

► Education and training for rapidly evolving labour markets

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► Digital tools are changing the way in which we prepare youth for work.

Automation, digitalization and new technologies herald new challenges in limiting the relevance of previous education and training. Young men and women are spending more time in education, allowing them to achieve more knowledge and qualification levels. Yet, the main labour market challenge they face nowadays is the school-to-work transition. The International Labour Organization (ILO) defines this transition as the passage of a young person aged 15–29 years from the end of schooling to the first regular or satisfactory job.⁹⁶

As new forms of work arise, youth employment policies need to support young people with the tools to navigate an already complex labour market. A considerable share of the youth population in many developing countries lacks basic labour market-relevant skills, and they cannot access technical and vocational education or training. Worldwide efforts to improve this situation are reflected in Sustainable Development Goal 4, which highlights the importance of skills for employment and entrepreneurship and aims to “substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills for employment, decent jobs and entrepreneurship” by 2030.⁹⁷

Young people and challenges in contemporary labour markets

Education and training are paramount. But their effectiveness depends on how relevant they are

to the needs of the labour market. In recent years, researchers and policymakers have concentrated on skills mismatch to determine how relevant education and training (labour supply) are to labour demand. Skills mismatch in the labour market refers to the inadequacy of the skills developed in the education or training systems in relation to what is required in the job market, specifically: “the degree to which workers in firms possess skill or education levels that are above, below or poorly connected to those required within their current job [...] and, in the case of vacancies, the degree to which the education and skills of job applicants meet the requirements of the hiring firm” (McGuinness, Pouliakas and Redmond 2017). Because young people represent the largest share of the population in education and training, skills mismatches are particularly relevant to them.

Skills mismatches affect young people’s employability in different ways (table 1). From the labour supply perspective, vertical and horizontal mismatches have greater effect on young workers. Vertical mismatch refers to the level of skills to perform a job. While some experienced workers struggle to find a job because they are overskilled, young people tend to be underskilled for many of the job offers available.⁹⁸ Horizontal mismatch is the discrepancy between the field of education of a given worker in relation to the job offers. This type of mismatch is particularly relevant to young people because it affects recent graduates in fields with little or no demand, resulting in poor labour market outcomes.

96 While in most contexts a young person is defined as 15–24 years, the ILO extends it to 29 years for the purpose of the school-to-work transition to recognize that some young people remain in education beyond age 24 and thus to capture more information on the post-graduation employment experience. This definition is relevant because it considers the status in employment (employee, employer, own-account worker, contributing family worker, etc.) as well as job satisfaction. See www.ilo.org/employment/Whatwedo/Instructionmaterials/WCMS_140857/lang-en/index.htm.

97 Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. See <https://sustainabledevelopment.un.org/sdg4>.

98 It is important to differentiate between skills and education. A young person can be overeducated (in terms of years of education and qualifications) but still be underskilled.

► **Table 1. Typology of skills mismatches**

Vertical mismatch	Overskilled
	Underskilled
Horizontal mismatch	Field of study or training relevant
	Field of study or training not relevant
Skills shortages	Unfilled vacancies
	Hard-to-fill vacancies
Skills gap	Skills to perform current job
	Lack of skills to perform current job
Obsolescence	Maintains skills relevance over time
	Skills become obsolete over time

Source: McGuinness, Pouliakas and Redmond 2017.

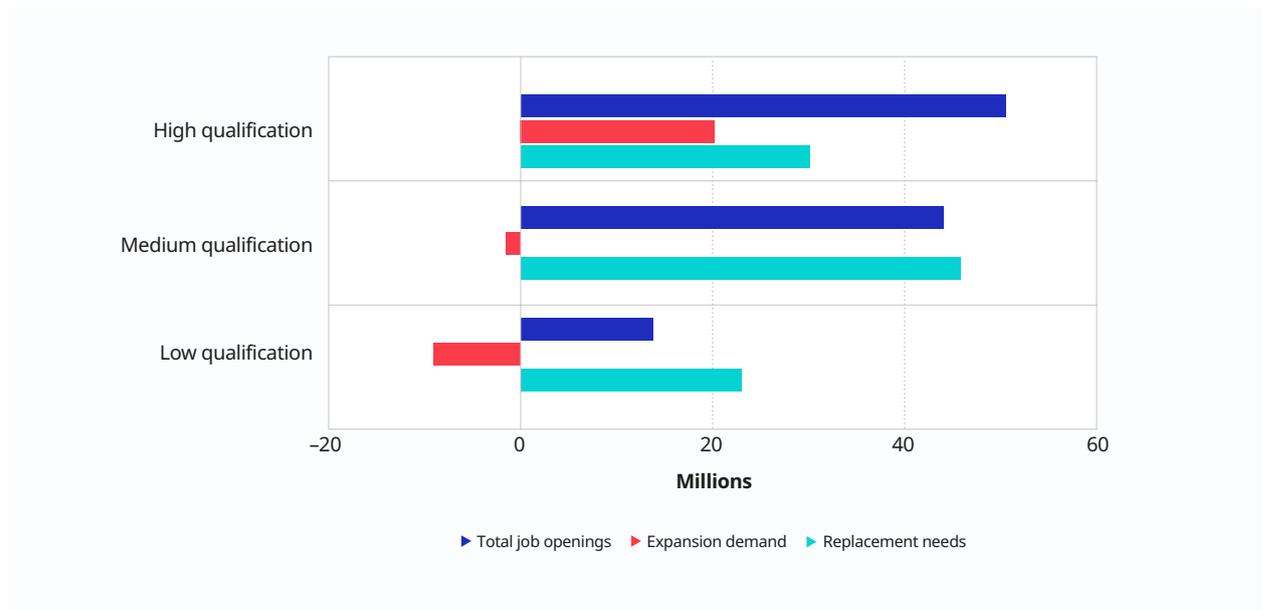
From the labour-demand perspective, young people are mostly impacted by the skills gap (lack of skills to perform a job) and skills shortages (unfilled and hard-to-fill job vacancies) because the demand for a certain type of skill is greater than the supply. Skills obsolescence (uselessness of skills to per-

form a job over time⁹⁹) tend to affect older workers because their skills become less relevant due to new technologies. Due to the rapid technological change and digitalization taking place, skills gaps and skills obsolescence are increasingly affecting young peoples' employability.

Skills mismatches affect young people in many ways, but until recent years, most research centred on analysing the vertical and horizontal mismatches. Evidence indicates that the demand for low-skill jobs remains high, and workers are often overqualified for the jobs they perform in both developing and developed economies. In advanced economies, overeducation¹⁰⁰ accounts for an average of 22 per cent of workers (OECD 2016b), while the incidence of overeducation in developing economies is, on average, 36 per cent (Handel n.d.). Undereducation seems to impact young people to a greater extent. According to ILO data, the incidence of undereducation in the youth population of 28 low- and lower-middle-income countries is, on average, 37 per cent, while overeducation averages 16 per cent (Sparreboom and Staneva 2014).

It is not clear yet to what extent overeducation influences the level of employability, but it can also affect

► **Figure 1. Total job opportunities in the European Union, by qualification, 2013–25 (millions)**



Source: See www.cedefop.europa.eu/en/publications-and-resources/publications/9098, accessed 18 November 2019.

99 Situations in which the skills previously required in the labour market are no longer required or their importance has been reduced. See www.eqavet.eu/eu-quality-assurance/glossary/skills-obsolescence.

100 Overeducation refers to workers having more years of education than the job requires.

wage levels and job satisfaction (OECD 2016b). According to forecasts by the European Centre for the Development of Vocational Training, the demand for jobs that require high qualifications in European Union Member States is expanding while the demand for jobs that require medium and low qualifications is contracting.¹⁰¹

Although differences between advanced and developing economies must be considered, this forecast provides an indication of the trend for the demand of qualifications in the near future. Hence, there are major implications for governments to articulate policies for youth employment that ensure the development of labour market relevant skills for which there is growing demand. It is thus important and useful to see what types of policies national governments around the world are using to promote youth employment.

Reviewing education and training policies for youth employment

Of the 485 youth employment policy and legislation documents from 65 countries (and dating between 1947 and 2015) in the ILO Youth Employment Policies and Legislation database,

known as YouthPOL,¹⁰² almost half (44.6 per cent) of them dwell on education and training (figure 2). “Education and training” refers to all organized, systematic education and training activities in which people take part to obtain knowledge and/or learn new skills for a current or future job, to increase earnings, to improve career opportunities in a current or other field and generally to improve their opportunities for advancement and promotion (OECD 2003).

Global perspective

Labour market policies account for around one in five interventions in the YouthPOL collection. These policies aim at establishing an efficient and functioning labour market by correcting the imbalances between the supply and demand of labour. Labour market policies can be distinguished from other general employment policy interventions in that they act selectively to favour particular groups in the labour market (Eurostat 2013).

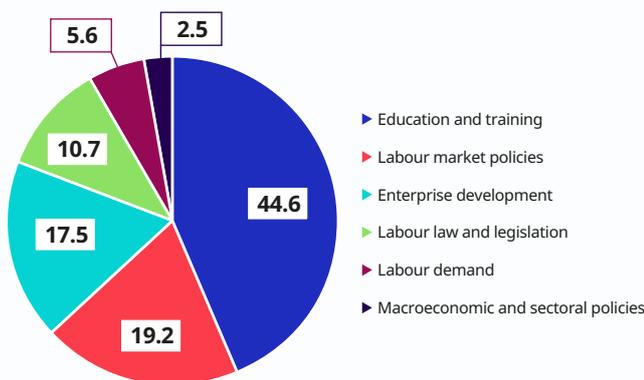
Measures for **enterprise development** account for almost 20 per cent of the total number of youth employment interventions. They focus on businesses to accommodate their growth and to help realize their potential through, for example, tax rebates, subsidies, access to finance and formalization.

Labour law and legislation represent one in ten of the interventions at the global level. These typically included legal measures to provide youth with different means of protection, such as contractual arrangements, anti-discrimination legislation and occupational safety and health.

Labour demand interventions, which target employers’ demand for workers, account only for 5.6 per cent of the total. These types of measures include waivers for social security contributions and tax rebates for hiring young people as well as incentives to promote the transition of informal workers to the formal economy.

Finally, **macroeconomic and sectoral policies** only represent 2.5 per cent of the total policies. The macroeconomic policies include monetary, fiscal and exchange rate policies. They involved government spending and central banks, generally intended

► **Figure 2. Measures for youth employment across 65 countries, by policy area (%)**

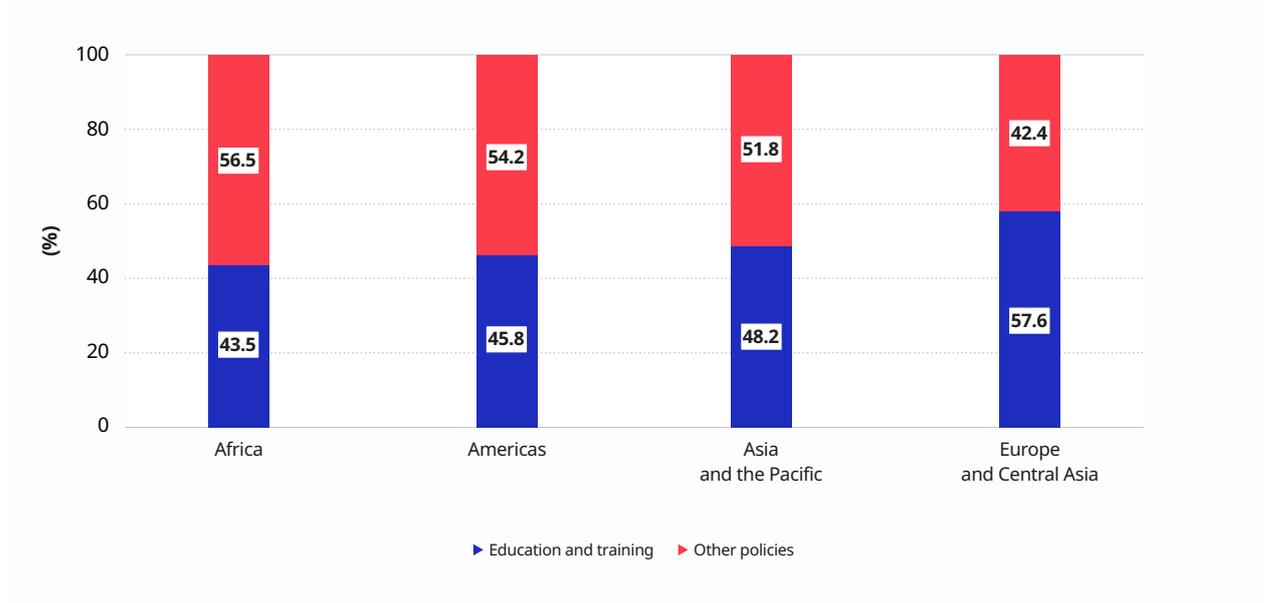


Source: Authors’ 2019 review of 478 youth employment policy and legislation documents.

101 See www.cedefop.europa.eu/en/publications-and-resources/publications/9098.

102 YouthPOL is an ILO online inventory of policies and legislation relevant to youth employment collected from 2012 to 2016. Though many of the policies and legislation contained in the inventory are still valid, some of them may have been amended or replaced by new ones after the collection period. See www.ilo.org/employment/areas/youth-employment/youth-pol/lang-en/index.htm.

► **Figure 3. Education and training measures as a percentage of all youth employment interventions in 65 countries, by region**



Source: Authors' 2019 review of 478 youth employment policy and legislation documents.

to maximize growth while keeping down inflation; sometimes they include an employment target. Although macroeconomic policies “have a critical influence on decisions by companies to produce, hire or fire workers or export and import goods” (World Bank 2014), they are not frequently used as instruments for promoting youth employment or employment in general.

Sectoral policies, which are adopted by governments as a plan of action for a particular sector of the economy, do not seem to be a common means to promote youth employment. Most employment in many developing countries concentrates only in a few sectors (such as agriculture).

Regional perspective

The importance of education and training at the regional level is consistent with the global picture. In most regions, education and training represent about half of the total number of interventions. In Africa, they account for 43.5 per cent, in the Americas it is 45.8 per cent, in Asia it is 48.2 per cent, and in Europe and Central Asia it is 57.6 per cent. Despite the different employment policy

approaches of governments across regions, education and training receive similar importance. In the Europe and Central Asian region, the percentage is slightly greater. This is in part explained by the inclusion of many European Union countries, such as Austria and Germany, where education and training systems are advanced.

Education and training can be delivered in different forms, through various means and for specific purposes. The YouthPOL database integrates the forms of education and training that have greater relevance to youth employment.¹⁰³ They include technical and vocational education and training (TVET), career education and career guidance, apprenticeships, other work experience provisions (including internships), remedial education, scholarships and other incentives (including conditional cash transfers) and lifelong learning.

The analysis of education and training policies revealed some areas more frequently than others. Almost one quarter of the education and training policies were part of TVET. Lifelong learning represents 16.2 per cent of the total policies. Internships, other work experience provisions, career education and career guidance account for

¹⁰³ The policy areas and sub-areas, including education and training, were developed by the ILO Youth Employment Programme in 2012–13 in line with the ILO call for action to tackle the youth employment crisis (ILO 2012). These are the operational definitions used to analyse policy and legislation documents in the YouthPOL database.

Categories of education and training relevant to youth employment

Technical and vocational education and training: A comprehensive term for education and training beyond compulsory education but excluding degree-level programmes, which provide individuals with occupational or work-related knowledge and skills (Rosas and Corbanese 2006).

Career education and career guidance: Career education is delivered by education institutions to help students make education and career choices. It provides young learners with knowledge of the labour market and with skills to make choices about education, training and life generally. Career guidance is the process, services and activities aimed at assisting individuals of any age and point in their life to make education, training and occupational choices and to manage their career. It can also include the provision of a mentor (Watts 2013).

Apprenticeships: A system of training that usually combines on-the-job training and work experience with institution-based training. It can be regulated by law (formal apprenticeship, normally providing remuneration to apprentices) or by custom (traditional or informal apprenticeship where remuneration and/or institution-based training are not always envisaged) (Rosas and Corbanese 2006).

Internships and other work experiences

Internships involve a limited period of work experience with an employer, usually lasting a few weeks to one year. They are neither part of a regular employment relationship nor a formal apprenticeship. Three types of internship are typically distinguished:

- ▶ Internships that link to a course of academic study.
- ▶ Work experience undertaken as part of an active labour market programme.
- ▶ Open market internships, which is work experience in enterprises or organizations that do not fall under either of the previous criteria (O'Higgins and Pinedo 2018).

Remedial education: Education through formal institutions for adults who left education without mainstream schooling or other qualifications and who now want to gain basic literacy skills, primary education or secondary education. These also include activities or programmes aimed at helping students with learning difficulties or supporting students who may need to develop better learning skills as well as master content (International Bureau of Education n.d.).

Scholarships and other incentives, including conditional cash transfers: Conditional cash transfers refer to an exchange of financial support for certain behavioural guarantees (see <https://ec.europa.eu/social/BlobServlet?docId=12638&langId=en>).

Lifelong learning: A process that encompasses all learning and training activities undertaken throughout a person's life for the development of competencies and qualifications (Rosas and Corbanese 2006). This refers to all general education, vocational education and training, non-formal education and informal learning undertaken throughout life, resulting in an improvement in knowledge, skills and competencies within a personal, civic, social and/or employment-related perspective (European Commission 2011).

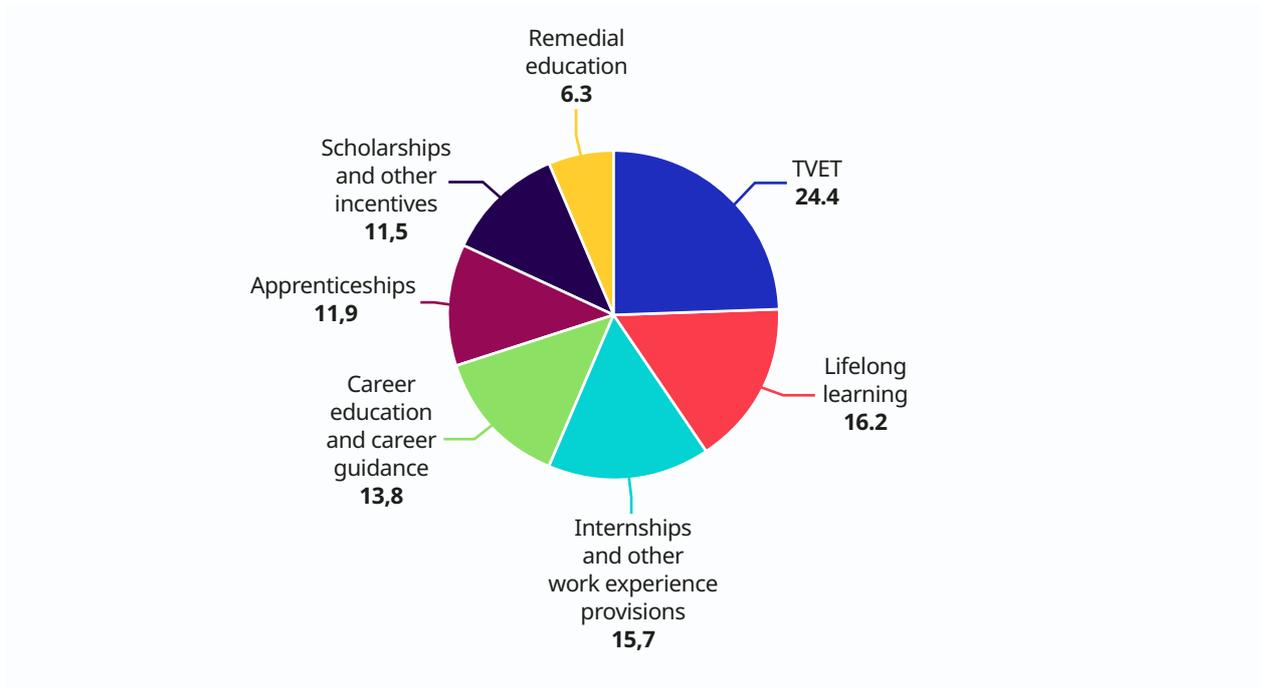
Lifelong learning involves more than the skills needed to work; it is also about developing the capabilities needed to participate in a democratic society. It offers a pathway to inclusion in labour markets for youth and people who are unemployed. It also has transformative potential: investment in learning at an early age facilitates learning at later stages in life and is in turn linked to intergenerational social mobility, expanding the choices of future generations (Global Commission on the Future of Work 2019).

nearly a third of the total provisions. Apprenticeships represent slightly more than one tenth of the total measures. And scholarships and other incentives and remedial education represent 11.5 per cent and 6.3 per cent of the total, respectively.

The education and training provisions present a different distribution across regions (table 2). Apart

from scholarships and other incentives, Europe and Central Asia have the largest share of measures for each type of intervention. This is largely due to the greater representation of countries from Western Europe, a region with highly developed and sophisticated national education and training systems. This region accounts for more than half of the interventions for career education, career

► Figure 4. Education and training measures across 65 countries, by sub-policy area (%)



Source: Authors' 2019 review of 478 youth employment policy and legislation documents.

guidance, internships, other work experience provisions and remedial education and almost half of the provisions for apprenticeships and lifelong learning. TVET interventions, scholarships and other incentives account for about a third of the education and training measures in Europe and Central Asia.

Other regions demonstrated similar trends in the breakdown of education and training measures. TVET interventions in Africa, the Americas and Asia and the Pacific represent about two in ten education and training measures in each region. Lifelong learning interventions in Asia and the Pacific account for almost four in ten of the total and slightly more than one third of the provisions for scholarships and other incentives – more than in Europe and Central Asia. Remedial education is an important policy provision for education and training in Africa, where it represents almost one third of the total, only behind Europe and Central Asia. Apprenticeships account for a similar share in Asia and the Pacific, the Americas and Africa, with

the exception of Europe and Central Asia, where they represent almost half of the total.

While the data underscore the relevance of education and training policies for youth employment around the world, some provisions are more relevant than others, depending on the region. In the analysis of the 65 countries, TVET and apprenticeships emerge as the more common components in most national strategies for youth employment. Apprenticeship training, which is a form of TVET, is singled out in the next section for three reasons: First, it facilitates the school-to-work transition of young people and has proven to be more effective in employing them in countries with developed apprenticeship systems. Second, the direct involvement of enterprises in this type of training guarantees that young people develop labour market-relevant skills, including core skills.¹⁰⁴ And third, apprenticeship training is increasingly considered by policymakers in government and multilateral agencies as a resourceful means against youth unemployment.

¹⁰⁴ Core employability skills build upon and strengthen the skills developed through basic education; the technical skills needed for specific occupations or to perform specific tasks or duties (such as nursing, accounting, using technology or driving a forklift); and professional and personal attributes, like honesty, reliability, punctuality and loyalty. See www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_234467.pdf.

► Table 2. Education and training interventions across 65 countries, by region (%)

Region	TVET	Career education and career guidance	Apprenticeships	Internships and other work experience provisions	Remedial education	Scholarships and other incentives	Lifelong learning
Africa	20.9	11.6	18.5	11.5	27.0	6.1	11.7
Americas	19.7	9.4	15.1	13.4	7.9	27.0	8.0
Asia and the Pacific	23.0	23.2	21.0	22.9	12.7	34.8	38.9
Europe and Central Asia	36.5	55.8	45.4	52.2	52.4	32.2	41.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Apprenticeship training

Transiting from school to work is the main challenge for most young people. Regardless of their level of education, they often lack labour market-relevant skills and have little or no work experience, which is a critical issue for most employers. The quality and relevance of education is often insufficient and not adapted to the needs of enterprises. This results in a situation in which job offers remain vacant while many young people are unemployed or underemployed.

TVET aims at equipping students with specific occupational and core skills. It is typically delivered at vocational schools. A functional and structured TVET system increases young people's employability and their chance to have a job. However, in many developing countries, the TVET curricula is outdated and/or is often developed without the involvement of employers. Rapid technological change in economic sectors, industries and occupations makes it difficult for vocational schools to ensure the relevance of their programmes to meet employers' needs. In fact, recent research suggests that young people with TVET training are more likely to be working in an automatable job than those with a university degree (ILO 2020b). For this reason, TVET curricula need to be modernized and constantly updated, in line with technological change. However, some forms of TVET, in particular the dual apprentice-

ship system, seem to better facilitate young's people entry into the labour market (Biavaschi et al. 2012).¹⁰⁵

Apprenticeships have developed over many centuries from schemes in which young people were trained by master craftsmen to develop trade-specific skills. Currently, there are sophisticated and structured apprenticeship systems involving the participation of various actors, including enterprises, vocational schools, employers' associations and trade unions. Advanced apprenticeship systems exist mainly in developed economies, while informal apprenticeships are mostly found in developing countries. The primary difference between them is that formal apprenticeships are based on training policies, institutions and legislation, while agreements in informal apprenticeships are embedded in local culture and traditions, with the incentive to participate on both sides rooted in a society's norms and customs (ILO 2012). The importance of informal apprenticeships is undeniable because they are widespread in the developing world¹⁰⁶ and are a proven system for providing technical skills.¹⁰⁷ Yet, they often lack many quality elements that a formal apprenticeship system offers.

There is no international standard that provides a universal definition of a formal apprenticeship.¹⁰⁸ Apprenticeship training and other forms of work-based learning, such as internships and trainee-

105 As cited in ILO 2020b.

106 Informal apprenticeship systems are widespread in many countries. They are considered by far the most important source of skills training in Africa and Southern Asia. Informal apprenticeships are believed to be responsible for the majority of all skills development in Ghana and account for almost 90 per cent of all training for trades in Benin, Cameroon and Senegal (ILO 2012).

107 An informal apprenticeship is a socially accepted practice for transmitting skills from one generation to the next. In their workplaces, apprentices learn relevant technical skills and are introduced to a business culture and a business network. Familiarity with these environments increases their chances of employment once the apprenticeship is complete.

108 Although it is not an international standard, the ILO Vocational Training Recommendation, 1962 (No. 117) defines apprenticeships as "systematic long-term training for a recognized occupation taking place substantially within an undertaking or under an independent craftsman should be governed by a written contract of apprenticeship and be subject to established standards." See www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0:NO::P12100_ILO_CODE:R117.

► **Table 3. Typical differences between apprenticeships and other forms of work-based learning**

	Apprenticeship	Informal Apprenticeship	Internship	Traineeship
Tripartite governance	Yes	No	No	No
Remuneration	Yes	Possibly	Probably	Possibly
Written contract	Yes	No	Possibly	Possibly
Social security coverage	Yes	No	No	No
Legal framework	Yes	No	No	No
Programme of learning	Yes	No	No	Possibly
On-the-job training	Yes	Yes	Yes	Yes
Off-the-job training	Yes	No	No	No
Formal assessment	Yes	No	No	No
Recognized qualification	Yes	No	No	No
Duration	1–4 years	Variable	Up to 12 month	Up to 12 month

Note: The table is from the ILO Toolkit for Quality Apprenticeships.

Source: ILO, on the basis of Steedman 2012.

ships, are used interchangeably in many countries. Formal apprenticeships have four main features: First, they consist of a training regime set up by or with the approval of the government. In other words, they are regulated by law. Second, they combine off-the-job-training (typically in a vocational school) and on-the-job training (in an enterprise). Third, the employer holds the main responsibility for the development of the apprentice. And fourth, apprentices are awarded some type of official recognition that enables them to practise an occupation independently after the completion of the apprenticeship training (Smith 2010). Other forms of work-based learning, such as internships and traineeships, do not have many of the features of apprenticeship training (table 3).¹⁰⁹

Apprenticeships bring together the supply and demand sides of the labour market. They equip young people with labour market-relevant skills and provide enterprises with qualified labour. But

apprenticeship systems are not all the same nor will all of them provide quality training conditions. While some apprenticeship schemes only transfer skills to an apprentice with minimum or no compensation, developed apprenticeship systems provide remuneration and social security coverage. The ILO promotes the concept of “quality apprenticeships”, which encompasses what apprenticeships should be, based on six criteria or building blocks (figure 5).¹¹⁰

In recent years, the quality apprenticeship concept has caught the attention of governments and multilateral organizations for their potential to improve employment outcomes for young people. In 2016, labour and employment ministers from the G20 countries¹¹¹ adopted the G20 Initiative to Promote Quality Apprenticeships. In doing so, they acknowledged:

“Apprenticeship (training) has proven to be an increasingly useful method to deliver vocational training globally. Quality apprenticeship

109 Formal apprenticeships do not necessarily feature each and every characteristic mentioned in the table, apart from the legal framework, on-the-job training, off-the-job learning and the recognition of a qualification.

110 The ILO defines quality apprenticeships as “a unique form of technical vocational education and training, combining on-the-job training and off-the-job learning, which enable learners from all walks of life to acquire the knowledge, skills and competencies required to carry out a specific occupation. They are regulated and financed by laws and collective agreements and policy decisions arising from social dialogue and require a written contract that details the respective roles and responsibilities of the apprentice and the employer; they also provide the apprentice with remuneration and standard social protection coverage. Following a clearly defined and structured period of training and the successful completion of a formal assessment, apprentices obtain a recognized qualification”.

111 The G20 is an informal group of 19 countries and the European Union, with representatives from the International Monetary Fund and the World Bank.

► Figure 5. Building blocks of quality apprenticeship systems



Source: ILO Toolkit for Quality Apprenticeships.

programmes provide workers with unique opportunities to receive training, job experience and wages, while contributing to growth and innovation in the broader economy. Apprenticeship (training) builds human resources and can improve opportunities for individuals, including disadvantaged youth and other vulnerable workers by facilitating their entry into the labour market, strengthening their skills, and thus contributing to higher wages and better-quality jobs. They provide businesses with skilled workers needed to adapt to the rapidly changing technology and markets and help support national prosperity and more inclusive growth.” (G20 2016)

This initiative was endorsed by the G20 Leaders’ Summit in Hangzhou, China in 2016 with ten action points.

In 2013, the L20¹¹² and the B20¹¹³ workers’ and employers’ organizations in the G20 countries issued a joint appeal to governments to increase apprenticeship numbers and emphasizing seven principles that are key to making apprenticeships work.¹¹⁴ Many countries have improved their national apprenticeship system through various measures, including by upgrading their regulatory framework, building partnerships, developing funding mechanisms and reviewing occupational profiles.

In 2018, the ILO conducted a survey among government units, national trade unions and employers’ organizations in the G20 countries to track their progress on the ten action points of the Initiative to Promote Quality Apprenticeships. In the survey report, the ILO (2018) concluded that “the wide

112 The L20 represents the interests of workers at the G20 level. It unites trade unions from G20 countries and global unions and is convened by the International Trade Union Confederation and the Trade Union Advisory Committee to the Organisation for Economic Co-operation and Development.

113 The B20 is the private sector’s voice of the G20 community. It addresses the global challenges and priorities defined by the G20 countries, by building solid consensus among business leaders, international organizations and civil society regarding how they should be approached.

114 See www.ituc-csi.org/key-elements-of-quality.

Ten actions of the G20 countries' Initiative to Promote Quality Apprenticeships

1. Establish national goals or targets to develop, expand and improve apprenticeship programmes, including for higher education levels.
2. Raise the quality of apprenticeships by fully engaging social partners in the design, development and delivery of apprenticeship and ensuring a strong work-based training component; for instance, through dual training systems, effective career guidance and integration with formal schooling and skills recognition systems.
3. Promote apprenticeship programmes in a broad array of occupations and sectors, particularly emerging sectors and those with skill shortages.
4. Foster the engagement of businesses in the apprenticeship systems, make apprenticeships more attractive to employers, in particular [small and medium-sized enterprises], by reflecting their skill needs in training programmes, addressing legal and regulatory disincentives and promoting an adequate or appropriate sharing of costs among employers, providers and public authorities.
5. Ensure that apprenticeship programmes offer good working and training conditions, including appropriate wages, labour contracts and social security coverage as well as respect for labour rights and occupational safety and health.
6. Implement initiatives to raise the awareness and highlight the benefits of apprenticeships among enterprises, guidance counsellors, jobseekers and the general population.
7. Improve access to quality apprenticeship for disadvantaged groups through income subsidies, training credits, pre-apprenticeship programmes, affordable quality childcare and family-friendly work opportunities, among others.
8. Strengthen partnerships between businesses and vocational schools in apprenticeship programme design, delivery and certification.
9. Support programmes to upgrade informal apprenticeships and to facilitate the inclusion of informal apprentices in the formal economy, either through certification and recognition of prior learning, supplementary training or other appropriate measures.
10. Expand quality apprenticeships globally, including through technical cooperation and regional initiatives.

Source: See www.g20.utoronto.ca/2016/160713-labour.html.

range of examples and descriptions [...] show that the governments, workers' and employers' organizations in the G20 Member States are improving apprenticeship systems and actively promoting apprenticeship training opportunities". Major gaps were also cited, including:

- the concentration of apprenticeships in only a few industry areas;
- difficulties with monitoring rapidly expanding apprenticeship systems;
- difficulties with encouraging employers to participate in the system;
- low status of apprenticeships and perceived unfairness in the distribution of financial incentives; and

- poor-quality training by private providers, among others.

These challenges persist and indicate that much work is still needed to improve apprenticeship systems in both developed and developing countries. TVET, including apprenticeship training, is an effective means to deliver labour market-relevant skills to young people. But the quickening pace of new technologies and new forms of work organization are increasing the stress on rigid education and training systems. Technological change not only affects the ways the production of goods and services are organized. It also changes the way we learn and develop new skills. Adapting learning and training models to the new technologies will be essential for lifelong labour market transitions.

Education and training in the Fourth Industrial Revolution

Rapid technological change and digitalization are two factors that have direct impact on youth employment. New technologies change and, in some cases, destroy jobs. But they also create opportunities. In 2011, the University of Phoenix and the Institute of the Future described the drivers that would “reshape the landscape of work” (Davies, Fidler and Gorbis 2011). These drivers have proven relevant for changing labour markets around the world.

The first driver is human longevity. It has major implications for education and training systems because a longer life expectancy, coupled with rapid technological change, means that workers must continue learning and developing new skills throughout their lifetime. The second and third drivers – smart machines and systems and the computational world – spell the progressive end of occupations that involve repetitive tasks and low levels of creativity due to automation and the exponentially growing capacity of computers to process information. Other drivers of change – new media ecology, supersaturated organizations and a globally connected world – will reshape the development of information and communication technology (ICT) skills and digital skills.

Digital skills are, according to the United Nations Educational, Scientific and Cultural Organization,

“a range of abilities to use digital devices, communication applications and networks to access and manage information. They enable people to create and share digital content, communicate and collaborate and solve problems for effective and creative self-fulfilment in life, learning, work and social activities at large.”¹¹⁵ The European Centre for the Development of Vocational Training estimated that around “85–90 per cent of jobs will require ICT skills by 2020” (EU Science Hub 2013). This estimation contrasts with the results of a 2016 survey by the Organisation for Economic Co-operation and Development showing that 56 per cent of the adult population lacked or had poor ICT skills (OECD 2016a). The survey also revealed that the younger share of its sample (adults aged 25–34) had better ICT skills and were capable of completing “tasks involving multiple steps and requiring the use of specific technology applications”. Although young people are more prone and apt to learn, use and develop new technologies, there are disparities depending on their level of education, sex and geographical location (urban or rural).

To build systems that offer youth the channels to create a better future, it is necessary to analyse the changes taking place in the global economy. Most occupations will be transformed, and the imminent automation of repetitive tasks, particularly in low- and middle-skill jobs. Governments and social partners must design systems that prepare youth for increasingly high-skill jobs that take advantage

Drivers of change for future work skills

1. **Extreme longevity:** Increasing global lifespans are changing the nature of careers and learning.
2. **Rise of smart machines and systems:** Workplace automation is nudging human workers out of rote, repetitive tasks.
3. **Computational world:** Massive increases in sensors and processing power are making the world a programmable system.
4. **New media ecology:** New communication tools are requiring new media literacies beyond text.
5. **Supersaturated organizations:** Social technologies are driving new forms of production and value creation.
6. **Globally connected world:** Increased global interconnectivity is putting diversity and adaptability at the centre of organizational operations.

Source: See www.iftf.org/futureworkskills/.

¹¹⁵ See <https://en.unesco.org/news/digital-skills-critical-jobs-and-social-inclusion>.

of technology. Millions of manufacturing, production and administrative roles will be depleted, while job gains will emerge in computer, data and engineering-related fields. This trend has significant implications for gender equality because women tend to be over-represented in the former fields and under-represented in the latter.

Under these circumstances, it is critical to innovate on how to help youth acquire the skills that will prepare them for the jobs of today and those of the future, especially young women and low-income youth who are more vulnerable to being left ill-prepared. Teaching high-demand technical skills to sustain employment is imperative. Even in non-technical roles, such as customer service, sales and care work, digital skills are increasingly needed to make candidates more competitive.

In addition to technical skills, the new labour market landscape is making core skills more important than ever before. In an era of automation, skills that no computer can replace (for now), such as adaptability, creativity and collaborative problem-solving, gain immense value. Social and emotional intelligence will be of great importance for future workers. All actors in the education and training space should prioritize these soft virtues in their skills-building programmes.

Technological change is not only influencing what skills youth need to successfully transition to employment but is also tremendously enhancing student learning in a way that facilitates their transition to employment. Digital technologies today are more widespread and accessible than ever. Online education enables students to learn at

their own time and pace. Online career portals help better match candidates with job opportunities. And online job-assessment platforms help youth better understand what skills they need for a job. Using these technologies properly to advance youth employability prospects at a broad scale could significantly help young people and all service providers overcome the current challenges.

Although there is still a long road before seeing enough successful examples scale up through public policy, there are already many initiatives using innovative approaches with promising results. These endeavours, often promoted by an array of players, such as social entrepreneurs, non-profit organizations, government agencies, B corporations¹¹⁶ and international cooperation, encompass good practices that could be scaled up to reach millions of people. They also help expose the risks that could hamper their impact. Two such examples of innovative learning initiatives through which young people are trained to develop skills for the digital economy are featured here. The first case study from Peru, spotlights a non-profit organization that helps young women from disadvantaged backgrounds develop programming and life skills. The second case study from France, illustrates the work of a French social enterprise that targets vulnerable youth, in partnership with the national public employment services. The learning models of both organizations have proven successful and have been replicated in many countries. Although their impact is still limited to the scale of their funding and operational capacity, they provide insights into what learning models might look like in the near future.

Programming and life skills for the technology sector in Peru

Background

Laboratoria is a non-profit social enterprise that started in Peru in 2014 with the goal of preparing young women from low-income backgrounds with programming skills and life skills to also help fill the talent gap in Latin America's growing tech sector. According to data from the Inter-American Development Bank, software development is one of the fastest-growing careers in Latin America, with 1.2 million developers needed by 2025 (Alaimo et al. 2015). Demand for coders who can build digital products is growing rapidly with the digital economy, and unlike many other sectors, employers are making hiring decisions based more on skills than degrees. In fact, 56 per cent of developers responding to the Stack Overflow's annual survey in 2016 did not have a degree in computer science or related field. The non-profit social enterprise targeted this niche and prepare talented young women who had been unable to access quality higher education – and hence were typically limited to low-skill, low-paying jobs – for transformatio-

116 Certified B Corporations are businesses that meet the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance profit and purpose. B Corporations are accelerating a global culture shift to redefine success in business and build a more inclusive and sustainable economy. See <https://bcorporation.net/about-b-corps>.

nal careers in tech fields. In Latin America in 2019, young women were significantly more vulnerable than men to remaining out of employment or education and training opportunities, at 28.9 per cent of all women aged 15–29, compared with 14.5 per cent of men (ILO 2020a). For these reasons and given the staggering gender gap in the tech fields, Laboratoria focuses only on women. Targeting women is paramount for (i) closing the gender gap, (ii) giving them the skills behind the types of jobs the digital economy will increasingly need and (iii) instilling diversity into the sector, which will arguably lead to better products.

Since its launch in Lima, Laboratoria has refined its training and job-placement model and accomplished positive results. The organization now operates five training centres across Latin America: in Lima (Peru), Santiago (Chile), Mexico City (Mexico), Guadalajara (Mexico) and São Paulo (Brazil).

Characteristics

Laboratoria begins with a widespread call for talented female applicants aged 18 or older who have not been able to access quality higher education due to economic limitations and are therefore unemployed or doing low-skill, informal work with minimum pay. Most of the targeting is done through social media, mass media and alumnae referrals. The selection process, which validates their socio-economic context through a baseline survey, has multiple steps to evaluate candidates across several skill sets. Candidates do not need to demonstrate any previous experience in technical skills, but they are assessed in basic math, logic and reading comprehension. The evaluation also includes an introductory course on programming to evaluate each candidate's interest in technology, a personal interview and a pre-admissions week to assess skills, such as communication, group work and emotional intelligence. Through this process, candidates are selected according to who is best equipped to finish the programme and transition to employment.

Once enrolled, students go through a six-month, full-time immersive programme (bootcamp style) involving nearly 1,000 hours of training. The curriculum, which is open source and validated by hiring companies and developer communities, covers core programming tools and languages, such as JavaScript, HTML5, CSS3, Git and Github. They offer two sub-specializations: front-end development and user experience design. One of the most important innovations of this programme is their Agile Classroom, a learning methodology by which they build up the values of agile software** development in their students. Collaboration, self-learning and constant retrospection are part of what makes their classrooms an intense, challenging experience. Students receive continuous feedback on their progress, and teachers obtain immediate data on student performance through a learning management system. This approach to education helps the students build up soft skills for work. More than 20 per cent of the programme is dedicated to strengthening socio-emotional skills like self-awareness, self-esteem and leadership.

Laboratoria also provides a job placement service for graduates. Its strategy is to build close relationships with leading employers, from software factories to banks, retailers, start-ups and digital agencies. Each local team continuously sources job opportunities and has worked to consolidate its image as a great resource of tech talent. They host distinctive events – Talent Fests and Hiring Games – to engage companies and get them to assess their students' skills in a practical way. This close relationship also ensures that students develop the skills that employers need and continuously refines the programme based on company feedback. Digital technology helps maximize the placement process through an online hiring platform where companies can access the profile of each graduating student, including data on the level of mastery of each skill taught. Companies place their offers through the platform, providing important data on their culture and needs to enable the best company-developer match.

After graduating the bootcamp, participants join Laboratoria's alumnae community, which organizes activities and trainings aimed at promoting the professional growth and leadership of its graduates. The community is also a source of peer-to-peer support, which is crucial for the women in their first few months at work.

Students do not pay for the first six immersive months and can even qualify for a transportation stipend if needed. Once they secure a job, graduates begin paying a monthly fee of approximately US\$150 for two years. On average, this represents between 15 per cent and 20 per cent of their salary, and only graduates who find a job must pay it. This helps protect the primary goal of connecting graduates with the best jobs. This business model, at this point, is geared towards building a self-sustaining organization; until then, it relies on grants from philanthropic, corporate and multilateral donors for its operations and growth.

Impact to date

Since its launch in 2014, more than 1,000 female developers have graduated. Their placement rates have increased with every cohort, averaging 80 per cent of their latest class. The salary its students attain significantly jumps year after year because the students are better prepared and join better employers. With their latest cohort, the average monthly salary of graduates was US\$900. This represents, on average, a 2.7-fold increase in income for women who were working before and is comparable to what university graduates earn after a quality five-year degree. More

than 40 companies hire their graduates, including world-class players in the tech sector, such as Accenture and IBM. Through their transition to high-skill careers, the young women graduates of this non-profit social enterprise considerably change their income, social networks and their perspective for the future. They join a growing industry, contributing diverse talent and becoming an example for thousands of other women in the region.

Practice highlights

1. The right candidate-programme match backed by data

The selection process finds the candidates with the right skills to succeed in the programme. Given their emphasis on transitioning their students to a high-skill career, they use a unique process to select high-potential youth from low-income backgrounds. This makes them selective but also highly effective with the youth they reach. They continuously refine this selection process with their students' track record, through an algorithm that enables them to fill their capacity with young women who can make the most out of the programme.

2. An externally verified, continuously evolving curriculum

The technical curriculum is open source. This means developer communities and employers globally can review it, validate it and suggest improvements. This ensures their content stays updated and relevant. In the tech sector, which changes so fast with new frameworks and tools emerging yearly, this is a significant benefit.

3. A constant connection with hiring companies

An innovative model on how graduates connect with potential employers, designing a placement process that responds to company needs. This includes a digital platform to facilitate the process, and multiple recruitment events year-round. These strategies build close and constant connections with the market, growing their reputation as the best source of diverse junior tech talent.

** Agile software development comprises various approaches to software development under which requirements and solutions evolve through the collaborative effort of self-organizing and cross-functional teams and their customers or end users. See Collier 2011.

Closing the gap in accessing education in the digital sector for disadvantaged youth in France

Background

Simplon is a French-based solidarity enterprise of social utility.** According to the Directorate-General for Employment, Social Affairs and Inclusion of the European Commission (2016), such an entity is a social enterprise whose sole aim is to achieve social utility, which means that financial surpluses are to be redirected towards consolidating the objective, and financial profitability must be limited. The highest-paid employee, for instance, cannot have a wage that exceeds ten times the minimum wage.

Simplon's social mission is the inequality gap in access to education in the digital sector. In France, the employment gap between prime-age men and disadvantaged groups is 27.5 per cent (OECD 2018). Within the digital sector, there is an increasing gap in the diversity of digital workers, despite the growing demand for qualified web developers that the European context presents. According to the European Commission (Kiss 2017), by 2020, Europe may encounter a deficit of up to 756,000 ICT skilled workers. Not helping matters is the reality that an estimated 45 per cent of the European Union's population does not have satisfactory digital skills.

Simplon targets disadvantaged groups with free training on web development and coding. They work to educate women, unemployed youth, refugees, older persons, people with disabilities, people in rural areas or at a geographical disadvantage or any person who considers themselves in unfavourable circumstances regarding access to education in technology. The training Simplon provides for technical jobs is directed at "populations who are distanced from the labour market and unrepresented in the digital industry" (Bardeau 2017). The enterprise both prepares people for jobs in the digital sector and promotes popular awareness on the increasing importance of web development and the digital world.

Characteristics

Anyone can apply to Simplon, but the prioritized candidates are disadvantaged youth. There is no required background in web development or advanced computer skills. The first step of the application process consists of filling out an online form and following a short online coding course that comprises several steps that, when completed, earn the candidate a “badge”. There is a minimum number of badges that each candidate must earn for their application to be approved, and this number varies according to the specialization each person pursues: HTML, CSS, JavaScript, PHP or Ruby. This part of the process is essential because it determines if a candidate has the skills to become a developer and proves whether or not coding is something that motivates them and something they like doing. Candidates who are pre-selected are invited to Simplon for an interview and take part in group workshops, a process through which the company makes its final selection.

The programmes Simplon provides vary depending on the origin of a candidate, their initial level of digital ability and the type of work that they want to pursue in the future. There is a programme for dataristians (people who want to specialize on data preparation), another one centred around software development, one that specializes predominantly on WordPress training and several others. The duration of the programmes varies, from six weeks to nine months of full-time training, depending on the specialization that is chosen, with six months of training the average. Each programme contains special characteristics according to who it is designed for. For instance, programmes created specifically for youth not in employment, education or training offer short digital acculturation trainings (Bardeau 2017) that aim to help them ease into the process of being incorporated into a professional workplace. The programme for refugees includes four hours of French classes a week, and the WordPress programme provides skills to easily personalize a website without a high level of knowledge on web development. Some of the programmes connect students with internships and job opportunities.

Simplon’s teaching methods distance themselves from conventional educational methods and emphasize the importance of interactive classes in which each student’s motivation is tapped so they can discover their potential: Their courses involve learning by doing, peer programming, test-driven and project-oriented training and a strong focus on inspiring a collaborative and entrepreneurial mindset (Bardeau 2017).

Because the programmes offered by Simplon are free of charge, it is financed largely through partners who are committed to creating social change. These include public and private organizations, philanthropic foundations and companies interested in digital development. The French public employment service agency (Pôle Emploi) partially sponsors the training of unemployed students, who constitute 76 per cent of the student population (Bardeau 2017). Simplon also works with a social web agency, Simplon Prod, which is dedicated to creating “digital solutions for non-profit organizations and associations and offering a wide range of special training for corporate innovation” (Bardeau 2017) through the hiring of former Simplon students.

Impact to date

Since its launch in 2013, Simplon has trained more than 4,000 people, 31 per cent of whom were women and 41 per cent who were youth. After each six-month training period, an average 75 per cent of students found a job, either in a company in need of digital workers or as freelance and independent workers. Simplon has expanded to 54 locations in France and 15 overseas, in places such as Cote d’Ivoire, Lebanon and Romania. Many of the centres operate as a social franchise, enabling the rapid expansion to date. As for indirect social impact, Simplon has reached more than 42,000 children with information on the importance of coding and digital culture for the future.

Practice highlights

1. An innovative, publicly backed financing system

By partnering with public sector agencies willing to invest in the training of vulnerable youth, Simplon has developed an effective financing model with which they can build a robust education system while relying on public funding to continue targeting specific populations in need.

2. A scalable model

By developing a social franchise system, the solidarity enterprise has rapidly scaled up nationwide and internationally. This is usually one of the core challenges for education models and this experience provides important lessons for scaling up similar initiatives.

3. Broad programme for different needs

Simplon provides several training programmes, all within the world of digital skills. This enables them to cover several professional profiles with high demand and provide youth with several alternatives than can match their skills and interests.

** See www.simplon.co.

The two initiatives highlighted here represent a mix of public, private and civil society-backed programmes that incorporate digital technologies in different ways to strengthen the job prospects of underserved youth. Both cases focus on teaching youth digital skills across an array of levels while also relying on digital platforms, either partly or fully, to impart their training. Partnerships with external education providers that reduce costs and tap into existing expertise are also a common component of the two initiatives. In a world economy impacted by automation, market demand is rapidly shifting to technology-related jobs, and it is not surprising to see the surge of new youth employment programmes revolving around these skills.

Likewise, digital tools are changing the way in which we prepare youth for work, with many interventions now primarily online and self-paced. While these approaches are highly disruptive and have proven to be effective in transitioning lower-income youth to the job market, their potential to reach many more youths has yet to be seen. These examples were chosen because they are innovative and give insights on future approaches for youth employment. Initiatives like these are relatively new, which still limits the evidence on their impact and potential.

From technology disruption to new youth employment pathways

To improve youth employment outcomes, policymakers and social partners likely could benefit with guidance and ideas to improve the design and implementation of policies in a labour market increasingly disrupted by technological change and thus to improve youth employment outcomes. The following offers a few such ideas.

1. Rethink the learning experience. The apprenticeship model as well as the case study in Latin

America (Laboratoria) have a common element that has led to successful transitions to employment of young people: the high engagement of employers throughout the programme to guarantee a learning experience that replicates the work environment. Work-based learning environments help students build the skills needed for work and become better prepared for their formal transition to employment. Learning experiences that do not take place in the work environment can still find ways to replicate the work dynamics through such methodologies as project-based learning and company engagement (from curriculum design to execution). This proximity of the learning and work experiences requires a rethinking of the traditional learning schemes and the flexibility of education and training systems to adapt to the needs of the labour market.

- 2. Promote self-learning in students as a tool for success.** In a world in which technological change is constantly redefining jobs and the skills needed to perform them, a core skill that young people should develop throughout their training is self-learning. The better prepared youth are to learn continuously and independently, the more successful they will be in their labour market transitions. With information widely accessible online, preparing students to properly research, organize and source their learning process will have significant impact on better equipping them for work, especially those with limited access to formal training environments.
- 3. Prioritize the use of technology for lifelong learning.** Digital technologies are becoming a core part of the content and teaching methodologies of youth training programmes. But with technology penetrating every aspect of life, there are significant opportunities to better use the technology tools to attain efficiencies for lifelong learning. Among the many advantages,

technology can better inform and connect youth to training opportunities; it can provide more flexible, remote learning experiences; and it can connect youth to employment opportunities. As actors in the economy continue to digitalize their activities – from youth to training providers and employers, it is crucial that policymakers design interventions that align and take advantage of this reality.

- 4. Build partnerships at all levels between education, training and the labour market.** Education and training involve different stakeholders and multiple stages. From policy design to financing, execution and evaluation, there are varied roles and responsibilities, and building partnerships at all levels can massively increase the chances of success in these interventions. Governments are best placed to lead on policy design and regulations. Training delivery can be a responsibility that the other actors share. Social impact organizations, such as the ones cited in the case studies, have more flexibility to experiment and take the risks that result in greater innovations. Private companies might be the best actor to understand market demand and connect candidates with opportunities. Financing training for young people should also be a shared responsibility between governments, the private sector and individuals. Private and philanthropic interests can help with financing early-stage innovative initiatives.

Governments can scale up the investments for these initiatives once as they prove to be effective. Different actors can grow to specialize on what they do best – be it financing, training or connecting – and work in partnership to advance opportunities for youth on a bigger scale.

- 5. Adapt and advance the protection of young people's rights as new forms of work emerge.** Ensuring that young people's rights are respected and that they benefit from social protection is essential in light of the new forms of work and employment relationships. It is important that education and training systems inform youth about their basic rights (including labour rights), in accordance with national laws. Governments should ensure that young people benefit from basic social protection, and they should update their labour legislation to better regulate work-based learning schemes, such as apprenticeships. As new technologies make it possible to work outside the workplace (teleworking) in many occupations, governments and social partners should work to ensure that young people's privacy is protected and that they can enjoy a work-life balance (for example, the right to disconnect). Finally, governments and social partners need to support young people to ensure their right to freedom of association and collective bargaining in the emerging forms of work, such as in the gig economy and the platform economy.

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