

The ‘New’ Normal of Business Education in a Post COVID Era: The CDIO Approach



Isam Zabalawi, Helene Kordahji, and Rola Mourdaa

Abstract With the resumption to normal life peering at the end of the tunnel, one cannot help but pause and ponder what the future of business education will look like in a post COVID world. Based on the evolution of the professional business context that goes beyond basic disciplinary knowledge, this chapter caters to the current and future needs of this discipline and presents an innovative framework and roadmap for Business schools to follow using the Conceive-Design-Implement-Operate (CDIO) adjusted Business Syllabus and applying standards that go hand in hand. Moreover, the chapter includes a Business Generic Management Curriculum that includes the required knowledge, skills, and attributes needed for successful business graduates.

Keywords Higher education · Innovation · Curriculum · Reform · Business programs · Business education · CDIO · Syllabus · Standards

1 Introduction

Since 2019, the pandemic has accelerated the speed of digital transformation in business schools across the world and within the Arab region. Business schools, overnight, turned to remote online teaching. Faculty and students had to quickly adapt to this new normal. Programs of study and pedagogies were modified to accommodate this sudden shift.

With the resumption to normal life peering at the end of the tunnel, one cannot help but pause and ponder what the future of business education will look like in a post COVID world. The contours of this world seem to be shaped by words like ‘agile’, ‘adaptable’, ‘resilient’, and ‘innovative’.

I. Zabalawi (✉) · H. Kordahji · R. Mourdaa
Australian University, West Mishref, 13015 Safat, Kuwait
e-mail: i.zabalawi@au.edu.kw

H. Kordahji
e-mail: h.kordahji@au.edu.kw

R. Mourdaa
e-mail: r.mourdaa@au.edu.kw

Business schools are now at a stage where their education is becoming more of a personalized journey characterized by flexibility, active pedagogy, digital transformation, and adaptability. These are the principles of Education 4.0.

The pandemic highlighted the challenges facing business schools. These range from shifting student demography, facilities, strategy, and governance to pedagogy, research, and partnerships. It also affected the mode of learning, assessment designs, deadlines, and academic integrity.

To tackle these challenges and the impact of the pandemic, innovative practices targeting reform are required across the business education sector. These include but are not limited to research, teaching and learning, governance, pedagogies, curriculum development and design, community and industry engagement, and student experiences.

Reforming a curriculum requires a paradigm change in a university's landscape. Innovation requires action and a recognized need for change. The process of innovating a curriculum requires universities to embrace an innovative culture. This means that the higher education sector cannot innovate its curricula without reforming its fundamental pillars as well. Expectations on program performance of those inside higher education should align with performance expectations of those outside these institutions. The elements of an innovative culture such as leadership, shared governance, comprehensive program design and evaluation, rewarding innovation, training faculty and staff, not imposing too many rules, and autonomy and accountability are critical in the reform process. These are important tools that can be used by Arab universities while re-thinking their curriculum.

Within the Arab region, business degrees are highly sought after. For instance, in 2017–2018, out of the 55,820 students enrolled in universities in Dubai, 24,463 were registered in business courses [1]. Graduates from business schools tend to work in different sectors and their impact is observed in several sectors. Due to the high demand for business education in the Arab region, this chapter will emphasize the importance of building innovative programs of study that meet the local and regional needs of the labor market.

Through this chapter, an innovative approach to reforming the curricula for business schools is presented using the Conceive-Design-Implement-Operate (CDIO) framework. Many engineering programs across the world have had success stories through the application of CDIO. However, outside engineering, the adoption of this model has been relatively modest. CDIO can be applied in different contexts including business programs. This model focuses on experiential learning, which implies learning through experience. A CDIO curriculum ensures that graduates are leaving their institutions ready for a post COVID world and geared with practical, professional, system thinking, and interpersonal skills including cognitive and disciplinary knowledge that will enable them to survive and adapt in a highly dynamic and agile work environment.

The guidelines presented will provide a flexible structure for business schools to leverage from. Its strength lies in its relevance to working life and closeness to industry while ensuring that the quality of education is not compromised. The CDIO syllabus provides a benchmark that will codify the principles for designing

programs and methods of learning to ensure students are being taught the right skills in these uncertain times. As such, this will assist universities in program evaluations and development cycles. To support this narrative, this chapter presents a complete CDIO syllabus for business studies and a case study of the Australian University in Kuwait that demonstrates the application of CDIO in the School of Business. Also, a four-year Business Generic Management Curriculum mapped to the CDIO syllabus is included. This chapter is divided into several sections that cover the evolution and context of business education as well as current challenges highlighted by COVID. CDIO Standards and Syllabus adapted to business majors are incorporated via an innovative curriculum. The chapter ends with recommendations and appendices.

2 Redefining Business Education

2.1 The Evolution of Business Education

There is a common misconception that the world's first business school was Wharton School of the University of Pennsylvania, which was founded in 1881 by Joseph Wharton.

However, the first business school is actually the Ecole Supérieure de Commerce de Paris, which was founded in France in 1819 by a circle of economists and traders including the famous economist Jean-Baptiste Say and the banker Vital Roux [2].

In the past, business programs were a type of vocational training where students learned skills to sell products [3]. During the times of industrial revolution in the nineteenth century, management theories started to evolve as a result of increased industrial development and the rise of labor work. By the end of the nineteenth century, management became a systemic field of study.

Because of the need to increase productivity and to compensate for the shortage in the supply of labor at the time, scientific management theories began to surface in the early twentieth century. These theories focused on doing time and motion studies per task/job at the factory level. Management theories kept progressing so that by 1949, organizational management principles and their universality became popular. These are still being taught to date [4].

The impact of the external environment meant that some of the classical theories were no longer suitable in the world of business. For instance, the principle of centralization, which over-emphasizes formal structures, was no longer applicable in every situation. In 1963, behavioral theories, which highlighted human relations and behavioral science theory, started to surface. As such, the focus shifted from the job to the worker who performed that job. This is where the element of human resources became a new component in business education.

As complexities in organizations increased, modern management theories started to develop. Management concepts progressed to become more knowledge-based, multidisciplinary, effective, and dynamic. This also led to further changes in the

context of business curriculum. Management became a multi-disciplinary area which considers the impact of psychological, sociological, behavioral, technical, and other sciences. In addition, students started to train in statistics, research, and problem solving [4].

Moving ahead and because of the current recession and technological advancements, the concept of entrepreneurship became a priority in governmental planning. Education institutions proceeded to embed the concept of entrepreneurship within their business study programs. As a result, the number of courses offered in entrepreneurship have increased over the past two decades. Business schools are also creating Entrepreneurship Centers which support innovative projects developed by students. In addition, business schools started to teach change management courses so that students can understand the dynamics of constantly changing environments [5].

In the twenty-first century, business education was dominated by innovation and marketing experts. Business schools began to incorporate courses in marketing, focusing on target markets, consumer behavior and product, and process innovation. Furthermore, technology started to be integrated within business studies instigating courses such as operations research, management information systems, digital marketing, data analysis, modeling, and simulation in the business curriculum.

Recently, the increase in awareness of environmental issues and sustainability in business practices has led some business schools to update their curricula to incorporate social responsibility courses and promote the use of sustainable business practices that make an impact.

2.2 Business Education Context

The context of business profession is integrated within other professions such as medicine and health, education, commerce, engineering, industries, services, and in public and private organizations and establishments. Therefore, business education plays a vital role in the socio-economic growth and development of any nation. In a fast-changing era, business professionals require certain and specific graduate traits that are centered around creativity, adaptability, in-depth business knowledge, and management skills with an entrepreneurial spirit.

In addition, graduates are expected to be well versed in business research, review, benchmarking, strategic thinking, in addition to strategic planning, flat organization, and pattern recognition. There is also an expectation that business graduates should be socially, ethically, and environmentally aware individuals.

Nowadays, business professionals are required to possess an entrepreneurial mindset marked by communication skills, passion, leadership, accountability, dedication, and sacrifice. They need to have the right amount of curiosity to venture into new opportunities while being agile, team-oriented, and possess a risk mitigating mindset.

2.3 Challenges Facing Business Education Highlighted by COVID

Moving forward, 'uncertainty' is a term resonating within the business education landscape since the start of the pandemic. Business schools have had to re-strategize to consider the challenges imposed upon them by the pandemic and design solutions to move forward.

Learning goals have shifted. Business schools must ask themselves whether they are doing a good job in preparing students for a complex workforce. They must also consider the impact of the pandemic and reimagine organizations and labor market needs post COVID19.

Business education in universities is expected to produce 'the leaders of tomorrow' with competencies centered around critical thinking, adaptability, agility, teamwork, knowledge of the marketplace, and transparency. These skills reflect the changing needs of the workforce and society. Most importantly, these are the shared skills of great business managers and leaders.

As economies are becoming more volatile, the industry is looking for agile and adaptable business graduates. Business schools play a critical role in ensuring they keep supplying the next generation of talented managers who will meet the challenges facing organizations in the twenty-first century.

We must ask ourselves whether current business programs are relevant in a post COVID future. What is clear is that profound change is eminent. The next few paragraphs will highlight some of the major problems facing business schools today which have been exacerbated by the pandemic.

2.3.1 Shifting Student Demography

The student population is shifting away from the traditional 18-year-old heading off to university to students who are older and possessing lower income [6].

There seems to be a continual drop in domestic college-age population paralleled with an increase in diversity, more non-traditional students, less international students, and adjustments in the current Gen Z population [7]. To put it into perspective, in the United States of America, nearly half of those entering post-secondary education are over 25 years old and nearly half of those work at least 30 h a week [8]. Within the Arab region, there is a similar occurrence in the influx of older students pursuing education.

These older students are commonly referred to as non-traditional. A non-traditional student is defined as any student who is 25 years of age or older according to Hittepole of the University of Denver [9]. Non-traditional students are on their way to becoming the new majority amongst college-going students. However, despite their growing presence in higher education institutions, many universities and colleges do not have services that cater to their needs. Services are still designed to cater mainly to younger traditional students.

The youth-centric collegiate culture could at times serve as a barrier for non-traditional students to engage in post-secondary education. Since their presence on campus is projected to continue to grow as academic requirements for job qualifications is on the rise, ignoring this section of student diversity will have economic and social ramifications [10].

The pandemic has also augmented the influx of mature students returning to universities as more people are thinking about lifelong learning and relearning [11]. The one size fits all model is no longer viable. Competency-based models are now considered attractive alternatives to the traditional credit hour model for non-traditional students. Such models focus on whether students are learning the necessary skills rather than measuring how many credit hours were completed [12]. In addition, competency-based learning rewards prior experience.

Lifelong learning is becoming a permanent part of the workers' professional lives; in turn, educators should develop the necessary infrastructure to support lifelong learning [12]. The increase in the demand to learn will affect how the landscape of business education will innovate itself.

2.3.2 School of Business Facilities

Business schools cannot innovate their curricula if they do not have the appropriate facilities within the universities. Findings from a study conducted by Elliot and Healy [13] found that student centeredness, campus climate, and institutional effectiveness have a strong impact on how satisfied students are with their educational experience.

Higher education resources are categorized by campuses, facilities, human resources, curriculum, and students. Expenditures on campuses and facilities is the second largest cost item after salaries in higher education [14]. The physical environment of a university plays an important role in its approach to innovation. The changing needs of the business environment including globalization and wide use of technology coupled with the different modes of delivering education means that business programs should consider how their facilities foster innovation.

Demonstrating innovation mastery requires universities to have the supporting infrastructure and technology. Campus design is considered a prime catalyst for transforming universities into becoming the societies' engines of growth [15]. As an illustration, some campus facilities have been designed with the intention to expose students to people and ideas that are different to what they are used to [16]. In addition, universities should gear their facilities and infrastructure for an environment that is based on building competency development skills. This is known as the Learning Factory Concept. To this end, training facilities and the learning environment should allow students to learn and train in a realistic manufacturing environment by bringing it closer to industrial practice [17]. The sudden shift to emergency remote teaching during the pandemic showcased the importance of developing the universities' facilities to accommodate any type of change in the modes of learning.

In the past, facilities were considered single-use buildings on campus. Today, the boundaries are blurring. For instance, a residence hall might include classrooms and

a coffee shop while an academic building might house a variety of units and projects [18]. Schools of business halls can include screens open to international markets.

University facilities are consumables and with time they require maintenance, replacements, or upgrades. Often, the scarcity of university funds affects the budget allocated to facilities. In addition, facilities management departments in universities were not designed with technological integration in mind. Such change requires the lines between information technology and facilities to blur as technology becomes integrated within the campus. Universities should adjust their structure and goals to ensure they are crafting the right policies to foster these integrations [18].

Vidalakis et al. [14] argue that the value of higher education facilities depends on the organizational objectives and needs; hence, the dynamic relationship relies on the changes in the education sector, teaching and learning methods, and students' expectations. They stress that the role of facilities should be part of the university strategy and culture. By providing faculty and students with the necessary infrastructure that form the basis for the university's functions, facilities become the pillar for achieving the goals of the university [19].

In parallel, high-quality facilities have a major impact on the learning process. They can influence the students' decision when selecting a university and can damage or reduce student motivation [19].

When attempting to invest in facilities, business schools should have clear objectives as to what they want their infrastructure to achieve. The benefits of such investments should be clearly mapped with the university's strategic objectives. Because many universities have limited funds to invest in facilities, cost-benefit analysis exercises should be a priority.

2.3.3 The University Strategy and Governance Model

Business schools do not exist in a vacuum. They cannot progress if the university-at large does not have a clear mission which emphasizes the importance of innovation.

Business schools should move toward embedding innovation within their strategic planning by focusing on several key areas. The first area should be directing more funds into research and development (R&D). Sub-par investment in R&D is associated with a decline in innovation.

To ensure business schools are key players in innovation, they should endeavor to collaborate closely with the industry and government sectors. Once collaboration is established and managed in areas of research, innovation, and education, it can increase the capacity to exchange knowledge between the industry and the higher education sectors. An example of a successful collaboration between the higher education sector and industry is the 'Faculty for Factory' initiative, which was launched by the University of Jordan in 2003, to tap the potential of applied scientific research in improving the productivity and competitiveness of industry. The program has become a national success and an effective tool to link industrial companies to academic institutions [20].

In terms of university governance, progressive and collaborative leadership must be at the forefront of reforms. Embracing effective and shared leadership amongst faculty and executives will allow universities to change their classic management styles into more innovative pathways.

Canals [21] explains that there are several layers of governance that business schools must consider. The first is the relationship between the university's executive governing body and the school of business itself which is often impacted by the lack of strategic and financial autonomy. The second layer of governance is around issues surrounding accountability and the powers of the dean and senior executives in the school where they do not seem to be clearly defined. Thirdly, the important role that faculty can play in strategic planning, curriculum design and decision making are often not capitalized on and overlooked.

2.3.4 Pedagogical Approaches

In addition, the pedagogical approach of business schools must support innovative practices such as research based learning, case studies, and project based learning. Universities should develop a pedagogy that serves to transfer practical knowledge and develop relevant skills that support entrepreneurs. Students' learning experiences should aim to foster an entrepreneurship mindset. Such teaching methodologies ensure graduates are equipped with critical and system thinking skills, problem solving abilities, strong communication, teamwork, agility, analytical and systematic skills, and interpersonal skills. As such, universities are stimulating innovation and preparing their graduates for increasingly innovative working environments. Graduates will also acquire skills that will enable them to become in-demand within the industry and highly sought after.

2.3.5 Relevant Academic Research

Academic research needs to be targeted and aligned with the needs of the industry and stakeholders. There seems to be a gap between business research and teaching. Academic research often fails to consider its application in real-world as it lacks practical elements [22].

A study of over 1600 business and management authors reflected a gap between working professionals and academics in their choice of research. Professionals preferred to publish in outlets that value practical relevance while academics favored journals with high impact factor. Furthermore, the results of the survey revealed that 76% of academics had the luxury to engage with working professionals for their research but only 36% felt incentivized to do so [23].

Some of the most useful management ideas such as lean manufacturing and global supply chain have emerged out of business practice and later have been redefined in business school research [21]. Researchers in business schools need to consider

the needs of practicing managers in their research and aim to find solutions to their problems.

2.3.6 Faculty Readiness

With the evolving needs of business education, faculty readiness and adaptability have become paramount. Derkach [24] identified independence and critical thinking, active participation in solving socially important problems, and development of creative abilities as pre-requisites for the readiness to conduct innovative work.

Faculty readiness requires motivation to overcome difficulties and minimize resistance. There are certain elements of structural readiness that are essential for faculty to conduct their work. They are centered around the five pillars of readiness: psychological, scientific, theoretical, practical, and physical [25]. Once these pillars are incorporated within the training structure of a university, faculty readiness can be augmented.

Innovation within business schools requires faculty readiness to shift from the standard methods of teaching toward content and technological change that is more efficient and effective. Professional training programs must aim to develop not only skills, but also positive attitudes and mindsets geared toward innovation. Recruiting faculty with industry experience can enhance the process of teaching and learning. With the proper level of faculty development, readiness for innovation can be attained.

2.3.7 Importance of Innovative Partnership

Innovative partnerships on a local and international level can contribute to building the reputation of business schools. Partnerships are essential in the context of innovation. Business schools must take advantage of local, regional, and international institutions to spur collaborations that have an impact. These partnerships are a two-way stream in terms of benefits. They facilitate research and activities dedicated to solving real world problems while at the same time the advancements of knowledge make the industry more competitive. Such collaborations also ensure that graduates are equipped with in-demand skills.

Partnerships, however, require an ecosystem to develop. On the internal front, the universities' strategies and policies must be geared toward building partnerships. This should be supported with the right governance models and organizational units.

For partnerships to succeed, critical factors must be present, such as, clear communication of expectations between partners, synergy to ensure stakeholders are treated fairly and equally, impact evaluation to measure the effectiveness of the partnership, and clear measurable objectives and transparency to ensure accountability. Financial commitments that ensure continued sponsorship of endeavors should be defined at the beginning of an agreement.

2.3.8 University Degrees Versus Professional Certificates

There has been an ongoing debate as to whether academic degrees should be supplemented by industry-related certificates to better prepare students for the job market. One form of degree is not meant to exclude the other. However, evidence is pointing to the fact that certain jobs now require graduates to combine their degree with a quality certification. In fact, many universities and colleges now offer industry certifications and independent credentials alongside their degrees. This way the student will benefit from attaining specialized certified skills in addition to their program of study. Such strategies are important for the graduates' success and continuation in a workforce that is rapidly changing.

The concept of corporate universities is proliferating in all sectors such as banking, pharmaceuticals, and the food industry. For instance, the food chain McDonald's launched its own university 'McDonald's Hamburger University', which trains students in restaurant management skills and has over 275,000 graduates [26]. Within the Gulf region, the Kuwait Foundation for the Advancement of Sciences has launched its 'KFAS Academy'. The Academy provides an array of higher education courses for students interested in pursuing self-learning. This has posed a direct challenge to local universities where students might select international universities in a local setting. It is also critical to highlight the important role that specialized certifications play in the workforce where at times a certified specialist without a bachelor's degree could be more appealing to employers than a university graduate with academic qualifications only. For this reason, many tertiary education institutions are now linking with professional associations so that students graduate with a qualification and professional certification.

A study by Marquardson and Elnoshokaty [27] investigated the cybersecurity entry level job offerings and found that 60% required college degrees and the rest professional certificates. This is a strong illustration on how job market requirements may be shifting away from demanding academic degrees and where advanced studies are being replaced by practical professional certificates.

Recently, companies such as Google, Apple, and Oracle have dropped the college degree requirement, and instead emphasize work experience and specific skills [28].

It is important to highlight that the competition between university degrees and professional certificates varies amongst disciplines. This requires business programs to be innovative in their strategy, pedagogical design, and decisions as they integrate certifications with academic programs to enable students to seek both. Business schools should consider including courses that prepare students for professional certificates such as CFA, CMA, CPA, PMP, and many more.

2.3.9 Disruptive Technologies

The sudden outbreak of the COVID-19 pandemic required business schools around the world to invest in different types of technologies to support all their activities including teaching and learning, administrative and management units, research,

and infrastructure. Disruptive technologies are creating challenges for universities. According to Flavin [29], disruptive technologies are defined as those that disrupt established practices, often starting with a small number of users, but growing over time to the extent that they displace a previously dominant, incumbent technology.

Technologies adopted by business schools are mainly used for e-learning and assessment purposes; however, both students and faculty rely on other disruptive technologies like Google, YouTube, social media, and Wikipedia to support their teaching and learning inside the classrooms.

Disruptive technologies created new routes to knowledge which are convenient, accessible, and often free. This poses a challenge for universities when they monitor the quality of learning. Therefore, it is important to clearly understand how students use and experience e-learning/technology in their learning activities as this is essential for the development of tools, pedagogy, and teaching practices. In general, students use technologies in their learning to research, attend classes, submit assessments, and communicate.

Disruptive technologies are affecting the way business schools design their operations and as such, the following principles of education technology need to be considered:

- The environment surrounding students, since they are now learning in complex and dynamic environments that rely on the usage of technology;
- The usability of technology and its ability to adapt to the changing needs of the business programs;
- The accessibility of knowledge;
- Teaching and learning strategies that rely on a variety of technologies; and
- The institutional infrastructure should support the design and implementation of technology.

2.3.10 Forms of Learning

With the rapid development of technologies, new trends in teaching and the emergence of diverse learning tools and environments, business education should endeavor to adopt the three forms of learning: (1) formal learning, which is the traditional type based on classroom offerings and textbook knowledge (with certification); (2) non-formal learning that is based outside the classroom (no certification); and (3) informal learning that is derived from unofficial sources of knowledge.

The growing impact of informal learning is diminishing the value of systematic formal learning. Marsick [30] states that although informal learning is defined in contrast to formal learning, they are intertwined as they both impart and augment knowledge and skills. Illeris [31] identified five main learning approaches: everyday learning; school and educational learning; workplace learning; interest-based learning; and net-based learning.

Business schools need to embrace different learning styles within their pedagogical design. International organizations like UNESCO, OECD, and others have been

researching and shedding light on the importance of life-long learning and the recognition of non-formal and informal learning. Large corporations around the world have also stressed the importance of learning outside the formal structure. This represents a challenge for business programs as they need to embed informal learning within their systems.

Given a generation of students with unique personality profiles and different learning styles, business schools are faced with the challenge of going beyond the textbook to innovate creative educational learning that is designed to meet the individual needs of students while meeting job and social requirements.

3 Understanding Innovation Within the Context of Business Education

3.1 Positioning Innovation

In general terms, innovation is defined as the introduction of new ideas, a new way of thinking, new products, or transformational change in the way things are done.

Innovation as it currently stands can be classified into three broad categories: disruptive innovation, sustaining innovation, and efficiency innovation. Disruptive innovation is concerned with a new way of doing things. On the other hand, sustaining innovation is built around the practice of doing something that is already being done but in a better way. Efficiency innovation is about doing more for less. As nations continue to transition into knowledge-based economies while accommodating the needs of Society 5.0, all categories of innovation become critical for economic growth.

Within the context of business education, many simply correlate innovations with technology, robotics, and artificial intelligence. According to OECD [32], innovation in education is defined as a significant change in selected educational practices. The context for successful innovation requires an interconnection between national/regional and institutional factors, with the adoption of a horizontal and vertical approach. Innovation in business education means ‘doing new things’ and ‘doing existing things better’.

Diffusing a culture of innovation within business schools is no easy undertaking as it affects the higher education institution at large. Higher education systems are known to be rigid in management. The process of innovation requires universities to think of new ways of doing things instead of the traditional methods. Universities have been referred to as ‘dinosaurs’ and the staff as ‘men in their ivory towers’ [33]. The innovation process for business programs touches every aspect of the higher education institution and this includes its leadership, programs of study, infrastructure, faculty and students, community involvement, research, and knowledge. Even though universities are experts in teaching management methodologies, university

managers are not trained in innovation practices as in most cases they are promoted academics [34].

Entrepreneurship and innovation are leading economies with a focus on small and medium enterprises. Business schools need to shift their focus to teach leadership skills rather than simply teach the basic knowledge.

3.2 Culture of Change and Innovation Factors

One of the many lessons learnt from the pandemic is the importance of embracing change and being innovative. This is of particular importance in the education sector. Brennan et al. [34] explained that three main elements centered around components, relationships, and functions impact the success of innovation. At the components level, direct and indirect individual and institutional actors are influenced by innovation. At the relationships level, cooperation, networking, and increased mobility are crucial. While at the functions level, the impact is observed on the education function as well as the research and engagement functions.

Innovation is about creating a culture of change where every member of the university is part of the change process. It represents a significant shift in the mindset of the university community as members must endeavor to move away from their comfort zone and break into new experiences.

Embedding innovation within business programs of study is a process that begins when the university builds the right conditions that foster innovation. Seven factors have been identified, that if used properly can catalyze, enable, and sustain an effective innovation culture. They are leadership, communication, resource allocation, capacity, structure and process, learning agenda, and policy environment. These seven factors are dynamic and interactive. First, university leadership must recognize the problems hindering innovation and find creative solutions. In addition, they should acquire a clear vision with a roadmap. Leaders must ask the hard questions and the 'so what questions' that often arise in the process of innovation. Within this context, it is very important that the leadership provides the space for the team to try new approaches and embrace the learning experience that comes with failure. As for communication, the university leaders should be clear, transparent, and avoid ambiguity as they embark on change. They should have clear objectives of desired innovation outcomes so that targets are clear for the faculty and all those involved. Most importantly, university leaders should champion engagement of stakeholders by opening a two-way dialogue with faculty and staff. With regards to resource allocation, professional development opportunities should be invested in to promote the teams' skills. Even though many universities suffer from insufficient funds, the allocation of dedicated resources and financial funds for innovation is important. Capacity entails adopting a growth mindset where all team members of the university regardless of their rank are important for the success of innovation. The university must have the needed capacity to instill innovation as well as the correct structures and processes. Universities must develop clear processes for how innovation will

be promoted and supported. Design loops and prototyping can enhance innovation opportunities. On the learning agenda, change leaders should be able to pilot small-scale version of change concepts over a short period of time before moving forward. They must also devise new indicators different from the old processes with clear metrics based on continual improvement cycles. Leaders should work toward creating a policy environment that promotes and rewards innovative behaviors [35].

According to Brennan et al. [34] policy recommendations on innovation should be clustered around three central themes. The first is related to the changing landscape of teaching and learning in higher education; this is done by establishing a regulatory framework that addresses the hindrances facing online learning. The second policy recommendation is related to technology and student performance, where policy makers should consider the need to clarify the funding implication and outcomes for innovation, as well as collect and analyze feedback from all stakeholders. The third policy recommendation is related to globalization and internationalization strategies, where higher education institutions should develop international strategies and provide support for the mobility of students.

4 The Innovative Business Curriculum

Designing and redesigning curriculum has evolved into a topic of considerable debate [36]. It involves conflicting perspectives among policy makers, experts, stakeholders, and society at large.

First and foremost, the definition of a curriculum needs to be clarified. There are varied definitions of curriculum. For some, curriculum means the way educational content is organized and presented in the classroom to meet different learning needs [37]. However, given the changing landscape of the higher education sector and the high pace of development occurring worldwide, curriculum cannot be viewed within a narrow lens as the simple conveyer of knowledge. Therefore, for the purposes of this chapter, the curriculum is viewed as a political and social agreement that reflects a society's vision while considering local, national and global needs, and expectations [36].

Students are now more autonomous in their learning process and self-determined. An innovative business curriculum engages students and faculty in interdisciplinary education that is based on inspiring creativity, as well as analytical and critical thinking in an experiential learning environment.

Modernizing and innovating business programs of study is not a straightforward process. It must be built on past reviews and be future-oriented. As stated in the earlier sections, it is a process that begins with transforming the university's vision and mission. In this case, the university will be reforming its paradigm from a teacher-centered model into a learning-oriented one. With that said, this approach puts students at the forefront of the learning process where they are the drivers of their knowledge.

When discussing curriculum reform, it cannot be done without a proper understanding of UNESCO's pillars of learning. Central to innovation is learning how to learn; therefore, education should be holistic and cover not only knowledge (Learning to Know), but also skills (Learning to Do), engagement (Learning to Live Together), and awareness (Learning to Be). Universities, in addition to their roles in research and education, must remain the "guarantors of universal values and cultural heritage" [38]. At a later stage, a fifth pillar, Learning to Transform Oneself and Society and a six pillar, Learning to Get Employed, were added.

5 Design of the Business Innovative Curriculum Structures and Content

Three key words should guide the design of an innovative business curriculum: intent, implementation, and impact.

Business schools must ask themselves what they are trying to achieve through the redesign of the curriculum (*intent*). They must also create a clear pathway that demonstrates how the intent of the curriculum will be achieved (*implementation*). Finally, they need to have a quality assurance framework based on continuous monitoring, evaluation, and improvement so that they can measure the impact of the curriculum (*impact*).

Before delving into the canvas of the innovative business curriculum, it is important to highlight the seven pillars of teaching and learning [39], which act as the basis of any innovative curriculum design. They are as follow:

1. Create an engaging, motivating, and intellectually stimulating learning experience.
2. Encourage the spirit of critical inquiry and creative innovation informed by current research.
3. Emphasize the importance, relevance, and integration of theory and knowledge with professional practice to develop solutions to real world issues.
4. Provide learning experiences that develop inter-culturally capable graduates who can make a difference as socially and ethically responsible global citizens.
5. Value and recognize individual and cultural diversity through the provision of an inclusive context of support and respect for all students.
6. Enhance student engagement and learning through effective curriculum design, pedagogy, and assessment strategies.
7. Continuously improve teaching practice through academic staff professional development and critical reflection informed by a range of evaluation approaches.

Business Innovative Curriculum Framework

For the purposes of this chapter, a comprehensive innovative curriculum roadmap has been designed which could be used by business schools when they intend to reform

their programs of study. It is an integrated framework based on six components that is intended to be dynamic and interactive. It allows users to use each component independently and create tasks from within them.

Each block contains overarching guiding content that can direct the process of thinking. It can be used to design/redesign a course, project, assessment or assignment, or an entire business curriculum. The components are as follow:

(a) **Stakeholders**

This category is very broad. It is defined by anyone who is affected by the design of the curriculum. Students, faculty, chairs, deans, administrative staff, industry experts, research leaders, and government officials are all stakeholders. They can even be categorized into internal stakeholders (those from within the university) and external stakeholders (from outside the university). The important step here is to identify what is the role of each stakeholder and what kind of feedback is required from them. Of course, different stakeholders will play different roles within this process; therefore, this needs to be clarified from the beginning of the planning process. Clear communication is key here.

(b) **Leadership**

The university needs to identify who will lead and champion these changes. Identifying leaders is not restricted from within the university's executive management. They can assign faculty from within departments, experts from the field, and/or external consultants. Often, change is not easy and managing this process along with expectations requires agility and adaptably. Universities should select leaders who are able to navigate change and diffuse tensions that can arise.

(c) **Program and Course Design**

As stated earlier, this framework can be used to design any type of course, program at a large or just assessments, assignments, and student activities. Business schools must be clear on the desired and intended outcomes they want the curriculum to achieve. They should also have an insight into the desired impact and how this will be measured. All the planning should be geared toward creating a student-centered environment with facilities that allow students to be the champions of their learning process. With the changing demographics and the increasing proportion of older students, a flexible learning environment should be created. In addition, it is critical that technology and research-based learning is infused into the curriculum.

(d) **Resources**

At this stage of the planning, business schools must identify the required resources through manpower planning with clear job descriptions. In addition, all the financial, facilities and infrastructure implications should be identified and mapped. Policies and procedures are also part of this process where they can be drafted/reviewed to ensure they are meeting the needs of the university.

(e) **Limitations**

No matter how thorough the planning is, constraints and limitations are part of this process. Highlighting them and working to mitigate them will provide

business schools with the space to navigate boundaries through innovative measures.

(f) **Quality Assurance**

An overarching quality assurance cycle based on the principles of plan-do-check-improve needs to be in place with this framework. Quality assurance should be guided by two fundamental questions:

- Are we doing the right things?
- Are we doing these things in the right way?

As such, developing a continuous cycle of support, development, and improvement will ensure that the innovative curriculum is setting out to achieve its intended purpose while maintaining and meeting the legislative, regulatory, industry, and university requirements. The framework is depicted in Fig. 1.

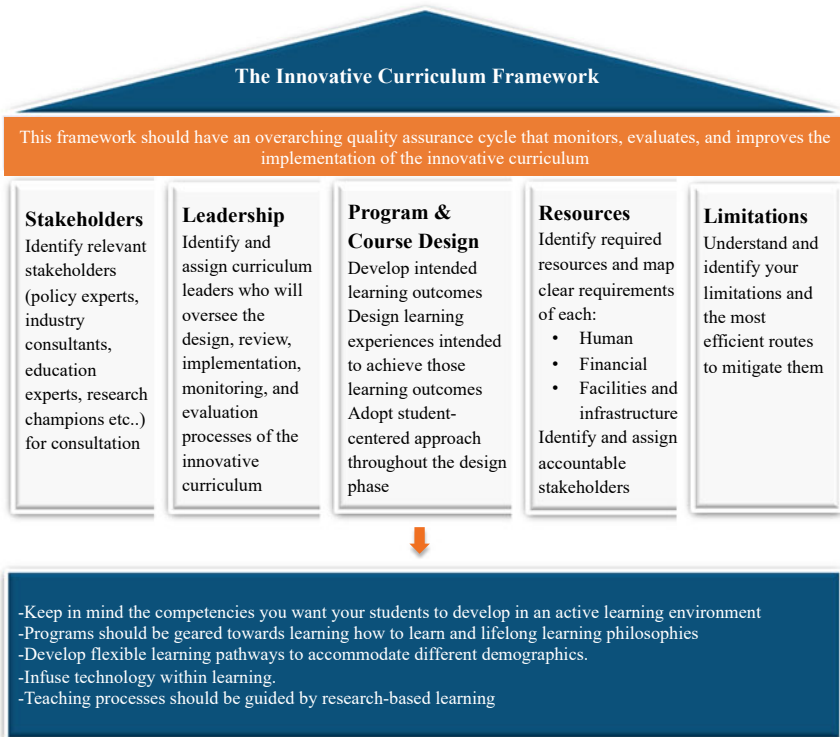


Fig. 1 Innovative curriculum framework

6 Adoption of the CDIO Model

6.1 CDIO Background

The following sections will provide a pathway for innovating business programs in particular the learning outcomes and syllabus that should be used in conjunction with the Innovative Curriculum Framework, which was detailed in Sect. 5.

Throughout much of the twentieth century, engineering programs offered students hands-on practice. As the century progressed, scientific and technical knowledge expanded rapidly while engineering education evolved into the teaching of engineering science. Teaching engineering practice was increasingly de-emphasized. As a result, the industry in recent years observed graduating students that were technically adept but lacked many abilities required in the real-world of engineering situations. Consequently, major companies created lists of abilities they wanted their engineers to possess [40].

The Accreditation Board for Engineering and Technology (ABET) was founded in 1932 to encourage schools to meet real world needs and rethink their educational strategies while listing expectations for graduating engineers. In the late 1990s and still faced with the gap between scientific and practical engineering demands, the Massachusetts Institute of Technology along with three Swedish universities proceeded to reform engineering education. The result of the endeavor was the worldwide Conceive-Design-Implement-Operate (CDIO) initiative [40].

6.2 CDIO Initiative, Standards and Syllabus

This initiative focuses on building programs of study centered around active and experiential learning experiences for students such as project-based learning, problem-based learning and research-based learning, multidisciplinary knowledge, and specific learning outcomes. The learning process is engaging and is set in classrooms as well as modern learning laboratories and workspaces. The teaching and learning process is constantly improved through robust assessment and evaluation processes [41].

The *Conceive* part relates to the needs of the customer, technology, enterprise strategy, and regulations, in addition to conceptual, technical, and business plans. It allows students to understand business problems and synthesize a solution. The *Design* part is concerned with taking the conceptual idea and converting it into a practical solution. It is based on plans, drawings, and algorithms that describe what will be implemented. In *Implement*, the student transforms the design into a product, process or system including manufacturing, coding, testing and validation. As for *Operate*, the student must demonstrate how the physical solution resolves the problem or challenge by delivering the intended value, including maintaining, evolving, and retiring the system.

The first tangible outcome of the CDIO initiative is the CDIO standards and syllabus which is a codification of contemporary engineering knowledge, skills, and attitudes [42, 43]. The objectives of the syllabus are to create clear, complete, and consistent set of goals for engineering education in sufficient detail that they could be understood and implemented by engineering faculty [44].

The CDIO Initiative developed 12 standards which address program philosophy (Standard 1), curriculum development (Standards 2, 3 and 4), design-implement experiences and workspaces (Standards 5 and 6), methods of teaching and learning (Standards 7 and 8), faculty development (Standards 9 and 10), and assessment and evaluation (Standards 11 and 12) [45].

CDIO standards include:

- The adoption of the principle that product, process, and system lifecycle development and deployment are the context for engineering education.
- Specific, detailed learning outcomes for personal and interpersonal skills, and professional competencies consistent with program goals and validated by program stakeholders.
- A curriculum designed to integrate personal and interpersonal skills, as well as product, process, and system building skills.
- An introductory course that provides the framework for engineering practice as part of the curriculum.
- The participation of students in two or more design-implement experiences at various levels.
- workspaces and other learning environments that support hands-on learning are
- fundamental resources for learning to design, implement, and operate products, processes, and systems;
- An environment for the integrated nature of the learning process (training, real practice).
- Teaching and learning based on active experiential learning methods.
- Enhancement of faculty competence in CDIO implementation.
- A students' assessment system focusing not only on the acquisition of disciplinary knowledge, but also on the evaluation of their ability to create new products, processes, and systems [41].

The 12 standards are listed in Sect. 7.1.

The strength of the CDIO syllabus is that it is adaptable across all engineering schools. The level of detail provided in the syllabus creates the basis for curricular and assessment planning in engineering education.

Most importantly, the CDIO syllabus is used as a reference to derive specific learning outcomes in engineering education and classifies learning outcomes into four high level categories [43, 44]:

1. Disciplinary Knowledge and Reasoning
2. Personal and Professional Skills and Attributes
3. Interpersonal Skills: Teamwork and Communication

4. Conceiving, Designing, Implementing and Operating Systems in the Enterprise, Societal and Environmental Context: The Innovation Process.

Recently CDIO released their extended syllabus which includes Leadership and Entrepreneurship. Modifications on innovation, invention, internationalization, and sustainability were incorporated into the revised version [41].

6.3 *CDIO Initiative and Business Education*

There is no reason why CDIO cannot be applied in other disciplines. As an illustration, Singapore Polytechnic adapted the CDIO framework into institution-wide initiatives including non-engineering programs such as business, music, and information communication programs. They were able to customize the graduate attributes for their own fields including specific learning outcomes for each course (Standard 2). Once they identified the graduate's attributes, they proceeded to develop the relevant student skills that ranged from communication and teamwork to creative, innovative and enterprise skills. Students were able to work in multidisciplinary teams to draw insights and create prototype solutions. The Design thinking method was adopted to conceive and design new products and services [46].

With the increased competition from traditional and non-traditional higher education institutions as well as the pressing need to improve curriculum design that meets the needs of different stakeholders and improves the quality of business education, many business schools should start considering the CDIO approach to education.

According to Crawley et al. [47], CDIO can be applied to non-engineering programs by:

- Developing a description of the profession's context of practice as a starting point (CDIO Standard 1)
- Working with stakeholders to identify their requirements for the graduates (CDIO Standard 2)
- Adapting pedagogical and curricular elements of CDIO to the discipline's needs (CDIO Standards 3–11)
- Applying the CDIO curriculum development and quality assurance processes (CDIO Standard 12)

One of the main roles of business programs is to produce innovative thinkers with multidisciplinary perspectives. Business programs should ensure students are able to keep learning even after they finish their studies, have strong in-depth knowledge, and have solid communication skills. These three requirements are in essence what the CDIO initiative is geared towards.

The main advantage of the CDIO is that it uses a systematic thinking approach that leads to product/business development. It also provides practical hands-on experience that allows students to implement theory in practice, which is a job market requirement. The relevance of this model is that it is based on active learning where students

take charge of their learning, and the instructor takes on the role of a facilitator and mentor.

Through active learning, students are more engaged as they learn to critically think, solve problems, and make decisions. They are given the opportunity to apply their knowledge to make room for a deeper understanding of concepts and retention of information. Project-based learning (PBL) is a good example of active learning that allows students to develop a set of competencies that are needed in the job market.

Furthermore, the CDIO approach offers practices that guarantee clear and measurable assessments for the learning outcomes. The model adopts various assessment tools like projects, portfolios, and reflective exercises that focus on creativity and measuring of skills beyond basic knowledge.

7 Modified CDIO Standards and Syllabus for Business Education

Adopting the CDIO Initiative into business education provides the required roadmap for innovation especially as it covers four main pillars related to disciplinary knowledge, personal and professional attributes, interpersonal skills, and social context.

The CDIO standards and syllabus tackle three fundamental questions in curriculum redesign: *why*, *what* and *how*. By asking the “why” question, universities will be able to redesign their business programs to ensure they graduate professionals who understand how to Conceive-Design-Implement-Operate complex business products, processes, and systems in a modern team-based environment. The “what” question targets the knowledge, skills, and attitudes students should possess as they graduate from university. In the CDIO context the answer includes disciplinary knowledge, personal, professional and interpersonal skills, and the knowledge of how to conceive, design, implement and operate products, systems and services. As for the “how” question, it is concerned with the way a program of study will ensure students learn the necessary CDIO skills. This is done by implementing an integrated curriculum with clear learning outcomes and assessments, developing innovative teaching and learning methodologies, and enhancing faculty competence and learning workspaces.

This section demonstrates how CDIO standards and syllabus can be adapted to business majors. It covers the overall set of knowledge, skills, and attitudes required from business graduates.

The following table outlines the CDIO standards contextualized to Generic Business Standards. It outlines a framework for improving curriculum design for Business Schools. It also showcases the Australian University in Kuwait (AU) College of Business experience as a case study. In addition, a detailed mapping of the CDIO curriculum developed by AU’s College of Business- Management Program is presented in Appendix 1.

7.1 CDIO Standards—Adjusted to Business Major

CDIO standards	Generalized business CDIO standards	AU as case study
1. The context	<u>The context:</u> Providing students with business knowledge accompanied by hands-on learning opportunities, industry engagement, social impact and dedication to professional practice studies	College of Business Vision: To produce business graduates who are capable of developing into effective managers that contribute to the success of any organization that employs them, and to the economic development and welfare of Kuwait or the country in which they work
2. Learning outcomes	<u>Learning outcomes</u> A. Demonstrate an understanding of the importance of ethics and the legal environment of contemporary business B. Explain the major concepts in the functional areas of accounting and finance, HR, Marketing, MIS, Corporate Governance and Management and entrepreneurship C. Use quantitative and qualitative skills to facilitate management decision making and/or problem-solving D. Evaluate human behavior and possess high level of Emotional Intelligence E. Evaluate the economic environments of businesses F. Apply knowledge of business concepts and functions in an integrated manner G. Apply academic knowledge in a professional setting H. Obtain through electives in-depth knowledge and understanding in more specific related areas, yet wider perspective I. Research a topic, develop an argument and organize supporting details J. Develop proficiency in business communication—oral, written, and non-verbal K. Develop business/ product plans	AU developed learning outcomes for its College of Business majors (Marketing, Management and HR—both at Diploma and Bachelor levels) under the following graduate attributes <ul style="list-style-type: none"> • Professional behaviors • Communication and teamwork skills • Critical thinking • Entrepreneurial skills • Planning and organizational skills
3. Integrated curriculum	<u>Integrated curriculum:</u> that is designed with interdisciplinary subjects, with an explicit plan to integrate personal and professional skills and attributes, interpersonal skills, and professional competence	AU developed a curriculum that includes electives, PBL, internships, entrepreneurship, and Business Integration final project
4. Introduction to engineering	<u>Introductory course:</u> that provides the framework for professional practice, and introduces essential personal and interpersonal skills	Introduction of courses on subdisciplines (Management, Marketing, Accounting, Economic etc.). Courses on business communication that are also integrated in all the other courses
5. Design-implement experiences	<u>Professional practice experiences:</u> that provides corporate internship opportunities	Internship opportunities, entrepreneurial competitions with local and regional institutions that foster the entrepreneurial application at young age
6. Integrated learning experiences	<u>Integrated learning experiences:</u> that lead to the acquisition of disciplinary knowledge, as well as personal and interpersonal skills, and professional competence	Event management course based on PBL that requires the plan and execution management of an event from A to Z
7. Learning Assessment	<u>Learning assessment:</u> that target personal and interpersonal skills, and professional competence, as well as in applied disciplinary knowledge	Traditional assessments coupled with oral, job -shadows, evaluations, portfolios, and project presentation

(continued)

(continued)

CDIO standards	Generalized business CDIO standards	AU as case study
8. Engineering workspaces	<u>Workspaces for professional practice</u> : that include workspaces and laboratories that support and encourage experiencing professional practice, disciplinary knowledge, and social learning; ex: stock market simulation	Computer labs, plan for banking and stock market simulations
9. Active learning	<u>Active learning</u> : through applying student center teaching pedagogies and engaging activities	Courses include engagement activities like field visits, gaming, competitions, role play, peer review, debating, case-based learning, PBL etc
10. Enhancement of faculty competence	<u>Professional development</u> : that enhances faculty competence in personal and interpersonal skills, as well as professional competence	Provision of in-house technical professional developments, participation in discipline-related conferences, and collaboration with local institutions for executive training programs
11. Enhancement of faculty teaching competence	<u>Enhancement of faculty teaching competence</u> : through teaching and learning training	Teaching and Learning Center conducting workshops on teaching pedagogies, planning annual forum that fosters teaching and learning excellence attended by distinguished international speakers, organizing seminars that target generic, personal, and interpersonal skills (Change Management and Social and Emotional Learning, Online Learning and Effective Components of Instructional Design etc.)
12. Program Evaluation	<u>Program evaluation</u> : through internal/external audits and international accreditations	The College of Business is accredited by the Accreditation Council for Business Schools and Programs (ACBSP). ACBSP is a leading specialized accreditation body for business education supporting, celebrating, and rewarding teaching excellence. The association embraces the virtues of teaching excellence

7.2 CDIO Syllabus—Adapted to a Business Major

The objective of the syllabus is to develop clear, detailed and a comprehensive set of objectives for a generic business major while providing the necessary flexibility for implementation of sub-discipline specifications, especially with regards to level one where major-related knowledge and reasoning is applied (HR, Marketing, Management, finance, economics, accounting, entrepreneurship, MIS, and Corporate Governance).

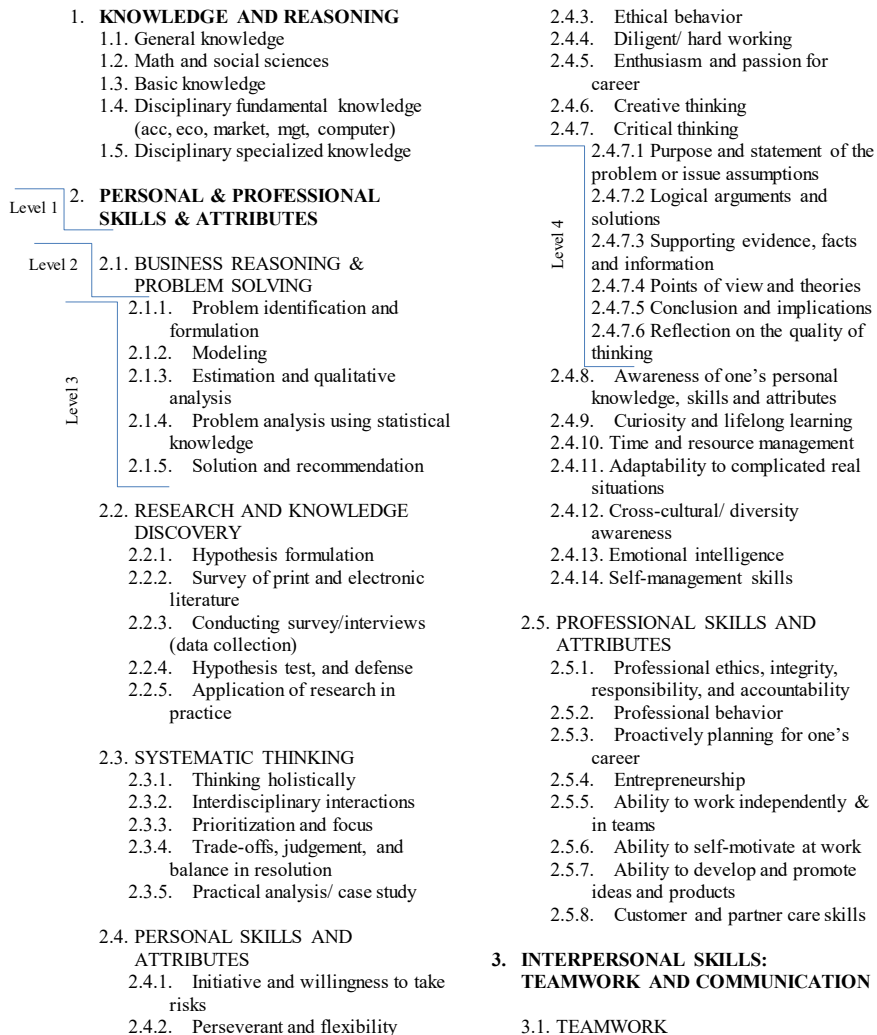
The CDIO—business adapted syllabus below provides a reference framework for specific learning outcomes in business education.

The four levels of details in the syllabus represent the competencies for business graduates. The levels and sub-levels are mapped below in the syllabus.

It is important to also highlight that the CDIO syllabus is linked with UNESCO’s five pillars of learning, which were previously highlighted in Sect. 4. An important component of the syllabus is the focus on system thinking. The syllabus organizes

system thinking into four main areas: thinking holistically; emergence and interactions in systems; prioritization and focus and trade-offs; and judgement and balance in resolution [48]. This component is often missing in accreditation bodies for business. For instance, when the syllabus was mapped with the business accreditation body, AACSB Accreditation Standards, the result demonstrated that system thinking was not present in the AACSB standard (refer to Appendix 2 for the result of mapping AACSB to CDIO Standards and Appendix 3 to the Syllabus). The following section demonstrates a comprehensive CDIO Syllabus for Business Management mapped up to the fourth level for business programs.

CDIO Syllabus for Business Management



- 3.1.1. Forming effective teams
- 3.1.2. Team Operation
- 3.1.3. Team growth and evolution
- 3.1.4. Leadership
- 3.1.5. Ability to work with diverse teams
- 3.2. COMMUNICATION
 - 3.2.1. Communications strategy
 - 3.2.2. Communications structure (argument, idea arrangement, debate, negotiation)
 - 3.2.3. Written communication
 - 3.2.4. Digital/ social media communications
 - 3.2.5. Presentations
 - 3.2.6. Oral inter-personal communications
- 3.3. COMMUNICATION IN FOREIGN LANGUAGES
 - 3.3.1. English- listening and speaking
 - 3.3.2. English-reading and writing
 - 3.3.3. Other languages
- 4. APPLYING KNOWLEDGE TO BENEFIT SOCIETY**
 - 4.1. EXTERNAL AND SOCIETAL CONTEXT
 - 4.1.1. Roles and responsibility of business graduates
 - 4.1.2. The impact of business on society
 - 4.1.3. Society's regulation of business
 - 4.1.4. The historical and cultural context
 - 4.1.5. Contemporary issues and values
 - 4.1.6. Developing a global perspective
 - 4.2. ENTERPRISE AND BUSINESS CONTEXT
 - 4.2.1. Appreciating different enterprise cultures
 - 4.2.2. Enterprise strategy, goals, and planning
 - 4.2.3. Entrepreneurship and relationship between enterprises, the economy & the global market
 - 1.2.3.1 Entrepreneurship opportunities that can be addressed by technology
 - 1.2.3.2 Technologies that can create new products and systems
 - 1.2.3.3 Entrepreneurial finance and organization
 - 4.2.4. Working successfully in organizations
 - 4.3. CONCEIVING BUSINESS IDEAS
 - 4.3.1. Set up business objectives (based on the market need and societal context)
 - 4.3.2. Basic definitions, concepts, theories as foundation
 - 4.3.3. Modeling of ideas and insuring goals can be met
 - 4.3.4. Development of project management (risks, feasibility, costs, resources...)
 - 4.3.5. Developing entrepreneurship (SMEs)
 - 4.4. DESIGNING ECONOMICS/ BUSINESS PLAN/ PROJECT
 - 4.4.1. Feasibility studies
 - 4.4.2. Plans or project's approach (approach methods, steps...)
 - 4.4.3. Utilization of knowledge in developing the plan
 - 4.4.4. Disciplinary plan/project design (tools, methods and relevant process...)
 - 4.4.5. Multi-disciplinary plan/project design (relationships among tools, methods and processes, departments and sub majors)
 - 4.4.6. Multi-objective plan/project design (designing implementation plan, testing, environmental factors, reliability..)
 - 4.5. IMPLEMENTING BUSINESS PLAN/ PROJECT
 - 4.5.1. Training/ coaching
 - 4.5.2. Selecting resources for implementing plan/project
 - 4.5.3. Organizing the implementation of plan/project
 - 4.6. OPERATE & EVALUATE
 - 4.6.1. Designing standards/criteria to evaluate performance/ outcomes
 - 4.6.2. Evaluating performance/outcomes (economic- social- environmental...)
 - 4.6.3. Adjusting/ upgrading plan/project
 - 4.6.4. Creating new plans/project

8 Recommendations and Conclusions

A wise man once said, ‘if you don’t change, you will be changed’ and this is where business programs in the higher education sector currently stand. As the world is learning to live in this new normal imposed by the pandemic, business schools must look beyond the horizon and find new and innovative approaches to revamp their programs. This chapter mapped the difficulties facing business schools that were highlighted by the pandemic. It then presented the method for reforming programs of study in business schools using the CDIO approach. AU in Kuwait was used as case study to showcase how the University adopted CDIO in its College of Business and designed an entire program that meets the CDIO requirements.

Moving forward, there are many expectations from business graduates nowadays. They are expected to be adaptable, agile, problem solvers, analytical, and have strong abilities to think outside the ‘box’. Preparing them for an ever-evolving workforce begins the minute they are admitted into their programs of study. As such, business programs need to be highly innovative and engaging.

Universities must embrace the culture of change that came with the pandemic. Open leadership, industry partnerships, technology development, research with impact, innovative pedagogies, and community engagement must all be examined closely and reformed to ensure the progression of the university. Business schools need to examine what they are teaching their students and how they are delivering this knowledge and the skills accompanied with it. There is no doubt that business schools can be real drivers for change and development. We instill in our students the notion that they need to be learners for life, however, higher education institutions need to have the same expectations from themselves as well.

Appendix 1

The below curriculum is designed for Business Management Studies which is mapped to the CDIO Syllabus. The flexibility is embedded, and the program is adapted to the four principles of CDIO (Conceiving, Designing, Implementing, Operating). The program (4 years) is targeted to equip business students with graduate attributes that are applicable in real-life job market. With sub-major specific course modifications, this program can be applied to other majors under the business umbrella.

Business Management Curriculum—Diploma (Two years)

Semester 1

Unit Name	Mapping to CDIO Syllabus
Business Computer Applications	1.1 General Knowledge
English for Business	1.3 Basic Knowledge

(continued)

(continued)

Unit Name	Mapping to CDIO Syllabus
Marketing Principles	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Management Principles	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Business Math	1.2 Math and Social Sciences

Semester 2

Unit Name	Mapping to CDIO Syllabus
Principles of Economics	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Business Communications	1.2 Math and Social Sciences 3.2 Communication
Accounting Principles	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Business Law	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Foundation of Management Information System	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)

Semester 3 (Includes 2 PBL Courses)

Unit Name	Mapping to CDIO Syllabus
Event Management (PBL)	2.3 Systematic Thinking 4.5 Implementing Business Plan/Project
Business Ethics	2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes
Principles of Finance	1.3 Basic Knowledge 1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer)
Business Planning (PBL)	2.2 Research and Knowledge Discovery 4.4 Designing Economics/Business Plan/Project
Electives (humanities, social skills, arts, drama, music)	1.1 General Knowledge 4.1 External and Societal Context

Semester 4 (Includes 2 PBL Courses)

Unit Name	Mapping to CDIO Syllabus
Business Leadership	1.5 Disciplinary Specialized Knowledge (Sub-Major) 2.1 Business Reasoning & Problem Solving 2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication
Change Management	1.5 Disciplinary Specialized Knowledge (Sub-Major) 2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.2 Communication 3.3 Communication In Foreign Languages 4.1 External and Societal Context
Innovation and Entrepreneurship (PBL)	1.5 Disciplinary Specialized Knowledge (Sub-Major) 4.1 External and Societal Context 4.2 Enterprise and Business Context 4.3 Conceiving Business Ideas 4.4 Designing Economics/Business Plan/Project 4.5 Implementing Business Plan/Project
Business Research (PBL)	4.1 External and Societal Context 4.2 Enterprise and Business Context 4.3 Conceiving Business Ideas 4.4 Designing Economics/Business Plan/Project
Operations Management	1.5 Disciplinary Specialized Knowledge (Sub-Major) 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 4.1 External and Societal Context 4.2 Enterprise and Business Context

Summer Internship I: Covering all aspects of CDIO Syllabus (applying theory to practice)

Business Management Curriculum—Bachelor (2 years after the Diploma, in total 4 years)

Semester 1

Unit Name	Mapping to CDIO Syllabus
HR in Organizations	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer) 2.4 Personal Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context
Managerial Accounting	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer) 2.1 Business Reasoning & Problem Solving 2.3 Systematic Thinking
Organizational Behavior	1.5 Disciplinary Specialized Knowledge (Sub-Major) 2.1 Business Reasoning & Problem Solving 2.3 Systematic Thinking 2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.2 Enterprise and Business Context
Customer Service	2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context 4.2 Enterprise and Business Context
Elective (Humanities)	1.1 General Knowledge 4.1 External and Societal Context

Semester 2 (Includes 2 PBL Courses)

Unit Name	Mapping to CDIO Syllabus
Managerial Economics	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer) 2.1 Business Reasoning & Problem Solving 2.3 Systematic Thinking 4.1 External and Societal Context

(continued)

(continued)

Unit Name	Mapping to CDIO Syllabus
Business Data Analysis (PBL)	2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 4.3 Conceiving Business Ideas 4.4 Designing Economics/Business Plan/Project
Market Research (PBL)	2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 4.1 External and Societal Context 4.2 Enterprise and Business Context 4.3 Conceiving Business Ideas 4.4 Designing Economics/Business Plan/Project
International Business	2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context 4.2 Enterprise and Business Context
Strategic Management	1.5 Disciplinary Specialized Knowledge (Sub-Major) 2.3 Systematic Thinking 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context 4.2 Enterprise and Business Context

Semester 3 (Includes 2 PBL Courses)

Unit Name	Mapping to CDIO Syllabus
Wealth Management (Investment Simulation)	2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 4.1 External and Societal Context 4.2 Enterprise and Business Context
Managing Organizational Change (PBL)	2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context 4.2 Enterprise and Business Context

(continued)

(continued)

Unit Name	Mapping to CDIO Syllabus
Entrepreneurship, Innovation and New Ventures (PBL)	2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 4.1 External and Societal Context 4.2 Enterprise and Business Context 4.3 Conceiving Business Ideas 4.5 Designing Economics/Business Plan/Project Implementing Business Plan/Project
Islamic Finance	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer) 4.1 External and Societal Context 4.2 Enterprise and Business Context
Elective (Language)	3.2 Communication 3.3 Communication in Foreign Languages


Semester 4 (Includes 2 PBL Courses)


Unit Name	Mapping to CDIO Syllabus
Emotional Intelligence	2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 3.1 Teamwork 3.2 Communication 3.3 Communication in Foreign Languages 4.1 External and Societal Context 4.2 Enterprise and Business Context
Digital Marketing (PBL)	1.4 Disciplinary Fundamental Knowledge (Acc, Eco, Mrkt, Mgt, Computer) 2.2 Research and Knowledge Discovery 4.1 External and Societal Context 4.2 Enterprise and Business Context 4.3 Conceiving Business Ideas
Quality Management	1.5 Disciplinary Specialized Knowledge (Sub-Major) 4.5 Professional Skills and Attributes
Business Information and Decision Systems	2.1 Business Reasoning & Problem Solving 2.2 Research and Knowledge Discovery 2.3 Systematic Thinking 2.4 Personal Skills and Attributes 2.5 Professional Skills and Attributes 4.5 Implementing Business Plan/Project
Graduation Project (PBL)	Covering all aspects of CDIO Syllabus Start-up companies with team members from different business sub-majors (HR, MIS, ACC, Finance, Marketing and Management as simulation to how real companies operate)


Appendix 2

Correlation between AACSB Accreditation Standards and CDIO Standards

CDIO Standards	AACSB Accreditation Standards								
	Strategic Planning	Physical, Virtual, and Financial Resource.	Faculty and Professional Staff Resources	Curriculum	Assurance of Learning	Learner Progression	Teaching Effectiveness and Impact	Impact of Scholarship	Engagement and Societal Impact
Context									
Learning Outcomes	Strong correlation								
Integrated Curriculum				Good correlation					
Discipline Introduction									
Design Implement Experience					Good correlation				
Integrated Learning Experience				Good correlation	Good correlation		Good correlation		Good correlation
Learning Assessments							Good correlation		
Workspaces		Good correlation							
Active Learning					Good correlation		Good correlation		Good correlation
Enhancement of Faculty Competence			Good correlation				Good correlation		
Enhancement of faculty teaching competence			Good correlation				Good correlation		
Program Evaluation							Good correlation		Good correlation

 Strong correlation


 Good correlation


 No correlation


Appendix 3

Correlation between AACSB Accreditation Standards and CDIO Syllabus


CDIO SYLLABUS 2.0	AACSB Accreditation Standards									
	Strategic Planning	Physical, Virtual, and Financial Resource	Faculty and Professional Staff Resources	Curriculum	Assurance of Learning	Learner Progression	Teaching Effectiveness & Impact	Impact of Scholarship	Engagement & Societal Impact	
1. DISCIPLINARY KNOWLEDGE AND REASONING										
1.1 Knowledge of underlying mathematics and sciences				Strong			Strong			
1.2 Core engineering fundamental knowledge				Strong			Strong			
1.3 Advanced engineering fundamental knowledge, mathematics and tools				Strong			Strong			
2. PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES										
2.1 Analytic reasoning and problem solving				Good		Good	Good	Good		
2.2 Experimentation, investigation and knowledge discovery										
2.3 System thinking										
2.4 Attitudes, thought and learning				Strong	Strong	Strong	Strong	Strong		
2.5 Ethics, equity and other responsibilities				Good	Good	Good	Good	Good		


 Strong correlation


 Good correlation

 No correlation

CDIO SYLLABUS 2.0	AACSB Accreditation Standards									
	Strategic Planning	Physical, Virtual, and Financial Resource	Faculty and Professional Staff Resources	Curriculum	Assurance of Learning	Learner Progression	Teaching Effectiveness & Impact	Impact of Scholarship	Engagement & Societal Impact	
3. INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION										
3.1 Teamwork				Strong	Strong	Strong	Strong	Strong		
3.2 Communications				Strong	Strong	Strong	Strong	Strong		
3.3 Communications in foreign language										
4. CDIO SYSTEMS IN THE ENTERPRISE, SOCIETAL AND ENVIRONMENTAL CONTEXT- THE INNOVATION PROCESS										
4.1 External, societal and environmental context		Strong		Strong	Strong	Strong	Strong	Strong		
4.2 Enterprise and business context		Strong		Strong	Strong	Strong	Strong	Strong		
4.3 Conceiving, system engineering and management										
4.4 Designing		Good		Good	Good	Good	Good	Good		
4.5 Implementing		Good		Good	Good	Good	Good	Good		
4.6 Operating		Good		Good	Good	Good	Good	Good		

 Strong correlation

 Good correlation

 No correlation

References

1. Reynolds R, Rizvi A (2019) Dubai university figures shows nearly half study business degrees, as science lags behind. *The National Gulf*, UAE. <https://www.thenationalnews.com/uae/education/dubai-university-figures-show-nearly-half-study-business-degrees-as-science-lags-behind-1.867847>
2. Riccoboni A (2010) Who invented the Business School. *Business Because*. <https://www.businessbecause.com/news/mba-degree/352/who-invented-the-business-school>
3. James E (2019) As business needs evolve, so should business education, says Goizueta's dean. *Bus J Atlanta Bus Chronicles*. <https://www.bizjournals.com/atlanta/news/2019/04/15/as-business-needs-evolve-so-should-business.html>
4. Tanuja A (nd) Classification of management theories: 4 schools of thought. *Business Management Ideas*. <https://www.businessmanagementideas.com/management/theories-management/classification-of-management-theories-4-schools-of-thought/4679>
5. Azana G, Grama S, Bono G (2017) Entrepreneurship education in business schools: Best Practices and Recommendations. *Equal Report for Orientation of Entrepreneurship Activity on Business Schools in Europe*. https://equal.network/wp-content/uploads/2018/10/1.-Entrepreneurship-Education-in-Business-Schools_Project-report-Spain.pdf
6. Amour M (2020) Faculty face uphill adapting to needs of today's students. *Insider Higher Ed*, Washington DC. <https://www.insidehighered.com/print/news/2020/04/03/faculty-face-uphill-battle-adapting-needs-todays-students>
7. Comevo (2020) The changing student demographics in 2020. <https://comevo.com/the-changing-student-demographics-in-2020/>
8. Seale S (2021) How higher education institutions can “future-proof” against the demographic cliff. *Higher Ed Connects*. <https://higheredconnects.com/futureproofing-against-demographic-cliff/>
9. Hittepole C (nd) Nontraditional students: supporting changing student population. University of Denver, US. https://naspa.org/images/uploads/main/Hittepole_NASPA_Memo.pdf
10. Chen JC (2017) Nontraditional Adult learners: the Neglected Diversity in Postsecondary Education. *SAGE J*. <https://journals.sagepub.com/doi/https://doi.org/10.1177/2158244017697161>
11. Powell A (2020) Lockdown has a lot to answer for: the mature students going back to university. *The Guardian*, International Edition. <https://www.theguardian.com/education/2020/jun/15/lockdown-has-a-lot-to-answer-for-the-mature-students-going-back-to-university>
12. Sledge L, Fishman TD (2014) *Reimagining Higher Education*. Deloitte University Press, NYC, Deloitte Development LLC. <https://www2.deloitte.com/us/en/insights/industry/public-sector/reimagining-higher-education.html>
13. Elliot KM, Healy MA (2001) Key factors influencing student satisfaction related to recruitment and retention. *J Mark High Educ*. https://doi.org/10.1300/J050v10n04_01
14. Vidalakis C, Sum M, Papa A (2013) The quality and value of higher education facilities: a comparative study. *Facilities* 31(11):489–504. <https://doi.org/10.1108/F-10-2011-0087>
15. Higa K, Vel J (2016) Designing innovative campuses for tomorrow's students. *Plan Higher Educ J* 44(4). *Designing Innovative Campuses for Tomorrow's Students - ProQuest*
16. Rullman L (2018) Lazy rivers and learning. *Insider Higher Ed*, Washington DC. <https://www.insidehighered.com/views/2018/01/17/improving-value-campus-facilities-opinion>
17. Abele E, Metternich J, Tisch M, Chryssolouris G, Sihh W, ElMaraghy H, Hummel V, Ranz F (2015) Learning factories for research, education, and training. In: *Proceedings from the 5th conference on learning factories 2015*, science direct. <https://doi.org/10.1016/j.procir.2015.02.187>
18. APPA Thought Leader Series (2015) *Facilities and Technology: the transformation of campus*. <https://eric.ed.gov/?id=ED581273>
19. Hanssen TS, Solvoll G (2014) The importance of university facilities for student satisfaction at a Norwegian university. *University of Nordland, Bodo, Norway*. <https://www.emerald.com/insight/content/doi/https://doi.org/10.1108/F-11-2014-0081/full/html>

20. University of Jordan (2020) Faculty for factory. <http://sites.ju.edu.jo/ar/fff/EnHome.aspx>
21. Canals J (2009) Seeking a greater impact: new challenges for business schools. IESE Business School-University of Navarra, working paper. <https://media.iese.edu/research/pdfs/DI-0838-E.pdf>
22. Avolio B, Benzaquen J, Pretell C (2019) Global challenges for business education and the new educational agenda: graduate attributes and teaching methods. *E-J Bus Educ Sch Teaching* 13(2):80–99. <https://files.eric.ed.gov/fulltext/EJ1250465.pdf>
23. Vieira H (2017) Why much of academic business research remains irrelevant for business. *LSE Business Review*. The London School of Economic and Political Sciences. <https://blogs.lse.ac.uk/businessreview/2017/11/21/why-much-of-academic-business-research-remains-irrelevant-for-business/>
24. Derkach AA (2004) Akmeologicheskie osnovy razvitiya professionala: Acmeological Basis of Professional Development. Voronezh Publ. Derkach A.A. Akmeologicheskie osnovy razvitiya professionala./DERKACH A.A. Akmeologicheskie of of professional., 2004, Voronezh by n/a - 2004 (biblio.com)
25. Slastenin VA, Podymova LS (2007) Readiness of the teacher for innovative activity. *Siberian Pedagogical J* (1):42–49 (in Russian). <https://elibrary.ru/item.asp?id=11687141>
26. Walters N (2015) McDonald's hamburger university can be harder to get into than Harvard and is even cooler than you'd imagine. *Business Insider India*. <https://www.businessinsider.in/McDonalds-Hamburger-University-can-be-harder-to-get-into-than-Harvard-and-is-even-cooler-than-you-d-imagine/articleshow/49517893.cms>
27. Marquardson J, Elnoshokaty A (2019) Skills, certifications, or degrees: what companies demand for entry-level cybersecurity jobs. *Inf Syst Educ J*. <https://files.eric.ed.gov/fulltext/EJ1246234.pdf>
28. Hill C (2019) You don't need a 4-year college degree for these high-paying jobs at Google, Apple, Netflix. *Market Watch*. <https://www.marketwatch.com/story/you-dont-need-a-4-year-college-degree-for-these-high-paying-jobs-at-google-apple-netflix-2019-04-08/>
29. Flavin M (2012) Disruptive technologies in higher education. *Res Learn Technol*. <https://www.semanticscholar.org/paper/Disruptive-Technologies-in-Higher-Education-Flavin/ae28f9aa228c1321424ae5b7f095c2c5b027dda6>
30. Marsick V (2009) Toward a unifying framework to support informal learning theory, research and practice. *J Workplace Learn* 21(4):265–275. <https://www.emerald.com/insight/content/doi/https://doi.org/10.1108/13665620910954184/full/html>
31. Illeris K (2009) Transfer of learning in the learning society: How can the barriers between different learning spaces be surmounted, and how can the gap between learning inside and outside the schools be bridged? *Int J Lifelong Educ* 28(2):137–148. <https://doi.org/10.1080/02601370902756986>
32. OECD (2019) The future of education and skills: Education 2030. [https://www.oecd.org/education/2030-project/contact/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030-project/contact/E2030%20Position%20Paper%20(05.04.2018).pdf)
33. Chandler N (2010) Reasons and forms of organizational resistance to change in the higher education sector. *Pract Theory Syst Educ* 5(1):87–104. https://www.researchgate.net/publication/266287738_REASONS_AND_FORMS_OF_ORGANIZATIONAL_RESISTANCE_TO_CHANGE_IN_THE_HIGHER_EDUCATION_SECTOR_Reasons_for_change_in_Higher_Education
34. Brennan J, Ryan S, Ranga M, Broek S, Durazzi N, Kamphuis B (2014) Study on innovation in higher education: final report. European Commission Directorate for Education and Training Study on Innovation in Higher Education, Publications Office of the European Union, Luxembourg. ISBN 9789279350818. http://eprints.lse.ac.uk/55819/1/_lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_Durazzi%2C%20N_Study%20innovation_Durazzi_Study%20innovation_2014.pdf
35. Sester B, Morris H (2015) Building a culture of innovation in higher education: design and practice for leaders. In partnership 2Revolutions & Educause. <https://library.educause.edu/-/media/files/library/2015/4/ngt1502-pdf.pdf>

36. UNESCO IBE (2021) Curriculum (plural curricula). <http://www.ibe.unesco.org/en/glossary-curriculum-terminology/c/curriculum-plural-curricula>
37. Zhao N (2006) Four pillars of learning for the reorientation and reorganization of curriculum: reflections and discussions. UNESCO IBE. http://www.ibe.unesco.org/fileadmin/user_upload/archive/cops/Competencies/PillarsLearningZhou.pdf
38. Jacques D (1996) Learning: the treasure within; report to UNESCO of the International Commission on Education for the twenty-first century (highlights). UNESCO Digital Library. <https://unesdoc.unesco.org/ark:/48223/pf0000109590>
39. Griffith University (2021) Principles to promote excellence in learning and teaching practices at Griffith University. https://www.griffith.edu.au/__data/assets/pdf_file/0014/370400/PrinciplesLandT.pdf
40. CDIO (2021) About CDIO. <http://www.cdio.org/about>
41. Zabalawi I (2018) Engineering education for future world: the CDIO approach. In: 28th Arab engineering conference, December 11–13. <http://www.cdio.org/files/document/file/Engineering%20Education%20for%20the%20Future%20World%20-%20The%20CDIO%20Approach.pdf>
42. Crawley EF, Brodeur DR, Soderholm DH (2008) The education of future Aeronautical engineers: conceiving, designing, implementing, operating. *J Sci Educ Technol* 17(2):138–151. <https://doi.org/10.1007/s10956-008-9088-4>
43. Crawley EF (2001) The CDIO syllabus: a statement of goals for undergraduate engineering education. CDIO. http://www.cdio.org/files/CDIO_Syllabus_Report.pdf
44. Crawley EF, Malmqvist J, Lucas WA, Brodeur DR (2011) The CDIO syllabus v2.0: An updated statement of goals and engineering education. In proceedings of the 7th Int. CDIO conference, Technical University of Denmark, Copenhagen, June 20–23. http://www.cdio.org/files/document/file/crawleyetalcdiosyllabus2.0paper_29may2013_0.pdf
45. The CDIO standards v.2.0 (with customized rubrics) (2010) CDIO. http://www.cdio.org/files/standards/CDIOStds&Rubricsv2.0_2010Dec8.pdf
46. Malmqvist J, Kwee Huay HL, Kontio J, Thi Minh TD (2016) Application of CDIO in non-engineering programs- motives, implementation and experiences. In: Proceedings of the 12th Int. CDIO conference, Turku University of Applied Sciences, Turku, June 12–16. http://rocket.ship.cdio.org/files/document/cdio2016/76/76_Paper_PDF.pdf
47. Crawley EF, Malmqvist J, Östlund S, Brodeur DR, Edström K (2014) Rethinking engineering education: the CDIO approach, 2nd edn. Springer International Publishing. <https://link.springer.com/book/https://doi.org/10.1007/978-3-319-05561-9>
48. Froyd J, Pchenitchnaia L, Fowler D, Simpson N (2007) Systems thinking and integrative learning outcomes. American Society for Engineering Education. <https://peer.asee.org/systems-thinking-and-integrative-learning-outcomes.pdf>