



International Baccalaureate  
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# Study on employability skills in the International Baccalaureate Diploma Programme and Career-related Programme curricula

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## Research summary

Summary developed by the  
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## Background

Facing the challenges of the 21st century requires deliberate effort to cultivate the competencies that students need to respond to the labour market. This study explores how fit-for-purpose the International Baccalaureate (IB) Diploma Programme (DP) and Career-related Programme (CP) are for teaching the skills that will prepare graduates for future employment and a rapidly-changing world.

## Research methods

The study included four main components. The first phase was a literature review to identify the main global trends that are transforming today's workforce, as well as the skills workers will have to acquire to adapt. The second phase involved using the O\*NET skills database to present possible future areas of skill surpluses and shortages, based on analysis from the Organisation for Economic Co-operation and Development (OECD). Third, the researcher conducted a curriculum mapping and gap analysis to identify the extent to which key employability skills are currently covered in DP and CP curriculum documents. Lastly, the fourth component provided an overview of effective teaching and learning approaches for supporting the development of employability skills.



## Findings

### Literature review

The literature review examined how future shifts and challenges could transform the workforce and with it the demand for particular skills. The following section highlights some of these trends and emerging issues.

### The future of technology and skills

#### *Offshoring*

Migration of jobs overseas for the purpose of lowering labour costs is a trend that is affecting employment. While migration of manufacturing jobs is a common phenomenon, offshoring of service sector jobs is a recent trend caused mainly by rapid advances in telecommunications technology. The key consideration with regard to offshoring is whether

the service can be delivered to its user electronically over a long distance. Low-skill, routine types of jobs with impersonal delivery are most vulnerable to being offshored and automated.

#### *Job automation*

Technologists, economists and historians have warned of large-scale unemployment caused by automation from artificial intelligence (AI) and other emerging technologies. However, there remains significant uncertainty regarding the real impact of technological unemployment. Being able to predict whether and how the displacement and productivity effects will offset each other is a crucial question for policymakers and educational leaders.

McKinsey Global Institute (MGI) offers one of the most authoritative assessments of the scale of the

potential displacement effect (Manyika et al 2017). MGI estimated the automation potential across industries and showed that accommodation and food services are the most vulnerable to automation across the United States. Manufacturing comes second, agriculture is third and transportation and warehousing follow close behind. Other industries that have automation potential include: retail trade, mining, construction, utilities, wholesale trade, finance and insurance, art and entertainment, and real estate.

#### *Skills in an age of computers*

Although computers are making inroads into domains previously confined to human workers, they are unlikely to replace jobs that require complex social interactions, such as persuasion and negotiation, as well as creative work involving the creation of new ideas. Thus, in order to adapt to recent trends in technology, workers will have to acquire creative, social and digital skills.

While the demand for digital skills is projected to increase by 2030, there are signs that there will be a shortage of such skills. At the same time, many OECD countries have seen the share of graduates in science, technology, engineering and mathematics (STEM) fields stagnate or decline.

#### *New and emerging occupations*

Recently, new job titles and occupations have emerged as a result of advances in nanotechnology, medicine, robotics and green technology. Most new jobs are more skilled than jobs of the past and many now require an advanced degree (Berger, Frey 2014). More importantly, many of these jobs necessitate a combination of technical knowledge coupled with skills and character qualities.

#### **The future of inequality**

In tandem with rapid technological progress many countries have experienced a rise in income inequality (Acemoglu 2002). Accompanied by employment growth both at the top and bottom of the skill and income distribution, the automation of routine work has contributed to a hollowing-out of labour markets across the industrial world (Autor, Levy, Murnane 2003). The share of hours worked in middle-income occupations has declined, while jobs at the top and bottom of the wage distribution have experienced rapid employment growth.

As low-income and low-skill workers are at risk of automation and new and emerging occupations are largely confined to skilled workers, the recent surge in inequality is likely to be exacerbated. A central challenge for many workers will be to upgrade their skills, allowing them to transition into meaningful and better-paying jobs that are less susceptible to automation.

#### **Demographic shifts**

As population growth tapers off in the industrial world, the age composition of nations and regions will change dramatically. Along with this trend, the share of people 65 and over will increase substantially, which will have considerable effects on occupations and the skills of the workforce. As populations age, the demand for health care will continue to increase. This is reflected in the wide range of new and emerging health care-related occupations, requiring character qualities such as caring, sociability, respect, service orientation and social perceptiveness (OECD 2015).

Additionally, substantial skill upgrading of the workforce will be required to adapt to these demographic shifts. In particular, as populations gradually age, providing opportunities for upgrading or re-skilling later in life will become increasingly important. Countries that successfully upskill their workforce, making their skills complementary to digital technologies, will experience further productivity gains as a result.

#### **Urbanization and innovation**

Today, a larger part of the world's population is living in cities than a decade ago—a trend that is likely to continue. The shift towards technology industries has made new occupations and industries cluster in cities where the workforce tends to have more applicable skill sets. Over the next decades, cities will likely remain the drivers of innovation and the generators of new occupations and industries. Educational institutions should focus on supporting skill development by investing in skills associated with complex problem-solving, science, mathematical reasoning, creative thinking, entrepreneurial ability and curiosity.

#### **Skills demands**

The O\*NET database remains the most comprehensive assessment of skills in employment and provides a



crucial source of information for mapping occupations to skill needs. Although it was developed by the Bureau of Labor Statistics in the United States (US), the database is regularly used for analysis in other countries. The OECD skill needs indicators (OECD 2017) provide a novel strategy for quantitatively estimating knowledge, skill and ability shortages and surpluses across European countries and South Africa using the O\*NET database.

### **Knowledge**

The most common knowledge shortages were found in computers and electronics, education and training, some mathematics and science fields (for example, geography and biology) and health care fields (for example, therapy and counselling, psychology and medicine and dentistry). Surpluses, on the other hand, were found mainly for transportation, manufacturing and production, building and construction, and mechanical knowledge.

### **Skills**

Skill shortages were concentrated among content skills (for example, reading comprehension, writing,

speaking and active listening), process skills (for example, critical thinking and active learning), complex problem-solving skills and social skills (for example, instructing and social perceptiveness). Surpluses were more common for technical skills, such as equipment maintenance and repair.

### **Abilities**

Shortages in abilities occurred mainly for cognitive abilities, as well as auditory and speech abilities. Surpluses were found primarily for physical (for example, endurance and physical strength) and psychomotor (for example, fine manipulation and control movement) abilities.

### **Curriculum content mapping**

Curriculum content mapping (CCM) is the process of reviewing a curriculum to identify and address academic gaps, redundancies and misalignment for purposes of improving the overall coherence of a course of study and, by extension, its effectiveness (OECD 2016). The researcher used a CCM exercise to identify the extent to which 21st century competencies are included in DP and CP curriculum documents.

The Center for Curriculum Redesign (CCR) synthesized existing research with the overarching complementary goals of addressing the needs of 21st century education while maximizing both accuracy and clarity. Based on this analysis, CCR developed a framework for 21st century education, which included four dimensions:

- knowledge: “what we know and understand”
- skills: “how we use what we know”
- character: “how we behave and engage in the world” and
- meta-learning: “how we reflect and adapt”.

The competencies—particular aspects of knowledge, skills, character and meta-learning that students need to thrive in and shape the future world—were selected based on the literature review of global trends and their impact on the labour market. The selected competencies, which were found to be particularly relevant, included:

- creativity
- critical thinking
- communication
- collaboration
- mindfulness
- curiosity
- courage
- resilience
- ethics
- leadership
- metacognition
- growth mindset.

Degree	Contribution	Criteria
<b>Degree 3</b>	Large contribution	Main target of the learning area: the competency is clearly written/spelled out as the main development target.
<b>Degree 2</b>	Medium contribution	Sub-target of the learning area: the competency or associated competency is written as a part of the development target.
<b>Degree 1</b>	Low contribution	Not targeted in this learning area: the competency is not specifically included as a development target.

Table 1. Degree of competency contribution

This phase involved mapping of the various learning areas to identify the extent to which the selected competencies are addressed in each document and respective programme. Fourteen IB curriculum documents were reviewed for analysis. The occurrence of competencies was identified based on the degree of competency contribution in each document (high, medium or low contribution) (Table 1).

The quantitative breakdown (Table 2) provides an overview of how many times and how extensively each competency is represented across the reviewed DP and CP documents.

Table 2. Quantitative breakdown of degrees of contribution

	Competencies	Large contribution	Medium contribution	Low contribution
<b>Top 4</b>	Communication	12	1	1
	Ethics	11	3	1
	Mindfulness	10	1	4
	Critical thinking	10	2	3
<b>Middle 4</b>	Metacognition	7	3	5
	Collaboration	5	4	6
	Creativity	3	9	3
	Leadership	2	3	10
<b>Bottom 4</b>	Growth mindset	1	3	11
	Curiosity	1	2	12
	Courage	0	6	9
	Resilience	0	4	11

The analysis of curriculum content mapping of CP and DP documents demonstrated that there are some competencies that are well integrated in the existing intended curricula and others that are not represented sufficiently. Communication and ethics are two skills that appear to be the most represented across all documents reviewed, equally included in both the DP and CP. Additionally, mindfulness and critical thinking are well represented in the curriculum documentation.

The middle four competencies have less contribution but are still sufficiently covered in both programmes. Metacognition and collaboration are both represented to a moderate degree across the DP and CP. While metacognition is represented in a slightly stronger manner in the CP, collaboration is more salient in the DP. Creativity and leadership are also moderately represented in the curriculum documents.

Lastly, the bottom four competencies as represented in DP and CP curriculum documents were growth mindset, curiosity, courage and resilience. These are important competencies related to positive academic and labour market outcomes. The IB should consider explicitly integrating these competencies into the DP and CP curricula.

### **Innovative approaches to teaching and learning**

Supporting teachers' capacity to guide children's learning is an important part of transforming the teaching and learning process. Indeed, making progress in education requires being open to new ways of teaching and learning that may look quite different from what characterizes the average classroom (Hilton, Pellegrino 2012). Effective teaching puts student inquiry at the centre and actively engages students. A collection of diverse pedagogical approaches stems from this overarching principle. Learner-centred pedagogies, such as inquiry-based learning or collaborative learning, are particularly suitable in promoting the application of key skills, character and meta-learning. Innovative pedagogies—specifically blended learning, gamification, computational thinking, experiential learning, embodied learning and discussion-based teaching—are particularly effective in developing students' 21st century competencies.

Additionally, integrating the development of employability skills into traditional classroom subjects, or teaching skills through subjects, is an important

strategy for cultivating a breadth of necessary skills and competencies. Emphasizing these competences does not come at the expense of content knowledge. Instead, the demanding policy reality is that both 21st century competencies and a deep understanding of content knowledge are needed.

## **Conclusion**

The rapid increase in the rate at which technological change is occurring around the globe creates a world that is increasingly volatile, uncertain, complex, ambiguous and thus hard to predict. Such an unpredictable context requires an increased capability for humans to engage with complex challenges, adapt to new situations and develop a diverse set of individual competencies. An increased number of occupations in the future will involve complex problem-solving, creative thinking and social interactions. Deliberate effort and innovative pedagogies are needed to address the challenges of the 21st century and needs of the labour market. While the knowledge dimension matters, the skills, character and meta-learning dimensions are just as important, and all of them need to be fostered for individuals and societies to prosper.

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This summary was developed by the IB Research department. A copy of the full report is available at: [www.ibo.org/en/research/](http://www.ibo.org/en/research/). For more information on this study or other IB research, please email [research@ibo.org](mailto:research@ibo.org).

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