Think green

Education and climate change

Trends Shaping Education
Spotlight #24

On a daily basis, a deluge of academic studies, reports and news tell us that the Earth's ecosystem is in danger. They further warn that we need more than just information to address the climate crisis, protect the environment, and promote a sustainable way of living. We need action.

Education plays a pivotal role in raising awareness and sensitivity about the environment. It must provide the foundational knowledge and skills to identify and resolve environmental challenges, and shape attitudes and behaviours that lead to both individual and collective action.

OECD

Centre for Educational Research and Innovation

Environmental awareness, attitudes and behaviours

Results from the Programme for International Student Assessment (PISA) show that most young people know and care about the environment. In 2018, 78% of students on average across OECD countries agreed or strongly agreed that looking after the global environment is important to them, and 79% said that they knew about climate change and global warming (OECD, 2020a).

Most 15-year-olds across the OECD know about climate change and care about the environment

Schools play a central role in raising environmental awareness and pro-environmental attitudes early on. First of all, they are a key source of environmental knowledge: in 2018, about 9 in 10 school principals reported that climate change and global warming were covered in the school curriculum (OECD, 2020a).

Importantly, students that gain a deep understanding of science are more aware of environmental issues and have a stronger sense of responsibility for sustainable development (OECD, 2007; Echazarra, 2018).

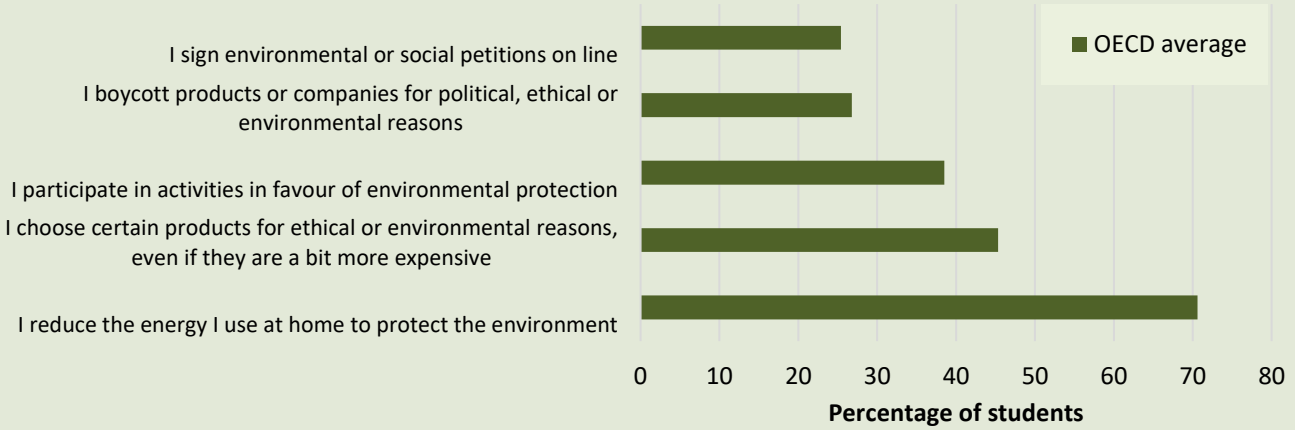
However, a key goal of environmental education is to promote pro-environmental behaviours that minimise the negative impact of people's actions on the environment. On this point, 2018 student reports were not as optimistic.

Figure 1 reflects that 15-year-olds are more likely to engage in actions that do not require time or financial commitments – such as reducing energy consumption at home – instead of more profound forms of engagement, such as advocacy and critical consumerism.

High levels of environmental awareness may not always lead to significant adjustments in behaviour. However, earlier research found that individuals with higher environmental awareness were more willing to accept *costly* political changes to protect the environment, such as higher fuel taxes (Diekmann and Preisendoerfer, 1992). These findings underscore the need for both strong knowledge and positive attitudes. Mainstreaming environmental education, both in schooling and post-secondary education, can help develop these.

Figure 1. Students supporting environmental sustainability in their daily lives

Percentage of 15-year-olds who report that they take the following actions, 2018



Source: OECD (2020), *PISA 2018 Results (Volume VI): Are Students Ready to Thrive in an Interconnected World?*, https://doi.org/10.1787/d5f68679-en.

Understanding the science matters

Since 2006, results from PISA have identified a strong link between performance in science and learners' environmental awareness and pro-environmental attitudes.

As shown in Figure 2, an average of 78% of students across OECD countries attained Level 2 or higher in the PISA 2018 science assessment. At a minimum, these students can recognise the correct explanation for familiar scientific phenomena and can use such knowledge to identify, in simple cases, whether a conclusion is valid based on the data provided (OECD, 2019a).

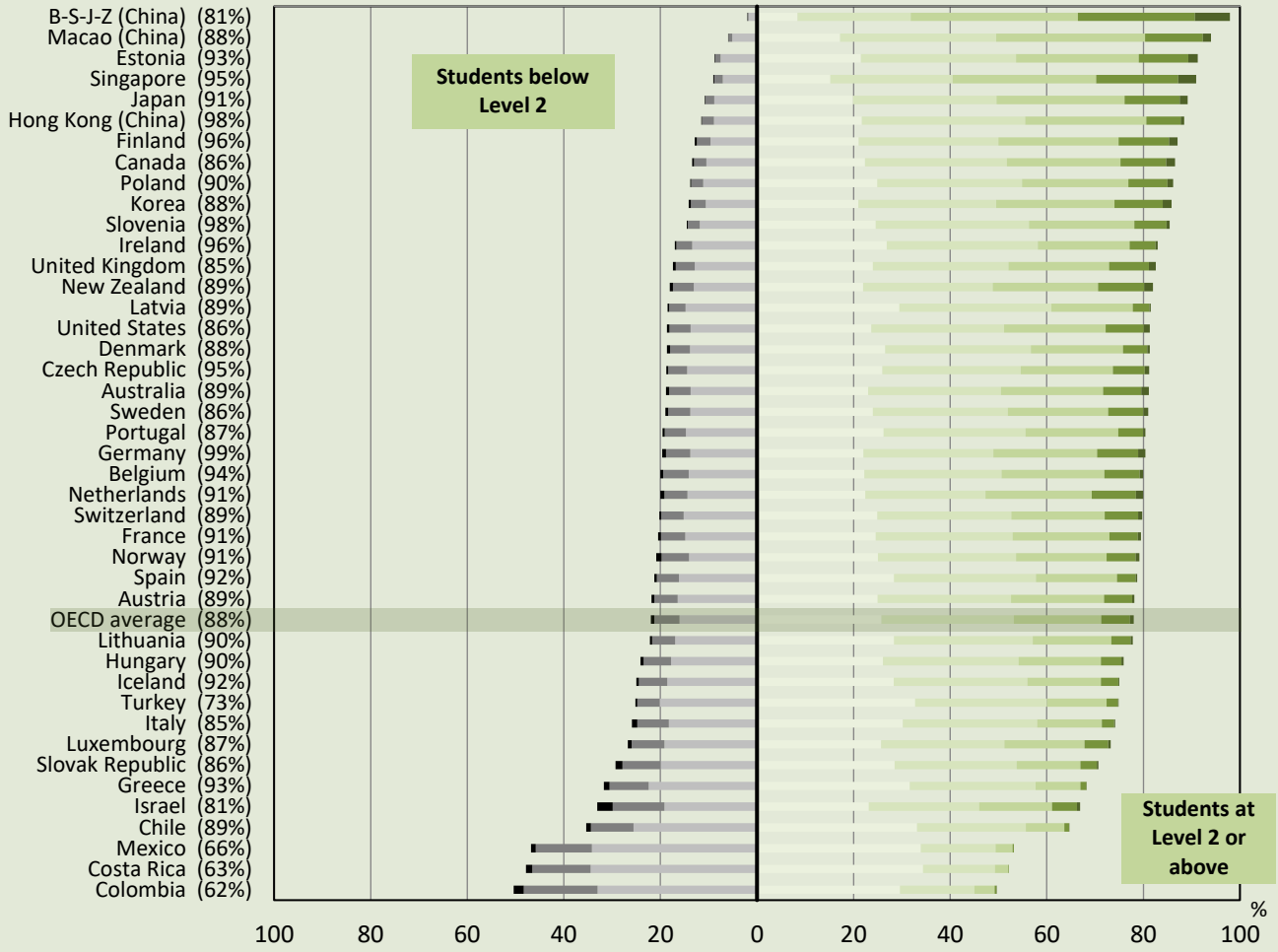
Better knowledge enables students to assess the magnitude of the climate crisis realistically. Otherwise, important issues may be overlooked or misinterpreted if knowledge is missing.

PISA reveals that students at low levels of science proficiency report greater levels of optimism towards environmental issues (Echazarra, 2018), which can be problematic if optimism leads to complacency, and complacency to inaction.

All the same, strong awareness could lead to pessimism, resulting in helplessness and paralysis (Jensen, 2002).

Figure 2. Students' proficiency in science

Percentage of students at different levels of science performance in PISA, 2018



Note: The index of coverage of the test is shown next to the country/economy name.
Source: OECD (2019), *PISA 2018 Results (Volume I): What Students Know and Can Do*, https://doi.org/10.1787/5f07c754-en.

The big picture

Our natural world at risk

Climate change is real. Greenhouse gas emissions keep growing in the atmosphere, average global temperature is rising, and climate-related disasters are becoming increasingly frequent. The international scientific community tells us that, if current practices continue, the world will face many negative consequences, including water and food shortages, loss of biodiversity, and forced migration.

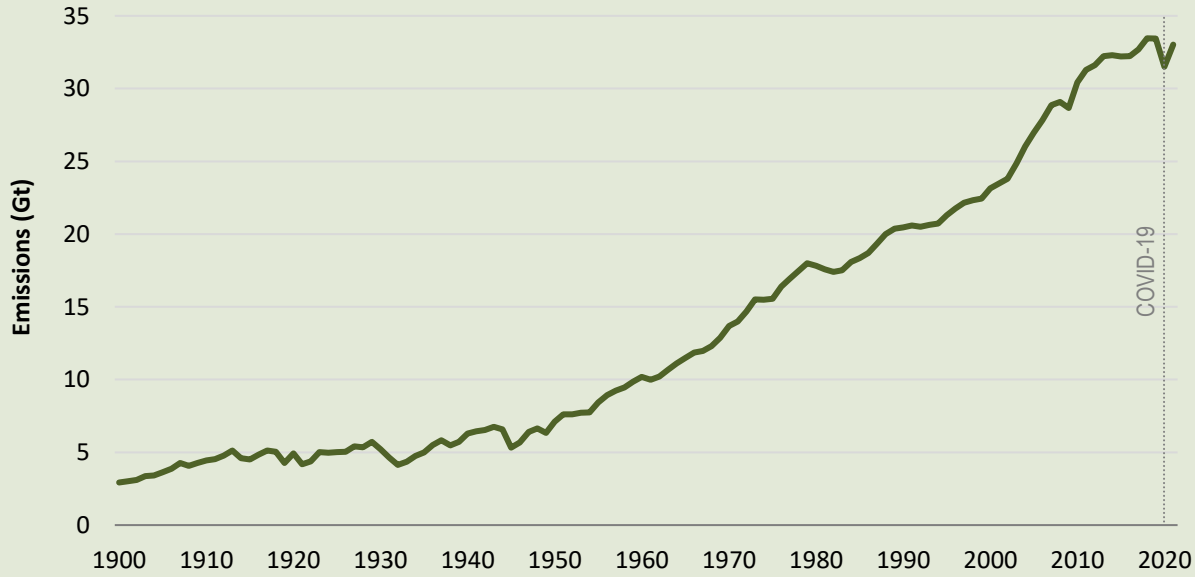
see **Figure 3** →

Temperature changes and other disruptions of the Earth's climate are mainly caused by greenhouse gas (GHG) emissions from human activities. CO2 from the combustion of fossil fuels and biomass and industrial processes represents more than 70% of global GHG emissions.

As shown in Figure 3, despite the ratification of international agreements to tackle GHG emissions by many countries, such as the Kyoto Protocol and the Paris Agreement, CO2 emissions continue to grow worldwide. In 2019, global energy-related CO2 emissions reached an all-time high of over 33 gigatonnes, over 11 times the amount of emissions in 1900.

Figure 3. CO2 emissions keep rising

Global energy-related CO2 emissions, gigatonnes, 1900-2021



Source: IEA (2020), *Global Energy Review 2020*, https://www.iea.org/; IEA (2021), *Global Energy Review 2021*, https://www.iea.org/.

3Ps to green up education

Three areas of action are key to supporting climate change mitigation and adaptation across all levels of education: *pedagogy*, *procurement* and *partnerships*.

Pedagogy

Environmental education has traditionally focused on passing on knowledge to learners. It assumes that more scientific and technical knowledge raises awareness and concern for the environment, leading to pro-environmental behaviours.

But research has noted that information alone cannot change behaviour. Environmental identities and values, attitudes and motivations are other important factors at play (Kollmuss and Agyeman, 2002; Gatersleben, Murtagh and Abrahamse, 2014).

Addressing climate change requires citizens who understand the science and are willing to take action to improve the environment

In addition to being aware of the effects of climate change and global warming, learners need to know what actions can be taken and how. Furthermore, having the opportunity to reflect on the impact of certain behaviours can be decisive for learners to overcome feelings of pessimism and take action (Jensen, 2002).

Along these lines, Frisk and Larson (2011) proposed four categories of knowledge:

- **Declarative**: scientific and technical understanding of socio-ecological interactions, which reduces misconceptions and misinformation.
- **Procedural**: an understanding of how to undertake particular actions, such as recycling or advocating for environmental protection.
- **Effectiveness**: an understanding of the links between actions and their consequences, positive or negative.
- **Social**: an understanding of social views and norms and their relation to pro-environmental behaviour.

Research findings suggest that learning in real-life contexts can effectively develop much more comprehensive forms of knowledge (Kollmuss and Agyeman, 2002; Hadjichambis et al., 2020).

Pedagogies such as experiential learning (e.g. project- and enquiry-based learning) and discussion-based teaching offer learners at all levels of education the opportunity to develop declarative knowledge across all curricular subjects, while exercising their agency and developing the confidence needed to work out practical, real-life change in their daily lives (Dyer and Andrews, 2011; Gibb, 2016; Paniagua and Istance, 2018; OECD, n.d.).

The Earth Kids Space Program (Japan)

Developed by the Goi Peace foundation in 2005 and commissioned by the Japanese Ministry of Education, Culture, Sports, Science and Technology, the Earth Kids space program aims to teach children peace, harmony and respect for all life and the environment through cooperative games, stories, interactive workshops and outdoor activities.

In 2010, UNESCO recognised the program as an official activity of the United Nations Decade of Education for Sustainable Development. Anevaluation of the programme demonstrates its success in instilling appreciation for nature among children and promoting inter-generational solidarity.

For more information:
https://www.goipeace.or.jp/

Procurement

With more frequent and severe extreme weather events (e.g. floods, heat waves), education institutions face increasing financial and safety risks (OECD, 2019b). These risks need to be assessed and monitored regularly for education institutions to build resilience and avoid high future costs (Dyer and Andrews, 2011).

Simultaneously, education systems can contribute to mitigate climate change by choosing goods, services and works that have a reduced environmental impact. There are four areas in particular where high positive impact could be achieved (European Commission, 2016):

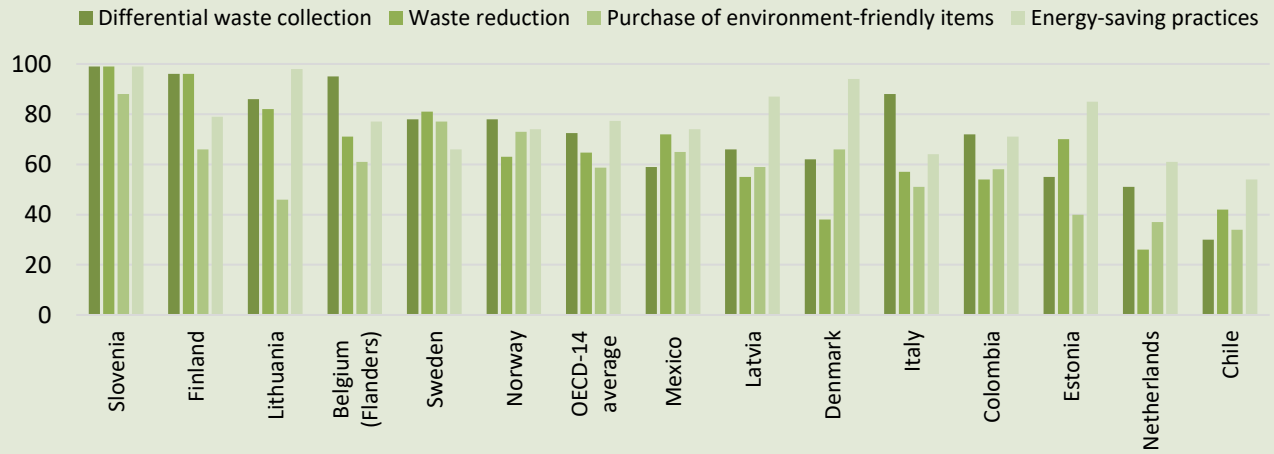
- **Buildings**: designing facilities that use energy and water efficiently and incorporate renewable energy systems
- **Food**: considering the footprint of food, including production, packaging and transport, and tackling food waste.
- **Transport**: promoting clean school transport, from procuring 'greener' bus fleets to promoting public transport and cycling through urban planning.
- **Energy-using products**: procuring energy-efficient equipment, such as lighting and ICT, and limiting e-waste.

Figure 4 shows that, by 2016, many schools across 14 OECD countries had already adopted measures linked to recycling, waste reduction, environment-friendly purchasing and energy-saving. Moreover, a 2021 survey including 372 higher education institutions (HEIs) from across the European Higher Education Area showed that over 90% of HEIs have institutional measures in place linked to recycling and waste management, energy efficiency for new buildings, and resources use (Stoeber, Gaebel, and Morrisroe, 2021).

Yet, several barriers limit the adoption of 'green' procurement practices, including more expensive environment-friendly products, lack of information and leadership, and limited implementation capacity. A legislative framework recognising the long-term gains of green procurement and guidance and technical support for implementation are needed across all levels of governance (Sönnichsen and Clement, 2020; Cheng et al., 2018).

Figure 4. Environment-friendly practices in schools across 14 OECD countries

Percentage of students at schools where principals reported that the school had adapted the following environment-friendly practices to a large or a moderate extent, 2016



Note: See the original source for details about these calculations and country samples.

Source: Table 6.14, in Schulz et al. (2017), *Becoming Citizens in a Changing World: IEA International Civic and Citizenship Education Study 2016 International Report*, p. 167, https://doi.org/10.1007/978-3-319-73963-2.

Procurement policies and environmental education complement and reinforce each other. For instance, children's regular contact with nature has been linked to increased environmental sensitivity (Chawla, 1998), and research has found that school designs facilitating such contact (e.g. through green playgrounds and gardens) reinforce pro-environmental behaviour (Tucker and Izadpanahi, 2017).

Similarly, involving students directly in 'greening up' educational facilities and operations reinforces learning outcomes. For example, engaging students in planning, purchasing for and cooking school meals allows them to work hands-on on topics such as a varied diet, food production and its environmental implications, and the importance of tackling food waste and how to do it.

Partnerships

Learning institutions alone may raise environmental awareness and pro-environmental behaviours in local communities. For example, PISA shows a strong link between parents' environmental knowledge and attitudes and those of their children. While this likely reflects the impact of parental environmental education, the contrary is also true: children's environmental awareness can influence parents' environmental knowledge and behaviour (Damerell, Howe and Milner-Gulland, 2013).

Synergies between education institutions and their communities – including public administration, businesses and civil society – can be achieved using more explicit and institutionalised forms of collaboration. Education-community partnerships can take multiple forms and target different goals, from enhancing the provision of extracurricular activities to unifying academic learning and community service through service-learning (OECD, 2017a; Gwilliam and Peterbauer, 2021).

Partnerships can accomplish several things at once. They can reinforce and amplify efforts related to learning practices and procurement policies, as well as strengthen social ties in communities for the benefit the environment and other purposes (Wheeler, Guevara, and Smith, 2018).

Community wealth building in Cleveland (United States)

In Cleveland (Ohio), the local administration collaborates with public services, think tanks, and foundations to leverage the power of local anchor institutions to develop new economic policies conducive to more resilient and sustainable local economies.

As noted by Facer (2020), specific roles for universities in this process include: purchasing from local vendors; hiring locally; providing workforce training; incubating new local businesses and non-profits; serving as an adviser or network builder; leveraging development to promote local retail, employer-assisted housing and community land trusts; and using pension and endowment funds to invest in local job creation and provide community venture capital for non-profits, entrepreneurs, and employee-owned firms.

For more information:
https://community-wealth.org/

Building a flexible, adaptable, and resilient workforce

As products and services in the economy change due to new environmental standards and regulations, so will jobs and skill needs in labour markets.

Changing skill needs

The adoption of policies to mitigate climate change may not imply large effects on overall employment levels, but it does imply job creation and destruction. New jobs will emerge in some sectors, either to replace polluting activities with cleaner ones or to provide environmental services. Other jobs will be destroyed, mainly in carbon- and resource-intensive sectors (OECD, 2017b).

For example, changes in the production and use of energy could result in millions of new jobs linked to clean energy, electric vehicles and public transport, and the adoption of more sustainable construction practices. Conversely, jobs will be lost in 'brown' industries, like oil extraction and refining (ILO, 2018).

Existing evidence on energy and climate change policies suggests that, at the global level, job creation and destruction concentrate in low-skilled jobs, while net job gains accrue mostly to high- and medium-skilled labour (OECD, 2017b).

In addition to creating new jobs, which tend to emerge at higher skill levels, the green transition will also change existing jobs. This means that many workers will be affected and may need opportunities to update their skills (OECD/Cedefop, 2014; OECD, 2017b; ILO, 2019; see Table 1).

Adjusting training and qualification frameworks will be key for a successful and fair transition to a greener economy. This means upskilling and reskilling within existing jobs as well as supporting workers, particularly those with lower skills, to transit from declining to emerging sectors.

Table 1. Skill shifts in the emerging green economy

Changes in skills required, by skill level of occupation

Skill level	Nature of change	Typical skills response	Example occupations
Low-skilled jobs	Occupations change in a generic way, e.g. requiring increased environmental awareness or simple adaptations to work procedures	On-the-job learning or short reskilling and upskilling programmes	Refuse/waste collectors, dumpers
Medium-skilled jobs	Some new green occupations Significant changes to some existing occupations in terms of technical skills and knowledge	Short to longer upskilling and reskilling programmes; VET courses	New jobs: wind turbine operators; solar panel installers Changing jobs: roofers; heating, ventilation and air conditioning technicians; plumbers
High-skilled jobs	Locus of most new green occupations. Significant changes to some existing occupations in terms of technical skills and knowledge	Tertiary education degrees; longer upskilling programmes	New jobs: agricultural meteorologists, climate change scientists; energy auditors; carbon trading analysts Changing jobs: building facilities managers; architects; engineers

Source: ILO (2019), *Skills for a greener future: A global view based on 32 country studies*, https://www.ilo.org/.

Preparing and supporting individuals to learn, unlearn and relearn

Several building blocks are needed to ensure the responsiveness of training systems to evolving skill demands.

Assessing and anticipating skill needs

A first component is the use of skills intelligence to identify skill needs early on (OECD, 2016). Information on the supply and demand of skills is necessary to align qualifications and programmes and to prevent skills gaps and shortages.

Many countries have integrated green elements into pre-existing monitoring mechanisms, such as sectoral skills councils, advisory groups and employer surveys (ILO, 2019). Permanent mechanisms dedicated to monitoring and anticipating green jobs and skills specifically are less common, although there are some exceptions.

In France, for example, a National Observatory for Jobs and Occupations of the Green Economy, Onemev, was created in 2010. In collaboration with a broad range of institutions, it produces regular information on the evolution of the green economy (Cedefop, 2019).

Upgrading training provision

Countries with well-developed vocational education and training (VET) systems have incorporated general environmental considerations as cross-cutting themes in all training programmes. In Spain, for example, all VET diplomas incorporated some 'green' content by 2010 (Cedefop, 2019).

Since changes in skills tend to concentrate in existing jobs, VET qualifications and programmes have updated their technical knowledge requirements to reflect the use of greener technologies and processes in the workplace (ILO, 2019). After 2010, the Spanish VET system was further upgraded, revising its diplomas and developing new ones. By mid-2017, 21 VET diplomas were dedicated to green jobs, 17 of which had been created since 2010. In addition, 78 new diplomas included content linked to green criteria, such as green regulations.

Involving employers in the design and delivery of VET programmes and qualifications can enhance VET responsiveness. In some countries, social partners are the ones taking the initiative to update existing VET qualifications and create new ones (ILO, 2019).

Furthermore, work-based learning, such as apprenticeships and internships, are common in some countries. Work-based programmes help workers acquire practice-oriented knowledge and valuable employability skills. They can also provide access to state-of-the-art equipment and infrastructure (OECD/Cedefop, 2014).

Making training more accessible

Supporting all individuals to adapt to the changes created by the green economy requires greater inclusion in training systems.

On the one hand, this means closing gender gaps in training across fields of study. Technology-driven emerging and changing jobs, such as those in the field of renewable energy, remain dominated by men. Women are largely underrepresented in technology-related studies such as engineering, manufacturing, and construction, both at secondary and tertiary education (OECD, 2020b).

On the other hand, upskilling and reskilling workers who face rapidly evolving skill demands means implementing lifelong learning strategies, rather than front-loading qualifications and training.

Climate Action Plan 2050 (Germany)

With the goal of becoming largely greenhouse gas neutral by 2050, the German's government Climate Action Plan 2050 aims to provide guidance in fields ranging from energy, the buildings and transport sector to industry, business, agriculture and forestry while covering all three dimensions of sustainability – environmental, economic and social.

The Plan explicitly recognises the role of education with reference to vocational skill development. It emphasises the need for governmental efforts to improve climate education along the entire educational chain; integrating training and education about climate action into funding lines; providing research funding that is linked to market requirements and innovative measures; and promoting the participation of various actors – the federal states and local authorities, business, industry, and community – in climate-related actions.

For more information:
https://www.bmu.de/.

Yet, many adults do not participate in training, especially in training leading to formal qualifications. Across most OECD countries, the proportion of learners in VET who are 25 years old or older is still low (OECD, 2021a; 2020b). Establishing more flexible entry requirements and modular programmes as well as formally recognising prior learning are measures that can enhance working adults' participation in education and training.

Targeted support for Small and Medium-Sized Enterprises (SMEs) is also important. Two-thirds of the OECD labour force work in SMEs, which frequently do not have the resources for training and may have limited awareness of environmental issues (OECD, 2017b; OECD/Cedefop, 2014).

Career guidance, at school and as part of active labour market policies, can inform students and workers about growing, emerging, and declining sectors and jobs, available training options, and associated support mechanisms (ILO, 2019).

Leveraging research and innovation

The COVID-19 pandemic has underlined the role of science and innovation in preparing for and reacting to crises like climate change. The global pandemic accelerated ongoing trends in open access to data and publications, enhanced international research collaboration, and spurred public-private partnerships to develop vaccines in record time (OECD, 2021b).

The development and rapid diffusion of technologies with positive environmental impact will also be vital to reconciling shared prosperity and environmental sustainability in the years to come (OECD, 2021c).

First, this requires policies that facilitate the adoption of already existing 'green' technologies, including fiscal policies incentivising sustainable consumption choices and green public procurement norms and practices.

It also requires a sustained investment in research and development activity, which fosters international collaboration, incentivises long-term, risk-taking research, and ensures that publicly-funded research outputs are made widely available to scientists and innovators.

Higher education institutions play a crucial role in (re)imagining, innovating, and experimenting with new practices that will build a sustainable future. To this end, HEIs will need to modernise existing research training programmes and redesign their processes and structures to foster greater transdisciplinary research (OECD, 2021b; Gwilliam and Peterbauer, 2021; Dyer and Andrews, 2011).

Towards the future

Questions for further thinking:

1. How are extreme weather events due to climate change (e.g., heatwaves and floods) affecting your education system? How might they in five or ten years? What schooling arrangements (e.g., calendar, schedules) and resources (e.g., infrastructure, transport) may need to be adapted?

2. How might climate change affect the inequalities present in your education system? Would you expect them to increase, decrease, or shift? What can be done to reduce current and expected inequalities?

3. Regular connection to nature has many benefits for learning and well-being, but is the environment in and surrounding educational institutions always healthy or, indeed, "natural"? How can urban planning, design and regulation ensure safety and well-being in educational institutions and their communities?

References

Cedefop (2019), *Skills for green jobs: 2018 update: European synthesis report*, *Cedefop reference series*, No. 109, Publications Office of the European Union, Luxembourg, http://data.europa.eu/doi/10.2801/750438.

Chawla, L. (1998), "Significant life experiences revisited: A review of research on sources of pro-environmental sensitivity", *The Journal of Environmental Education*, Vol. 29/3, pp. 11–21, https://doi.org/10.1080/00958969809599114.

Cheng, W., et al. (2018), "Green Public Procurement, missing concepts and future trends–A critical review", *Journal of Cleaner Production*, Vol. 176, pp. 770-784, https://doi.org/10.1016/j.jclepro.2017.12.027.

Damerell, P., C. Howe, and E. J. Milner-Gulland (2013), "Child-orientated environmental education influences adult knowledge and household behaviour", *Environmental Research Letters*, Vol. 8/1, https://doi.org/10.1088/1748-9326/8/1/015016.

Dyer, G. and Andrews, J. (2011), "Higher education's role in adapting to a changing climate, American College and University Presidents' Climate Commitment", http://secondnature.org/publications/higher-educations-role-in-adapting-to-a-changing-climate/.

Echazarra, A. (2018), "Have 15-year-olds become "greener" over the years?", *PISA in Focus*, No. 87, OECD Publishing, Paris, https://doi.org/10.1787/6534cd38-en.

European Commission (2016), *Buying green! A handbook on green public procurement*, European Union, https://doi.org/10.2779/246106.

Facer, K. (2020), "Beyond business as usual: Higher education in the era of climate change", *HEPI Debate Paper*, No. 24, Higher Education Policy Institute, https://www.hepi.ac.uk/.

Frisk, E., and K. L. Larson (2011), "Educating for sustainability: Competencies & practices for transformative action", *Journal of Sustainability Education*, Vol. 2/1, pp. 1-20.

Gatersleben, B., N. Murtagh, and W. Abrahamse (2014), "Values, identity and pro-environmental behaviour", *Contemporary Social Science*, Vol. 9/4, pp. 374-392, https://doi.org/10.1080/21582041.2012.682086.

Gibb, N. (2016), *Getting Climate-Ready: A Guide for Schools on Climate Action*, UNESCO, Paris, https://unesco.org/.

Gwilliam, J., and H. Peterbauer (Eds.) (2021), "Environmental sustainability of learning and teaching: Thematic Peer Group Report", *Learning and teaching paper*, No. 14, European University Association, https://eua.eu/.

Hadjichambis, A. Ch., et al. (Eds.) (2020), *Conceptualizing environmental citizenship for 21st century education*, Springer Nature, https://doi.org/10.1007/978-3-030-20249-1.

ILO (2019), *Skills for a greener future: A global view based on 32 country studies*, International Labour Office, Geneva, https://www.ilo.org/.

ILO (2018), *World Employment Social Outlook 2018: Greening with jobs*, International Labour Office, Geneva, https://www.ilo.org/.

Jensen, B. B. (2002), "Knowledge, action and pro-environmental behaviour", *Environmental education research*, Vol. 8/3, pp. 325-334, https://doi.org/10.1080/13504620220145474.

Kollmuss, A., and J. Agyeman (2002), "Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?", *Environmental education research*, Vol. 8/3, pp. 239-260, https://doi.org/10.1080/13504620220145401.

OECD (n.d.), "Climate action", in Global Teaching Insights, https://www.globalteachinginsights.org/.

OECD (2021a), *OECD Skills Outlook 2021: Learning for Life*, OECD Publishing, Paris, https://doi.org/10.1787/0ae365b4-en.

OECD (2021b), *OECD Science, Technology and Innovation Outlook 2021: Times of Crisis and Opportunity*, OECD Publishing, Paris, https://doi.org/10.1787/75f79015-en.

OECD (2021c), "Aligning short-term recovery measures with longer-term climate and environmental objectives: A background report prepared by the OECD for the 2021 G20 Presidency of Italy", https://www.g20.org/.

OECD (2020a), *PISA 2018 Results (Volume VI): Are Students Ready to Thrive in an Interconnected World?*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/d5f68679-en.

OECD (2020b), *Education at a Glance 2020: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/69096873-en.

OECD (2019a), *PISA 2018 Results (Volume I): What Students Know and Can Do*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/5f07c754-en.

OECD (2019b), *Trends Shaping Education 2019*, OECD Publishing, Paris, https://doi.org/10.1787/trends_edu-2019-en.

OECD (2017a), *Schools at the Crossroads of Innovation in Cities and Regions*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/9789264282766-en.

OECD (2017b), *Employment Implications of Green Growth: Linking jobs, growth, and green policies*, OECD report for the G7 environment ministers, July 2017, https://www.oecd.org/.

OECD (2016), *Getting Skills Right: Assessing and Anticipating Changing Skill Needs*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264252073-en.

OECD (2007), *PISA 2006: Science Competencies for Tomorrow's World: Volume 1: Analysis*, PISA, OECD Publishing, Paris https://doi.org/10.1787/9789264040014-en.

Paniagua, A. and D. Istance (2018), Teachers as *Designers of Learning Environments: The Importance of Innovative Pedagogies*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/9789264085374-en.

OECD/Cedefop (2014), *Greener Skills and Jobs*, OECD Green Growth Studies, OECD Publishing. http://dx.doi.org/10.1787/9789264208704-en.

Schulz, W. et al. (2017), *Becoming Citizens in a Changing World: IEA International Civic and Citizenship Education Study 2016 International Report,* IEA, Amsterdam, https://doi.org/10.1007/978-3-319-73963-2.

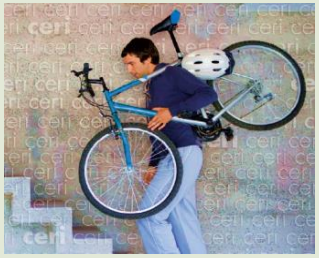
Sönnichsen, S. D., and J. Clement (2020), "Review of green and sustainable public procurement: Towards circular public procurement", *Journal of Cleaner Production*, vol. 245, https://doi.org/10.1016/j.jclepro.2019.118901.

Stoeber, H., M. Gaebel, and A. Morrisroe (2021), "Greening in European Higher Education Institutions, EUA Survey Data", EUA.

Tucker, R., and P. Izadpanahi (2017), "Live green, think green: Sustainable school architecture and children's environmental attitudes and behaviors", *Journal of environmental psychology*, Vol. 51, pp. 209-216, https://doi.org/10.1016/j.jenvp.2017.04.003

Wheeler, L., J. R. Guevara, and J. A. Smith (2018), "School–Community learning partnerships for sustainability: Recommended best practice and reality", *International Review of Education*, Vol. 64/3, pp. 313-337, https://doi.org/10.1007/s11159-018-9717-y.

For more information:



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See: **OECD (2019), *Trends shaping education 2019*, OECD Publishing**

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