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Impact of COVID-19 on Education for Sustainable Development (ESD) in the context of twin transition

Analytical Report 02/2021

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Impact of COVID-19 on Education for Sustainable Development (ESD) in the context of twin transition

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ABOUT EENEE

EENEE is an advisory network of experts working on economics of education and training. The establishment of the network was initiated by the European Commission's Directorate-General for Education and Culture and is funded by the Erasmus+ Programme. PPMI is responsible for the coordination of the EENEE network. More information on EENEE and its deliverables can be found on the network's website www.eenee.eu. For any inquiries, please contact us at: eenee@ppmi.lt.

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Executive summary

Background

The COVID-19 pandemic is a global crisis which has demonstrated how interconnected societies, human systems, and environmental systems are. It is an example of a sustainability challenge of responding to a crisis and preparing for the aftermath of such and future crises. This report focuses on one human system – that of education, and the changes and potential role Education for Sustainable Development (ESD) did or could have made. The report analyses challenges and opportunities created by the pandemic taking into account, where possible, the EU economy twin transition – digital and green, as well as other relevant EU initiatives and policies. Other considerations were global initiatives such as the sustainable development goals (SDGs) and the UNESCO 2020-2030 Strategic Objectives for Education for Sustainable Development (ESD).

Structure and methodology

The report is based on desk-based research, including a literature review and policy documents related to the impacts of COVID-19 on ESD. As COVID-19 is still ongoing, the narrative regarding policy responses and the impact on ESD is also still unfolding. The analysis also examined the transformation required for an 'at-scale' reorientation to ESD in the EU Member States.

Many of the policy responses uncovered did not necessarily target ESD but targeted the provision of education generally at each level. The authors organised their research around the concept of sustainability and ESD for each level (primary and secondary education, VET, higher education). The integration of ESD and impacts on this process by the COVID-19 pandemic were then analysed following the dimensions and aspects of sustainability relevant to each education level. The conclusions and recommendations are based on the identified trends and recognised needs for policy consideration.

Definitions used

Education for Sustainable Development (ESD):

ESD empowers learners to make informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education. ESD is holistic and transformational education, which addresses learning content and outcomes, pedagogy and the learning environment. (UNESCO)

Competences

Competences in sustainability: *'the interlinked set of knowledge, skills, attitudes, and values that enable effective, embodied action in the world with respect to real-world sustainability problems, challenges, and opportunities, according to the context.'* (Bianchi, G. (2020), *Sustainability competences*, EUR 30555 EN, Publications Office of the European Union, Luxembourg)

The impact of COVID-19 on ESD in schools

Embedding ESD in schools requires transformative pedagogies shifting from the didactic approach to teaching to the co-creation of knowledge with teachers and students learning

together. It could and should also lead to engaging other partners (e.g. business, media, parents) in co-creation of knowledge and shared learning rather than as experts brought in. In addition, delivery of ESD requires a whole-school approach, focusing not only on the content ('what') but also the 'how' and 'why' we are educating. It calls for reconsidering the purpose of schooling, the content of education (curriculum) and exams, the learning environment, and the pedagogies used. The overall objective of education would need to shift to the development of ESD competences rather than success in exams.

Studies show that before COVID-19, national and institutional policies and approaches to adoption and practice of ESD had varied hugely across EU Member States. At the time of writing, analysis of the longer-term impact of COVID-19 on schools and students in terms of ESD was limited in academic literature, mainly to predictions of the impact. However, it is clear that the pandemic which affected approximately 825 million learners (by school closures in response to the pandemic), has also affected the delivery and promotion of ESD.

In the context of ESD, COVID-19 had at least a threefold impact on the **curricula**. Due to the move to online / blended learning, the critical thinking and analysis of sustainability-related information required teachers to have solid ICT skills to engage students in debate, challenge thinking, and encourage group work. Though some teachers use such skills in the classroom, the evidence shows that this was a new skill set to learn for many. Secondly, due to the lack of face-to-face contact, the typical experiential ESD activities schools normally undertake (active projects, eco-days, eco-clubs) were not possible. Finally, with external exams and monitoring of schools being postponed or cancelled there was a need to re-evaluate how to monitor student progress and success. This lays the ground open to guidance, if not policies, on embedding sustainability competencies in school systems, and Member States could follow the lead of countries that have already done the groundwork.

Effective development of sustainability competences, which is the goal of ESD, requires **pedagogies** that are problem or enquiry-based. These were challenged at the start of the COVID-19 pandemic, as many schools and teachers did not have any experience of online learning and had to develop new pedagogical approaches via digital platforms. It sometimes led, however, to positive developments, when teachers moved from a lecturing approach to embracing interactive, participatory approaches.

COVID-19 led to many changes in access to traditional **learning environments**. The use of outdoor spaces and visits to 'green' spaces, which had always been an important component of ESD, were encouraged. Building experiences of students and teachers of moving the learning from the classroom to other environments can be considered a promising approach to be continued after the pandemic.

Coping with the new education realities inflicted by the pandemic required substantial accommodation by teachers. It showed that **teachers** lack **training** in risk and resilience building, outdoor use, flexible timetabling, use of IT, measuring learning outcomes in different ways to exams, partnering with communities and businesses, inclusivity and well-being of students when they learn remotely.

The examples of repatterning of relationships as a response to COVID-19 restrictions, shows that it would be also possible to repattern relationships towards embedding ESD in school practice and curriculum, including working with businesses and communities. The adoption of blended learning also shows the ability of the systems and teachers to adapt and focus more on the role of 'facilitator' rather than the deliverer of content, which is necessary for effective ESD, too. Finally, there could be a positive potential impact on the uptake of ESD in the EU if schools continue engaging parents in learning for sustainability with their children.

The impact of COVID-19 on ESD in vocational education and training

The pandemic has highlighted problems that existed in vocational education and training before, such as the digital divide by gender, age, birth origin (migrant students and workers), employment status, social status, and location (urban and rural areas). Additionally, there are also potential risks for other key dimensions of VET, particularly in facilitating transitions to and within the world of work, as well as enabling the capacity-building for sustainable development. The weak progress in sustainable development curriculum design stands out, where competences for sustainability are far from being systematically integrated into vocational teaching-learning processes. Those impacts of a pandemic may be seen as threats to implementing ESD in VET in a short-, medium- and long term.

During the pandemic, the main focus of VET systems was to ensure that both the school-based and company-based initial vocational education and training (IVET) models continued to function, so that young people could still gain the education necessary for their personal development. Countries adopted a variety of measures to facilitate online access (students, families, VET schools and training firms), spanning enhanced connectivity, IT infrastructure, devices, digital learning platforms, etc.

As for employee training, there appears to have been little systematic effort to support further employers in using lockdowns to train their staff. In those cases, with public support, continuing training was usually related to online training that was already available before the outbreak of COVID-19. Although there are certain differences between European countries, the window of opportunity to strengthen training in firms and training for the unemployed has been underexploited.

The response to COVID-19, both from governments and from the VET system itself has been fundamentally aimed at ensuring access to and provision of VET, mainly through online distance learning environments. The practical absence of preparation in the VET field — both in Europe and worldwide — for a crisis of such magnitude has become evident, revealing a threefold problem:

- insufficient pedagogical adaptation of experiential learning processes to online distance learning environments (online learning by doing);
- the difficulty of ensuring the continuance of face-to-face work-based learning options (apprenticeships and internships);
- limited socialisation of learners – students' opportunities diminished in terms of the experience acquired in the workplace, the relational capital gained, and the personal maturity achieved.

VET systems need to ensure that all learners acquire the competences needed to promote sustainable development, as well as provide youth and adults with the relevant information and awareness of it. Also, it requires stronger integration of other key functions of VET, such as the promotion of (green/sustainable) technology transfer and locally applied innovation. Before COVID-19, the promotion of ESD in VET was generally minimal at both the European level and in the Member States. During the pandemic, it appears that digitalisation at the organisational level has been advancing more rapidly than embedding sustainability. In this regard, governments have greater room for manoeuvre in providing a comprehensive framework for strategies, action, monitoring, and assessment of VET for sustainable development.

However, it is also necessary to point out that the pandemic has had effects that may help to make the most of this global crisis in terms of promoting sustainability. Firstly, the pandemic has reinforced public discourse on the relevance of VET to address the present and future of Europe in terms of sustainable competitiveness, social equity and resilience. Secondly, the various initiatives that allowed to continue accessing VET during the

pandemic show a strong institutional and educational framework in Europe, which highlights our strengths and assets to move forward with the new curricula, competences and methodologies towards sustainability. Finally, in the Berlin Declaration, the roadmap for ESD is reinforced as a result of the pandemic, which allows the European Union to give a new political impetus to VET for sustainable development.

The impact of COVID-19 on ESD in higher education

In higher education (HE), approximately 220 million students globally have been affected due to the disruption caused by COVID-19. Studies recognise major influences of the pandemic on the core aspects of higher education: education, research, institutional framework, and community outreach.

In the dimension of **education**, the urgent shift to online learning and teaching in HEIs led to a situation where the focus was put on teachers' digital skills and use of platforms, rather than on competences in teaching and integrating ESD in HE. In addition, online learning led to lack of engagement and activity of students, as well as limited opportunities to connect with real-life experience, not to mention the increased stress and social isolation and inequality of students and teachers, in terms of internet access.

In terms of **research** – another core function of HEIs – the dominant orientation toward health-related issues lead to lack of research on other important issues related to sustainable development. The disruption of projects or restrictions on fieldwork caused by COVID-19, inflicted risks for obtaining the data and disturbed the dynamic of research. Many conferences were cancelled or postponed, which reduced communication and exchange of knowledge between researchers.

The developments of the pandemic affected the **institutional framework** of HEIs. The frequent changes and uncertainty led to difficulties in long term-planing of sustainable governance, and the lost income from tuition or public funds challenged the financial sustainability of HEIs. As the whole-institution approach is key for the holistic delivery of ESD, the closure of institutions and campuses disrupted the delivery of usual services and 'greening practices'.

Finally, the pandemic caused barriers for **community outreach**, as emergency needs in healthcare and economic challenges inflicted risks of economic crisis and social isolation, followed by unequal access of people to education, technology and employment. The pandemic also heightened the issues of equity and inclusiveness, delivery of lifelong learning, and the quality of results in HE. Threats to equity, inclusiveness, lifelong learning and quality of education can compromise progress toward implementation of SDGs and thus the success in integrating ESD in HE.

Besides its negative effects, the pandemic also has transformative potential for education. Creative use of information and communication technologies (ICTs) in sustainable leadership, providing transparency of decision-making processes, policy measures and changes can contribute to a more enabling environment for the development of a 'culture' of sustainability, increasing the chances for quality integration of ESD in all HEI segments.

The impact of the COVID-19 pandemic opens the space for re-designing curricula and strategies in teaching sustainability at HEIs. Changes caused by the pandemic in environmental, social and economic aspects of life and developments have provided an opportunity to critically reflect on previous perspectives, searching for constructive solutions and scenarios for the future.

COVID-19 impacts strengthen the need for collaboration and sharing experiences between teachers and researchers in teaching for sustainability. Online conferences and workshops on sustainability issues significantly contributed to bridging the gap between that need and

opportunities to meet 'face to face' due to many restrictions applied. It also improved access to professional development and learning programmes for teachers, researchers and students from HEIs in the ESD field.

Despite many common challenges, the response of HEIs around the world to the changes brought by the COVID-19 pandemic varied but is generally estimated as quick and efficient, assuring continuation of studies. Lessons learnt and the reflection on experiences should be used at the institutional as well as the systems' level in order to improve resilience for coping with future challenges as an important segment of competences for sustainability.

Reflections and recommendations: impact of COVID-19 on ESD as the window of opportunity to transform education and society

COVID-19 has caused a global health and sustainability crisis. One of the greatest disruptions has occurred in the education sphere, meaning that all different educational levels (primary and secondary schools, VET schools and HEIs) have been affected across all their functions. Based on the analysis of trends and threats to the institutional, normative, socio-economic and territorial frameworks articulated around each level of education, challenges and barriers may also be seen as opportunities to contribute to the transformation of education and its supporting systems. The key recognised recommendations facing ESD are structured according to the five UNESCO 2020-2030 Roadmap priority areas: advancing policy; transforming learning environments; building capacities of educators; empowering and mobilising youth; accelerating local level actions.

Moreover, each priority area is articulated from a systems-thinking approach:

a) A system paradigm shift;

b) A change in whole-system goals;

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD;

d) A reconfiguration of structures and flows within the education system.

1. Advancing ESD policy for ESD

Future policy preparedness for education sustainability

a) A system paradigm shift

- Rethinking education ecosystems in terms of sustainable development beyond digitalisation, bringing the educational offering into line with the prevailing social demand for sustainability.

b) A change in whole-system goals

- Providing appropriate strategy and governance is a *sine qua non* for efficient and effective ESD, as it enables the design and development of an ESD policy framework and regulations. Governance of ESD must involve representatives from all areas within the educational ecosystems (primary and secondary education, VET and HE).
- Integrating and prioritising ESD policies at the national, regional and local level, applying holistic and cross-sector policy approaches.
- Developing an integrated ESD information system or other SD reporting, surveillance and enforcement mechanisms which, under a harmonised and flexible approach, make it possible to monitor and evaluate countries' and regions' progress towards ESD, which in turn requires comprehensive, reliable data on ESD.
- Developing public means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing public perceptions of sustainability.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Including ESD criteria (cross-sector, transdisciplinary, collaborative, participatory) in the provision of grants and funds for innovation in education.
- Integrating ESD planning into the lifelong learning curriculum (from early childhood education through to active ageing). Dedicating resources to expanding, adapting and innovating education and training offerings to correct the lack of coverage sustainability receives in European education systems.
- Developing public means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing public perceptions of sustainability.

d) Reconfiguration of structures and flows within the education system

- Strengthening resources to support equity and inclusiveness in education for children, young people and adults, including non-formal and informal programmes for communities and stakeholders.
- Fostering research, technology transfer and innovation programmes and schemes for sustainability projects, in particular in senior years at school, VET and HE. Programmes, incentives and investment in research and innovation must be promoted in both blended SD learning for all and work-based learning for sustainable development for young people and adults.
- Developing proximity policies, bringing the focus of analysis of ESD shortfalls at the different educational levels (primary and secondary, VET and HE) down to at least regional level by 2030 (e.g., 'Regional ESD systems' – RES30) and prioritising knowledge and experience of SD in terms of proximity and the needs of the respective education ecosystems.

2. Learning environments for ESD

Promoting a whole-institution approach towards ESD

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Promoting a whole-institution approach to ESD: governance, estates/campus, procurement, curriculum, community/stakeholders, action learning/research.
- Creating mechanisms for ESD coordination in education systems, including the needs and activities related to emergency prevention, preparedness, and response.
- Developing internal means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing schools', VET and HE institutions' perceptions of sustainability.
- Conducting constant monitoring and evaluation so that school/vocational organisation/university operation and the outcomes achieved in terms of sustainability are continuously improved.

d) Reconfiguration of structures and flows within the education system

- Enhancing learning environments to support the development of competences of children, young people and adults, facilitating their human development at a cognitive, affective and behavioural level, in the context of contributing to sustainable development.
- Promoting and supporting collaboration between students and teachers, communities, trainers and academic/non-academic staff in action research and activities addressing sustainability and the impacts of the pandemic (e.g., through collaborative project-based learning).
- Ensuring and allocating funds for financial support to students and staff (technology, tools for teaching and learning, etc.) and ensuring that policies are created to ensure that disadvantaged students have access to online learning.
- Design and develop rigorous quality assurance systems specific to education settings to guide the whole-institution approach.
- Intensifying communication through online and social media channels, assuring transparency of information and opportunities for students and staff to participate in decision-making processes, including full and clear information on policy regarding the measures against the pandemic.
- Developing clusters of schools with active and dynamic management teams to act as learning hubs by building networks around them, to move to scale and move beyond merely ad hoc activities.

- Embedding ESD in schools, VET schools and universities and other educational and training organisations means developing or updating ESD and sustainability strategies at the institutional level, incorporating the lessons learnt during the pandemic.

3. Teachers and educators for ESD

Providing SD capacity development in:

b) A change in whole-system goals

- Authorities must multiply their plans and programmes to meet the needs detected among teaching staff (and among non-teaching staff) in terms of sustainability experience: knowledge and understanding of SD, sustainability competences and skills and use of learning methodologies for ESD.
- Fostering sustainability knowledge and competences, using the framework developed by UNESCO (for instance, anticipatory competency, normative competency, strategic competency, collaboration competency, critical thinking competency, self-awareness competency and integrated problem-solving competency), or the future European key competence framework on sustainability.
- Relevant competences for a sustainable production system (efficient technologies, clean technologies, Artificial Intelligence, etc.)
- Innovative and sustainable blended experiential formats and work-based learning (apprentices, trainees, etc. for SD).
- Providing incentives for organising and participating in local and global gatherings, webinars and conferences dealing with issues of sustainability teaching and integration of issues related to the impacts of the pandemic into curricula.
- A stable ESD training framework for teachers, with clear priorities and supported by incentives and traceable ESD and SD specialisation in the short, medium and long term.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Integrating sustainability and ESD into the pre-service education of teachers at all the education levels and encouraging subsequent lifelong learning and training throughout their careers.
- Supporting knowledge sharing and improving online teaching strategies based on a participatory and transformative approach.
- Maximising the synergies, support and incentives needed to advance applied research into sustainability-oriented education.

d) Reconfiguration of structures and flows within the education system

- Having a sustainability information system for teachers to ensure effective vocational guidance and to adapt the education and training offering.
- Creating new prescriptive roles, such as that of sustainability adviser for educators, and boosting actions and experiences that promote sustainability culture among teaching staff.

4. Youth and ESD

Providing opportunities for youth engagement

a) A system paradigm shift

- Supporting initiatives involving joint projects and activities between students and staff of schools, VET schools and universities, addressing the sustainability of institutions or communities or the quality of education.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Involving students in decision-making on all important issues related to the impacts of the pandemic, policy or structural changes, and sustainable development.
- Supporting students' networks and associations in providing help or assistance to international students, those hit by the impacts of COVID-19 or those who are disabled or marginalised.

d) Reconfiguration of structures and flows within education

- Better support for students in identifying and encouraging their interest in SD and the development of personalised learning pathways as part of lifelong vocational guidance.
- Encouraging socialisation of students in both the world of education and the world of work in a changing world, focusing on a sustainable and just future for all.

5. Community and ESD

Empowering local communities as 'nodal' platforms for all priority action areas

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Initiating activities to meet emerging needs of communities during and after the pandemic, providing professional and voluntary support from staff and students at primary and secondary schools, VET schools and universities, promoting solidarity and collaboration.
- Establishing and strengthening partnerships with local stakeholders contributing to practical inputs to teaching and learning for sustainability.
- Fostering knowledge, research and innovation both within the educational ecosystems (primary and secondary education, VET and HE) and towards local communities, firms and institutions to foster sustainability and ESD.

d) Reconfiguration of structures and flows within education

- Involving community members in action research and capacity development programmes addressing local and global sustainability issues and global trends.

Looking across all three education sectors (schooling, VET and higher education), the pandemic has focused more attention on the purpose of education to be about thriving in a changing world and not just on jobs and careers. It has also fast-tracked the use of remote learning and IT in the education sector, sometimes without much training available. It has questioned how and where educational institutions can operate.

In a moment of change, as the pandemic has been, many other aspects of society will also be questioned and re-examined. They include the climate crisis and other sustainability issues which have been highlighted or heightened during the pandemic.

Integration of sustainability through ESD into the system – from policy through institutional transformation, human resources and community development – contributes to the systemic changes, necessary to meet complex demands of today and tomorrow. The synergy of 'top-down' and 'bottom-up' actions and processes is needed at all the levels of education and aspects of life in all the regions around the world. Massive changes caused by the pandemic create opportunities to learn from it and to contribute to the resilience of citizens and systems in order to cope with possible new disasters sustainably. Implementation of ESD in all levels of education can significantly support that process.

1. Introduction

The COVID-19 pandemic is a global crisis which has demonstrated how interconnected societies, human systems, and environmental systems are. It is an example of a sustainability challenge of responding to a crisis and preparing for the aftermath of such and future crises. This report focuses on one human system – that of education, and the changes and potential role Education for Sustainable Development (ESD) did or could have made. The report analyses challenges and opportunities created by the pandemic taking into account, where possible, the EU economy twin transition – digital and green, as well as other relevant EU initiatives and policies. Other considerations were global initiatives such as the sustainable development goals (SDGs) and the UNESCO 2020-2030 Strategic Objectives for Education for Sustainable Development (ESD). Of direct use here is SDG 4.7, but it must also be noted that education is seen by UNESCO as crucial to achieving all the SDGs.

> *Target 4.7* By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

The report covers school education, vocational education and training, and higher education. The chapters are organised to cover different education levels but have a similar structure:

a) How COVID-19 actually and potentially impacted delivery and promotion of ESD; and
b) How COVID-19 impacts green skills / sustainability competences at each education level.

1.1. Methodology used

The report is based on desk-based research, including a literature review and policy documents related to the impacts of COVID-19 on ESD. As COVID-19 is still ongoing, the narrative regarding policy responses and the impact on ESD is also still unfolding. The analysis also examined the transformation required for an 'at-scale' reorientation to ESD in the EU Member States.

Many of the policy responses uncovered did not necessarily target ESD but targeted the provision of education generally at each level. The authors organised their research around the concept of sustainability and ESD for each level (primary and secondary education, VET, higher education). The integration of ESD and impacts on this process by the COVID-19 pandemic were then analysed following the dimensions and aspects of sustainability relevant to each education level. The conclusions and recommendations are based on the identified trends and recognised needs for policy consideration.

1.2. Definitions used

For this report, we will use the definition of Education for Sustainable Development (**ESD**) as:

ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education. ESD is holistic and transformational education, which addresses learning content and outcomes, pedagogy and the learning environment. (UNESCO, 2018)

The following definitions for **competences** are used for this document.

Competences in sustainability: *'the interlinked set of knowledge, skills, attitudes, and values that enable effective, embodied action in the world with respect to real-world sustainability problems, challenges, and opportunities, according to the context.'* (Bianchi, 2020)

1.2.1. A systems approach

Education exists as a human system, and to analyse it, it needs to be reviewed it as such. This report uses a systemic approach to analyse the impact of COVID-19 on ESD (adoption or further embedding), given that COVID-19 was a systemic crisis. It revealed emergent strategies to cope with a sudden global crisis, which it is possible to learn from. A systems approach for change and identifying leverage points or processes can be viewed in four levels, as suggested by Birney (2021):

a) ESD requires a paradigm shift in our thinking about the world we inhabit and, therefore, education;
b) A change in whole education system goals;
c) A repatterning of relationships, cultivating systemic ways of organising towards ESD;
d) A reconfiguration of structures and flows within the education system.

1.2.2. Whole-institution approach

Using a whole-institution approach (WIA) to sustainability and ESD would provide the governance, support and learning environment that would support the teacher's work and development. This report uses the developmental improvement WIA model as developed by UNESCO during its GAP programme (2014-2019). It is an appreciative enquiry starting point and can be adjusted to individual education settings as an institution develops its learning and understanding of sustainability (SEEd, 2021). The six domains of the UNESCO WIA framework are:

1. Governance – i.e., policies, mission, funding, training, responsibilities;
2. Estate – i.e., the buildings and grounds;
3. Procurement – i.e., what the institution buys in;
4. Curriculum – the design, intent, outcomes (including sustainability competencies), and approaches to teaching and learning;
5. Community/stakeholders – the ways in which the institution works with others to make learning for sustainability a real-world learning opportunity;
6. Action learning / research for the development of sustainability and ESD practice, evidence of impact, and ongoing improvement.

Research has shown that adopting this model has led to a change in culture and sustained sustainability work in educational institutions, moving it on from ad hoc or 'add-on' types

of activities to a more central role in the organisation of the education institution (UNESCO, 2019).

1.3. Impact of COVID-19

The COVID-19 pandemic has affected all aspects of economic, social, and education systems both directly and indirectly. Closures of education establishments, remote learning, and cancellation of education processes, such as exams, have been direct. However, the impact on jobs, income, economies, and inequalities has also been affecting the education community. The media, other literature and social media have run and hosted discussions that reflect the questioning of the following dimensions of modern society:

- Consumption and production/competitiveness;
- Pandemic mutual aid;
- Role of community in education;
- Adaptation and resilience to crises;
- Role of governments;
- Global-scale and interconnectivity of the pandemic;
- Deepened inequalities with the poorest suffering most;
- Need for disaster planning for education systems and institutions;
- Socialisation and well-being, and the benefits of the outdoors/nature.

Many of these directly link to ESD through concepts such as resilience, critical thinking, systems-thinking, interconnectedness of global societies, disasters and well-being.

1.3.1. Looking across three education sectors

The pandemic has focused more attention on the purpose of education to be about thriving in a changing world and not just a focus on jobs and careers. It has also fast-tracked the use of remote learning and IT in the education sector. It has questioned how and where educational institutions can operate.

In a moment of change, as the pandemic has been, many aspects of society, such as those listed above, will also be questioned and re-examined. This report, therefore, explores how to make use of the pandemic, how to build from the pandemic, and how to prepare for future crises.

The key issues across all education systems have emerged, and these are:

- The urgency for transformative change in the education systems to ESD;
- The need to scale which will involve top-down and bottom-up approaches;
- The need to use co-learning approaches to achieve the urgency and scale issues above;
- The need to think about education as a system and the context in which it sits – especially the twin transition to digital and green economy.

1.3.2. Recommendations

The recommendations have been organised by the five UNESCO 2020-2030 (UNESCO, 2021c) Roadmap priority areas in Chapter 5. These are:

a) Advancing Policy;
b) Transforming Learning Environments;
c) Building Capacities of Educators;
d) Empowering and Mobilising Youth;

e) Accelerating Local Level Actions.

2. The impact of COVID-19 on ESD in schools

There are approximately 1.9 billion school-age children in the world, and prior to COVID-19 in 2020, globally, 258 million students were out of school. The estimates were that even in high-income countries, '30% of children were not mastering basic secondary education skills needed to thrive in work and life' (Vegas and Winthrop, 2020). This background situation needs to be considered when examining the impact of COVID-19. The COVID-19 school responses reflected the fact that this was a new phenomenon, and previous pandemics did not necessarily lead to useful predictive models or were not in line with the politics of that country. Research by UNESCO during the pandemic on school closures has shown the following:

Mid-April 2020: A total of 1.725 billion students globally had been affected by the closure of schools and higher education institutions in response to the COVID-19 pandemic. According to the UNESCO Monitoring Report, 192 countries had implemented nationwide closures, affecting about 99% of the world's student population (UNESCO).

12 January 2021: Approximately 825 million learners were affected by school closures in response to the pandemic. According to UNICEF monitoring, at the beginning of 2021, 23 countries were implementing nationwide closures, and 40 – local closures, impacting about 47 % of the world's student population. In 112 countries, schools were open (UNESCO). The pandemic led to very different approaches from country to country and even region to region. The response to reopening schools was also different.

The effect of COVID-19 on ESD in schools must then be thought of as affecting educational:

- **intent** (or purpose of education);
- **implementation** (i.e., change of practice or systems towards ESD where it does not exist or exists at a low level); and
- **impact** (or learning outcomes on current practice where it exists, on teachers, teacher training, and students).

These three areas also need to be cognisant of scale – from the individual teacher and their practice to the education system adopted across a whole country. The longer-term impact is, of course, still unknown, but this review will explore the situation and thinking to date.

The recent study on national and institutional policies and approaches to education for environmental sustainability (Mulvik et al., 2021) shows the huge variability across EU Member States in the adoption and practice of ESD. Many are small scale and pilots. Some of this diversity and variation is due to historical reasons, some due to the emergent state of ESD and some due to difference in ideology. The multi-factorial starting point means that one way for teachers and schools to understand the different approaches being advocated was the framework: learning *in*, learning *about*, learning *through* and learning *for* the environment (Mulvik et al., 2021).

What has characterised the development of EE, and since Rio 1992 ESD, is the broad understanding of two things – how we are all part of an interconnected set of ecosystems, and how we have been affecting those ecosystems which we need to survive. This is important to consider when looking at the impact of COVID-19 on the human system of education in the EU Member States, as the impacts are not just a set of problems but also existential crises.

The need to prepare young people for a partially unknown future (some of which is known e.g., climate change, and some unknown e.g., how societies will cope with climate change), based on the knowledge that is constantly changing and that teachers may not have been trained in, is a major challenge for embedding ESD. The addition of learning *through* (i.e. learning by practising and developing sustainability projects at a variety of scales including school and community), means there is a need to model this new way of learning as schools become laboratories of learning for sustainability rather than purveyors of knowledge. This suggests a change in culture, old structures, and traditions within schools and the system within which they sit.

At the time of writing, analysis on the longer-term impact of COVID-19 on schools and students is limited in academic literature, mainly to predictions of the impact (e.g., Di Pietro et al., 2020), but elsewhere the discussions and debates are expanding. Commentators and reviewers of current education systems, including OECD, UNESCO, BERA (UK), FED, EI, The Great Transition, the Brookings Institute, John Hattie and Steen Nepper Larsen (2021) are focusing on education for this new future and have been boosted by conversations about COVID-19. The new challenges, the scale of them, and the global connectivity that COVID-19 has highlighted have led to new perspectives and opportunities including inequalities in learning outcomes due to access to remote learning tools or the impact of lack of contact on student well-being.

For some, ESD has always been based on futures-thinking, and as such, the need to *transform* education systems has been articulated. However, up until this current set of crises, it would be true to say that most EU education jurisdictions have adopted an *adaptive* approach of adapting current practices and systems to include sustainability and environmental issues (Sterling, 2001). It would also be true to say that as a new field, for many, the practice and understanding of what ESD is varies. This can be summarised into ESD1 and ESD2 as outlined by Scott and Vare (2007), where ESD1 is education *about* sustainability and ESD2 is education *for* sustainability. ESD1 is essentially an adaptive approach, and a backwards-looking approach to what has been created and can often be very content focused. The second approach (ESD2) requires thinking about not just the content (the what) but 'the how and the why' we are educating, i.e., the purpose of schooling, the chosen content of education (curriculum) and exams, the classroom and learning environment, and the pedagogies used. This would suggest that what is needed is a systems approach (Meadows, 2008), placing ESD at the heart of this transition.

Systems-thinking is about leveraging change and is different from many of the management systems that are often used in current education systems. In a systemic approach, the system is not made up of discrete components separated from each other, but all are interconnected through structures and flows. These flows may be staff, pupils, knowledge, money, resources, equipment, policies, expertise. When focusing on students, it leads to emerging work on ESD competences rather than success in exams.

2.1. How COVID-19 impacts delivery and promotion of ESD:

2.1.1. A cultural change and opportunity towards ESD

The Brookings Institute research in 2020 (Vegas and Winthrop, 2020) with evidence from over 160 countries showed that the impact of COVID-19 has led to four global trends:

1. **Accelerating education inequality**, especially in countries where it was already high, and access to online learning is limited.

2. **'A leapfrog moment'** – education innovations that have been on the fringe of mainstream education have become more mainstream as they were needed during

the pandemic. The OECD also conducted a 59-country survey showing that COVID-19 has revealed an enormous potential for transformation (OECD, 2020).

3. **Rising public support of education for teachers** and for their work. The pandemic highlighted the need that parents of all economic levels have involvement for a safe and quality schooling for their children.

4. **New education allies**. School-aged children can spend between 15 % and 20 % of their waking hours in school. The pandemic led to a variety of other community and business partnerships and support to learning during the pandemic (Vegas and Winthrop, 2020).

These global trends could lead to a culture change in education as they coincide with the rising awareness of the climate change and biodiversity crises and awareness of the interest and concern young people have about the future of the planet. In effect, this possible culture change is a systems goal change. This is especially important as sustainability is an evolving area of human activity whose content and facts do not lead to teachers being 'experts' in it. Instead, as Vegas and Wintrop (2020) outline, teachers will need to be the holders of the instructional core of ESD. This is more of a design and facilitating/managing role for teachers. There is little evidence of teacher training and support in this type of role yet (Vegas and Winthrop, 2020). It would need to be built up and supported by policies based both in the school and the jurisdiction that may govern schoolwork.

Using a whole-school approach to sustainability would provide the governance, support, and learning environment to support the teachers' work and development. A developmental school improvement model was tested by UNESCO during its GAP programme (2014-2019). A generic model was adapted to suit all educational institutions from early years to higher education institutions (UNESCO, 2019).

This model uses a continuous school improvement methodology that can be adjusted to individual education settings. Research has shown that adopting this model has led to a change in culture and sustained sustainability work in schools, moving it on from ad hoc or 'add-on' types of activities to a more central role in the organisation of the school (Mogren et al., 2018). It also models the important concepts of lifelong learning, collaboration, and action learning from an early age in a safe environment within the school or organised by the school.

2.1.2. Content of education (curriculum) and exams

Curriculum in this report means 'a systematic and intended packaging of competencies (i.e., knowledge, skills and attitudes that are underpinned by values) that learners should acquire through organised learning experiences both in formal and non-formal settings' (UNESCO).

However, there are different perspectives on it: the **'intended'** curriculum, sometimes called the 'written' and/or 'official' curriculum; and the '**implemented**' curriculum (i.e., what can be assessed and can be demonstrated as learning outcomes / learner competencies) constitutes the 'achieved' or 'learned' curriculum. In addition, curriculum theory points to a **'hidden'** curriculum (i.e., the unintended development of personal values and beliefs of learners, teachers and communities; unexpected impact of a curriculum; unforeseen aspects of a learning process)' (UNESCO).

What a society deems as the 'intended' curriculum depends on an expressed or sometimes assumed 'purpose of education'. Currently, there is a plethora of debates and writings

worldwide on the '**purpose of education**'. Some include ESD explicitly, others acknowledge the need to prepare students for this uncertain and changing future which COVID-19 and the climate crisis have highlighted. This may well be the beginning of a paradigm shift about sustainability in general and a new set of whole-system goals about the preparation of students for this changing world. This in turn would affect what is considered to be the intended curriculum including knowledge, skills and attitudes.

Three key outcomes stemming from COVID-19 on curriculum need to be mentioned here:

1) *The move by some schools and jurisdictions to online / blended learning*. A report by Carretero Gomez et al. (2021) showed the differences and some impacts on teaching. Blended learning requires the availability of appropriate content or for teachers to design online content and lessons. With sustainability and climate change being such a continuously developing topic this adds extra challenges to teachers. For teachers to support the critical thinking and analysis of online information on sustainability, they require solid ICT skills, as well as those required to engage in debate, challenge thinking, and encourage group work. Though some teachers use such skills in the classroom, the evidence shows that this was a new skillset to learn for many. In addition, the parental involvement as facilitators of learning – was a new area for teachers to engage in.

2) *With external exams and monitoring of schools being disrupted and, in some jurisdictions, cancelled, there was a need to re-evaluate how to monitor student progress and success.* Teachers, schools and jurisdictions had to review thinking about continual assessment or teacher-based assessments. Given the purpose of education debates, this lays the ground open to guidance, if not policies, on sustainability competencies and how to embed them in school systems. This is a 'leapfrog moment' (Vegas and Winthrop, 2020), and Member States could seize the moment and follow the lead of countries that have already done the groundwork, e.g., Finland, Austria (Mulvik et al, 2021).

3) *Due to the lack of face-to-face contact, typical experiential ESD and EE activities schools undertake were not possible.* These include active projects in the school, special eco-days, and eco-clubs. If school closures are to be a feature of future crises (e.g., pandemics or nature disasters), then a move to working in communities and with external partners will be needed. It could also encourage a full sustainability approach, i.e., not just focusing on technical or behaviour change solutions but understanding the social, economic, health and justice implications of environmental solutions.

2.1.3. Pedagogies

The accepted position of school-based formal education is as *preparation* for life and the *basic skills* needed for that. It is not seen as a direct training for work skills (VET or HE) or a place for experimentation and where knowledge is co-created (HE). Embedding ESD in schools with the transformative pedagogies suggested by UNESCO requires this shift to the co-creation of knowledge with teachers and students learning together. This co-creation may even lead to other partners, e.g., business, media, parents, being engaged in co-creation and shared learning rather than as experts brought in.

ESD pedagogies have been tried and tested for over 30 years, and UNESCO has collated and named these as:

Pedagogy and learning environment: Employ interactive, project-based, learner-centred pedagogy. Transform all aspects of the learning environment through a whole-institution approach to ESD to enable learners to live what they learn and learn what they live. (UNESCO, 2020)

This involves pedagogies that are problem- or enquiry-based learning, systems-thinking, futures-thinking, critical thinking, action learning and thinking about change.

At the start of the COVID-19 pandemic, many schools and teachers did not have any experience of online learning but have had to develop new pedagogical approaches via digital platforms (Carretero Gomez, 2020). Many moved from a lecturing approach with concerns about online security to embracing interactive, participatory approaches, including break-out rooms, student debates and discussions, small working groups etc. Technology such as Zoom was the most common platform used (Joia, 2021). This again is encouraging for ESD co-creation of sustainability understandings. Developing hands-on projects were less common during COVID 19, as one would expect.

2.1.4. Classroom and learning environment changes

The ability of schools and teachers to find solutions quickly to an ever-changing and unpredictable situation, with variable guidance, indicates that changes in how education is organised can be achieved. COVID-19 led to many changes in access to traditional learning spaces, through closures, staggered openings for children of key workers, e.g., Norway and the UK, use of outdoor space, and then flexible timetabling / cohort organisation to allow social distancing both for students and parents dropping off students. During COVID-19, the use of outdoor spaces and visits to 'green' spaces were encouraged. One example in the UK was an urban forest run by an NGO, where children from local schools were dropped off for all their lessons instead of being dropped off at school.

There is an assumption that once students get access to natural environments, they will learn to love them and therefore protect them. This linear change theory has never been proved. Many models to overcome the gap between environmental awareness and pro-environmental behaviours have been promoted. Kollmuss and Ageman (2002) have analysed this complex area of adoption of pro-environmental behaviours. They concluded that adoption is often a mix of factors such as: demographic, external factors e.g., institutional, social, economic; and internal factors e.g., motivation, locus of control, awareness and responsibilities. No one factor nor one model has been shown to be effective in all situations. However, increased motivation from COVID-19, climate and biodiversity crises will have provided not just the motivation but a change in understanding responsibilities. Schools can work on many of these internal factors. By including community engagement and critical thinking, some of the external factors can also be addressed.

The health (mental and physical) benefits of being outdoors have been monitored and researched and proven for many years (Richardson, 2015). However, what has been clear is the need for schools to be a place for socialisation for students (Hattie, 2012). Student well-being has been a concern during COVID-19 due to school closures. In addition, the climate and ecological crises have been noted as also leading to anxiety in students. Outdoor classrooms may well be one solution. Another would be developing a sense of agency, which is an attitude that enables students to feel they can engage with sustainability issues, can make a difference and have skills to do this. Agency is another way to think about 'locus of control' and goes beyond climate strikes or student voice. The OECD 'Green at Fifteen' (Schleicher, 2021) report explores agency and knowledge and

concluded that a didactic, content-focused educational approach leads to a lower sense of agency than in education systems where action learning is encouraged.

2.1.5. Teacher skills

Much of this adaptation to school closures has been achieved without much training for these eventualities, but it shows that risk and resilience training could be encouraged in the Member States. Risk and resilience are key concepts in sustainability as there is a need not just for a planned change but also to be able to respond to crises. Merely because of the pandemic and in the case of future pandemics, training would be needed in:

- Risk and resilience building;
- Outdoor use;
- Use of flexible timetabling and use of IT;
- Measuring learning outcomes in different ways if exams are not possible;
- Partnering with communities / business;
- Inclusivity and well-being of students when they need to learn at home.

There are examples of training programmes all over the EU (see Mulvik et al., 2021), and these sometimes include teacher sustainability competencies, e.g. UNECE, which have now been tested and practically developed into an Erasmus+ project called a Rounder Sense of Purpose (https://aroundersenseofpurpose.eu/). The competencies include:

- **Integration**: systems, futures, achieving transformation;
- **Involvement**: attentiveness, empathy, values;
- **Practice**: transdisciplinarity, creativity, action;
- **Reflexivity**: criticality, responsibility, decisiveness.

They can be further grouped under thinking holistically, envisioning change and achieving transformation.

2.1.6. Equity and inclusion

The existing research on COVID's impact on education shows that the closure of schools does not affect all students equally (Di Pietro, 2020; OECD, 2020). Due to differences in non-financial parental support, parental financial resources, schools attended and students' digital skills, students from less advantaged backgrounds can experience more significant learning losses (Di Pietro, 2020).

The OECD report on the impact of COVID-19 (OECD, 2020) on student equity and inclusion investigated issues of social, economic and health inequalities and presented the country strategies for coping with them:

(from highest most common focus to least common focus)

- Ensure the continuity of the academic learning of students; (highest focus)
- Support education of disadvantaged students;
- Ensure distribution of food to students;
- Ensure the well-being of students;
- Ensure provision of other social services to students;
- Support education of students with special needs;
- Address emotional needs of students;
- Support students whose parents have limited command of the language of instruction;
- Ensure social development of students;
- Support students at risk of violence at home. (lowest focus)

Note: The data used include information from the 36 countries that have responded to the OECD/Harvard Survey, namely: Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Croatia, Czech Republic, Dominican Republic, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Italy, Jamaica, Japan, Korea, Latvia, Lithuania, Mexico, Netherlands, Norway, Peru, Portugal, Slovenia, South Africa, Spain, Sweden, United Kingdom, United States of America and Uruguay. The answers have been weighted to account for the number of responses submitted for each country. (OECD, 2020)

The data reflect that government's biggest concern was academic learning. This is reflected in the many subsequent media reports on 'learning loss'. However, the Brookings review shows that often the social and health issues potential through not attending school were creatively sorted out at the school level. Schools and teachers found ways to keep in contact with parents and their students and to monitor and track the progress of student learning and well-being (Vegas and Winthrop, 2020).

Some examples in the OECD research (OECD, 2020) are:

- The French Ministry of Education used national media such as culture and education-oriented television and radio channels to distribute educational material and to reach as many students as possible.
- The Portuguese Ministry of Education launched the "#EstudoEmCasa" educational programme on the public television channel, directed at primary students, to enrich students' education during the crisis. A Roadmap and weekly television grids were shared with students, families and school to facilitate the planning and monitoring of transmissions.
- In Portugal, schools, public and private organisations partnered in order to provide laptops and internet access to some students from disadvantaged backgrounds. When it was not possible, in cooperation with Post Office Services and the National Scouts Group, students who lived far from schools or without access to the internet received hard copy lessons and tasks from schools.
- In Portugal, schools across the country hosted children whose parents worked in essential services, and provided food support to students. Some Learning Support Centres also provided face-to-face and distance support.
- In Portugal, families with children younger than 12 years old (who did not return to school until after the summer holidays of 2020) received extra financial support from the government. *CRI goes home* is a guide of strategies and activities for children, young people, and families, which contains a set of practical guidelines related to psychology, psychomotricity, occupational therapy, physiotherapy and speech therapy.
- Students in refugee camps in Greece received weekly homework packages if unable to connect to online platforms by phone or internet.
- Rome, besides providing basic services to families from low socio-economic backgrounds, had worked on identifying Roma students without digital devices and internet connection. Computers and tablets were offered.
- In the Netherlands, educational institutions in higher and upper secondary vocational education could remain open to facilitate students without access to distance learning at home. Also, primary and secondary schools could remain open for children whose parents were working in critical jobs.

- In Norway, schools remained open to vulnerable students.
- In Sweden, there were not many school closures during the COVID-19 outbreak to ensure that young children and vulnerable students could have continuity in accessing contacts with teachers and educators.
- In Ireland, the Ministry of Education provided numerous resources online to support parents during school closures. Documents specifically dedicated to parents of children at risk of educational disadvantage and with students with SEN were provided.
- Various international organisations and non-governmental organisations (NGOs), such as Save the Children in Spain, provided online resources to support parents during the crisis. These materials included recommendations and guidelines, explanatory videos on how to help children manage their emotions, or how to promote their participation at home and in society or how to play creative games.

Source: OECD, 2020.

These all represent examples of repatterning of relationships and some flows but not yet system paradigm shifts. This shows it would be also possible to repattern relationships towards embedding ESD in school practice and curriculum, including working with businesses and communities. The adoption of blended learning also shows the ability of the systems and teachers to adapt and focus more on the role of a 'facilitator' rather than the deliverer of content. This would allow overcoming issues such as teachers feeling lack of expertise in climate change or sustainability, and instead focusing on the critical thinking, futures-thinking, systems-thinking and action learning design for embedding ESD.

Another example of repatterning was that some parents said they would like to stay involved in their children's learning. However, there is a note of caution. When using new online pedagogical approaches, parents were not as happy as these methods were not understood by them, and they felt they were not delivering quality education. The Brooking's analysis shows that teachers should continue to engage parents, and this is a good cultural change, but when introducing new, more participatory methods, they should not engage parents as fully (Vegas and Winthrop, 2020).

This has an interesting potential impact on the uptake of ESD in the EU if schools continue engaging parents in learning for sustainability with their children. The collaborative partnership approaches to understanding sustainability are crucial to ESD as teachers cannot be expected to be experts or stay up to date.

2.2. How COVID-19 impacts the development of sustainability competences in schools

Firstly, in the early years and primary levels of schooling, students could not be expected to progress sustainability itself, as they do not have the agency to make decisions, apart from voicing their concerns e.g., Fridays for Future. The approach to sustainability competencies in younger years could be viewed as preparation for building these competencies.

It may be useful to separate out education interventions for developing sustainability competencies into two groups: known challenges and unknown challenges.

2.2.1. Educating for known SD challenges

Schools often choose to focus on known SD challenges, e.g., zero carbon, waste, water conservation, food growing, food waste, transport to school, air pollution around school, recycling, plastics, ethical procurement of materials, etc. These challenges often emerge from media coverage, and teachers choose them for motivational reasons. As students get older and curricula are often more prescribed, teachers need to weave the current issues into set curricula. Some of these known challenges can lead to direct impacts, e.g., carbon footprint of the school is reduced. Some are more indirect, e.g., procurement policies that encourage suppliers to move to more circular economy production and supply or longer-term partnerships with community or businesses. This approach can be supplemented by the teacher through curricula or to deepen the learning experience from action to action learning.

However, to encourage the fullest transformative learning, with students choosing the problem they wish to solve and then experiment, requires an enquiry-based learning (or *participatory* project-based learning) approach, allowing for new thinking, creativity and innovation – all skills many employers ask for, especially in problem-solving. During COVID-19, cooperation and community support showed this could be possible, but was challenged by COVID-19 restrictions.

2.2.2. Educating for unknown SD challenges

Most education systems are built on the teachers having the knowledge, or knowing where to find it, and being able to engage the students to develop their learning and skills. Given the pandemic, an example of a sustainability crisis that schools did not have plans for, and knowing that more sustainability crises are likely to occur in future, the question is how best to prepare for the unknown. Even some current sustainability challenges have no known solutions, so how do teachers address those?

If schools reorient to preparing for future capabilities to deal with crises, the unknown, and dealing with change, then this should also apply to teachers and the education system. Co-learning with students can lead to the development of a good relationship between teacher and student, and this has been shown by Hattie to be the most effective educational intervention in producing good learning outcomes (Hattie, 2012).

2.3. Conclusions

Although the pandemic has been a major distraction for teachers and society, it has potentially paved the way for thinking about not just the intention of schooling but also the implementation and the potential impact of embedding education for sustainability across the entire school experience. However, the scale of the culture change should not be underestimated as a move from 'business as usual', which includes a backwards look at both knowledge and the world as we knew it, has been lost forever.

Summary
Challenges and priority action areas for schools Education for Sustainable Development post-pandemic
(1) Advancing ESD school policies: - Promoting the understanding of schooling to be about 'thriving' for a sustainable and just world within a changing world;

- In light of 'thriving', review exam processes in schools and especially during crises such as the pandemic school shutdowns;

- Developing across Europe disaster response policies for schools, including addressing inequality issues;

- Develop policies that support the development of leadership, teacher / educator and youth capacities for ESD;

- Create learning exchange programmes across Europe for 'building back better' for ESD;

- Encourage 'moving to scale' across Member States by adopting a scaling-up model;

- Testing and monitoring the 'movement to scale' – including from pioneers to early adopters to mainstream schools.

(2) Transforming school learning environments for ESD:

- Encourage all Member States to adopt whole-school approaches that encourage whole-school communities to learn together in a participatory way;

- Ensure all schools have access to regular, accessible outdoor spaces so work can continue in outdoor classrooms where possible;

- Ensure all schools have access to regular, accessible nature for well-being.

(3) Building capacity of schoolteachers, leaders, and educators in ESD in:

- Disaster and crisis management;

- Using IT for remote and flexible learning;

- A flexible, accessible teacher and student competency framework;

- Co-learning and especially ESD transformative pedagogies;

- How to work with communities including businesses, VET and universities;

- How to develop 'agency' and 'voice' in young people.

(4) Schools, ESD and youth: providing opportunities for youth engagement:

- Identify ways to mobilise young people to embrace sustainable development beyond the classroom;

- Ensure that new projects and approaches are shared back with the school and students to build hope by developing a platform to share ideas;

- Connect young people and adults to their local environment;

- Encourage socialisation of students in both the world of education and the world of work.

(5) Accelerating local level solutions:

- Through school / community partnerships;

- Build on EU-funded projects that have already identified collaborative ways of developing local solutions;

- Develop a platform to share these solutions.

3. The impact of COVID-19 on ESD in Vocational Education and Training

3.1. Understanding VET for sustainable development

3.1.1. Sustainability in VET – concept and implementation

Vocational education and training is inherently broad and heterogeneous, as it involves diverse groups — with differing objectives and structures — whose dynamics and paths are highly dependent on the business and employment context in which they operate (Rauner and Maclean, 2008; Billet, 2011; Mulder and Roelofs, 2012; Gessler, 2017; Pilz and Li, 2020). For this reason, we initially approach VET from a systemic way, offering an evolutive understanding of it from the standpoint of sustainability.

VET's main functions are to educate and train both young people and adults over the course of their lives. However, it also increasingly performs the functions of transferring technology to SMEs and promoting regional (Albizu et al., 2017; Gamboa-Navarro et al., 2020; Lavía et al., 2021; Navarro, 2018; Rosenfeld, 1998; Toner and Dalitz, 2012) and local development (Estensoro, 2018; Rego-Agraso et al., 2017). We, therefore, believe that the VET system, as part of the education and innovation ecosystem, is key to fostering social well-being, environmental balance, and sustainable competitiveness in terms of lifelong learning, applied innovation and local development. Although there are differences between European countries in terms of the way VET is designed and organised at the institutional level, in its interaction with the business and employment spheres, as well as in its governance, VET systems usually include two subsystems with differing functions and dynamics: initial VET (IVET) and continuous VET (CVET) (Cedefop, 2014, 2017).

- Initial VET (IVET) — general or vocational education and training carried out in the initial education system. It is oriented towards young people obtaining qualifications demanded by the labour market and accredited by diploma.

- Continuous VET (CVET) has been oriented towards employed and unemployed groups, and accreditation can be either formal or non-formal. It is typically applied to adults.

The 'sustainable development' and its relationship to, and implications for, VET is relatively new and has lagged behind other levels of education (such as primary education and HE) (Pavlova, 2009). Due to the close relationship between the world of vocational education and labour, VET systems are mainly oriented to the needs of industry and enterprises, shaping its ethos, functioning, outcomes and culture (Anderson, 2008; Fien and Wilson, 2005).

As Table 1 shows, the approach to sustainability in VET has changed over time, although the progress does not show pure or linear states but is uneven and overlapping as a result of its evolving pathway (Fien et al., 2009). The most established approach is the one focused on economic development, where the VET system is understood as a provider of human resources ('skills for productivity') (Anderson, 2009; Giddens, 1994; Rees, 1990; Stevenson, 1993). This approach is still evolving, being combined with new social demands (in particular for social inclusion), resulting in the growing relevance of the effectiveness of transitions to/within the labour market and of the skills for employability (Elder, 2015; Malloch et al., 2021).

Table 1. Main EU objectives and indicators related to VET approved in 2020

	VET for economic growth	VET for sustainable/ green growth	VET for sustainable development
Ethos	Productivity	Productivity, social inclusion & technocracy	Sustainability
Approach to sustainability	Instrumental: source of human and natural resources for the economy	Functional: economic development for solving social & environmental problems	Integrated: economic, environmental and social development
	Continuist: 'unlimited resources and constraints'	Reformist: 'renewable resources' (regulation, efficiency & new Techs)	Transformative: natural limits, environment as a driver
Leitmotiv in VET	One-sided demand: industry-driven needs	Economic and social demands	Triple bottom line: sustainable challenges
Assumptions in VET	Training for growth (based on patterns of stability)	Education and training for growth and employment for all (occupational rotation)	Education and training for SD (new patterns of production / consumption / work)
	Skills for productivity	Skills for productivity and employability, new green skills & 'sector niches'	SD applied objectives competences based, combination of competences
Focus of VET	Industry-focused: shaped by short and medium-term market demand	Industry and worker-focused: adaptation to new work contexts, techs & accreditation	System-focused: holistic, interdependent and transdisciplinary
Status in VET	Main ideology of work, proactive	Rising relevance of VET as an inclusive driver	Marginalised, reactive
Orientation of VET providers	Supplying human resources	Facilitating labour transitions: qualifying, up/reskilling	Facilitating human capacities for alternative futures
Implementation in VET	Predominant model: shaping vocational programmes and occupational learning	Social and pedagogical improvements: new inclusive programmes & resources	Fragmented, project-based & devalued at the curricular, process & organisational level.
Performance Measurement	Lineal approach: human capital & skills (input-output)	Process approach: labour transitions and social issues (e.g. NEEs)	Systemic approach: need for harmonised, integrated indicators
References	Anderson (2008, 2009) Giddens (1994) Rees (1990) Stevenson (1993)	Elder (2015), Fien et al. (2005), Goldney et al. (2007), Malloch et al. (2021), Muller (2021)	Fien et al. (2009) Hemkes et al. (2021) McGrawth. et al. (2016, 2018), Pavlova (2009)

Source: adapted from Moso-Diez (2019).

In this sense, the environment is understood from a solving-problem and technocratic perspective that allows regenerating the natural resources and environment, where VET provides new technological and green skills for both traditional industry and new flourishing green subsectors or niches (Muller, 2021).

Moreover, VET for sustainable development seeks a new type of development, not based on growth, but on new forms of work because of new forms of production, consumption and relationship with the environment (Goldney et al., 2007). It is not only important to be aware of natural limitations but also to learn and experience sustainability by working with VET schools and companies in terms of sustainability (Grawth et al., 2018). VET graduates can be agents of change for companies in their technological, organisational and business model transformation and innovation (Pavlova, 2009). However, this approach is not only marginal but has been devalued after burning the term at the declarative level and making little progress at the curricular, operationalisation and organisational levels (Fien et al., 2009; Hemkes and Melzig, 2021).

Finally, it is relevant to understand and differentiate the idiosyncrasies and implementation between VET for green / sustainable growth and VET for sustainable development.

The first perspective is currently acquiring a relevant role, and its reformist character is of great interest to remedy environmental problems, always from the perspective of the needs of sustainable growth and employment. In this field, the environment continues to be a source of resources (albeit limited) and a lever for growth, where new sectors and sub-sectors emerge as niches for new employment, new technologies (clean, green technologies) and greater respect for the environment. The underlying concept lies in the efficiency of resources, the mitigation of environmental impact and the positioning of a green market that responds to the needs of companies and individuals (Fien, Goldney and Murphy, 2009).

In the context of VET, this mainly involves the adaptation of professional profiles in both vertical sectors in the environment (energy, water, agriculture, livestock, etc.) and transversal sectors (green industry, green mobility, etc.), all under the parameter of the green economy, which modifies production patterns more than consumption or labour patterns (Fien and Wilson, 2008). Progress in VET depends to a large extent on the speed of change of its own business environment, and of its predominant sectors, and eco-innovation strategies.

The second perspective corresponds to VET for Sustainable Development, characterised by a transformative approach, where the environment is not only an object or resource but also an engine or 'subject' in the articulation of the triple bottom line of development. The implications of this transformation involve political authorities (with policies, programmes and actions at the national, regional and local level) promoting curricular changes for sustainable development and resources and tools for capacity-building (i.e. teacher training for SD) to encompass its necessary deployment in educational organisations to yield organisational transformations (institutional approach) as well as procedural transformations of the world of education and VET (i.e. action-oriented transformative pedagogy). This approach implies rethinking education at all levels (UN, 2019).

3.1.2. Evolving towards the new framework of ESD in VET

The UNESCO strategy for Technical and Vocational Education and Training (TVET) (2016–21) explicitly and deliberately places VET for Sustainable Development on the international public agenda, a cornerstone of which is the 2030 Agenda for Sustainable Development. UNESCO's vision is of a 'transformative VET' with an enabling strategy combining economic development, equity and environmental sustainability. On the one hand, it aims to support

Member States to enhance the relevance of their TVET systems and to equip all youths and adults with the skills required for employment, decent work, entrepreneurship and lifelong learning. On the other, it aspires to be a key instrument for implementing the 2030 Agenda for Sustainable Development as a whole.

UNESCO Strategy for TVET (2016–21)
'*TVET is focused on the acquisition of knowledge and skills for the world of work and helps youth and adults develop the skills needed for employment, decent work and entrepreneurship while supporting inclusive and sustainable economic growth. (…) based on three main pillars:*
- fostering youth employment and entrepreneurship,
- promoting equity and gender equality, and
- facilitating the transition to green economies and sustainable societies.'
Source: UNESCO (2016: 3).

Within this framework of advocacy and support for sustainable development, TVET is characterised by its threefold nature: firstly, it is an area or object of improvement that is encapsulated in Goal 4; secondly, it is a bridge enabling transitions to and within the world of work for young people and adults; and finally, it is a key capacity-building instrument for achieving the rest of the Sustainable Development Goals (SDGs). Goal 4 is the one that appeals directly to VET, advocating for the right to lifelong learning within the parameters of equity and inclusion in access (targets 4.3 and 4.5) and participation in learning spaces (target 4.a), quality in education and training processes and the relevance of learning outcomes (mainly skills) (target 4.4) both to the world of work and to the knowledge of sustainable development itself (target 4.7).

VET is directly present in the rest of the goals and targets to a greater or lesser extent, and although there is some debate about its connection to specific targets (McGrawth et al., 2018), here we highlight those directly related to three fundamental roles that underlie an understanding of VET. The first of these roles is facilitating transitions to and within the world of work in a framework of productive employment and decent work (targets 8.3, 8.5, 8.6, 8.b and 9.5). Secondly, VET is identified as a cognitive and technological enabler in the capacity-building process for awareness of and action on the more environmental and social side of sustainable development (targets 5.b, 12.8. and 14.a). Thirdly, VET plays a dual role as a subject of interaction and as a local and global space for socialisation and collaboration (target 17.16).

UNESCO's broader approach is a significant shift from previous skills approaches in which VET was corporatised, and competency-based training was introduced to strengthen the connection between skills formation and economic production, shaped by the ethos of productivism (Giddens, 1994) without considering environmental sustainability or ecological balance (Palmer, 1998). This shift implies denying the primacy of economic growth and aims to integrate economic, social and environmental development, overcoming previous visions more related to human capital theories. On behalf of the SDGs, VET was reintroduced into the overall education and development narrative. Underlying the SD approach, there is a more systemic, multi-dimensional and lifelong learning focus from an economic evolutionary perspective that was embedded by the EU. Nonetheless, some limitations are also identified concerning informal learning, quality assessment, the measuring of certain targets and the remaining unbalanced focus on youth employment, etc. (McGrawth, 2016; Elder, 2015).

3.1.3. VET for SD in the EU — a process under construction

The adoption of the 2030 Agenda came halfway through the Europe 2020 strategy (COM, 2016; European Commission, 2019a), and in the field of VET, it implied adapting to the

strategic framework for European cooperation in education and training 2020 (ET, 2020) whose objectives (OJC, 2020), already set prior to the adoption of the 2030 Agenda, partly coincide with the SDGs. Although ET 2020 goals come under the umbrella of the 2030 Agenda, they adopt a limited and partial version in which the environmental sphere is not clearly defined, and the concept of social inclusion is diluted.

The new cycle in the European Commission's strategic priorities (2019-2024) (European Commission, 2019b) is a window of opportunity to integrate sustainable development goals into the design of initiatives, embedding VET-related policies into the sustainable development policy rationale and discourse.

Council Recommendation on Vocational Education and Training for sustainable competitiveness, social fairness and resilience.

'Proposes a modernised EU policy vision for VET, with the view to equipping young people and adults with the skills to thrive in the labour market and supporting the green and digital transitions, including transversal skills, ensuring inclusiveness and equal opportunities, and establishing European VET as a global reference point for skills development'.

Source: OJ C 417/2.12.2020.

At this defining moment, two important issues can be identified.

On the one hand, in this strategic and programming framework, VET takes on a leading role as a provider of the necessary skills for the strategic twin transitions: green and digital. This reinforcement of the role of VET on the European agenda was reflected in July 2020 in one of the seven EU flagship initiatives, the European Skills Agenda for sustainable competitiveness, social fairness and resilience (2020). Another key milestone, also in the context of the COVID-19 pandemic, is the Osnabrück Declaration on vocational education and training as an enabler of recovery and just transitions to digital and green economies (2020)[1].

On the other hand, while the purpose directly affects the VET system, the indicators that establish their scope answer mainly to an input-output conception of lifelong learning processes for adults; and to indicators of work-based learning, European mobility and employability among young people. This monitoring approach to sustainable development is unbalanced in terms of the environmental dimension for sustainability.

In this sense, it may be said that embedding VET for sustainable development (SD) is under construction at the European level. Within the framework of these agreements, the concept of VET is based on the approach that the VET system must principally serve the needs of present and future labour market demand and facilitate labour transitions. This vision of VET in terms of sustainability may be seen as more reformist than transformative, underlying a functionalist conception of sustainable or green economic growth rather than of sustainable development. While this understanding of VET matches the SDGs to a large extent, it only represents a partial conception as regards the potential of VET for sustainable development from an institutional perspective, which can become a catalyst for sustainability at macro, meso and micro levels in our societies.

[1] Declaration of the Ministers in charge of vocational education and training of the Member States, the EU Candidate Countries and the EEA countries, the European social partners and the European Commission (2020), meeting on 30 November 2020 to agree on a new set of policy actions in VET for the period of 2021-2025 to complement and operationalise the vision and strategic objectives formulated in the Council Recommendation on vocational education and training for sustainable competitiveness, social fairness and resilience.

Finally, echoing the EU, Member States' starting position on sustainability is only tentatively applied to the field of VET, where the social and economic perspective has taken precedence over the environmental one (Cedefop, 2020a). Despite these differences between countries, progress reviews show that Member States are promoting changes intended to strengthen their VET systems. Thus, countries' efforts are advancing somewhat in parallel and partially addressing sustainable development objectives.

In Germany, the Federal Institute for VET (BIBB), on behalf of the Federal Ministry of Education and Research, has pilot projects aiming to embed sustainability within the structure of VET. The analysis of these 'VET for sustainable development' (VETSD) pilot projects of the past 20 years identifies five dimensions which offer starting points for the structural integration of sustainable development into vocational education and training (Hemkes and Melzing, 2021).

- Raising awareness of sustainable development
- Sector-oriented strategies
- Sustainability-oriented vocational competencies
- The company as a sustainable learning venue
- Training of staff providing training

Source: https://www.bwp-zeitschrift.de/en/bwp_142426.php

3.2. The impact of COVID-19 on ESD in VET

As previously stated, the impacts of the COVID-19 pandemic on the implementation of ESD in VET is analysed here using the framework of VET for SD. Following the core functions of VET, we focus on four dimensions: policy (mostly, education and training), institutional framework, multi-stakeholders, and community outreach, and their sub-dimensions or individual aspects inside each of the categories.

Dimensions of sustainability in VET under the influence of COVID-19

1. Impacts of COVID-19 on VET for SD – policy dimension
    - Assuring health and security as well as VET access and provision;
    - Facing inclusive and equitable access and supporting VET remote learning;
    - Lacking integrated strategies, policies or plans for sustainability in VET.
2. Impacts of COVID-19 on VET for SD – institutional dimension
    - SD strategies, decision-making and action plans of VET schools / organisations:
        - Lacking integrated strategies, plans and resources for sustainability;
        - Reacting to the sustainability crisis: emergency management teams;
        - Developing virtual teaching environments from a problem-solving approach.
    - Organisation and processes: education and training for SD:
        - Impacts on curricula: digitalisation versus 'sustainabilisation';
        - Online distance teaching, limited practical learning and interactions;
        - Facing quality assessment and decontextualised learning.
    - Organisation and processes: technology transfer and applied innovation:

- Innovation issues – limited sustainable issues and interdisciplinarity;
- Technology transfer and applied innovation projects – SD Tech for SMEs.

3. Impacts of COVID-19 on VET learners and teachers' lives – stakeholder dimension
   - New working and studying conditions and living sustainability risks;
   - Resilience for sustainability at individual and collective level;
   - Digital capacity building: an opportunity for capacity building in sustainability.
4. Impacts of COVID-19 on VET for SD at the virtual and local level – community dimension
   - Virtual collaborations for sharing knowledge and resources;
   - Public-private partnerships for supporting VET: experiencing partnerships;
   - Collaborative initiatives at the local level: empowering VET nodes.

Due to limited access to data, analysis of the impact of COVID-19 on European VET is based on the information available on the initial operational impact on VET systems and focuses on the educational and training function.

To this end, analysis is principally based on the results of surveys, and their respective studies, conducted by Cedefop (2020b, 2020c), the European Commission (2020c), the ILO, UNESCO and the World Bank (ILO, 2021) and the OECD (2020, 2021a), as well as on more qualitative studies carried out via expert groups (Van der Graaf et al., 2021) and certain analyses by country (Muehlemann, Pfeifer and Witte, 2020) or internationally (Hoftijzer, Levin, Santos and Weber, 2020; Majumdar, Araiztegui and Tknika, 2020) and periodical newsletters (e.g., through Cedefop's briefing notes and news) or globally (ILO, 2020a, 2020b; OECD 2021b. 2021c) and/or specific area of VET, e.g., digitisation (Cedefop 2020d; 2021), guidance (Cedefop et al., 2020), distance learning (Bogoslov and Lungu, 2020; Andreasen and Duch, 2021), and about business practices (Van Loo et al., 2021) and employment (Carranza et al., 2020).

3.2.1. How COVID-19 impacts VET for SD — policy dimension

COVID-19 has disrupted both access to and provision of VET in both learning environments (VET schools and firms) and in both VET subsystems (IVET and CVET). Initially, the crisis caused by the pandemic led governments to take extraordinary measures, introducing general lockdowns and seeking ways to ensure that education and work could continue remotely online. This global sustainability crisis revealed European governments' unreadiness as regards the impact on VET, managing the crisis reactively rather than implementing predefined contingency plans designed to ensure sustainable development. In this context, European VET systems had to tackle the challenge of adapting their educational role and training provision to distance learning approaches and methods, overcoming the many obstacles to these, given the inequalities between students in terms of access, and between VET schools in terms of digital and technological capacities and resources (Cedefop, 2020b).

Right from the start, countries opted to maintain VET mostly through online distance education and training, initially closing all VET schools and cancelling alternance programmes in firms, albeit with some exceptions in certain countries and sectors (especially healthcare). The main focus was on ensuring that both the school-based and company-based IVET models continued to function so that young people could still gain the education necessary for their personal development.

Obstacles to continuity in the provision of training to TVET learners

- *Lack of general and technological infrastructure: internet, connectivity and devices;*
- *Lack of effective and user-friendly distance learning platforms;*
- *Lack of staff capacity to support distance learning through quality pedagogical resources;*
- *Financial resource constraints.*

Source: ILO (2021:7).

Countries adopted a variety of heterogeneous measures to facilitate online access and participation by their VET ecosystems[2] (students, families, VET schools and training firms) spanning enhanced connectivity, IT infrastructure, devices and digital skills, as well as creating spaces for learning (fundamentally, digital learning platforms). All this is to correct and overcome the digital divide that directly affects the achievement of Goal 4 of the SDGs to 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'.

However, training of a more practical nature, which is inherent to the VET model, has suffered more, largely being cancelled and affecting the different forms of work-based learning (WBL) (apprenticeships, internships and other formulas). In this regard, it is worth highlighting several countries' efforts to continue WBL and secure apprenticeship contracts through incentives and specific programmes (especially in those countries with company-oriented VET systems, such as Germany). There has also been a downturn in continuing vocational training in firms under the CVET model (ILO, 2021).

As for the disruption of VET assessment and certification, the pandemic has weakened quality assurance processes by limiting evaluation to the most academic or theoretical parts of the syllabus. The response of most countries has been to maintain exams and to replace or cancel other more practical forms of testing. Several examples of how the evaluation was performed virtually have been identified. However, '*it is not clear whether the assessments were carried out virtually as standard or whether they were performed as a one-off mitigation measure, given the challenge of conducting remote assessment in VET'* (ILO et al., 2021: 13).

Table 2. COVID-19 impact on ESD in VET and response by Governments

Policy dimension	Sub-dimensions	Changes	ESD Impact
Health and security	Assuring health & security	Lockdown: IVET school closures Health & VET policy domains Progressive reopening	Living and experiencing a crisis Awareness about risks and need for anticipatory policymaking
		Work-based learning settings closures: total/partial (variation by sectors/countries)	Rethinking vocational learning environments and venues Need for innovative policies
		Continuous VET providers disrupted: total/partial	Missing opportunities to reinforce lifelong learning
Education and VET	Assuring access to and	Remote IVET schooling access and assessment, especially for graduating students	Improvement in online distance learning environments (mainly in IT learning platforms)

[2] The use of tools or resources in descending order of relevance were video conferences, You Tube, new videos, new virtual learning environments, new written resources, new blogs and discussion forums, simulators, virtual reality or augmented reality tools, podcasts and TV (ILO, 2021).

Policy dimension	Sub-dimensions	Changes	ESD Impact
	provision of VET & qualification	WBL: ranging from cancellation to promotion & incentives (contracts / scholarships)	Awareness of almost no alternatives Greater effort on VET company-oriented systems
		CVET: ranging from cancellation to reorientation of training	Depending on sectors & occupations Greater emphasis on digital skills & health security
Social and Education:	Ensuring digital access	Assuring IT access and infrastructures for all New initiatives for improving connectivity, digital assets & IT systems for VET schools	IVET as a priority A reactive and ad hoc response Need for future evaluation of the impact at the educational level: attainment, investments, etc
		Avoiding digital divide and socio-economic inequalities Programmes for vulnerable groups (and in some cases for SMEs) in terms of connectivity, digital devices & training.	Intensifying inequalities: Digital divide Gender divide Age divide Urban/rural divide
Sustainable development	Lacking VET for SD policies	Fragmented VET responses (IVET/CVET) from different policy domains (education, employment, social affairs, etc.)	Lacking integrated strategies, policies or plans for sustainability in VET A policy window opportunity

Source: *compiled by authors.*

Finally, it is relevant to point out that '*most countries appear to have lacked an emergency strategy to respond to the shock that COVID-19 caused to their TVET systems'* (ILO, 2021: 20), which is closely related to the widespread lack of sustainable development strategies in VET.

3.2.2. How COVID-19 impacts VET for SD — institutional dimension

At the organisational level, the response by VET providers, especially IVET schools, has been to create distance learning environments and dynamics. Although the process of reopening schools has progressed at varying speeds since the first wave, access to VET has been maintained throughout practically the entire pandemic to date. This has been achieved by shifting to online training environments, the predominant option in the case of VET schools. In general terms, the rapidity of the response has tended to differ between VET schools and training firms. In many European countries, the pandemic caused the partial or total closure of firms' facilities, broadly affecting more than three quarters of businesses in the first wave (ILO, 2021). The main impact of this was the temporary suspension of work-based learning and of training in general at that stage.

Table 3. COVID-19 impact on ESD in VET organisations from an institutional approach

Institutional dimensions	Sub-dimensions	Changes	ESD impact
Strategy, decision-making & action plans	A non-VETSD oriented strategy	Lacking integrated strategies, plans and resources for sustainability in VET schools/companies	Far from embedding VET for SD, but more aware of SD Need for institutionalisation of sustainability
	Crisis management	Creating ad hoc 'crisis management teams' No contingency plans High commitment of management teams & staff	More readiness for future sustainability crisis Risk of returning to VET as usual if the pandemic is not understood in SD terms
	Problem-solving approach	Crisis solution in terms of digitisation: new learning environments and processes Building up alternatives	Enhancing digital skills and IT programmes, rather than pedagogies and sustainable competencies Missing a systemic approach
Organisation & processes: Learning & training	Curricula and sustainability competences	Relations between the pandemic impacts and SD not included in curricula or approached in teaching	Accelerating VET 'curricular digitalisation' *versus* 'curricular sustainabilisation' Need for analysing crisis impact on it
	Practical, experiential & Work-based Learning	In VET schools: Cancellation of experiential classrooms, occupational labs, etc. Improvising new pedagogies & exploring new ways (virtual reality, occupational simulations)	Limited alternatives to learning by doing Opportunity for the education technology sector Need for more innovation in blended methodologies from a systemic approach
		In companies: Apprenticeships & internships: total / partial disruption Complex alternatives	Negative impacts in terms of students' socialisation, professional networking & organisational learning
	Facing quality assurance	Adapting assessment and assuring certification to remote formats	Mostly, theoretical exams & works Problems for assessing practical knowledge
Applied innovation	Innovation issues & sustainability	Dominant orientation toward health-related issues Mainly focused on ICTs, Artificial Intelligence, etc	Mainly focused on implementing and working with ICTs, Artificial Intelligence, etc
	Technology transfer & innovation	Disruption of projects or restrictions which prevented fieldwork	Reduced collaboration and communication Opportunity for 'learning by SD challenges'

Source: compiled by the authors.

As regards the approach to practical and experiential learning, while keeping the different WBL formats alive, the results have varied. Following the total or partial disruption, it has been difficult to emulate pre-pandemic training in distance learning environments or initiatives. VET is characterised by design and implementation of education and training programmes with a strong practical component of learning by doing and where face-to-face contact between students, teachers and tutors is fundamental.

The fact that schools and many training firms have been closed, mostly replacing face-to-face learning environments and dynamics (experiential classrooms, VET school labs, internships, apprenticeships, etc.) with remote ones, has been a major setback for VET because clear and proven alternatives have yet to be found. In the case of apprentices, it is relevant to note that the scheme is governed by different contractual frameworks, meaning there are apprentices who have contracts regulated by the labour code and are covered by labour market measures; and those with contracts not covered by the labour code and who continue to receive the State grant (Cedefop, 2020b).

In general terms, it currently appears that digitalisation at organisational level is advancing more rapidly than embedding sustainability ('sustainabilisation') in VET as a result of COVID-19. In this regard, it needs to be investigated how VET institutions and curricular designs have been transformed as a result of the pandemic. Initially, literature shows that the emphasis has been put on developing digital capacities (skills, resources, environments) rather than cross-cutting or sustainability-related competences or new institutional governance.

3.2.3. How COVID-19 impacts VET teachers and learners' lives — stakeholder dimension

The VET system participants most affected by COVID-19 can be divided into two large heterogeneous groups: those who learn (young people and adults) and those who teach (within both IVET and CVET). The first group is formed by learners that include young people (both IVET students and those receiving non-formal training as apprentices) and adults (both the employed and the unemployed). CVET is also key to responding to the COVID-19 crisis, with initial efforts mainly aimed at developing digital skills and targeting the sectors responding dynamically to the crisis (e.g., healthcare and manufacturing, retail and food industries, etc.) (Livanos and Rabanos, 2021). In this regard, equality and inclusiveness must be emphasised to ensure that people have broad access to training opportunities throughout their working lives, especially in times of crisis such as that deriving from COVID-19. The second group includes educators and teachers (usually in the educational field), trainers (usually as staff of CVET providers) and tutors (as learning facilitators in firms).

Online distance learning has produced multiple challenges for VET learners and teachers. Firstly, in some cases, learners and teachers did not have the necessary connectivity or equipment — or even appropriate spaces — to study or work from home. In the pandemic context, the digital divide has exacerbated inequality (Van der Graaf et al., 2021).

Secondly, teachers had to suddenly change teaching format (content, materials, exercises, etc.) and dynamics (observation, feedback, evaluation), prioritising theory over practice. All this occurs in the context of inappropriate and/or improvised virtual platforms and insufficient development of simulation environments/virtual reality for VET-specific learning content to train the specific practical sectoral skills (Cedefop, 2020b).

Thirdly, all these changes influence students' experiential and work-based learning, and although alternatives have been sought, at the European level, these have been partial, fragmented and piecemeal. It has been especially challenging to replace WBL formats, despite the efforts of instructors and company tutors. The impact on apprentices has varied according to the VET specialisation, with apprenticeships largely being maintained in the healthcare, food, and building sectors, and generally, wherever companies continued their activities.

In contrast, sectors such as hospitality, well-being and tourism shut down completely, making it more difficult to find alternatives for their apprentices (Cedefop, 2020b). A

shortcoming found in both IVET and CVET has been the need for online systems and mechanisms for the validation and recognition of all forms of learning (ILO et al., 2020b). Adapting to new teaching formats and managing remote classes while keeping students motivated (especially when they are accustomed to experiential learning) has been traumatic for many teachers.

New alternatives for VET students and apprentices on experiential learning and assessment

Online practical learning
- Online guidance and self-learning results by presenting photographs, videos, etc;
- The use of virtual simulation, usually as a result of pre-existing developments;
- Encouraging remote project work;
- Professional discussions between learners and tutors / teachers.

Blended qualitative and quantitative evaluation
- Exams (mostly remotely and in person, if possible);
- Essays, portfolios of past work, etc;
- WBL: largely cancelled, or only remote working arrangements have been maintained. In a few cases, face-to-face options remain in place, usually by combining online and in-person formats.

Posterior presential reinforcement
- Ad hoc work / study programme for summer;
- Beginning the next course earlier.

Fourthly, it is relevant to point out that personal development goes beyond technical, cross-cutting or specific theoretical or practical knowledge and also entails psychological, emotional and attitudinal development, especially in young people. In this sense, studies suggest that face-to-face alternate learning schemes operated jointly between schools and firms motivate students and reduce drop-out rates (Marhuenda-Fluixá, 2021), as well as facilitating social interaction both with their peers and with the work environment.

Interaction in distance education settings does not achieve the same degree of socialisation as in face-to-face ones, which are inherent to the internal dynamics of a country or region's VET ecosystem (Andreasen and Duch, 2021; Arenas Diaz et al., 2021). As a consequence, another important dimension of vocational learning has suffered: students' social interaction, both with their peers, teachers and counsellors, as well as with their tutors and colleagues during apprenticeships and internships. Therefore, in the context of COVID-19, students have seen their opportunities diminish in terms of the experience acquired in the workplace, the relational capital gained, and the personal maturity achieved.

Fifthly, age is a key factor in possessing or gaining familiarity with different online learning environments and educational technologies, meaning that the age divide among teachers and adult learners regarding digitalisation and new technologies had to be addressed. For many TVET providers, the switch to remote learning has been a process of learning by doing. The pandemic pushed forward the digital agenda in TVET, accelerating digital learning. Development and strengthening of the capacities of TVET teachers and students, as well as those of the managers of TVET institutions, have mainly focused on improving digital skills and use of digital tools, taking steps towards new blended learning formats (ILO et al., 2021).

Sixthly, it is important to note that IVET students usually come from families whose socio-economic status is more vulnerable to the impact of the pandemic and whose role in supporting students is more limited because the parents usually have fewer qualifications than those in upper secondary or higher education (Chisvert et al., 2021). Moreover, apprenticeship-based VET represents a source of income for young people that has been reduced, despite the efforts to uphold contracts with firms.

In the case of employee training, there appears to have been little systematic effort to support employers in using lockdowns to train their staff.

Table 4. Participation rate (25-64) in education and training (last 4 weeks) by sex and employment status (2019 and 2020)

EU	2019						2020					
	Employed			Unemployed			Employed			Unemployed		
	F	M	Total	F	M	Total	F	M	Total	F	M	Total
EU-27	13,3	9,7	11,4	12,2	9,3	10,7	11,	8,2	9,5	11,7	9,2	10,5
Austria	17,7	13,	15,2	20,7	18,1	19,3	13,4	10,6	11,9	19,3	12,8	15,9
Belgium	8,9	7,8	8,3	13,	10,	11,3	7,7	6,9	7,3	12,7	7,6	9,9
Bulgaria	1,6	1,3	2	:	:	:	1,3	1,	1,1	:	:	:
Croatia	3,8	3,	3	3,9	:	2,4	3,6	2,4	3,	3,2	:	2
Cyprus	6,7	5,4	6	5,5	:	4,5	4,5	3,8	4,1	3,7	6,	4,9
Czechia	9,3	8,3	8,7	5,4	3,1	4,3	6,	5,6	5,8	5,	3,1	4,1
Denmark	30,6	20,6	25,3	33,6	23,7	28,7	23,4	16,	19,5	25,1	21,	23,1
Estonia	25,7	18,2	21,8	25,9	18,	22,3	22,4	13,5	17,8	25,8	15,9	20,5
Finland	34,9	25,8	30,2	31,1	21,9	25,9	33,1	23,7	28,3	27,6	19,3	23,2
France	25,	18,3	21,6	17,	12,2	14,6	16,3	12,2	14,2	13,6	8,7	11,1
Germany	8,3	7,5	7,9	8,8	7,8	8,2	7,7	7,1	7,4	10,3	11,6	11,
Greece	4,2	2,9	3,4	4,8	3,6	4,3	3,9	3,	3,4	4,4	3,9	4,2
Hungary	7,2	5,5	6,3	:	:	2,4	6,9	4,3	5,5	:	:	1,9
Ireland	15,4	10,5	12,7	21,9	13,2	17,1	13,7	8,9	11,1	20,6	15,	17,6
Italy	10,2	7,5	8,7	5,8	4,2	5,	8,8	6,7	7,6	5,3	3,6	4,4
Latvia	10,1	5,7	8	11	:	7,2	8,9	5	7	11,2	:	7,3
Lithuania	9,6	6,0	7,9	4,9	:	3,5	9,8	6,1	7,9	5,2	4,2	4,7
Luxembourg	20,8	21,3	21,1	31,9	23,6	27,4	18,9	15,6	17,1	25,4	23,5	24,5
Malta	17,6	10,9	13,6	23,8	15,2	19,2	16,2	10,1	12,6	:	:	6,2
Netherlands	22,8	19,1	20,8	19,8	19,3	19,5	21,7	18,3	19,9	24,8	21,3	23,
Poland	7,	4,6	5,7	4,7	3,4	4,1	5,4	3,3	4,2	4,9	3,3	4,
Portugal	11,4	10,	10,7	14,1	11,5	12,9	11,3	9,5	10,4	15,1	13,8	14,5
Romania	1,2	1,1	1	:	:	:	1	0,7	0,8	:	:	:
Slovakia	4,1	3,8	4	:	:	:	3	2,7	2,8	:	:	:
Slovenia	14,4	10,5	12,3	10,9	8,5	9,7	10,6	7,6	9,	10,5	6,5	8,6
Spain	12,1	8,9	10,3	14,	11,5	12,8	13,	9,4	11,	14,	12,	13,1
Sweden	43,1	24,6	33,4	52,	40,2	46,	34,5	19,9	26,8	45,7	35,9	40,6

Source: Eurostat (extracted on 26 August 2021).

In those cases, with public support, continuing training was usually related to online training that was already available prior to the outbreak of the COVID-19 pandemic, such as, for example, that offered by national TVET agencies or private training providers (ILO

et al., 2021). The situation is very similar for the unemployed. The comparison between the 2019 and 2020 figures for one of the key indicators for CVET (Participation rate (25–64) in education and training in the last 4 weeks) shows that in Europe, training of employees was impacted more than that of the unemployed (Eurostat, 2021). However, the halt in training for the unemployed in the context of the job losses caused by COVID-19 means a loss of impact on one of the most vulnerable groups in European societies. Although there are certain differences between European countries, the window of opportunity to strengthen training in firms and for the unemployed has largely been underexploited.

Table 5. COVID-19 impact on ESD in main VET stakeholders' lives

Stakeholder Dimensions	Sub-dimensions	Changes	ESD impact
Learners: youth & adults	New studying conditions	Learning at home	New traumatic learning environment: 'space divide' Isolation, physical & mental health, inequality, + youth
		Diverse and unequal access to new learning tools and environments	Increased impact on vulnerable students Risk of falling behind
	Resilient to experiential gap	From learning by doing to learning by instruction Insufficient experiential support for learners	Risk of disengagement & demotivation Experiencing a sustainable crisis
		Digital capacity development	Enhancing the digital transition
		More focus on technical skills	Limited alternatives for soft skills
	Slowing down socialisation	Students as recipients, not as transformers	Scarce opportunities for youth engagement
		Disruption on international mobilities	VET international mobility was pretty affected in particular new one
		Limited interaction and networking with companies	Reducing networking potential
Teachers, Trainers & Tutors	New working conditions	Teaching at home Living new working conditions 'Long hours' Improvising teaching spaces	Experiencing a sustainable crisis Awareness of current limits Space divide and isolation Difficult conciliation: gender gap
		Unpreparedness for digital access Especially vulnerable teachers or/and those in rural areas, etc	Facing different unequal and unsustainable situations Age and digital divide Need for adaptative capacity
	Resilient effort	Adapting VET curricula Digitising content & resources Struggling with practical teaching and guidance Exploring new formats	Adapting learning objectives with pedagogical limitations No harmonised alternatives Shift to blended teaching Opportunity for contextualising sustainable knowledge & skills
		Online monitoring at individual level and theoretical distance assessment (exams, essays)	Restricted observation of & feedback for students Impacts on quality of teaching Opportunity for SD criteria
	Instrumental digital upskilling	Training VET teachers and educators in digital skills	Strong focus on IT tools and self-training Risk of 'digital age gap'
		Short educational technology-oriented programmes	More based on discretionary effort than on harmonisation

Source: compiled by the authors.

3.2.4. How COVID-19 impacts VET for SD at virtual and local level — community dimension

From the perspective of the role of VET, especially that of VET schools, although some initiatives have been launched to empower local communities as 'nodal' platforms to promote sustainable development and, in this case, respond to COVID-19, the efforts have been piecemeal and largely uncoordinated. In addition, they usually focused on the virtual community and paid less attention to the local one.

Firstly, virtual collaborative activities have been initiated in an effort to share knowledge and best practice, or even access to courses, organised around areas of vocational specialisation. While the virtual inter-peer collaboration between different members of the VET ecosystem through communities of practice based on vocational subjects stands out particularly, this mainly occurred among teachers of the same VET specialities. Nevertheless, virtual collaborative environments have emerged between different VET multi-stakeholders in order to share beneficial materials and experiences and even courses, opening them up to both young people and adults, usually with the support of public agencies (OECD, 2021a).

Secondly, the COVID-19 crisis has also provided a window of opportunity to create or strengthen public-private partnerships in VET. Some of the most noteworthy alliances are between firms providing ICT access or technical services to facilitate online digital learning or between firms that provide digital equipment and tools to teachers and underprivileged learners. Meanwhile, there are firms in the education technology sector whose purpose is both to improve online distance learning and develop new approaches to the assessment and certification of skills. *'A number of promising education technology initiatives have been mounted around the world in the form of start-ups or social initiatives by private tech companies'* (ILO, 2021: 49). Finally, alliances have also been detected between firms participating in WBL, which, together with the public sector and investment, seek to promote appropriate practices to encourage and foster apprentices' online learning.

Table 6. Impact of COVID-19 on ESD in VET at the community level

Dimensions	Changes	ESD impact
Virtual VET collaboration	Inter-peer collaborative initiatives (teachers, students, etc): communities of practice, repositories, etc.	Greater experience in sharing knowledge, materials, resources, experiences, etc Mostly, teachers' collaboration on specific vocational subjects rather than on SD issues
	Multi-stakeholder collaborative initiatives: portals for teachers, employers and other stakeholders	Aiming to develop and share their digital education materials related to vocational subjects Greater awareness of open community
VET public-private partnerships	Some ICT companies facilitate provision to the VET community	Different initiatives to provide connectivity, devices & IT platforms More collaboration
	New start-ups and social initiatives by private tech companies	Emerging new initiatives with the education technology sector Opportunity for sustainable initiatives
	Fostering investments at the corporate level to adapt WBL among public and private sector enterprises	Emerging promotion of the adoption of good practice (e.g., online learning for apprentices) Need for apprentices for sustainability
	Actions to address the shortages of labour and skills brought on by the COVID-19 crisis	Mostly, collaboration in essential sectors (government, training providers and social partners) Experiencing partnerships

Dimensions	Changes	ESD impact
	Among VET providers: sharing & opening courses Mostly supported by public agencies	Opening access to free courses for young people and adults Sharing resources and resilience
Local VET collaborations	VET schools and local companies' collaboration for assuring WBL	Interaction schemes between VET teachers and companies' tutors Shared commitment for leaners/apprentices
	VET and local stakeholders' collaborative initiatives	Empowering (e.g., producing protective equipment for the local community)

Source: compiled by PPMI.

Thirdly, in the context of COVID-19, VET schools have increased collaboration at the local level, both with firms and other local stakeholders (Van der Graaf et al., 2021). These initiatives are characterised by their highly proactive nature and by being linked to local environments' culture of collaboration. These span collaborations between VET schools and local firms, where pre-pandemic relationships in terms of trust between instructors and tutors and the level of systematisation of cooperation have been key to finding joint solutions in the context of COVID-19. VET schools have also launched initiatives to support their local communities with elements determined by the pandemic, such as the manufacture of protective equipment (e.g., sanitary masks using 3D printers) in VET school workshops.

3.3. Conclusions

3.3.1. Digitisation as the main impact of COVID-19 in VET

The response to COVID-19, both from governments and from the VET system itself (at the organisational, group and individual level), has been fundamentally aimed at ensuring access to and provision of vocational training, mainly through online distance learning environments. Management of this crisis in planetary sustainability has been characterised by an improvised and reactive event-driven response lacking Europe-wide coordination and implemented at differing speeds in IVET and CVET. The priority of preventing young people from losing a year of training and education is reflected in VET providers' rapid (although limited) response, enabled by the enormous efforts and resilience of key stakeholders such as educators, students and families.

The practical absence of preparation in the VET field — both in Europe and worldwide — for a crisis of such magnitude has become evident, revealing a threefold problem: (i) insufficient pedagogical adaptation of experiential learning processes to online distance learning environments (online learning by doing); (ii) the difficulty of ensuring the continuance of face-to-face WBL options (apprenticeships and internships); and finally (iii) the lack of an institutional effort to embed sustainability in VET.

3.3.2. A shared discourse of socio-economic risks of COVID-19 in VET

The pandemic has highlighted problems that existed before it, such as the digital divide by gender (women and men), age (young people), birth origin (migrant students and workers), employment status (employed and unemployed) and social status (salaries, family qualifications, etc.) and territory (urban and rural areas). Those impacts of a pandemic may be seen as threats to implementing ESD in VET on a short-, medium- and long-term basis. Considering the widely emphasised role of ESD in achieving all the SDGs and its particular function within SDG 4 ('Quality in Education'), changes and potential risks caused by the pandemic may also be seen through the key dimensions embedded in the definition of SDG4: equity and inclusiveness, lifelong learning and quality. Threats to

equity, inclusiveness, lifelong learning and quality of education can compromise progress toward implementation of the SDGs and thus the success in integrating ESD in VET.

Additionally, there are also changes and potential risks for other key dimensions of VET embedded in SDGs, in particular facilitating transitions to and within the world of work in a framework of productive employment and decent work, as well as enabling the capacity-building process for awareness of and action on the more environmental and social side of SD. Moreover, VET alliances and partnerships are affected in terms of global networking and collaboration. In many ways, European VET remains to be addressed from an environmental sustainability perspective.

3.3.3. Lacking a common understanding of the COVID-19 impact in VET in terms of ESD

Before the COVID-19 crisis, the promotion of ESD in the field of VET was generally minimal at both the European level and in the individual Member States. In the context of COVID-19, the importance of sustainability in the VET system has become clearer than ever. However, further research is needed to know how VET has been impacted by the pandemic at the macro, meso and micro levels in terms of sustainability.

In this regard, governments have greater room for manoeuvre in providing and sharing a comprehensive framework for strategies, action, monitoring and assessment of VET for SD. The recently ratified Declaration of Berlin on ESD is a great opportunity to work on and reinforce the revised proposal for 2030 contained in the UNESCO New Global Framework on Education for Sustainable Development (ESD for 2030) for the period 2020-2030 in its direct application to European countries' VET systems.

From the ESD approach, the great challenge for European VET systems is to ensure that all learners acquire the knowledge and skills needed to promote sustainable development, as well as ensuring that both youths and adults everywhere have the relevant information and awareness of sustainable development and lifestyles in harmony with nature. Furthermore, other key functions of the VET system, such as the promotion of technology transfer and locally applied innovation, as well as of social and territorial cohesion, need to be integrated.

3.3.4. Green transformation: towards green/sustainable growth or sustainable development in VET?

In the current context, one of the questions that arises is whether one of the impacts of COVID-19 is the acceleration of green transformation at the general level and also within the framework of VET. In fact, at the European level, different initiatives mentioned in section 3.1.3. are being developed to promote the green transformation within the framework of professional competences and qualifications. In this sense, it is important to see the coherence between the expected results in the green transformation and the articulation of the VET systems in terms of sustainable development. Therefore, it is key to share a vision, discourse and action framework to both differentiate and articulate the idiosyncrasies between VET for green / sustainable growth and VET for sustainable development. In this regard, it is relevant to point out that although the two visions are not mutually exclusive, VET for sustainable development is the one that affects institutional and cultural change, implying a transformation in the why and what for of VET, and not only in what and how VET does.

3.3.5. COVID-19 as a window of opportunity for VET for sustainable development

COVID-19 is acting as an enabler to enhance digital transition in European VET systems, but it is not yet clear whether it will also be an enabler for VET for SD. Nonetheless, the pandemic may be seen as a window of opportunity for ESD in VET.

Table 7. COVID-19 as an enabler to new opportunities for VET for Sustainability

Priority areas	Main opportunities
VET Policies	• Policy capacity to assure VET access and provision • Accelerating structural conditions and assets for SD • Facing new sustainability crisis and awareness of implications • Space for re-designing VET policies from the ESD approach
VET schools	• Organisational resilience and awareness of unreadiness for SD crisis • Shift to blended remote teaching and learning environments • Opportunity for education techs, clean techs and applied innovation, as well as assuring experiential teaching and learning and WBL • Space for structuring organisations and strategies in teaching, applied innovation and green and local development in terms of sustainability
Youth in VET	• Improved digital competences and facing self-learning • Resilience for sustainability crisis and awareness about ecosystems • A lever to increase maturity in terms of empathy, care, etc. • Space for providing opportunities for youth engagement in sustainability, empowering them for green and climate transition
VET Teachers	• Improved digital capacities and facing new EdTech and pedagogies • Acknowledging new SD teaching scenarios, instruments and tools • Resilience for sustainability crisis and new collaborations/partners • Space for re-designing curricula, pedagogic models and innovations in teaching sustainability (knowledge and competencies)
Partnerships & Community	• Proved capacity for public / private collaboration among different stakeholders of the VET ecosystem (communities of practices, projects) • Good experiences of VET schools and local and local stakeholders in collaborative initiatives and sharing digital knowledge and resources • Space for further efforts empowering local communities as 'nodal' platforms for all priority action areas in sustainability

4. The impact of COVID-19 on ESD in higher education

This segment of the Report is organised around the concept of sustainability of higher education and analysed following its dimensions and aspects. Conclusions and recommendations are formulated based on the identified trends and recognised needs for policy consideration (see Chapter 5).

There are at least two key limiting factors of the analysis of impacts of COVID-19 on ESD in higher education. First, despite the increase of research and policy papers on the impacts of COVID-19 on education, including higher education, there are only a few studies on the specific influence of the pandemic on the integration of SD and ESD in HEIs. Even when authors directly link their analysis to impacts of COVID-19 on sustainability issues and HE, it is rather focused on wider concepts of SDGs or ICT/e-learning and its relation to education (for example, Wang, 2021; Navarro-Espinosa et al., 2021) than to the specific aspects of ESD. Second, since the pandemic is still ongoing, it is only possible to look at emerging trends and short-term consequences rather than to reliably conclude on the long-term effects or changes caused or triggered by COVID-19.

4.1. The context: impacts of COVID-19 on HE

In higher education, approximately 220 million students globally have been affected due to the disruption caused by COVID-19 (Farnell et al., 2021; World Bank, 2020; UNESCO, 2021a). Already in March 2020, only weeks after WHO officially declared the pandemic, schools and universities were closed for 87 % of enrolled students and for more than 60 million teachers (UN DESA; Leal Filho et al., 2021b).

Studies and reports developed between early 2020 and mid-2021 recognise major influences of the pandemic on the core aspects of higher education. Although the pandemic has caused damage and forced HEIs to rapidly react to assure their core functions, as well as the health and safety of their staff and students, new learning and research opportunities and technology solutions emerged at the same time (UNESCO, 2021a; EC, 2021). Digitalisation of education has been identified as the common developing trend in HE in many countries (UNESCO, 2021a; Farnell et al., 2021; EC, 2021).

However, research data obtained from the academic staff and students from universities worldwide (most of them being from Europe) during the first wave of the pandemic (March-May 2020), show that 15 % of respondents stopped studying or teaching; in addition to that, students participating in the research seemed significantly less satisfied with the institutional support provided by their universities – in particular in less developed countries (Leal Filho et al., 2021b). According to the results of the survey of faculty members performed by The Chronicle of Higher Education (October 2020), academic staff experienced a high level of stress due to the workload and lack of work-life balance, which was particularly heightened for individuals from vulnerable groups (Fidelity, 2020). It further provoked a rethinking of their careers, including the options to leave HE, which was considered by one third of the respondents (Fidelity, 2020).

Social interaction and communication were significantly affected by new conditions for learning and teaching, as shown in the studies carried out in different countries and universities around the globe (Leal Filho et al., 2021b; Fidelity, 2020; Pejatovic et al., 2021), making a potential impact on the satisfaction of both students and teachers, thus influencing the quality of education (Wang et al., 2021). Almost 80 % of (254) teachers from HEIs participating in the survey performed by the Foundation Tempus in Serbia found that distance learning, mostly carried out through digital tools during the first year of the pandemic, has been of less quality when compared with 'standard' teaching. According to the estimates, consultations with experienced colleagues would be the best way to improve competences in this field in the future, and blended teaching would be, in their opinion, far better than online teaching only (Foundation Tempus Serbia, 2021).

The huge crisis provoked by the COVID-19 pandemic in all the sectors underlined existing inequalities between countries and regions (in terms of access to education, technology, funds, etc.), as well as structural and leadership weaknesses of HEIs around the world (Bergan et al., 2021). As recognised, it all contributed to increased uncertainty and awareness that pandemics can 'turn our world and our values upside down' (Bergan et al., 2021), highlighting the importance and social responsibility of HEIs in developing resilience and sustainability of local and wider communities.

Rapid changes and risks brought by this pandemic, in addition to the existing environmental crisis, may be – and is – seen as an accelerating factor for mobilising individuals and communities in finding new solutions for a sustainable future. This opens the opportunity for all of education and in particular for HEIs to reflect on their role in innovation, community cooperation and development of critically aware and active citizens – which are of tremendous importance for performing, and, potentially for transforming, their role in implementing sustainability in universities and in the wider community.

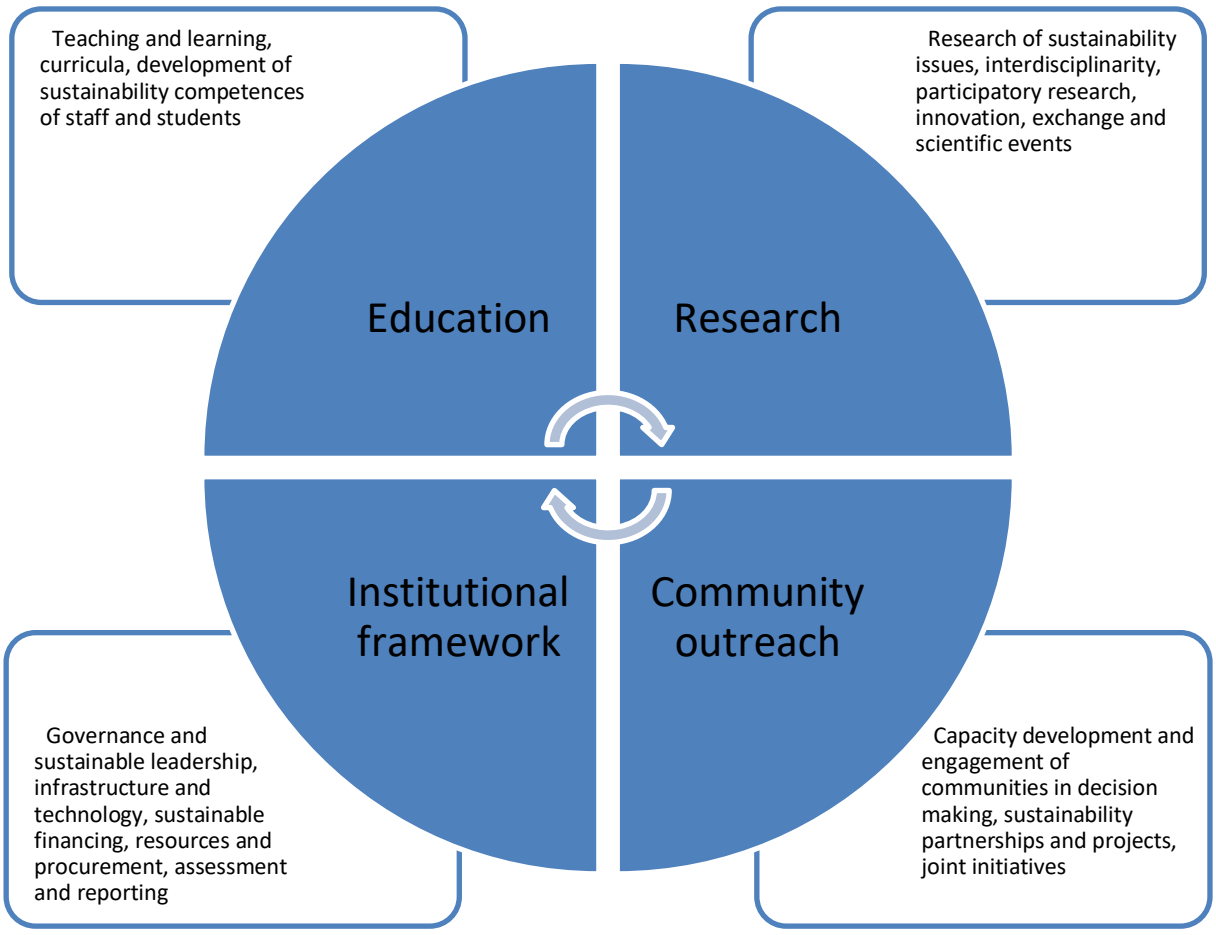
4.2. Dimensions of sustainability in HEIs under the influence of COVID-19

4.2.1. Sustainability in HE – concept and dimensions

As previously stated, the impacts of COVID-19 pandemic on the implementation of ESD in HE is analysed here using the framework of sustainability of HEIs.

The sustainability of HE is usually understood as the process of integrating principles and the concept of SD into all its functions and aspects (Orlovic Lovren et al., 2020). Considering the core functions of HEIs, the following dimensions or domains of implementation of HE sustainability are usually recognised: curricula, research, campus operations, community outreach and the institutional framework (Leal Filho et al., 2017); or education and curricula, research, facilities / campus operations, community outreach, organisational change management / institutional framework, and assessment and reporting (UNESCO, 2012; Lozano et al. 2017).

Figure 1. Dimensions of sustainability in HE



Source: adapted from Renner and Cross,1999; Waas et al., 2012; UNESCO, 2012; Leal Filho et al., 2017.

Expressing the awareness of the need for HEIs to play a more active role in implementing SDGs, 42 international and national networks launched the SDG Accord (2017). Joining this initiative, HEIs commit to one another to work more on the delivery of the SDGs, on

reporting about it and on sharing experiences with one another, as well as through the UN High Level Political Forum (https://www.sdgaccord.org/).

Accelerating education for the SDGs in universities: A guide for universities, colleges, and tertiary and higher education institutions

This guide was prepared by the Sustainable Development Solutions Network (SDSN) in 2020. Its aim is to help universities, colleges, and tertiary and higher education institutions implement and mainstream 'Education for the SDGs' within their institutions. Within this approach, ESDGs builds on the established field of education for sustainable development (ESD), incorporating a broader agenda of issues, objectives and methodologies than ESD, thus responding to the increasing interest across the university sector in engaging with the SDGs.(https://resources.unsdsn.org/accelerating-education-for-the-sdgs-in-universities-a-guide-for-universities-colleges-and-tertiary-and-higher-education-institutions).

The guide is accompanied by a case study website, with almost 50 innovative and inspiring examples of how universities around the world are already accelerating their implementation of education for the SDGs.(https://blogs.upm.es/education4sdg/).

A number of networks have been established in order to promote and contribute to the implementation of sustainability in higher education (the list of selected networks is included in Annex 1).

4.2.2. The impact of COVID-19 on ESD by the core dimensions of HE

Following the core functions of HEIs, we focus on four dimensions – education, research, institutional framework and community outreach and their sub-dimensions or individual aspects inside each of the categories.

Table 8. Dimensions and sub-dimensions of sustainability of HEIs used in the analysis

1. Education
   - 1.1 Impacts on curricula and development of sustainability competences
   - 1.2 Teaching approach, teaching / learning interactions and innovations
   - 1.3 Teaching and learning environment and access to learning

2. Research
   - 2.1 Research issues – sustainability, SDGs and interdisciplinarity
   - 2.2 Cooperation, networking and participatory research on sustainability issues
   - 2.3 Participation in conferences and scientific events related to ESD, SD and SDGs

3. Institutional development and governance
   - 3.1 Strategies, policy response and participation in decision-making about sustainability of HEIs
   - 3.2 Infrastructure, technology, budgeting and support to sustainable practices
   - 3.3 Campus operation, use of resources and human resources

4. Community outreach

4.1 Joint initiatives and response to challenges of COVID-19 to sustainability
4.2 Collaborative projects, partnership with different stakeholders
4.3 Engagement of community in teaching, research, decision-making

Based on the analysis of secondary data, identified trends and developments are presented in the following table and then discussed.

Table 9. Impacts of COVID-19 on ESD in HE – emerging trends and potential risks

Dimensions of sustainability in HEIs	Aspects /sub-dimensions of sustainability in HEIs	Changes	Impacts on ESD in HE
Education	*Curricula and sustainability competences*	Social, environmental and economic life affected by pandemic	Relations between the pandemic impacts and sustainable development not included in curricula or inadequately approached in teaching
		Urgent shift to online learning and teaching in HEIs around the Globe	Emphasis on teachers' digital skills and using of platforms/programs, rather than on competences in teaching and integrating ESD in HE
	Teaching approach	Teaching methods, tools and approaches rapidly adjusted to online learning	Lack of engagement and activity of students; rapid changes of understanding and conditions for participatory approach Limited opportunities to connect theory with real-life experience; impacts on quality of teaching
	Teaching environment and access to learning and teaching	Digital environment for teaching and learning; remote, 'emergency online teaching'	Increased stress and social isolation; lack of motivation and collaboration of students Inequality of students and teachers in terms of internet access, equipment and conditions for remote learning and teaching ('digital divide')
Research	*Research issues and sustainability*	Dominant orientation toward health-related issues	Lack of research and published work on other important issues related to SD and SDGs
	Research projects related to sustainability	Disruption of projects or restrictions which prevented fieldwork	Risks for obtaining of data from the field; disturbed dynamic of research and graduate studies of students
	Research conferences and events related to sustainability issues	Cancelled or postponed	Reduced communication and exchange between researchers, potential impacts on research support to the implementation of SDGs and ESD in HE
Institutional Framework	*Sustainable governance*	Frequent changes and uncertainty	Difficulties in long-term planning and adjustments of institutional policies to emerging needs

Dimensions of sustainability in HEIs	Aspects /sub-dimensions of sustainability in HEIs	Changes	Impacts on ESD in HE
		Limited opportunities for physical meetings and interaction with staff and stakeholders	Lack of transparency and opportunity of all stakeholders to participate in processes and decision-making
	Financial sustainability	Reduced public funds and sources; lost income from tuition and accommodation; impacts of the economic crisis on employment of staff Less international students;	Lack of funds for operation, salaries, technology support, sustainability practice Risks for internationalisation of HE as an important mechanism to develop collaboration, exchange and contribute to global sustainability; fewer funds for HEIs coming from this activity
	Campus operation	Closure of institutions and campuses	Disruptions in providing usual services and continuing with 'greening practices'
Community outreach	*Providing support to community*	Emergency needs in health care, economy, recovery and resilience of community	Risks of economic crisis and social isolation, followed by unequal access of people to education, technology and employment Risks for successful implementation of SDGs
	Support to students and teachers	Impacts of the pandemic on economic stability of families; drop-out or difficulties for students to continue studies or for 'non-traditional' students to enrol	Consequences on implementation of SDGs (poverty, quality of education and lifelong learning, inclusiveness) and human rights approach

The impacts of the pandemic presented above might be seen as threats to implementing ESD in HE both in the short term and long term. Considering the widely emphasised role of ESD in achieving all the SDGs and its particular function within SDG 4 (*'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'*), changes and potential risks caused by the pandemic may also be seen through the key dimensions embedded into the definition of SDG4:

Equity and inclusiveness:

- The difference in institutional and infrastructural support provided by HEIs for online learning and teaching, including the differences among countries and regions – in particular during the lockdown (Leal Filho et al., 2021b; Napier, 2021);

- Uneven status of HEIs in competition for resources affected by the economic crisis caused by the pandemic (EUA, Strategy 'Universities without walls');
- The economic crisis causing loss of jobs and financial stability of families, followed by lack of opportunity to support their members to enrol or continue studies within HE;
- Reduction of public funds for scholarships and stipends additionally contributes to the drop-out or limited access of HE for both young and adult students;
- The unequal burden on groups and individuals among the academic staff, causing higher stress, anxiety or work-life balance problems.

Lifelong learning:

- Limited access to HE for adults from socially and economically deprived groups;
- Lack of programmes for the development of teachers' sustainability competences affects the lifelong learning process and its implementation in HE;
- Reduced programmes for capacity development of communities, due to cancellation of projects or lack of funds.

Quality:

- Quality of teaching and curricula: challenges in delivering courses that require practical work and fieldwork;
- Difficulties of assessment which requires the same conditions;
- Lack of quality interactions between students and teachers;
- Limited opportunities for visits and apprenticeship as well as action research and initiatives.

Threats to equity, inclusiveness, lifelong learning and quality of education can compromise progress toward implementation of SDGs and thus the success in integrating ESD in HE.

4.3. COVID-19 impacts and windows of opportunities for ESD in HE

Besides its negative effects on all spheres of life, the pandemic also has transformative potential. If used through systems- and critical thinking and the participatory approach to teaching promoted by the ESD, it may create opportunities for learning, reflecting and changing – and therefore for integrating sustainability and implementing SDGs in HE and in the wider community.

Of many potential opportunities, the following are underlined, having in mind the framework and the scope of our analysis.

Information and communication technologies (ICTs) are seen as a 'key to create sustainable higher education institutions (HEIs)' (Navarro-Espinosa et al., 2021). Its creative use in sustainable leadership, providing transparency of decision-making processes, policy measures and changes can contribute to a more enabling environment for the development of a 'culture of sustainability', increasing the chances for quality integration of ESD in all segments of HEIs. Providing support to HEI staff and students in obtaining technology and access to the internet is a key precondition for democratic participation in the context of the limited 'face-to-face' interactions due to the pandemic. It is particularly important for less privileged communities and countries.

Financial support to communities and learners by local and provincial governments: an example from Canada

In Canada, provincial and territorial governments have provided support to communities in terms of infrastructure and financial incentives, assuring equity and meeting specific cultural and learner needs.

For example, in Alberta, in July 2020, the Ministry of Advanced Education provided the five First Nations colleges with a grant from the COVID-19 relief fund, securing a $100,000 grant for each First Nations college, to be used for the following expenses: technology, Wi-Fi, online programme development and delivery. First Nations colleges are free to tailor the grant to their specific needs.

Source: Council of Ministers of Education, Canada, 2021, UNESCO,2021a

Online learning can bring new and creative solutions in designing, performing and evaluating teaching, contributing to the quality of education, including ESD. Thanks to students' potential to use technology, online learning and communication through social media can motivate them for participation and active learning (Sahu, 2020). Lessons learnt by students and teachers during the pandemic may be used in future 'face-to-face' or blended learning and teaching (Leal Filho et al., 2021a; Pejatovic et al., 2021).

Supporting teachers in innovating their practice: University of Bologna

In order to support the quality and innovation of teaching in an emergency, the University of Bologna has developed a plan consisting of monitoring, research and training (Unibo Innovation, 2020). Consistent with this working method, specific monitoring and training activities were launched with the aim of supporting teachers in developing innovation in their practice. In the period February to June 2020, research and evaluation were carried out, and 21 training initiatives with 81 hours of training were delivered, involving a total of 590 teachers.

Source: Bergan et al., 2021

The impact of the COVID-19 pandemic opens the space for re-designing curricula and strategies in teaching sustainability at HEIs. Changes caused by the pandemic in environmental, social and economic aspects of life and developments have provided an opportunity to critically reflect (Leal Filho et al., 2021a), testing previous perspectives and discussing constructive solutions and scenarios for the future.

COVID-19 impacts strengthen the need for collaboration and sharing experiences between teachers and researchers in teaching for sustainability. There are examples of successful collaboration in sustainability and climate change teaching (Leal Filho et al., 2021), which may further initiate HEIs to rethink their missions towards achieving SDGs (Wang et al., 2021).

The 'World Sustainable Development Teach-In Day' was organised by the European School of Sustainability Science and Research (ESSSR) and the Inter-University Sustainable Development Research Programme (IUSDRP) and led by Hamburg University of Applied Sciences (Germany) and Manchester Metropolitan University (UK) in December 2020, 10 years after it was first held by the Research and Transfer Centre 'Sustainable Development and Climate Change Management' of Hamburg University of Applied Sciences. This open access event aims to facilitate networking of academic staff from universities all over the world and knowledge transfer within an international, digital learning environment. Holding a Teach-In-Day lecture and sharing presentations, teachers are becoming part of a global sustainability movement, providing support to one another and new learning opportunities to students – particularly valuable in the context of the pandemic.

Source: https://esssr.eu/events/world-sustainable-development-teach-in-day-series-2020-2030/

The impacts of the pandemic have shed light on different perspectives and the importance of inter-/multidisciplinary approaches in the research of sustainability issues. While many projects were cancelled or disrupted due to the pandemic, researchers recognise the need to include topics such as disaster, health-related risks and resilience of the local and global community in their studies. There is wide recognition by researchers and institutions of the need to use online environments and technology for planning, conferencing and sharing of data and experiences. As revealed by the recent study on impacts of the pandemic on sustainable development research, researchers can take innovative perspectives in interpreting system change, as well as using open access to COVID-19 papers for rethinking sustainability issues and looking at possible solutions through multidimensional and multidisciplinary lenses (Leal Filho et al., 2021c).

Online conferences and workshops on sustainability issues improve access to professional development and learning programmes for teachers, researchers and students from HEIs around the world. Although many in-person conferences and workshops were cancelled, organisers were able to quickly adjust to new circumstances and offered those programmes either for free or at reduced prices, with the opportunity to follow it from home, while saving on travel and accommodation expenses, and reducing the carbon footprint at the same time.

Supporting pedagogues and teachers in digital transformation during the COVID-19 pandemic: Example from Serbia

In May 2021, the Pedagogical Society of Serbia and the Institute of Pedagogy and Andragogy, Faculty of Philosophy, University of Belgrade, jointly organised a traditional gathering of pedagogues, and school and university teachers from all over Serbia. This year, it was organised online and devoted to the emerging topic – education and learning in a digital environment. All the participants had access not only to presentations of innovative practice shared by practitioners but also to the workshops held to support further innovation of teaching and digital transformation of schools and HEIs. This event has been evaluated by teachers as a very useful and timely support in their struggles to meet the demands of the new teaching and learning environment and learners' needs provoked by the pandemic.

Source: https://www.pedagog.rs/

Impacts of COVID-19 on the well-being of students and staff of HEIs ask for proactive and sustainable leadership and management in providing not only technological and financial, support, but also support in terms of empathy, solidarity and care. Rapid changes of circumstances for both permanently employed staff and associates, as well as for students from respective countries and international students, require flexibility and continuous adjustment of policies and decision-making, including recognition of the necessity for staff and students to be involved in these processes as equally and transparently as possible (Fidelity, 2020).

Leveraging the COVID-19 crisis to advance global sustainable universities: Tokai University, Japan

Tokai University has launched the Crisis Leveraged Actions for Revitalization (CLEAR) project, which aims to leverage this crisis to reform previously unchangeable issues in the university. Some changes achieved by the project are:

- Establishing a smoke-free campus: by leveraging the strong recommendation by the World Health Organization (WHO 2020), stating that no smoking is an important countermeasure to COVID-19, all seven campuses became smoke-free as of 1 April 2020;
- As part of the services available for students, faculty and staff members who are unable to enter campus, the university started online counselling, led by the health promotion division, and installed additional electronic books and online databases to support learning and research from off-campus locations.
- Given that online classes will continue for the foreseeable future, a new LMS server was installed and should go down [not fail] and even if it is accessed by many people from off-campus
- The university has been providing approximately USD100 for each student (costing a total of USD 3 million) as a request-based grant to improve the learning environment of online classes.

Source: Bergan et al., 2021.

Increased demands of the community to be supported and to collaborate with universities during and after the pandemic can inspire a re-evaluation of the policies and practices of HEIs in performing their 'Third' and 'Fourth mission'. Research and reports speak about initiatives of universities to update and innovate their policy and practice of communication, research and initiatives towards engagement of communities and joint actions for sustainable local development (Bergan et al., 2021).

Studying and working from home may also be seen as an opportunity to use the time for new learning and improving the quality of family life. Research performed during the lockdown shows that both academic staff and students valued this opportunity to spend more quality time with either family members or roommates (Leal Filho et al., 2021b).

Despite many common challenges, the response of HEIs around the world to the challenges brought by COVID-19 varied but is generally assessed as quick and efficient, assuring continuation of studies. It includes creative solutions, strategies and methods used by teachers, as well as the readiness of students to contribute to the success of the learning / teaching interaction. Experiences evidenced by previous studies and shared through networks or by participants of conferences and webinars show that **this, just like any other crisis, may be used as an opportunity to learn**, **reflect and improve teaching as well as institutional sustainability practice**. Further research is needed to indicate changes that occurred in different waves of the pandemic, particularly related to teaching and learning for sustainability. Lessons learnt and the reflection on experiences should be used at the institutional as well as the systems' level in order to improve resilience for coping with future challenges as an important segment of competences for sustainability.

5. Conclusions and recommendations

COVID-19 has caused a global health and sustainability crisis in which one of the greatest disruptions has occurred in the education sphere, meaning that all educational levels

(primary and secondary schools, VET schools and universities) have been affected across all their functions because the pandemic has impacted every dimension: policies, educational organisations, teachers and learners as well as local communities.

In the pre-pandemic context, the ESD framework was more declarative than action-oriented in both the EU and the individual Member States. Moreover, ESD actions were disaggregated and weighted more towards social and economic outcomes than environmental ones. European ESD was still far from having a comprehensive and procedural action framework based on lifelong learning of knowledge, skills and attitudes to sustainability.

In the context of the ongoing pandemic, the EU and its Member States have ratified their commitment to ESD through the Berlin Declaration (2021). This opens up an enormous window of opportunity to rethink European education in terms of sustainable development since, in addition to knowing how to respond to future sustainability crises, we need to make sure we avoid them. The main challenges facing Education for Sustainable Development are structured according to the main priority action areas of the ESD framework (UNESCO, 2017) (in which the ESD framework is fundamentally specified in Transversal core Sustainability competences and ESD-specific learning objectives, highlighting goal 4.7), which were ratified earlier this year. Moreover, each area will be articulated from a systems-thinking approach that implies (Hannon and Peterson, 2021):

a) A system paradigm shift;

b) A change in whole-system goals;

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD;

d) A reconfiguration of structures and flows within the education system.

5.1. Advancing ESD policy for ESD

Future policy preparedness for education sustainability

a) A system paradigm shift

- Rethinking education ecosystems in terms of sustainable development beyond digitalisation, bringing the educational offering into line with the prevailing social demand for sustainability.

b) A change in whole-system goals

- Providing appropriate strategy and governance is a *sine qua non* for efficient and effective ESD, as it enables the design and development of an ESD policy framework and regulations. Governance of ESD must involve representatives from all areas within the educational ecosystems (primary and secondary education, VET and HE).

- Integrating and prioritising ESD policies at the national, regional and local level, applying holistic and cross-sector policy approaches.

- Developing an integrated ESD information system or other SD reporting, surveillance and enforcement mechanisms which, under a harmonised and flexible approach, make it possible to monitor and evaluate countries' and regions' progress towards ESD, which in turn requires comprehensive, reliable data on ESD.

- Developing public means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing public perceptions of sustainability.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Including ESD criteria (cross-sector, transdisciplinary, collaborative, participatory) in the provision of grants and funds for innovation in education.

- Integrating ESD planning into the lifelong learning curriculum (from early childhood education through to active ageing). Dedicating resources to expanding, adapting and innovating education and training offerings to correct the lack of coverage sustainability receives in European education systems.

- Developing public means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing public perceptions of sustainability.

d) Reconfiguration of structures and flows within the education system

- Strengthening resources to support equity and inclusiveness in education for children, young people and adults, including non-formal and informal programmes for communities and stakeholders.

- Fostering research, technology transfer and innovation programmes and schemes for sustainability projects, in particular in senior years at school, VET and HE. Programmes, incentives and investment in research and innovation must be promoted in both blended SD learning for all and work-based learning for sustainable development for young people and adults.

- Developing proximity policies, bringing the focus of analysis of ESD shortfalls at the different educational levels (primary and secondary, VET and HE) down to at least regional level by 2030 (e.g., 'Regional ESD systems' – RES30) and prioritising knowledge and experience of SD in terms of proximity and the needs of the respective education ecosystems.

5.2. Learning environments for ESD

Promoting a whole-institution approach towards ESD

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Promoting a whole-institution approach to ESD: governance, estates/campus, procurement, curriculum, community/stakeholders, action learning/research.

- Creating mechanisms for ESD coordination in education systems, including the needs and activities related to emergency prevention, preparedness, and response.

- Developing internal means of acknowledging educational stakeholders' contribution to SD, thereby reinforcing schools', VET and HE institutions' perceptions of sustainability.

- Conducting constant monitoring and evaluation so that school/vocational organisation/university operation and the outcomes achieved in terms of sustainability are continuously improved.

e) Reconfiguration of structures and flows within the education system

- Enhancing learning environments to support the development of competences of children, young people and adults, facilitating their human development at a cognitive, affective and behavioural level, in the context of contributing to sustainable development.

- Promoting and supporting collaboration between students and teachers, communities, trainers and academic/non-academic staff in action research and activities addressing sustainability and the impacts of the pandemic (e.g., through collaborative project-based learning).

- Ensuring and allocating funds for financial support to students and staff (technology, tools for teaching and learning, etc.) and ensuring that policies are created to ensure that disadvantaged students have access to online learning.

- Design and develop rigorous quality assurance systems specific to education settings to guide the whole-institution approach.

- Intensifying communication through online and social media channels, assuring transparency of information and opportunities for students and staff to participate in decision-making processes, including full and clear information on policy regarding the measures against the pandemic.

- Developing clusters of schools with active and dynamic management teams to act as learning hubs by building networks around them, to move to scale and move beyond merely ad hoc activities.

- Embedding ESD in schools, VET schools and universities and other educational and training organisations means developing or updating ESD and sustainability strategies at the institutional level, incorporating the lessons learnt during the pandemic.

5.3. Teachers and Educators for ESD

Providing SD capacity development in:

b) A change in whole-system goals

- Authorities must multiply their plans and programmes to meet the needs detected among teaching staff (and among non-teaching staff) in terms of sustainability experience: knowledge and understanding of SD, sustainability competences and skills and use of learning methodologies for ESD.

- Fostering sustainability knowledge and competences, using the framework developed by UNESCO (for instance, anticipatory competency, normative competency, strategic competency, collaboration competency, critical thinking competency, self-awareness competency and integrated problem-solving competency), or the future European key competence framework on sustainability.

- Relevant competences for a sustainable production system (efficient technologies, clean technologies, Artificial Intelligence, etc.)

- Innovative and sustainable blended experiential formats and work-based learning (apprentices, trainees, etc. for SD).

- Providing incentives for organising and participating in local and global gatherings, webinars and conferences dealing with issues of sustainability teaching and integration of issues related to the impacts of the pandemic into curricula.

- A stable ESD training framework for teachers, with clear priorities and supported by incentives and traceable ESD and SD specialisation in the short, medium and long term.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Integrating sustainability and ESD into the pre-service education of teachers at all the education levels and encouraging subsequent lifelong learning and training throughout their careers.

- Supporting knowledge sharing and improving online teaching strategies based on a participatory and transformative approach.

- Maximising the synergies, support and incentives needed to advance applied research into sustainability-oriented education.

d) Reconfiguration of structures and flows within the education system

- Having a sustainability information system for teachers to ensure effective vocational guidance and to adapt the education and training offering.

- Creating new prescriptive roles, such as that of sustainability adviser for educators, and boosting actions and experiences that promote sustainability culture among teaching staff.

5.4. Youth and ESD

Providing opportunities for youth engagement

a) A system paradigm shift

- Supporting initiatives involving joint projects and activities between students and staff of schools, VET schools and universities, addressing the sustainability of institutions or communities or the quality of education.

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Involving students in decision-making on all important issues related to the impacts of the pandemic, policy or structural changes, and sustainable development.

- Supporting students' networks and associations in providing help or assistance to international students, those hit by the impacts of COVID-19 or those who are disabled or marginalised.

d) Reconfiguration of structures and flows within education

- Better support for students in identifying and encouraging their interest in SD and the development of personalised learning pathways as part of lifelong vocational guidance.

- Encouraging socialisation of students in both the world of education and the world of work in a changing world, focusing on a sustainable and just future for all.

5.5. Community and ESD

Empowering local communities as 'nodal' platforms for all priority action areas

c) A repatterning of relationships, cultivating systemic ways of organising towards ESD

- Initiating activities to meet emerging needs of communities during and after the pandemic, providing professional and voluntary support from staff and students at primary and secondary schools, VET schools and universities, promoting solidarity and collaboration.

- Establishing and strengthening partnerships with local stakeholders contributing to practical inputs to teaching and learning for sustainability.

- Fostering knowledge, research and innovation both within the educational ecosystems (primary and secondary education, VET and HE) and towards local communities, firms and institutions to foster sustainability and ESD.

d) Reconfiguration of structures and flows within education

- Involving community members in action research and capacity development programmes addressing local and global sustainability issues and global trends.

Finally, integrating sustainability through ESD into the system – from policy through to institutional transformation, human resources and community development – contributes to the system's transformation, which is necessary to meet the complex current and future demands. The synergy between 'top-down' and 'bottom-up' actions and processes is needed at all levels of education and aspects of life in all regions of the world. The huge changes caused by the pandemic create opportunities to learn from it and to contribute to citizens' and systems' resilience in order to sustainably cope with possible new disasters. Implementation of ESD into all levels of education can significantly support that process.

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Annex 1

Networks and associations working on sustainability of higher education

- **The International Association of Universities,** created under the auspices of UNESCO in 1950, is a membership-based organisation serving the global higher education community through: expertise & trends analysis, publications & portals, advisory services, peer-to-peer learning, events, global advocacy (https://www.iau-aiu.net/).

- **University Leaders for a Sustainable Future** (ULSF) support sustainability as 'a critical focus of teaching, research, operations and outreach at colleges and universities worldwide through publications, research, and assessment' (https://ulsf.org/). It also serves as the Secretariat for signatories of the Talloires Declaration.

- **The Association for the Advancement of Sustainability in Higher Education** (AASHE) Established in 2005, AASHE is comprised of over 900 members across 48 U.S. states, 1 U.S. Territory, 9 Canadian provinces and 20 countries (https://www.aashe.org/).

- **The Inter-University Sustainable Development Research Programme** (IUSDRP) Led by HAW Hamburg (Germany) and Manchester Metropolitan University (UK) with 140 member universities from across all geographical regions, is the world´s largest network of universities pursuing research on matters related to sustainable development (https://www.haw-hamburg.de/en/ftz-nk/programmes/iusdrp/).

- **The International Sustainable Campus Network** (ISCN) with the mission to provide an international forum to support higher education institutions in the exchange of information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability in research and teaching (https://international-sustainable-campus-network.org/#).

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