FACULTY PROFESSIONAL DEVELOPMENT IN CDIO DURING CURRICULUM REFORM AT A CAMBODIAN UNIVERSITY

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ABSTRACT

This paper reports on the design and implement of a continuing professional development (CPD) program to assist in supporting curriculum reform based on CDIO Framework at a public university in Cambodia. As part of a wider national agenda for higher education reform to include Outcome-Based Education and International Quality Assurance, the Faculty of Engineering at the Royal University of Phnom Penh (RUPP) adopted the CDIO Framework as a central mechanism for transforming its engineering programs toward ASEAN University Network–Quality Assurance (AUN-QA) recognition. This paper outlines the multi-year partnership that RUPP has developed with Singapore Polytechnic to develop the capacity of faculty through a Train-the-Trainer program (SP-RUPP CDIO3T), to address both enhancement of faculty competence (CDIO Standard 9) and enhancement of faculty teaching competence (CDIO Standard 10). The CPD program combines the STiCC framework (School Culture, Time, Choice, and Connection to Practice) with the 70:20:10 learning model to facilitate effective transfer of learning during curriculum reform. Workshops, structured peer learning, and experiential applications are all deliberately aligned to provide coherence between training and workplace practice. Participation by senior leadership, strategic scheduling around academic cycles and mandatory application of learning to curriculum redesign will be critical to creating an organizational culture that supports CPD during periods of reform and mitigate common transfer issues associated with CPD during reform. This paper contributes to a contextualized case study of CPD in a developing higher education system, demonstrating how CDIO can be operationalized as both a curriculum framework and a quality assurance enabler aligned with AUN-QA requirements.

KEYWORDS

Curriculum reform, continual professional development, CDIO Framework, Outcome-Based Education, AUN-QA Framework

INTRODUCTION: THE NEED FOR CURRICULUM REFORM IN CAMBODIA

The Royal Government of Cambodia introduced the Pentagonal Strategy - Phase I (2023–2028) in 2023 with the goal to transform the country into a high-income nation by 2050. It focuses on five pillars: growth, employment, equity, efficiency, and sustainability (RGC, 2023). One of the key pillars is human capital development, in this response to this, the Ministry of Education, Youth and Sport (MoEYS) has established a comprehensive Education Strategic Plan 2024-28 as its reform agenda, in which Outcome-Based Education is selected to modernize higher education programs. A comprehensive OBE framework called "FutureFit Educational Framework (FEF)" was developed with 3 guidelines, namely transformative curriculum, innovative pedagogies, and holistic assessment (MoEYS, 2024) as shown in Figure 1.

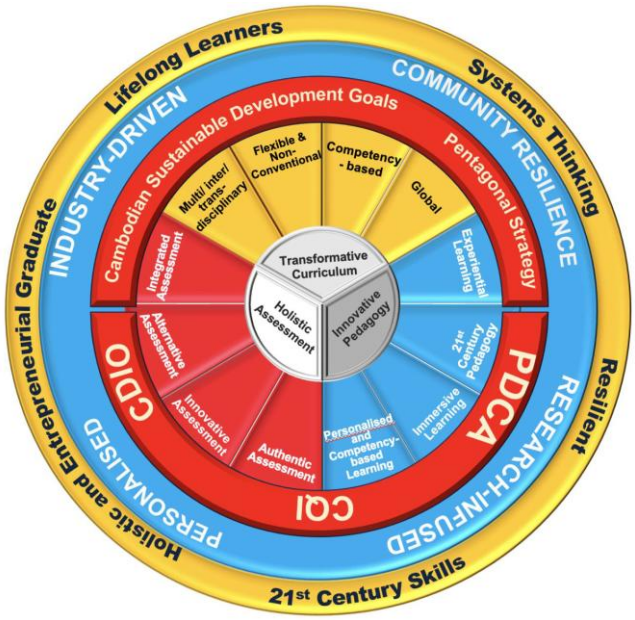

Figure 1. FutureFit Educational Framework (MoEYS, 2024)

The Royal University of Phnom Penh (RUPP) is a leading institution that worked with MoEYS to provide input into the development of FEF, most notably in the inclusion of the CDIO Framework into the FEF as can be seen in Figure 1. MoEYS under the Higher Education Improvement Project (HEIP) has selected RUPP to lead the development of engineering education reform using the CDIO Framework.

RUPP was first introduced to CDIO via a 10-day ASEAN-Republic of Korea (ASEAN-ROK) CDIO Workshop hosted by Singapore Polytechnic (SP) in 2019. From this exposure, RUPP started to reform its engineering curriculum under a project "Higher Education Improvement Project (HEIP)" with support from SP from 2021 to 2023 through a series of hybrid format workshop for CDIO faculty competency training. RUPP joined the CDIO Initiative in 2024 as a member with the stated aim of using CDIO Framework as the DNA to drive the revamp of programs from the Faculty of Engineering. Under the auspices of HEIP Phase 2 (2025–2027), RUPP has partnered with SP to train selected faculty members to be its own future CDIO trainers under the SP-RUPP CDIO Train-the-Trainer (CDIO3T) Programm, with the aim of achieving the ASEAN University Network–Quality Assurance (AUN-QA) recognition for two Faculty of Engineering programs, to drive a comprehensive, innovation-driven curriculum revamp that meets FEF requirements using the CDIO Framework.

Challenges of Processional Development at Time of Curricular Reform

Implementing the required changes to meet the requirements of FEF imposed many challenges on RUPP faculty, who are already facing heavy teaching loads. They need to learn CDIO principles during their non-teaching hours, and apply them to redesign their courses, and deliver them to the next semester. They had to juggle between current teaching commitments where interaction with students are pretty much didactic in nature, and to teach differently the next semester, and all the time trying to make sense of how the outcomes from their courses align to the needs of FEF and meet the requirements of AUN-QA.

SCOPE OF THIS PAPER

This paper documents the experience of RUPP Faculty of Engineering in executing a challenging curriculum redesign initiative using CDIO Framework within relatively short timeline. The aim is to prepare 2 programs ready for AUN-QA recognition by 2028. This paper focuses on the approach adopted in RUPP with SP support by operationalizing a faculty continual professional development (CPD) program designed using the 70:20:10 learning model, informed by the STiCC (School Culture, Time, Choice, and Connection to Practice) Framework. It provides a brief literature review of CPD with emphasis from the perspective of CDIO. An alignment between CDIO Standards ver 3.0 and AUN-QA ver 4.0 is provided, and brief explanation of how the 70:20:10 learning model is applied in context of FEF using CDIO Standards is provided. Faculty experience from this program is obtained via focus group discussion and shared. Challenges and ideas for moving forward are shared. Key takeaways useful for program owners intending on undertaking similar endeavour are presented.

BRIEF LITERATURE REVIEWS

The extant literature showed that faculty sentiments during curriculum revamp while undergoing training often reveal a mix of enthusiasm and strain. Common concerns include heavy workload, identity tensions, and skepticism toward imposed reforms (Trowler, 1998; Guskey, 2002). Faculty often feel underprepared for new pedagogical methods and worry about balancing teaching with professional development. Coping strategies typically involve reflection-in-action, experiential learning, and peer mentoring. Faculty rely on communities of practice and incremental adoption of reforms to manage the dual demands, and many validate their efforts by observing improvements in student learning (Guskey, 2002; Zellers *et al*, 2008). Institutional support that faculty value most are those that embed training into practice. Structured mentoring, workplace learning models, and recognition of teaching excellence help reduce resistance and make professional development feel integral rather than burdensome (Blackman *et al*, 2016; Steinert *et al*, 2019).

Kennedy (2005) noted that CPD can be structured and organized in several ways, and for several different reasons (p.236). She suggested that there can be a spectrum of 9 CPD models, which is shown in Figure 2. On one end of the spectrum are CPD models that are used for transmission purposes, that is, to prepare teachers for the implementation of curriculum reforms. The other end of the spectrum is one of transformative model, with accordingly to Kennedy, is “the combination of a number of processes and conditions – aspects of which are drawn from other models” and that the model “is not a clearly definable model in itself; rather it recognizes the range of different conditions required for transformative practice” (Kennedy, 2005, p.246). The series of CDIO training workshops described in this paper is our attempt to achieve the transformative outcomes of CPD, that is to prepare RUPP

faculty in using the CDIO Framework to redesign their respective courses towards an outcome-based education, aligned to the requirements of the AUN-QA Framework.

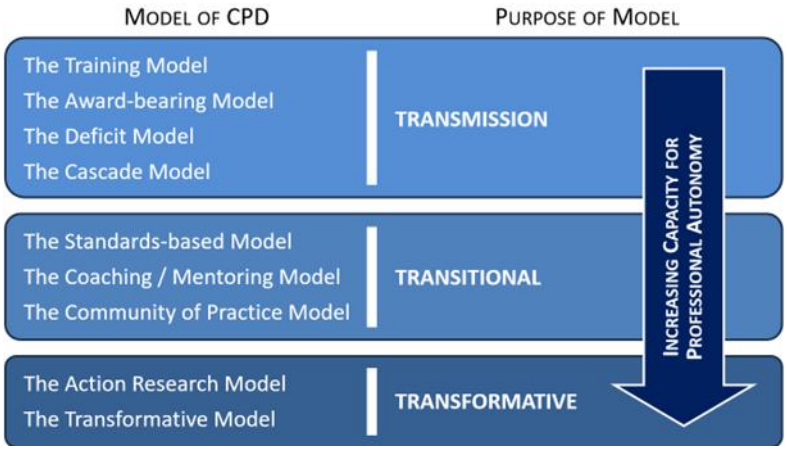

Figure 2. Spectrum of CPD Models (Kennedy, 2005)

One of the key challenges of CPD is the "transfer problem;" where positive transfer of training is defined as the degree to which trainees effectively apply the knowledge, skills, and attitudes gained in a training context to the job (Baldwin & Ford, 1988). The authors further noted that the conditions for transfer include both the generalization of learned materials to the job and the maintenance of trained skills over a period of time on the job.

CPD at a Time of Curriculum Reform

Porcenaluk *et al* (2023) noted that CPD offered during curriculum reform may look different from traditional professional development. Expecting faculty to learn and teach a new curriculum while undertaking CPD comes with challenges: one of which is the possibility that the enacted curriculum may not be quite like the intended one. The authors proposed a CPD framework to use during curriculum reform, known as the STiCC as shown in Figure 3. The framework aims to aid in creating a foundation for structuring CPD that supports teachers to shift their pedagogical approaches, learn new content knowledge, and understand theories underpinning the changes to teaching and learning, all while implementing a new curriculum (p.932).

Figure 3. STiCC Framework for CPD during Curriculum Reform (Porcenaluk *et al,* 2023)

We adopted the STiCC Framework as the basis for the training program for the SP-RUPP CDIO3T program. The program was operationalized using the 70:20:10 Framework (McCall, Lombardo & Morrison, 1988). The 70:20:10 Framework had been widely adopted by human resource development practitioners (Clardy, 2018) despite its lack of theoretical underpinnings and lack of empirical evidence to support its effectiveness. Johnson *et al* (2018) investigated how the framework is being implemented and whether it facilitates the transfer of learning. Although the outcomes were not satisfactory, the authors shared key learning points from their work that are especially useful for our present work, as will be shared in later sections.

CDIO AND FACULTY CONTINUING PROFESSIONAL DEVELOPMENT

Continuing professional development (CPD) is of paramount importance in ensuring that teaching faculty obtain to keep one's curriculum content up to date, in terms of the knowledge, skills and attitudes students needed for the workplace upon graduation. From the CDIO Framework perspective, it is also equally important that teaching faculty themselves are equipped with the appropriate teaching approaches, pedagogical know-how, design of meaningful and impactful learning experiences that engage students in learning from doing, the master the required competency to be work-ready. This is especially poignant in today's fast-changing workplace environment mediated by advances in technologies, most notable being the rapid adoption of data analytics, process automation, and artificial intelligence. New programs are introduced, and existing programs redesigned to cater for the needs of new skills demanded by employers in the workplace transformed by the adoption of digital technologies. CDIO Standard 9 and Standard 10 informed the requirements of CDP that address both the 'what" and "how" aspects of using CDIO, as shown in Table 1 below.

Table 1. Description for CDIO Standards 9 and 10

Standard 9: Enhancement of Faculty Competence	**Standard 10: Enhancement of Faculty Teaching Competence**
Actions that enhance faculty competence in personal and interpersonal skills, product, process, system, and service building skills, as well as disciplinary fundamentals.	Actions that enhance faculty competence in providing integrated learning experiences, in using active and experiential learning methods, and in assessing student learning.
CDIO programs provide support for improving the collective competence of the engineering faculty with regards to what to teach, according to the full set of intended learning outcomes of the program as described in Standard 2. Faculty competence refers to personal and interpersonal skills, product, process, system, and service building skills, including concepts and competences related to sustainable development. Faculty competence also refers to the ability to support students to achieve a deeper working understanding of the relevant disciplinary fundamentals.	CDIO programs take actions to enhance faculty teaching competence required for effectively creating, delivering, and improving courses in the curriculum. The need for faculty teaching competence includes for instance the ability to provide integrated learning experiences (Standard 7), including design-implement experiences (Standard 5) and using active and experiential learning in teaching (Standard 8), as well as assessing student learning (Standard 11) and evaluating and improving courses and programs (Standard 12).

Within the CDIO community, CPD is consistently portrayed as being delivered *concurrently with curriculum transformation:* a form of "just-in-time" training. Early comparative work showed Nordic universities experimenting with role-specific training while faculty were already

engaged in project-based teaching reforms (Malmqvist *et al*, 2008). In Sweden, Papadopoulou *et al* (2019) described a workshop designed to be explicitly "just-in-time" in that it requires participants to bring their own courses into the workshop, reflect on them, and immediately apply CDIO principles during the training. In India, Sukumaran & Gurusamy (2023) described the design and development of teaching competency development framework that addresses professional, techno-pedagogical, and organizational competencies that every faculty from their institution must possess.

At SP, CPD has been rigorously implemented for new faculty, via a systematic mentoring program which had evolved from a pilot-scale structured mentoring program by the third author (Cheah & Singh, 2011) to an institutionalized SP-wide Academic Mentor scheme that embed mentoring into ongoing curriculum redesign and concurrent support. At present the scheme is now known as the Teaching & Learning Mentor/Specialist (TLMS) scheme. Leong *et al* (2016) described a comprehensive CDP program in SP for all teaching faculty from lecturers to academic mentors to deputy director (programs). Cheah & Lee (2015) described how academic mentoring in SP is used as a professional development strategy implemented using the 70:20:10 learning model, although this term was not used in their paper at that time. The 70:20:10 model was used to embed faculty development into the act of building and delivering spiral curriculum for the chemical engineering program, making training inseparable from transformation (Cheah & Wong, 2019).

COMPARING THE CDIO STANDARDS AND THE AUN-QA REQUIREMENTS

The ASEAN University Network-Quality Assurance (AUN-QA) is a network of ASEAN higher education institutions aimed at harmonizing educational standards and promoting continuous quality improvement. Established in 1998, it provides, among others, programme-level and institutional-level assessments to enhance regional academic standards and facilitate student/faculty mobility. Nguyen *et al* (2013) suggested that under the legal, technical and social environment of Vietnam, CDIO can better prepare Vietnamese universities/colleges for international accreditation using AUN-QA as example. Phan *et al* (2020) showed that the CDIO Standards version 2.0 mapped very well to AUN-QA Criteria 3.0.

In 2023, version 4 of the AUN-QA criteria was used for assessment. It marked a significant change from earlier version where the 11 criteria have been consolidated and reduced to only 8 (Table 1.2, AUN, 2020). On the other hand, the CDIO Standards have also be upgraded to version 3.0. Table 2 below shows a mapping of the 12 CDIO Standards ver 3.0 against the 8 Criteria of AUN-QA Framework ver 4.0. It can be seen that CDIO Standards mapped well to the AUN-QA criteria related to fundamentals of good program design (learning context, integrated curriculum, outcomes, teaching and learning approaches, learning assessment). Good alignment was also achieved in program evaluation, which should not come as a surprised. However, there are several areas that the CDIO Framework did not and was not designed to cover. These are matters pertaining to student progression, offering of electives, major/minor, faculty hiring and promotions, etc. These aspects of education management rightfully be addressed by the institutions own internal policies and procedures.

RUPP FACULTY CDIO CAPABILITY DEVELOPMENT USING 70:20:10 FRAMEWORK

Preliminary discussions between SP and RUPP was initiated in early 2023 to plan for the SP-RUPP CDIO3T program with the aim of training some members of the RUPP Faculty of Engineering (FE) as master trainers. A total of 11 faculty members were eventually selected

by the RUPP management to lead the curriculum redesign effort. starting in accordance with Table 3 below.

Table 2. Mapping between CDIO Standards (ver 3.0) and AUN-QA Criteria (ver 4.0)

		AUN-QA version 4.0 Criteria							
CDIO Standards 3.0		1	2	3	4	5	6	7	8
1	The Context	1.1 1.4	2.1 2.3	3.1					
2	Learning Outcomes	1.2 1.3	2.2	3.5					
3	Integrated Curriculum	1.2	2.4 2.5		4.5		6.3		
4	Introduction to Engineering	1.1	**2**	3.1	4.2				
5	Design-Implement Experiences			3.4	4.4 4.6				
6	Engineering Learning Workspaces							**7**	
7	Integrated Learning Experiences			3.4	4.4 4.6				
8	Active Learning			3.3					
9	Enhancement of Faculty Competence				4.1 4.5	5.3			
10	Enhancement of Faculty Teaching Competence				4.1 4.5	5.7			
11	Learning Assessment	1.5			3.4 3.5	4.6			
12	Program Evaluation	1.4	2.7	3.6	4.7	5.7	6.6	7.9	**8**

Shading Explanation		Correlation with one or several sub-criteria		Correlation with whole criterion
AUN-QA 4.0 Criteria	1. Expected Learning Outcomes, 2. Program Structure & Content, 3. Teaching & Learning Approaches, 4. Student Assessment, 5. Academic Staff, 6. Student Support Services, 7. Facilities & Infrastructure, 8. Output & Outcomes			

Table 3. Program and participants for SP-RUPP CDIO3T

Program Name	Curriculum Development	Teaching & Learning	Remarks
Food Science & Engineering (FSE)	Vice dean x 1 Program manager x 1	Lecturer x 4	These 2 programs are slated to introduce new CDIO-type curriculum. All faculty members have teaching duties and experience.
Data Science & Engineering (DSE)	Vice dean x 1 Program manager x 1	Lecturer x 5	

The 3 components of the SP-RUPP CDIO3T program based on the 70:20:10 Framework are distributed as follows:

- 10% Formal – attend structured training via workshops from SP
- 20% Social – attend scheduled sharing between different programs within RUPP
- 70% Experiential – apply knowledge gained to redesign one's own program by RUPP

The entire duration for the SP-RUPP CDIO3T program took about 24 months. The program was divided into key segments in accordance with how the CDIO standards are typically used for program curriculum redesign:

- Context, Learning Outcomes
- Integrated Curriculum & Introduction to Engineering'
- Design-Implement Experiences, Integrated Learning Experiences, Active Learning
- Learning Assessment and Program Evaluation

Each segment is conducted as follows: 3 or 4 days of a workshop onsite in Phnom Penh or other city in Cambodia (i.e. the 10% formal part) followed by a break of about 2 months before the next formal workshop. During this period, faculty from both curriculum development and teaching and learning work together on their respective course(s) applying the knowledge gain from the workshop (I.e. the 70% experiential part). As for the 20% social part, we took note of the key lesson we learnt from the work of Johnson *et al* (2018) who cautioned against overlooking the role played by social learning in integrating experiential, social and formal learning in an effective CPD program. We therefore have regular sharing sessions built into the interim period for members from different program teams to meet and exchange learning experiences as well as learning from one another, e.g. what worked and what did not, etc. In addition, we also introduced an online 1-day "check-in clinic" for the 11 RUPP trainer to be in contact with SP CDIO Facilitator to share and get feedback on their work done. This is shown in Figure 4.

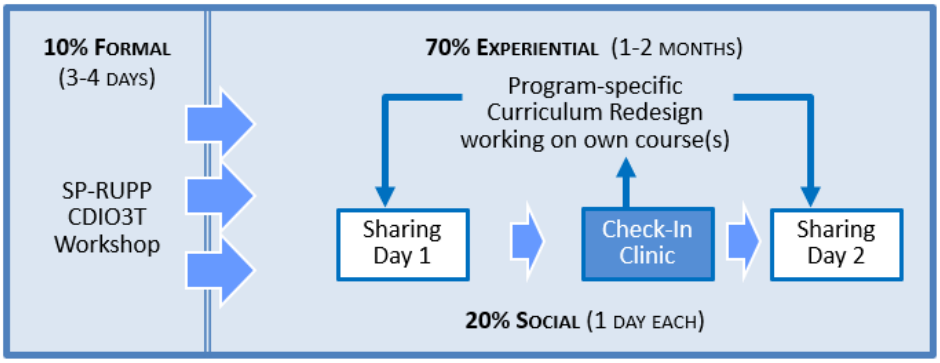

Figure 4. SP-RUPP CDIO3T Program designed using 70:20:10 Framework

Details of the SP-RUPP CDIO3T Program showing the planned dates and topics to be covered are shown in the Appendix. There are 3 main categories labelled A, B and C. Topics under Category A are foundational teaching and learning principles that formed the basis of CDIO principles, while Category B covers the use of each of the 12 CDIO Standards using 2 RUPP programs as context and referencing applicable criteria of the AUN-QA Framework, and Category C are meant to help RUPP improve its in-house quality assurance systems to continue the drive towards continual improvement using CDIO.

DESIGN OF SP-RUPP CDIO3T PROGRAM USING STiCC FRAMEWORK

The design of the program itself started with the end in mind: towards accreditation under AUN-QA Framework. In view of the fast-changing nature of today's educational landscape, especially considering technological advancements; we decided to frame the entire approach to the training to use respective CDIO standards that can demonstrate meeting the specific requirements of AUN-QA Framework. Figure 5 shows the PDCA cycle adapted for AUN-QA Framework.

We applied the STiCC model to the design of the curriculum for the SP-RUPP CDIO3T program, as briefly explained below.

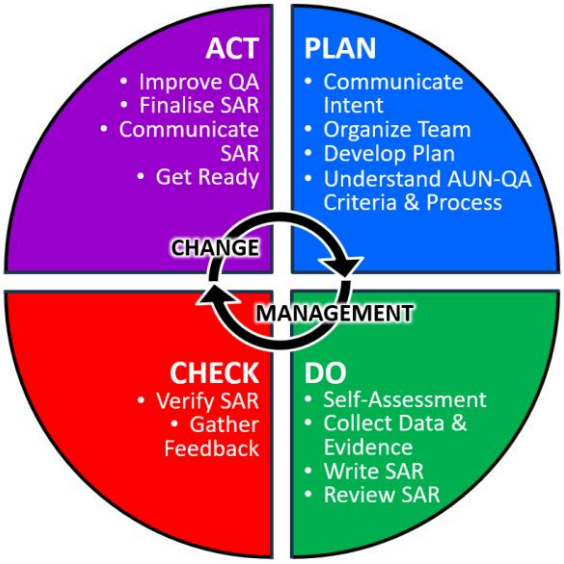

Figure 5. The PDCA Approach from AUN-QA Framework

- *School Culture*: "*Teachers should be given a supportive environment to undertake CPD*" This is the most important factor in the design of the SP-RUPP CDIO3T training program – members of the senior management team from RUPP FE took an active role in learning along with the participants in the workshop. An added benefit in the case of RUPP is that senior management themselves also have teaching duties, and their willingness to lead by example. The scheduled sharing sessions for faculty to meet up can further build a culture of sharing among faculty.
- *Time*: "*Consider when teachers will participate in CPD and what the time commitment is*" During curriculum redesign, time is especially precious given that everyone is already remarkably busy with the existing teaching commitments. SP work closely with RUPP FE senior management team to carry out advanced planning to make use of semestral breaks in the RUPP academic calendar to make time for CPD, for both the workshop (i.e. the 10% parts) as well as the sharing sessions and "check-in" clinic (i.e. the 20% parts). Careful consideration is also given to avoid peak period in a semester such as beginning of academic year, or examination period.
- *Connection to Practice*: "*Teachers must see how learning relates to teaching their students*" The training program design mandates that participants apply what they had learnt in the formal workshop to the course(s) that one is teaching. As seen from the earlier discussions, the program design provided time that allows participants to practice what they learnt.
- *Choice: "Provide teachers options in how they undertake CPD"* For the 70% experiential component, participants are encouraged to undertake action research to further deepen their knowledge of how the Framework is used to enhance teaching and learning; and attain the requirements of outcome-based education. Faculty is given a choice on which topic to do action research on.

The SP-RUPP CDIO3T program was targeted to end in June 2027. At the time of this writing, only the segment on Program Evaluation is yet to be covered. The remainder of this paper focuses on the learning points from participants on their experience from the training.

As an example of how the program works, consider the RUPP Food Science & Engineering (FSE) program. In May 2025, the FSE teaching team undergone 5 days of formal training by SP facilitators in Topics B1, B2 and B3 which cover CDIO Standards 1 (The Context), 2

(Learning Outcomes) and 3 (Integrated Curriculum). As shown in the topics in the Appendix, participants first identify key stakeholders for the FSE program and their requirements for the program's graduates in terms of job roles and responsibilities. These was mapped to RUPP's desired graduate attributes and professional identity and then unpacked to reveal the underpinning skills and attitudes needed. These requirements then cascaded into program-level learning outcomes and cascaded into appropriate courses, translated into course-level learning outcomes at the desired proficiency level and written using Bloom Taxonomy. An integrated curriculum is then designed to progressively develop the desired skills and attitudes to attain the required proficiency levels. Gaps in existing curriculum are identified as appropriate courses are identified as most appropriate to close the gaps. During this 5-day training, participants practice applying the principles learnt to their own courses and continue to do so for about a month before the "check-in" session with the same SP facilitator in June 2025. During this "check-in" session, participants presented their work done and areas of improvement identified and feedback given. Prior to the "check-in" session, RUPP management organize regular get-together for participants from FSE and the faculty from Data Science & Engineering to exchange learning points and insights, as a form of peer support in their curriculum redesign journey.

This sets the stage for applications for key elements of the FEF (Figure 1) in context of each program, namely systems thinking, lifelong learning (via self-directed learning) and Continuous Quality Improvement (CQI) using appropriate United Nations Sustainable Development Goals (UNSDGs). Topics B4, B5, B6, B7 and B8 covered these elements is a holistic manner through CDIO Standards 4 (Introduction to Engineering), 5 (Design-Implement Experiences), 7 (Integrated Learning Experiences), 8 (Active Learning), 11 (Learning Assessment) and 12 (Program Evaluation).

FACULTY REFLECTIONS ON LEARNING EXPERIENCE: FOCUS GROUP DISCUSSION

An online focus group discussion was organized by the second author from SP to learn about the experiences of participants, based on the STiCC Framework, and the 70:20:10 learning model. Questions were asked to ascertain how well the 4 dimensions of STiCC (School Culture, Time, Choice, and Connection to Practice) and different touch points of the 0:20:10 learning model facilitate participant engagement during the training. The findings are summarized into appropriate themes and discussed below.

Practice-Based Curriculum Redesign to Facilitate Transfer of Learning

Faculty valued applying CDIO concepts directly to their courses, noting stronger vertical and horizontal alignment, constructive alignment, and assessment design. Several described redesigning labs to include teamwork and peer evaluation, extending assessment beyond technical skills. Participants emphasized that the program's requirement to apply concepts immediately to curriculum work made learning "real" and sustained, addressing the common gap between training and practice.

Peer Learning and Mentoring as Support for Sense-Making at Times of Change

While workshops provided grounding, participants highlighted peer exchange as especially memorable. Sharing across departments helped them interpret CDIO, surface challenges, and validate their redesign efforts. Many expressed that these interactions built confidence and a sense of collective direction. They suggested communities of practice to sustain momentum, underscoring that peer learning is not supplementary but essential for reform.

Shifting Faculty Identity from Content Delivery to Learning Design

Reflections revealed a shift from content delivery to learning design. Faculty reported more interactive classes, with students engaging through projects and discussions. Yet they acknowledged challenges: students often preferred passive listening, and assessing teamwork or soft skills was difficult in large classes. Some suggested teaching assistants to support feedback. Participants admitted that many lecturers, trained as disciplinary experts, needed development in non-technical competencies, but also expressed excitement about designing richer learning experiences.

Accreditation as Quality Anchor

Accreditation was seen not as compliance but as a benchmark for quality and innovation. Faculty valued mock evaluations for clarifying expectations and welcomed AUN-QA as a platform to compare with established institutions. They requested ongoing training, practical examples, and the development of master teachers to guide younger colleagues. Several noted that such support would shorten learning curves and sustain capability, reinforcing the train-the-trainer approach.

Summary of Focus Group Discussion Outcomes

The program was most effective when workshops, peer exchange, and workplace application worked as an integrated system. Participants appreciated the balance of conceptual grounding, collaborative sense-making, and authentic curriculum tasks. This experiential application addressed the common gap between training and workplace practice, reinforcing the 70% experiential component of the 70:20:10 model. Sustainability, they stressed, will depend on mentoring, communities of practice, and internal master teachers as RUPP moves from redesign to enactment and continuous improvement.

CHALLENGES AND PLANS FOR MOVING FORWARD

One of the main challenges we faced is in trying to “lock in” the dates for the training. Despite the best of intentions, inevitably some changes to the dates become necessary. Because of the sequential nature of training, there will always be knock-on effects on downstream sessions. Despite the preference that the training be done face-to-face onsite and the “check-in” sessions online (to minimize cost), this arrangement is not always possible. Fortunately for the SP-RUPP CDIO3T Program, both institutions are flexible to accommodate the changes, with SP facilitators travelling and/or conducting the training during Singapore public holidays. RUPP participants also demonstrated resilience in attending workshops held during Cambodian public holiday and their vacation terms.

Heavy faculty workload continues to be challenge. Faculty were expected to redesign courses while maintaining full teaching loads. Even with careful scheduling, this dual demand risks burnout and may compromise the depth of curriculum redesign. The model assumes faculty can absorb significant additional responsibilities without reducing existing commitments. Moreover, the 70:20:10 model, though widely used in human resource development, lacks strong theoretical and empirical validation. Its effectiveness in academic CPD contexts remains contested, meaning outcomes may vary depending on institutional culture and faculty engagement. Despite widespread adoption of 70:20:10, learning transfer to the workplace was not always effective (Johnson *et al*, 2018). Faculty may struggle to sustain new practices over time, especially if institutional incentives and evaluation systems do not reinforce them.

Leadership participation in the training program can be a double-edged sword. While leadership involvement can strengthen culture, it may also unintentionally pressure faculty to conform rather than experiment. Faculty might feel less free to voice skepticism or propose alternative approaches when senior management is present in training. In the RUPP case, the 2 RUPP vice deans was actively assisting the SP facilitators during the training sessions. And it is with great respect that the 2 SP authors of this paper has noted that they successfully created a learning culture where other faculty can openly disagree and even challenge one another, including the vice deans.

Likewise, the accreditation-driven focus of training that anchors reforms to AUN-QA requirements may risk narrowing teaching and learning innovation to mere compliance instead. Faculty may prioritize meeting criteria over exploring pedagogical creativity or tailoring reforms to local student needs beyond accreditation requirements. The SP facilitators must strike a balance between over-emphasizing meeting AUN-QA criteria and focus more on innovative student-centred teaching and learning strategies using CDIO principles.

At the time of this paper, RUPP just rolled out the 2 programs redesigned using CDIO for its Year 1 students. Moving forward, RUPP will continue to work with SP in implementing the desired revamp for the remaining years of study. A longitudinal study of the impact on students learning will be introduced. RUPP and SP are in the process of discussing follow-up plans for supporting the newly minted RUPP CDIO trainers. In the near term, the focus is on supporting their action research and reflective practice using an evidence-based approach to ascertain the effectiveness of learning tasks designed using the CDIO Framework. A learning journey to SP is also being planned for 2027. The experience and learning points from this work will also be shared with other programs within RUPP, and with other institutions in Cambodia. Over the longer horizon, RUPP and SP can collaborate on joint education research on topics of mutual interest.

KEY TAKEAWAYS FOR PROGRAM OWNERS

We would like to offer the following guidance for program owners within the CDIO community who are tasked with executing a program redesign with “just-in-time” faculty CPD:

- *Embed CPD into Curriculum Reform*: Professional development is most effective when it is inseparable from the act of reform itself. Instead of treating CPD as an add-on, embed training directly into curriculum redesign cycles. This ensures faculty immediately apply new knowledge to their own courses, reducing the “transfer problem” where training remains theoretical. Embedding CPD also signals to faculty that reform and development are part of the same institutional priority, not competing demands.
- *Adopt Structured Frameworks (STiCC + 70:20:10)*: Frameworks provide coherence and balance. The STiCC model ensures faculty development is culturally supported, time-sensitive, practice-oriented, and flexible. Meanwhile, the 70:20:10 model balances formal workshops, peer learning, and experiential application. Together, they create a structured yet adaptable approach that integrates theory, collaboration, and practice, making CPD sustainable and impactful during curricular reform.
- *Secure Leadership Participation:* Leadership involvement is critical to building trust and legitimacy. When senior management participates in training alongside faculty, it demonstrates commitment and models the desired culture of learning. Leaders who also teach can bridge policy and practice, showing faculty that reform is not imposed but shared. This reduces resistance and fosters a culture of collective responsibility.

- *Plan Around Academic Cycles:* Faculty workloads are heavy, and reform adds pressure. Strategic scheduling of CPD during semester breaks or low-intensity periods prevents burnout and increases engagement. Avoiding peak times like exam seasons ensures faculty can focus on learning and application. Thoughtful timing signals respect for faculty commitments and makes CPD feel feasible rather than burdensome.
- *Mandate Application of Learning:* Training must be applied immediately to faculty's own courses to ensure transfer of learning. By requiring participants to redesign their courses during CPD, institutions guarantee that reforms are not delayed or diluted. This approach also helps faculty see the direct relevance of training, reinforcing motivation and embedding new practices into daily teaching.
- *Ensure Sustainability through Train-the-Trainer:* A train-the-trainer model builds long-term institutional capacity by creating internal champions who can cascade knowledge to others. This reduces reliance on external partners and ensures reforms continue beyond the initial project. Faculty trainers become role models and mentors, fostering peer learning and embedding CDIO principles into the institution's DNA.
- *Use Accreditation Goals as Anchors:* Anchoring CPD and curriculum reform to recognized accreditation frameworks (such as AUN-QA) provides a clear external benchmark and motivation. Faculty see the tangible value of their efforts in terms of international recognition and student mobility. Accreditation goals also help structure reforms, ensuring that training outcomes are measurable, aligned with quality assurance, and not left vague or aspirational.

CONCLUSIONS

The Royal University of Phnom Penh's (RUPP) case illustrates how faculty professional development can be embedded into curriculum reform to achieve both pedagogical transformation and international quality assurance. By aligning the CDIO Framework with Cambodia's FutureFit Educational Framework and targeting ASEAN University Network–Quality Assurance (AUN-QA) accreditation, RUPP created a reform pathway that was nationally relevant and regionally benchmarked. The SP-RUPP CDIO3T program combined the STiCC Framework and 70:20:10 Learning Model with a train-the-trainer approach, ensuring faculty development was contextualized, practice-oriented, and sustainable.

Overall, this case study demonstrates that CPD, when embedded into reform, can empower faculty and transform institutions. For program owners elsewhere, the RUPP experience offers a replicable model: anchor reforms in accreditation, embedding CPD into practice, and building sustainability through internal trainers, cultivating a culture of continual improvement that endures beyond the project cycle.

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GenAI was used in the following manner:

- To provide a concise summary of papers selected from the CDIO Knowledge Library to ascertain the content of each paper address issues of faculty development in times of curriculum change. This then formed the basis for writing literature reviews.
- To improve the abstract of the paper after the first draft was written.
- To improve conciseness of the write-up from the focus group discussion.
- To identify key takeaways from the paper, which was reviewed for validity and edited as necessary.
- To prepare the draft of the conclusion of the paper, after which it was reviewed and amended as necessary.

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APPENDIX. Details of SP-RUPP CDIO3T Program

Attached below is the listing of topics covered in the program over the duration of several months. Note that this is not the latest version of the actual program as implemented. This earlier iteration is used as illustrative only for the purpose of this paper.There are 5 topics under Category A (foundational teaching & learning principles), 8 topics under Category B (applications of core CDIO Standards) and 4 topics under Category C (quality education via continual improvement).

Date (2025)	Days	Components	Topic(s)	Type & Location
May 6 - 8	3	B1	Context of Learning via External Scanning	Training (Online)
		B2	Learning Outcomes, Proficiency Levels	
May 13 - 14	2	B3	Integrated Curriculum, Design-Implement Experiences	Training (Online)
May 30 - Jun 5	International CDIO Conference			Melbourne, AU
Jun 17 - 19	3	B1, B2, B3	As above	Checking-In @KH
Aug 4 - 7	4	A1	Manage Learning, learning theories, core principles of learning	Training @KH
		A2	Facilitating Learning (Questioning techniques, facilitation techniques, learning analytics)	
		A3	Underpinning Knowledge: Teamwork & Collaboration, Communication, Thinking	
		A4	Feedback & Assessment: Principles of Good Assessment, Types & Methods, Rubrics	
Aug 18 - 21	CDIO Asia Regional Meeting			Batam, ID
Sep 1 - 3	3	A1, A2, A3, A4	As above	Check-In (Online)
Oct 13 - 15	1	B4	Integrated Learning Experiences & Assessment	Training @KH
	1	B5	Prototyping of Basic-level (Year 1) Design Implement Experience	
	1	B6	Facilitation and Assessment of Capstone Project	
Oct 21 - 24	CDIO International Working Meeting (Oct 22-23)			Linkoping, SE
Nov 11 - 13	3	B4, B5, B6	As above	Check-In (Online)
Date (2026)	**Days**	**Components**	**Topic(s)**	**Type & Location**
Jan 12 - 14	3	B1-B3, B4-B6	Final Check before Official Roll-Out of RUPP 2 Revised Programs	Check-In @KH
Jan 15 - 16	1	B7	Special Topic: Self-Directed Learning (for Lifelong Learning)	Training @KH
	1	B8	Special Topic: Data-Enabled Flipped Classroom	
Feb 4 - 5	1	A5	Using Active Learning Methods with EduTech Tools	Training @KH
	1	A6	Using Reflective Practice to improve teaching	
Mar 11 - 12	2	A5, A6	As above	Check-In (Online)
Mar 18	1	C1	Introduction to Quality Programme and the PDCA Cycle	Training (Online)
Mar 19	1	C2	Introduction to CDIO Self-Evaluation for Continual Improvement & Quality Programme	Training (Online)
Apr 28	1	C2	Outcomes of The CDIO Self-Evaluation Process and action plans	Check-In @KH
Apr 29 - 30	1	C3	Faculty T&L Framework, Specific Job Analysis, Training Needs Analysis	Training @KH
	1	C4	Centre of Excellence for T&L, Academic Mentor Scheme	
May 20 - 22	3	C2, C4	As above (Outcomes from C3 TNA reflected in C4)	Check-In (Online)