

STUDENT ENGAGEMENT: A PROPOSED OPTIONAL STANDARD

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ABSTRACT

Education directly affected students' futures. However, the roles of students in the educational process, decision making, and development were generally less than other stakeholders. The paper proposed an optional standard in order to formally and systematically include the student engagement into CDIO framework in four spheres of engagement – (1) the management, (2) provision of education, (3) research, and (4) industry and society at the degree of partnership at least. With this platform, the optional standard would directly support most of the main standards in planning, operation, and development of activities and evaluation.

KEYWORDS

Student Involvement, Operational Implementation, Optional Standard, Standards: 2-12

INTRODUCTION

In engineering education, it was undeniably that industry was a very important stakeholder. The industry routinely directed, or even dictated, the goal and means of education to improve the employability of graduates. In the CDIO, there were many literatures on this topic such as Male et al. (2016) and even a proposal for the Standard on Industrial Engagement (Cheah & Leong, 2018).

Students had been one of, if not the most important, stakeholder in engineering education. The education and experiences that they were given during the university years would directly affect their future accomplishment and professional fulfillment. Yet, their roles in the educational process were usually providing feedbacks on teachings and learning processes. This lack of student engagement had also been raised several times at CDIO meetings and conferences. However, there were all piece-wise and focused on particular topics, especially teaching and learning.

In universities, some lecturers associated student engagement with the participation in classes, projects, learning activities or active learnings. In CDIO-related literatures, the student engagement mostly reinforced this perception. For instance, student engagement was mentioned as an important aspect in CDIO projects (Martín et al., 2016; Song et al., 2017), learning activities (Gommer et al., 2016; Hargreaves, 2016), active learning (Ferreira & Martins, 2016) and learning assessment (Ferreira & Martins, 2016). The CDIO Academy, which were

held in parallel to the annual CDIO conferences, also focused on the learning by providing opportunities for teams of international students to solve the provided multidisciplinary challenges (Picas, 2014).

STUDENT ENGAGEMENT

Student engagement referred to a broad range of activities in which students participated with the institution, usually the management, education, research, and communities. Student engagement had been a need-to-have for education because engagement was highly correlated with learning and personal development. There were many comprehensive descriptions of the student engagement such as Trowler (2010), Trowler & Trowler (2010). For practical purposes, there were two components of the student engagement that had to be considered, (1) the sphere or the area of engagement and (2) the degree or level of engagement (Quaye & Harper, 2015; Dunne & Owen, 2013).

While most literatures on student engagement did emphasize student behaviors, teaching practices, learning, and academic performance (Carini et al., 2006; Kahu, 2013), other spheres of engagement could be considered and implemented. There were many spheres of engagement depending on the level of education and disciplinary context. For example, in the medical education (Patricio, 2016), the sphere of engagement was identified as the engagement with (1) the management of the school, including the policy, mission, and vision (structure and process), (2) the provision of the education program (delivery of teaching and assessment), (3) academic community (research program and participation in meetings), and (4) local community and service delivery. Meanwhile, Dunne & Owen (2013) provided an outline which included the (1) responsibility for learning, (2) curriculum design and learning, (3) community and (4) discipline and pedagogical research.

In short, the first component described the field of involvements. For engineering education, the sphere could be interpreted into (1) the institutional management, including the policy, mission, and vision, (2) the provision of the education program, including the curriculum design, learning and assessment, (3) academic and professional development and (4) industry engagement and community services. Examples of each sphere could be model on the ASPIRE sub-criterion in Patricio (2016) with the addition of the inclusion of the peer engagement into the sphere (2) due to the undeniable influences and roles of peers on the student development (Porter, 2006) as well as the fact that collaborative learning and working was inherent in engineering practices. For sphere (3), the professional society and entrepreneurship could be added. For sphere (4), the industry could substitute the healthcare services.

The second component, the degree of engagement (Ashwin & McVitty, 2015), had been classified into (1) consultation in which students were asked for their views on a fixed process, resulting in incremental improvement (2) partnership in which students participated in transforming the process, and (3) leadership in which students created new objects of engagement. The increasing degree of engagement indicated the transfer of power, responsibility, and ownership in education. For this component, the higher degree of engagement indicated more students' power and authority; at least the partnership level is expected.

AN EXAMPLE IN IMPLEMENTATION AND LESSONS

The student engagement implementation in the mechanical engineering program, Chulalongkorn University, Thailand, was guided by the practices in the medical program of the same university which was a recipient of the ASPIRE-to-Excellence award for excellence in student engagement from the Association for Medical Education in Europe (AMEE) in 2015 (Drees & Peters, 2016). The objective of this award was to develop international peer-based criteria to benchmark excellence in medical education rather than using publication and grant data to rank medical schools (Hunt et al., 2018). This concept reflected well with the CDIO standards for engineering education.

The Faculty of Medicine, Chulalongkorn University, have been very successful in creating the institutional culture and formal framework for student engagement such that the degree of engagement was raised to the leadership level. Medical students were formally included in the governance process; student representatives sat as committee members in the program and various administrative committees. Medical students actively involved in curriculum development, formulating teaching and learning, and proving the effectiveness of such processes with educational research. Students also routinely published and presented their works on their education, e.g., Lumlertgul et al. (2009) and Wongkietkachorn et al. (2014).

For the last three years, the mechanical engineering program employed student engagement activities at the partnership level in the course and program evaluation, curriculum revision, and the extracurricular activities.

For the sphere (1) management, students were represented on administrative committees through the Mechanical Engineering (ME) Club, established from the student body and headed by the class presidents, was used as the channel for devolving power from the program and department. For the extracurricular activities, the ME Club representatives planned the activities and scheduled throughout the academic year with the consultation with the lecturers that oversaw the departmental student affairs. Students were consulted on the direction and development of infrastructure, notably the new common room/workspace within the department. Students was involved in the accreditation processes. The course and project feedback at the end of semesters were included into the twice-yearly faculty evaluation.

For the sphere (2) provision of education which concerned the program management, curriculum development, and learning, the student engagement unit in the ME Club was established with students from all years of study and answered to the program committee for the issues in academic affairs. The regular duty was to organize the dependent course and program conduction review at the end of every semester in which the students organized in the style of an end-of-term party (Figure 1). The results of this review were far more useful than the individual course feedbacks, particularly on the design and project courses (Maneeratana et al., 2017). Besides, the units also acted as the student advisory board on the program conduction and curricular. The formal student engagement platform was also useful for the accreditation process as students were holistically and systematically included as the stakeholder with supporting evidence. In short, results from student engagement activities truly transcended previous practices.

The use of student representatives as proxy was particularly useful for unpleasant issues such as plagiarism and cheating. With strict anonymity under the student interface, real situations and surprising insights could be gained such that better responses could be tailored. In a survey on homework copying, it was found that students could formulate more forthright

questions as they could empathize the situations better than lecturers. Other students gave truthful answers to their friends as shown in Figure 2. The results were then used to review assigned works, learning processes and supports as well as communication for mutual understanding.



Figure 1. Students' semester program and course review, <https://youtu.be/02bwldexY30>.



Figure 2. Some results from a students' survey on homework copying behaviors.

Concerning spheres (3) and (4), the ME club plans requested more self-discovery and networking within the student body across the classes, extended and more formal trainings instead of short visits and community services that were directed by students. For instance, there was a community service camp in conjunction with a College of Nursing that students insisted on continuing despite the reluctance from the department due to the complexity and the consumed resources. However, this camp allowed students to determine, direct, and design the contributions, resulting in a much higher sense of satisfaction, fulfillment, actively collaboration across the participating student body, and strong motivation to the junior classes. It was clear that there were shifts in the activities to those that provide more personal fulfillment, and tangible achievements in community services and professional trainings. The style of activities was also changed to be more playful.

It could be summarized that the activities in sphere (1) corresponded with the CDIO Standards 2, 6, 9 and 10. The sphere (2) involved the CDIO standards 3, 8, 11 and 12 as well as Standards 5 and 7 from feedbacks. The sphere (3) involved the CDIO Standards 4. The sphere (4) involved the CDIO Standards 5 and 7.

When the spheres and degrees of engagements were considered, it was found that the component (1) the institutional management as at the consultation level, the (2) provision of

education was at the partnership level, the (3) academic and professional was at the partnership level and (4) industry engagement and community services was at the partnership level. With these spheres and degrees in mind, the direction of continuous improvement was clearer.

On the departmental and program management sides, the implementation process was quite difficult due to the conservative institutional and personal culture. There was the real need to change lecturers' mindset on the role of students. For continuous improvement, the inability or inadequacy of the department and program to address the identified problems became a real issue. The surfaced problems had to be properly considered and prioritized for action otherwise the concerned parties would be disappointed and frustrated. Communication with students was the key to mutual understanding; it was normal that few students and lecturers would be particularly active, but all concerned had to achieve the minimum level of engagement and be aware of the ongoing process. The management had to be transparently accountable and perceived to be sincere from the students' viewpoint. All of these involved a change in institutional culture, which was a major challenge by any means.

A PROPOSED OPTIONAL STANDARD

It was recommended that emerging skills and best practices could be incorporated in CDIO as optional standards (Malmqvist et al., 2017). There had been several proposals and under reviewed (Malmqvist et al., 2020). It was noted that there was a student-oriented optional standard, 'Student Success: On the Need for a New Standard' (Gonzales et al., 2018) which placed the importance on the induction, support and retention of students.

The proposed standard came from the combination and adaptation of several standards and practices as well as the context of engineering education, particularly the ASPIRE initiative in medical education (Patrício, 2016) and the methods for enhancing student engagement (Peters et al., 2019).

Concerning the degree of engagement, it was clear that the consultation could only achieve mundane results, which hardly support the promotion of excellence in education. Hence, at least the partnership level was aimed for. Another point that had to be included was the emphasis on the formal platform and institutional structure on the success of the student engagement (Peters et al., 2019).

Optional Standard – Student Engagement

Adoption of the student engagement platform that provided a formal framework for student engagement such that students participated in management, education, professional & research activities and industry & society services in a mutually beneficial collaborative approach with the institutions and programs.

It was noted that the Standards 2-12 involved students' participation in varying degrees. The optional standard proposed a platform that could aid the implementation of these standards in the administrative structure of the program.

Description

The sphere of student engagement composed of the engagement with (1) the management, including the policy, mission, and vision of the department or institution, (2) the provision of the education program, including the teaching, learning activities, peer engagement, assessment and evaluation, (3) disciplinary and professional development, and (4) industry engagement and community services. The degree of involvements was (1) consultation on fixed processes for incremental improvement, (2) partnership which transformed the processes, and (3) leadership with creation of new objects of engagement.

The examples of each sphere in the examples were modeled on the sub-criterion of ASPIRE (Patricio, 2015). An institution could select specific items or formulate details for each sphere of engagement for implementation and specify the degrees of involvement that suited their institution. However, the partnership levels, at least, were recommended for transformative improvement.

Rationale

Students were probably the most important stakeholder in education; their participation in the educational management, processes, and experience had to be made a regular component in education. The student engagement increased learning, intrinsic motivation, as well as students' sense of ownership of the program and achievements. In order to ensure the students' involvement and ownership in their own education as well as provide a framework for supporting student engagement in other CDIO standards, a formal and institutionalized platform which covered desired spheres and engagement degree was needed.

Rubric

Scale	Criteria
5	Student engagement is institutionalized, and becomes a part of the program's continual improvement process with documented evidences of the student engagement platform implementation in all spheres at the partnership degree or above.
4	The student engagement platform is implemented in the program in all desired spheres at the partnership degree or above for at least one year.
3	The student engagement platform is implemented in the program for at least one year.
2	There is an explicit plan to implement the student engagement platform for the program.
1	The need to adopt the student engagement platform in the program is recognized and a process to address it has been initiated.
0	There is no plan to adopt the student engagement platform in the program.

DISCUSSIONS AND CONCLUSIONS

The student engagement had long been presented in CDIO Standards and actual practices. However, it was mostly considered in a narrow aspect of teaching and learning. The degree of engagement was usually consultation with few cases of partnerships. Students were generally in passive roles, while the administration and lecturers initiated and conducted projects, practices, and studies.

This situation did not accommodate the current context in which the co-creation of knowledge, design thinking, and user experiences were highly valued. The CDIO framework prided itself on the creation of innovation and application in learning in the real contexts and stakeholders. It would be logical to formally and extensively include the stakeholders that were personally and most affected by the education, namely, the students.

Considering by the spheres of engagement against the CDIO Standards and proposed optional standards (Malmqvist et al., 2017, Malmqvist et al., 2019), (1) the management, which included the policy, mission, vision, and the administration, supported the Standards 2, 6, 9 and 10. The inclusion of students into committees affected the way that learning outcomes, resource management, and the method of performance evaluation of staffs. Most dominantly, the sphere (2) the provision of the education program, including the curriculum revision, teaching, and assessment, involved Standards 3, 5, 7, 8, 11 and 12 that concentrated on the curriculum development, the methods of teaching and learning as well as the assessment and evaluation. The sphere (3) profession with industry, research, and entrepreneurship supported the Standards 4 and many optional standards on research-integrated education, and entrepreneurship. Lastly, the sphere (4) the service to society and community sphere supported the Standards 5 and 7 as well as optional standards on industrial engagement, sustainable development and workplace and community integration.

The extended CDIO framework and syllabus demanded that “students and faculty have greater awareness and access to tools to promote (i) student engagement in their own graduate capability development ...” (Campbell et al., 2009). This optional standard would support this framework by clarifying the definition, achievement, process, and evaluation.

Due to different institutional culture, there would be several approaches to implement this optional standard as different best practices could be used (Hunt et al., 2018). By comparing these practices, one of the most directed methods was to create an administrative platform for involvement of student representatives and then integrate that platform into the program administration and decision making processes. Hence, students would have a formal channel of authority and involvement via their representatives. The involvement of students in the implementation of CDIO standards could be formally channeled via this student platform. With a small group of students in different year of studies, long-term goals on the spheres of involvement could be formulated and activities could be coordinated and improved over time. Also, the resistance from lecturers would be lessen as the program committee would act as the interface.

By being accepted as an optional standard, the student engagement platform would be highlighted; the practices could be more active, systematic, and holistic. Students would be better motivated as the student engagement platform neatly supported all the three basic needs for intrinsic motivation - the autonomy, relatedness, and competence (Leong et al., 2016). Educators and administrators would have a system that facilitated the operation, feedback, and development in the spheres of administration, academic, profession- and

community-related aspects. More practices with student engagement as the main component would be studied and reported more systematically. Hence, it would be easier for best practices and lessons to be compiled, reviewed, and promoted for the CDIO and broader teaching and learning communities.

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