



Introduction to CDIO Handbook

Version 2 - June 2026

22nd International CDIO Conference, hosted by
University of Liverpool, Liverpool, UK, June 22-25, 2026.

This handbook accompanies the CDIO Introduction Sessions

Conference visitors new to CDIO and those who would like to know more about the framework, can visit the CDIO Introduction Sessions. There are four in total, which can be followed in order or cherry-picked as desired. Expect to be informed and work actively with other participants in each of the sessions!

- Session 1, **Impact and Benefits of CDIO Approach to Engineering Education**, introduces the CDIO initiative, clarifying its purpose, scope, and key resources. Participants gain an overview of how CDIO can enhance programmes and student learning through practical examples and case studies.
- Session 2, **Using the CDIO Standards in Education Development**, explores the CDIO Standards as a framework for curriculum design and evaluation. Participants learn to interpret and apply the standards to their teaching practices.
- Session 3, **Using the CDIO Syllabus in Education Development**, focuses on the structure and application of the CDIO Syllabus in curriculum planning. Participants practise linking syllabus elements to their course design and educational development initiatives.
- Session 4, **CDIO Collaboration and Community**, highlights strategies for adopting CDIO, including implementation timelines and early success tips. Emphasises collaboration within the CDIO community and the benefits of shared practices and continuous development.

The sessions have just been revamped and revised, and will run in their new form for the second time in the Liverpool conference. If you are joining us, we would be very happy to receive your feedback!

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What is CDIO?

An idea, a framework, and a community, with



What is a CDIO-based education?

Engineering education and real-world demands on engineers have a risk of drifting apart, due to rapid changes in society and technology. Realizing that this widening gap must be closed, leading engineering schools in the USA, Europe, Canada, UK, Africa, Asia, and New Zealand have formed the CDIO Initiative:

A worldwide collaborative sharing a vision of meaningful, futureproof engineering education.

CDIO is based on a commonly shared premise that engineering graduates should be able to Conceive – Design – Implement – Operate complex, value-adding, and sustainable engineering systems in a modern, dynamic, team-based engineering environment.

The main characteristics of a CDIO-based education are:

- An education that includes Conceiving – Designing – Implementing – and Operating learning activities
- A programme curriculum organised on mutually supportive courses for student learning progression
- Interwoven CDIO activities, such as Design-build-test projects
- Integrated learning of professional skills such as teamwork and communication in engineering courses
- Active and experiential learning
- A continuous quality assurance process with higher aims than accreditation

The CDIO Standards

Keeping track of the engineering education development:

The twelve standards of CDIO

Standard 1 — The Context*

Adoption of the principle that product, process, and system lifecycle development and deployment -- Conceiving, Designing, Implementing and Operating -- are the context for engineering education

Standard 2 — Learning Outcomes

Specific, detailed learning outcomes for personal and interpersonal skills, and product, process, and system building skills, as well as disciplinary knowledge, consistent with program goals and validated by program stakeholders

Standard 3 — Integrated Curriculum

A curriculum designed with mutually supporting disciplinary courses, with an explicit plan to integrate personal and interpersonal skills, and product, process, and system building skills

Standard 4 — Introduction to Engineering

An introductory course that provides the framework for engineering practice in product, process, and system building, and introduces essential personal and interpersonal skills

Standard 5 — Design-Implement Experiences*

A curriculum that includes two or more design-implement experiences, including one at a basic level and one at an advanced level

Standard 6 — Engineering Workspaces

Engineering workspaces and laboratories that support and encourage hands-on learning of product, process, and system building, disciplinary knowledge, and social learning

Standard 7 — Integrated Learning Experiences*

Integrated learning experiences that lead to the acquisition of disciplinary knowledge, as well as personal and interpersonal skills, and product, process, and system building skills

Standard 8 — Active Learning

Teaching and learning based on active experiential learning methods

Standard 9 — Enhancement of Faculty Competence*

Actions that enhance faculty competence in personal and interpersonal skills, and product, process, and system building skills

Standard 10 — Enhancement of Faculty Teaching Competence

Actions that enhance faculty competence in providing integrated learning experiences, in using active experiential learning methods, and in assessing student learning

Standard 11 — Learning Assessment

Assessment of student learning in personal and interpersonal skills, and product, process, and system building skills, as well as in disciplinary knowledge

Standard 12 — Program Evaluation

A system that evaluates programs against these twelve standards, and provides feedback to students, faculty, and other stakeholders for the purposes of continuous improvement

CDIO Optional Standards

Accepted Optional Standards

1. Sustainable Development
2. Simulation-based Mathematics
3. Engineering entrepreneurship
4. Internationalization & Mobility

In the pipeline:

- Student Engagement/Ownership
- Research-Integrated Education
- Workplace & community integration/learning
- Industry Engagement
- Curriculum Agility

Below you find two example optional standards, with a description, rationale and rubric for self-assessment: Sustainable Development and Engineering Entrepreneurship.

Optional Standard 1: Sustainable Development

A program that identifies the ability to contribute to a sustainable development as a key competence of its graduates. The program is rich with sustainability learning experiences, developing the knowledge, skills and attitudes required to address sustainability challenges.

Description

The program emphasizes environmental, social and economic sustainability in the adoption of the CDIO principles as the context for engineering education (Standard 1). Sustainability related knowledge, skills and attitudes, are explicitly addressed in program goals and learning outcomes (Standard 2). Aspects of sustainable development are integrated in several mutually supporting disciplinary courses and projects, possibly in combination with specific sustainability courses

(Standard 3). Concepts of sustainability, potentials and limitations of science and technology and related roles and responsibilities of engineers, are established at an early stage of the education (Standard 4). Design-implement experiences provide students with opportunities to apply and contextualize sustainability knowledge, skills and attitudes, both in the development of new technology and in the reuse, redesign, recycling, retirement, etc., of existing technology (Standard 5). Physical and digital learning environments enable interdisciplinary and transdisciplinary collaborative learning and interaction with various external stakeholders (Standard 6). Sustainability learning experiences are integrated with the learning of disciplinary knowledge, personal and interpersonal skills, and product, process, system and service building skills (Standard 7). Active experiential and transformative learning activities develop students' key competences for sustainability (Standard 8). Enhancement of faculty competences for sustainability and related teaching competences is actively promoted (Standard 9 & 10). Approaches appropriate for assessing sustainability related learning outcomes are implemented (Standard 11). The integration of sustainable development is evaluated by students, faculty, industry and societal stakeholders, and in relation to relevant UN and other frameworks (Standard 12).

Rationale

To address the issues of sustainability is a key challenge for humanity. Engineers need to understand the implications of technology on social, economic and environmental sustainability factors, in order to develop appropriate technical solutions in collaboration with other actors in addressing societal issues.

Rubric for self-assessment

5	Sustainable development is fully integrated in accordance with the description in the optional CDIO standard for sustainable development.
4	The integration of sustainable development is pervasive, well adapted to the program context, promoting progression of knowledge, skills, and attitudes, and there is documented evidence that students have achieved the related intended learning outcomes.
3	There are explicit program goals and intended learning outcomes related to environmental, social, and economic sustainability and at least three substantial sustainable development learning experiences of increasing complexity including an introduction early in the program.
2	At least one substantial sustainable development learning experience is being implemented and there is a plan for extended integration of sustainable development.
1	Minor sustainable development learning experiences have been implemented and needs and opportunities for extended integration of sustainable development have been identified.
0	There are no sustainable development learning experiences in the program.

Optional Standard 3: Engineering entrepreneurship

Engineering programs that actively prepare graduates for creating technology-based business ventures, in order to produce economic and other values for society.

Description

A curriculum that is permeated with entrepreneurial learning experiences, tailored to the relevant learning goals as defined in Standard 2. Entrepreneurial competence is developed through entrepreneurship learning activities (e.g. by students performing value creation projects in the community), by learning about entrepreneurship (e.g., marketing, intellectual property rights), by learning in entrepreneurial settings (e.g., student incubators or student-run companies) and learning for entrepreneurship (e.g. business model creation tools). The learning experiences are supported by appropriate learning environments, for example various kinds of maker spaces, and by staff with entrepreneurial competence. Throughout the curriculum, projects can be made increasingly authentic and realistic. They can allow students to make real-world connections and interacting with stakeholders. Some projects may involve co-creating solutions with clients or users. Valuable learning occurs not only through the hands-on activities, but also when the students reflect on their experiences, including their processes and methods, successes and setbacks. This is furthered by teacher-facilitated opportunities for reflection.

Rationale

The role of engineers has broadened from designing and implementing technical solutions to also forming business ventures based on technological innovations, thereby creating value for society. Startups are increasingly based on ideas developed by students during their studies, or on ideas and intellectual property owned by university researchers that students further develop and commercialize. The needed competences include for example opportunity identification, business planning, intellectual property rights, company financing and marketing. Entrepreneurial learning activities can be designed to address not only students' abilities in relation to venturing, but also, simultaneously, many learning outcomes that are broadly desired in all engineering programs, such as personal and interpersonal skills, and other engineering skills.

Rubric for self-assessment

5	The entrepreneurial learning experiences are regularly evaluated and revised, based on feedback from students, instructors, and other stakeholders.
4	There is documented evidence that students have achieved the intended learning outcomes of the entrepreneurial learning experiences.
3	At least two design-implement experiences of increasing complexity are being implemented.
2	There is a plan to develop entrepreneurial learning experiences at basic and advanced level.
1	A needs analysis has been conducted to identify opportunities to include entrepreneurial experiences in the curriculum.

0	There are no entrepreneurial learning experiences in the engineering program.
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Working with the Rubrics

For self-reflection and self-assessment, on each standard one can use its rubric, scoring "the CDIO way":

5. Yes, and the process is evaluated and adjusted regularly
4. Yes, and there is evidence of structural implementation
3. Yes, initiative has been taken at least incidentally
2. Almost, there is an action plan
1. Not yet, but there is awareness
0. No, not considered yet, not applicable, not wanted, not possible

CDIO Introduction Workshop

Session 4: Collaboration and Community

CDIO Collaboration and Community Activities

<i>CDIO International Conference & Collaborators' Meeting</i>		
	June, annual, 4 days	Hosted by a CDIO Member School
<p>ENGINEERING EDUCATION</p> <ul style="list-style-type: none"> • Invited keynote speakers • Paper podium / poster themed sessions • Introductory workshops • Advanced workshops • Round table discussions • Working group sessions • Facility tours 	<p>ORGANISATION & ADMIN</p> <ul style="list-style-type: none"> • Regional meetings • Council meetings • Council elections • CDIO Academy 	<p>SOCIAL & NETWORKING</p> <ul style="list-style-type: none"> • Newcomers' reception • Welcome reception • Conference dinner • Coffee and meal breaks • Tourist-type activities
<p><i>Participant benefits:</i></p> <ul style="list-style-type: none"> • Open to anyone – not just collaborators; chance to network with <300 participants • Learn about recent developments and best practices in engineering education • Contribute to the collaborative development of new curricula and pedagogy in engineering education • Participate in CDIO organisation and administration • Seek and provide advice, support and guidance to peers • Be inspired and inspire others 		

<i>CDIO International Working Meeting</i>		
	November, annual, 2 days	Hosted by a CDIO Member School
<ul style="list-style-type: none"> • Smaller annual International meeting – open to collaborators only • Participants collaborate to make progress in the CDIO Working Groups and on other emerging issues • Campus and teaching facility tours • Council meeting • Social activities and dinner 		
<p><i>Participant benefits:</i></p> <ul style="list-style-type: none"> • Collaborate with other experts in pedagogic research and development • Help to shape and develop the future of the CDIO Initiative • Participate in CDIO organisation and administration • Build new personal and collaboration relationships 		

CDIO Working Groups Continuous Voluntary membership

- Small groups of collaborators working on key topics in Engineering Education and CDIO
- Proposed by individual collaborators and promoted as part of Annual Conference
- Anyone can join the groups that they are interested in
- Blend of continuous remote collaboration and in-person activities at annual meetings and events
- Produce publications and resources – report at Annual Conference

SOME RECENT TOPICS:

- Curriculum Agility
- Updating CDIO Syllabus 3.0
- International Mobility of Staff and Students
- Engineering Ethics Education
- CDIO Peer-to-Peer Support Approach
- Designing the Format for the International Working Meeting
- Lifelong Learning at Engineering Institutions: Barriers and Enablers
- *Developing Mastery in Digital Age: Learning from Deliberate Failure*
- *Development Of Introductory Workshops And Supporting Resources*
- *Lifelong Learning at Engineering Institutions: Barriers and Enablers*
- *Future of CDIO – Working Towards 4.0*
- *Designing the University of the Future – an International Perspective*
- *Advancing The Role Of Technicians Within CDIO*

Participant benefits:

- Contribute to innovation and development of global engineering education and/or the CDIO Initiative.
- Propose your own pedagogic research and development projects in collaboration with other experts
- Build new and deep personal relationships

CDIO Regional Groups & Meetings Timing varies Hosted by a CDIO Regional Member School

Africa Asia Australia & NZ Europe Latin America North America UK & Ireland

- Each region has 2 or 3 Regional Leaders who coordinate activity and serve on the CDIO Council
- Regular meetings at member schools within the region: typically 1 or 2 per year:
 - Presentations and workshops on emerging engineering education themes
 - Regional contribution to CDIO Working Groups
 - Collaborative development of tools, resources and approaches
 - Support for newcomers and review of formal applications to join CDIO as a collaborator
 - Campus and teaching facility tours
 - Social and networking activities
- Additional meetings as part of annual International Conference – *you are all welcome to attend your Regional Meeting on Wednesday 12.00 to 13.00*
- Mailing list with regular communications about CDIO matters


Participant benefits:

- Immediate peer support network for advice, guidance and sharing of good practice
- Meetings easier and cheaper to access than International Conference and Working Meeting
- Chance to work with more participants from local region
- Allows a focus on specific regional / national context and issues
- **Most accessible way for newcomers to learn more about CDIO**

Hints and tips for early success

- **Find your early adopter.** Every successful CDIO adoption has at least one person who is genuinely enthusiastic and genuinely credible with their colleagues. If you can identify that person and give them some protected time and institutional backing, you have your starting point
- **Choose a visible win.** The pilot you choose in the early stages should be somewhere people will notice — a large compulsory module, a high-profile programme. Quiet successes in optional electives don't build institutional momentum
- **Don't wait for consensus.** You will never get everyone on board before you start. Get enough people, start moving, and let the results do the persuading
- **Use the community early.** You don't need to be a full member to reach out to a CDIO school and ask: how did you approach this? People in this network are genuinely generous with their time. We've all emailed strangers and had substantive conversations within a week
- **Document as you go.** Your experience — even your early, messy, uncertain experience — is valuable data. Write it down. It becomes your first conference paper/case study sooner than you think.

Activity 1: Three questions to reflect on


INTRODUCTION SESSION — WORKSHOP CARD
Three questions to *reflect on*

- 1

What is the single biggest challenge your programme faces right now?
 Be specific — not “we need to improve student outcomes.”
 What is the actual problem underneath that?
- 2

Which part of the CDIO menu could most directly help with that challenge in the next 90 days?
 A Standards self-evaluation. A Syllabus mapping exercise. A single module redesign. A conversation with a peer institution. Choose something real and doable — not aspirational.
- 3

Who could support you?
 Someone in this room. Someone in the CDIO network. A colleague back home. Name them if you can.

Activity 2: Planning your next steps

What will you do when you get back? Outline three concrete first steps for applying CDIO in your own context.

	Description of Activity	Where to access support, advice and information within CDIO
1		
2		
3		

Getting started with CDIO: a practical roadmap

- 1**
Determine the focus of your education development project
Are you going to develop your teaching activity at institutional, school, programme, or course level?
- 2**
Adopt CDIO as the context for your engineering education
(see CDIO Standard 1 – CDIO as Context)
Secure agreement and support from leadership at appropriate level
Bring those involved in development and delivery on board
- 3**
Specify the learner outcomes for the educational activity under development
(see CDIO Standard 2 – Learning Outcomes)
Refer to CDIO Syllabus; local / national standards; accreditation requirements; School strategies; employer feedback etc.
- 4**
Review the existing education activity to define the priorities for development
Benchmark your existing activity in three thematic areas: CURRICULUM; WORKSPACES; LEARNING, TEACHING & ASSESSMENT
Refer to CDIO Standards 3–8 and 11 – evaluate your current practice against the self-assessment rubrics
This will help you identify areas for development and enhancement
- 5**
Complete, implement and evaluate your education development
Use the CDIO Standards 3–18 and 11, the knowledge base and collaborator support to guide and inform your work
Refer to CDIO Standard 12 as you evaluate your development and plan further iterations