially but were tempted to TABEE due to the cost as well as the burden to translate a large number of documents from Thai.

At the first phase, programs are invited to voluntarily apply for TABEE accreditation with the aim to bring TABEE accredited programs to WA equivalent status in a later date. The process of TABEE accreditation involves: application; training (organized by COE) and consulting; submitting self-study report; site visit and assessment by TABEE's certified examiner. Programs from the two founding members of CDIO Thailand applied for the TABEE accreditation. CDIO Thailand's member from both CU and RMUTT were invited to share experience in implementing curriculum reform using CDIO framework for participants of TABEE.

The provision of Quality Education is based on the interaction between Program Design, Quality Assurance and Program Accreditation (Cheah, 2013). The experience at CU in applying for TABEE accreditation see the effectiveness of CDIO framework in support of such quality education (see Figure 1).

Table 3. CDIO Activities 2014 – 2018

Types of Sharing	University and Organization	No. of Participants
Seminar and Special Talk	1. Faculty of Engineering, Chulalongkorn University	60
	2. Faculty of Engineering, King Mongkut Institute of Technology Ladkrabang	65
	3. Faculty of Science, Mahidol University	82
	4. Faculty of Engineering, Burapha University	40
	5. Council of Dean of Engineering Annual Meeting and Conference	150
	6. Hui Chiew University	30
	7. RMUTL (Lanna)	58
	8. RMUTP (Phra Nakorn)	53
	9. Faculty of Engineering, Rangsit Unviersity	60
	10. Faculty of Engineering, Suranaree Unviersity of Technology	30
	11. Chiang Mai University	65
	12. Faculty of Mass Communication, Chiang Mai University	28
	13. Inje University, Korea	44
	14. RMTC	84
	15. RMUTKM+2	500
	16. Faculty of Business Administration and Liberal Arts, RMUTL	64
	17. Ministry of Education and Sports, People's Democratic Republic of Laos	12
	18. Postgraduate Institute of Management, Sri Lanka	44
Tutorial Session	1. iSTEM-Edu International Conference, Thailand	50
	2. International and National Conference of Engineering Education Thailand	34
	3. Thai Professional Organization Development (Thai POD)	30
Workshop Introduction to CDIO	1. Faculty of Liberal Arts, RMUTK (Krung Thep)	73
	2. RMUTP (Phra Nakorn)	60
	3. RMUTI (Isan)	120
	4. Faculty of Engineering, RMUTI (Isan)	80
	5. Hokkaido Information University, Japan	22
	6. Faculty of Engineering, Suranaree University of Technology	28
	7. Faculty of Engineering, Naresuan University	26
	8. Faculty to Allied Health Science, Walailuk University	14
	9. Faculty of Mass Communication, Chiang Mai University	28
	10. Camarine Sur Polytechnic College, Philippines	44
	11. RMUTSB (Suvarnnaphumi)	64
	12. Network of Printing Society Institute	16
	13. Faculty of Business Administration, RMUTI (Isan)	64
	Total	2,192

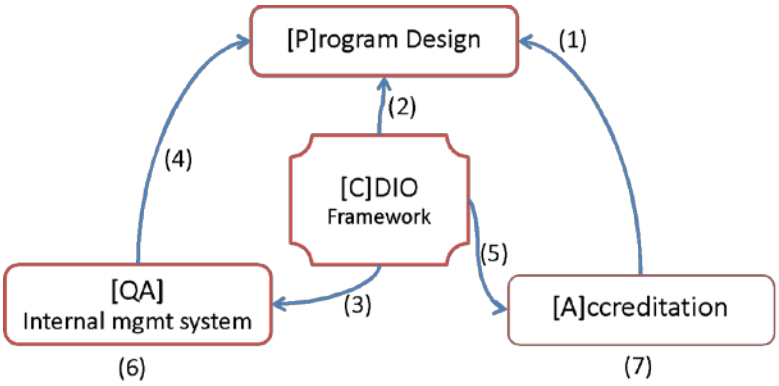

Figure 1: Synergy between Program Design, Quality Assurance and Program Accreditation provided by CDIO framework.

At first, the standard prescribed by accreditation body [A] influence the attribute for students documented in the program design [P]. Program proceeds to improve the quality of teaching and learning by using CDIO framework [C] as a guideline for curriculum redesign. During such processes, it is important to map out CDIO implementation with the quality assurance system [QA]. This way, the continuous quality improvement can be done according to the CDIO framework while relaying key quality indicator to the internal quality management system with ease. Even with accreditation body looking in from the outside to give an independent recognition of quality, a school still needs a QA system to answer its own need in ensuring uniqueness in attributes from a program in that school. The QA system can be internal or even external providing unbiased reflection to the operations of the program. At the same time, the systematic and holistic nature of CDIO framework allows the demonstration of the quality education process to the accreditation body without added or repetitive work. It was confirmed by experience in TABEE that the CDIO programs benefit from the synergy between the CDIO framework and the Program Design, Quality Assurance and Accreditation processes.

CONCLUDING REMARKS

Education reform is hard. It is even harder to start. CDIO Thailand is described as a unique way to start by having non-competing yet inspiring relationship coming from two universities with different background yet focusing on the same goal – Thailand's educational reform. Indeed, there are a lot of educational improvements made by practitioners nation-wide. Yet, it is more about holistic development that different parts of the hard work fit together. This is where the program-level development such as CDIO framework bring effectiveness to the educational reform. Indeed, it was the program-level implementation that is missed out from general considerations. CDIO Thailand believes that the unique proposition of CDIO framework is that, it is one, if not the only one, of education framework that brings holistic framework of curriculum reform to engineering programs. CDIO framework provides key focus in the form of CDIO standards for a program to focus and prioritize. Equally important is the CoP local and outside of a school that provides strength as well as continues motion towards education reform.

With the innovation society in full bloom, it is no surprise that programs other than engineering found CDIO framework entirely applicable and equally effective. A program focusing on the innovative/creative industry will find CDIO applicable in rather full form. Other programs will find many elements such as active learning or faculty development useful.

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BIOGRAPHICAL INFORMATION

Angkee Sripagakorn is an Associate Professor of Mechanical Engineering, Faculty of Engineering, Chulalongkorn University. His expertise covers alternative energy, energy conversion devices and electromobility. Besides the research work, Angkee cofounded the Engineering Education Initiative, EEi with Assoc Prof Kuntinee Maneeratana. EEi has completed a number of classroom-action-research and faculty training in engineering education. The collective effort of EEi members led to the formation of the Chula Engineering Education 4.0, the framework to restructure the teaching and learning experience in order to deliver innovation-producing graduates to Thai society and economy. The framework is currently fully adopted by all departments at Chula Engineering.

Natha Kuptasthien is currently as assistant to president for International Relations and an associate professor at the industrial engineering department, faculty of engineering, RMUTT. She led a full CDIO implementation at RMUTT since 2013. She has conducted a number of CDIO introductory workshops for engineering and non-engineering programs, which expanded the CDIO network to 8 RMUTs and universities in Asia. Natha graduated with a Bachelor of Engineering in Industrial Engineering from Chulalongkorn University, Master of Science and PhD in Engineering Management from University of Missouri-Rolla, USA.

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