The CYBER.VET.EU Handbook

Improving Cybersecurity readiness of the European Vocational education and training sector

YBER.VET.EU

réseau **tandem**plus

TANDEM PLUS NETWORK with the CYBER.VET.EU consortium:

NGO NEST Berlin AEII Cooperativa de Formação e Animação Cultural, c.r.l. EOS Extrafondente Open Source meath partnership engage · enable · participate · progress inerciadigital Latvian European Community Studies Association

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Summary

a) The CYBER.EU.VET project implementation

The European Union is facing an epochal challenge represented by the Covid-19 pandemic. Many sectors are strongly hitted by these crises and education is certainly one of them.

More and more users are now forced to use online classes or training, so the importance of recognizing the everyday threats to our security is now more important than ever. This topic

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is recognized as fundamental also by the European Commission that every year organize a European Cyber Security Month, of which website already includes some educational material and specific awareness campaigns as the "Get cyber skilled" on in 2018 .

The project **CYBER.EU.VET** includes 8 partners (NGO NEST – Germany (LEADER), MEATH COMMUNITY RURAL AND SOCIAL DEVELOPMENT PARTNERSHIP LIMITED – Ireland, TANDEM PLUS – A EU network based in France, COFAC COOPERATIVA DE FORMACAO E ANIMACAO CULTURAL CRL- Portugal, LATVIJAS ASOCIACIJA EIROPAS KOPIENAS STUDIJAM – Latvia, ASOCIACION EDUCATIVA POR LA INTEGRACION Y LA IGUALDAD – Spain, INECIA DIGITAL – Spain, Extrafondente Open Source – Italy)

DSI 2.0 – Individuals with above basic overall digital skills – All Individuals (aged 16-74)

Year:2021

European Commission. Digital Scoreboard [1]
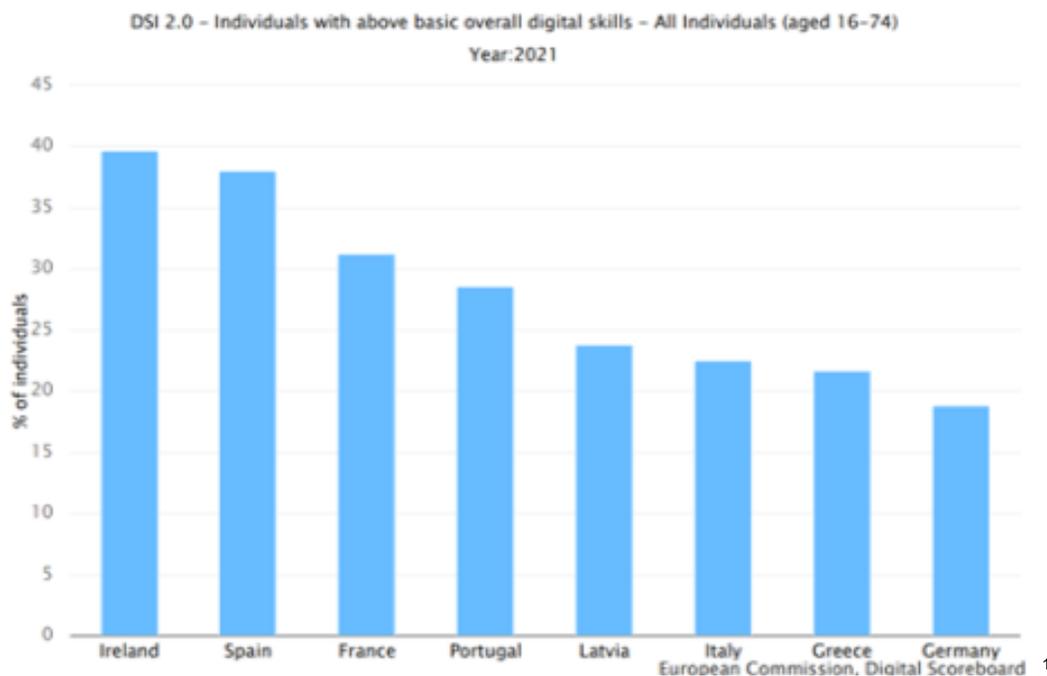
The main objective of **CYBER.EU.VET** is to strengthen the European VET capacity to recognize and manage cybersecurity threats (e.g. phishing attacks, botnets, financial & banking frauds, data fraud) in a historical context where online training is more and more utilized.

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[1] ESMS Indicator Profile (ESMS-IP) Compiling agency: Eurostat, the statistical office of the European Union.

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i.   **Project Impact**:

The project impacted local, regional and national levels by involving different levels of stakeholders, offering solutions that are tailored to meet the demands of the local levels, but are aligned at a higher level, developing, through the partnership, EU-wide applicable training material and standards.

In particular, the impact on the direct participants and main target groups has been:

- VET educators - A strengthened teaching capacity, adding to their skills a knowledge of the main digital security threats.

- VET educators and students - improved digital skills thanks to the educational training material.

- VET educators and students: an increased awareness on the threats and their real risks, both economical and social ones.

- VET institutions will be more prepared to face cybersecurity risks with the CYBER.VET.EU tools both for their educators and students.

ii.   **Project Target**

The project is expected to have a positive and long-term impact on the different stakeholders involved in the project, in particular:

- – - VET students
- – - Cybersecurity experts volunteers
- – - VET institutions networks
- – Policymakers

iii.   **Objectives of CYBER.EU.VET project:**

- - The first specific objective will be to have more prepared VET educators on cybersecurity threats management, given their central role in the knowledge transfer of good practices and skills to their students.
- - The second specific objective is to increase awareness among VET teachers, students and their relatives as well on the importance to recognize such daily risks, that can have a both economic and social impact on all the European citizens.

- The third specific objective is to support public institutions and VET institutions to be more ready to face such kind of challenges, providing them guidelines for future implementations.

iv.   Intellectual Outputs:

- O1: Research analysis: main cybersecurity challenges and best practices (responsible partner: NGO NEST BERLIN EV - E10166639)
- O2: Cybersecurity awareness training material for the VET sector (responsible partner: INERCIA DIGITAL SL (E10145080,)
- O3: Training for trainers toolkit (responsible partner INERCIA DIGITAL SL (E10145080)
- O4: The Cybersecurity handbook for VET institutions: best practices, training material and guidelines for future implementations (Responsible partner TANDEM PLUS - E10103913)

In parallel with the development of the intellectual outputs, the other objective of the project is to disseminate our outcomes and results EU-wide to potential participants, multipliers and interested stakeholders, to boost the impact and the relevance of CYBER.EU.VET.

v.   What is cyber security?

The formal definition of **cybersecurity** in EU law is found in the text of the EU Cybersecurity Act: "*cybersecurity means the activities necessary to protect network and information systems, the users of such systems, and other persons affected by cyber threats*" (Art. 2.1).

EU law, while adopting the "*protection of network and information systems*" approach also stresses that cybersecurity protects not only information systems, but also (and perhaps more importantly) persons, regardless of whether users of such systems or third parties affected in any way by cyber threats.

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In December 2020, the European Commission and the European External Action Service (EEAS) presented a new EU cyber security strategy aiming at building resilience to cyber threats and ensure citizens and businesses benefit from trustworthy digital technologies.

The Regulation (EU) 2021/887 establishing the European Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres sets up the European Cybersecurity Competence Centre (ECCC) and the Network of National Coordination Centres (the "network") and It lays down rules for national coordination centres (NCCs) and for setting up the Cybersecurity Competence Community.

The European Cybersecurity Competence Centre helps the EU to strengthen EU leadership in cybersecurity[2] by improving trust and security, including confidentiality, integrity and accessibility of data support the resilience and reliability of networks and information systems, including critical infrastructure and commonly used hardware and software.

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[2] Regulation (EU) 2021/887 of the European Parliament and of the Council of 20 May 2021 establishing the European Cybersecurity Industrial, Technology and Research Competence Centre and the Network of National Coordination Centres (OJ L 202, 8.6.2021, pp. 1-31)

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vi.   Main digital skills challenge in Europe

- About 70 million Europeans lack sufficient reading, writing and numeracy skills
- 24% of EU population has no upper secondary education diploma
- 13% of Europeans have never used the Internet
- 43% of EU population and 35% of UE labour force have insufficient digital skills
- 42% of those with no digital skills are unemployed
- Digital natives ≠ digital competence[3]

vii.   Background

Over 70% of businesses have said that the lack of staff with adequate digital skills is an obstacle to investment. Europe also faces a shortage of digital experts who can develop cutting-edge technologies for the benefit of all citizens.

A strong digital economy powered by Europeans with digital skills is vital for innovation, growth, jobs, and European competitiveness. The spread of digital technologies is having a massive impact on the labour market and the type of skills needed in the economy and in society. Member States, business, training providers, the European Commission and other organisations need to work together to tackle the digital skills gap. To follow the development of the digital transition and the digital skills gap the Commission publishes DESI [Digital Skills Indicator] annually. It tracks Member States' digital performance in different areas to monitor progress and pinpoint where further efforts are necessary.
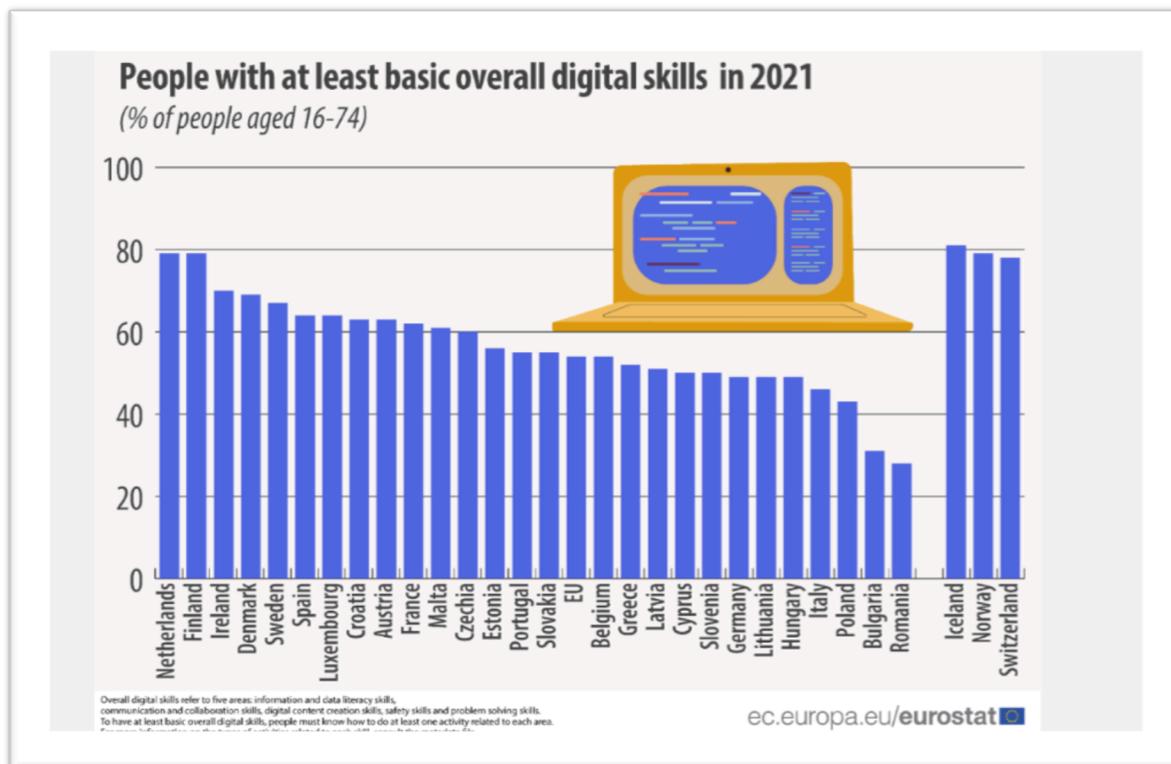
In 2021, 54% of people in the EU aged 16 to 74 had at least basic overall digital skills.

In 2021, the share of people aged 16 to 74 who had at least basic overall digital skills was highest in the Netherlands and Finland (both 79%), followed by Ireland (70%). On the other hand, the lowest share was recorded in Romania (28%), followed by Bulgaria (31%) and Poland (43%).

Digital skills indicators are some of the key performance indicators in the context of the Digital Decade, which sets out the EU's vision for digital transformation. The Digital

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[3] References: DESI Report 2018 – Human Capital; 2017 Education and Training monitor, 2016 Skills Communication, ICILS 2013

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[Compass](#) sets out an aim for 80% of EU citizens aged 16-74 years old to have at least basic digital skills by 2030.

People with at least basic overall digital skills in 2021
(% of people aged 16-74)

Overall digital skills refer to five areas: information and data literacy skills, communication and collaboration skills, digital content creation skills, safety skills and problem solving skills. To have at least basic overall digital skills, people must know how to do at least one activity related to each area.

ec.europa.eu/**eurostat**

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b)Digital skills of VET educators – a consortium insight

i.   Germany:

- VET Data Report (2019) elaborated by the German Federal Institute for Vocational Education and Training (BIBB) stated that "Digitalization is going to reinforce structural changes of the labour market", heading to a need for a shift in training capacities within the respective fields.

  As outlined in the Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs (2016-2017) the area of vocational education, the promotion of job-related competences in the context of digital work and business processes is an

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essential part of the teachers' competence as a starting point for their didactic activities.

ii. Ireland:

- One of Ireland's key strategies regarding digital skills of VET educators is the National Digital Strategy which was launched in July 2013. The strategy focuses on digital engagement and highlights how Ireland can benefit from a digitally engaged society. Regarding the digital skills of VET educators, evidence continues to highlight that there is an increased divide between educators who use digital devices in their class as a learning tool and those who don't.

iii. Portugal:

- The national qualifications system has reorganized VET into a single system in which programmes lead to a double certification. VET for adults is an integral part of the national qualification system, having education and training programmes for adults and recognition and validation of prior learning as key elements. Portugal has made significant progress regarding education attainment, but it remains lower than the EU average. Although less than 2015 (73.7%), in 2019 the share of people with low level or no qualification was 50.2%, the highest in EU.

iv. Italy:

- In the field of education the actions were carried out mainly through the implementation of the National Digital School Plan. The guidelines of the Ministry of Education, University and Research launched an overall innovation strategy for the Italian school and for a new positioning of its educational system in the digital age. Most of the actions for school staff training have been aimed at primary and secondary schools, which represent the majority of schools in Italy, while poor attention has been given to the Vocational Education and Training (VET) sector.

v. Spain:

- The Digital Agenda for Spain (ADpE, Agenda Digital para España) published in 2013, is the road map for fulfilment of the objectives set out by the Digital Agenda for Europe in 2015 and 2020, as well as the achievement of specific objectives for the development of the economy and digital society in Spain. It is structured around six major objectives and several specific plans. The sixth objective is about promoting digital inclusion and literacy and the training of new ICT professionals.

vi.   France
- Looking at the pace of training on the use of ICT in the French universities that offer it, we can see that there are no clear and sustained policies for training trainers on the use of ICT/E. About 58% report only one training session per year compared to 7.4% per month and 0.5% per week.
The statistics show that the density of IT training varies from one French-speaking region to another. There are several reasons for this the most significant of which are undoubtedly linked to the academic institutions and their governments.

vii.   Latvia
- In 2020, the Ministry of Education and Science of the Republic of Latvia has set the improvement of educators' digital competence as a priority goal of professional competence, allocating for this purpose additional funding (0,5 million EUR). The need for raising the awareness of learners and educators about information security, privacy protection and the use of reliable e-services (Cybersecurity Strategy 2019-2022, actions area "Public awareness, education and research").

viii.   Greece
- Albeit the acquisition of digital skills is a component that should not be absent from the educational toolkit of VET Educators, an important gap can be identified by monitoring the current educational system in Greece. Despite the many reforms of educational curriculum, evidence suggests that educators are not being sufficiently equipped with ICT knowledge and therefore lack of pedagogical, digital-oriented tools and techniques that could upgrade the teaching process (Ministry of Education,2019).

Findings

The research conducted for the project CYBER.EU.VET revealed that there is a lack of data and information on the cybersecurity competences and challenges of educators of education institutions at the European level, as well as that there is a limited number of initiatives focusing on the cybersecurity issues within the VET, indicating that project CYBER.EU.VET have addressed the emerging topic across the Member States. Currently, most of the activities and projects are focusing on the cybersecurity awareness raising of general population and improvement of overall digital competencies of educators, which was influenced by the rapid adaptation to remote work/learning process.

The partner consortium is multifaceted and a clear expression of a different extent of digital skills throughout Europe. However, regardless of the DESI ranking of the individual countries, this Consortium Research Report can be used to draw meaningful and valid indications for the entire European context. The feeling of a need for training is clear, even among those VET teachers who have already been trained in ICT. There is no rejection of the need for training, nor any questioning of its usefulness. We also note that the more teachers feel exposed to psycho-social, ethical, legal, technical or health risks, the more they say they feel a need for training. According to a national survey, more than half of teachers who feel vulnerable to cyberbullying feel that training is needed. For them, initial and continuing education is an opportunity to share experiences and analyze methods of professional practice in this field. It is still believed that using digital tools in education is a way to teach or an object to be taught to students rather than an integral part of their general culture. A culture of information sources and practices on digital risks (research and monitoring) should be developed. Training must also be stepped up on the challenges of digital technology and in particular on the psycho-social, ethical, legal and technical problems that can arise in the use of digital tools and which worry teachers to the point of leading them to give up all use.

Thus, knowledge of digital risks can positively influence pedagogical practices for educating students in digital literacy. A teacher with a strong digital culture will be more inclined to use digital technology in the classroom with his or her pupils and to make digital technology a teaching-learning object.

The obvious influence of the representation of risks is impossible to change positively without a general and plural digital culture, complementary to an information culture in the broadest sense, which avoids demonizing the technical object and enables the educational potential to be exploited.

It is not a question of educating in fear, but of emancipating (and being emancipated, as a teacher too) through a critical and enlightened apprehension of the digital world.

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c) CYBER.EU.VET Toolbox

According to the Digital Education Plan 2021-2027 digital Skills and learning challenges also high priority on European agenda. The European Commission is determined to tackle the digital skills gap and promote projects and strategies to improve the level of digital skills in Europe. All Europeans need digital skills to study, work, communicate, access online public services and find trustworthy information. However, many Europeans do not have adequate digital skills. The Digital Economy and Society Index (DESI) shows that 4 out of 10 adults and every third person who works in Europe lack basic digital skills. There is also low representation of women in tech-related professions and studies, with only 1 in 6 ICT specialists and 1 in 3 science, technology, engineering and mathematics (STEM) graduates being women.

The European Commission has set targets in the European skills agenda and the digital education action plan to ensure that 70% of adults have basic digital skills by 2025. These initiatives aim to reduce the level of 13-14 year-olds who underperform in computing and digital literacy from 30% (2019) to 15% in 2030. The European Digital Skills and Jobs Platform is a new initiative launched under the Connecting Europe Facility Programme. It offers information and resources on digital skills, as well as training and funding opportunities.[4]

i.   JRC/EC Digital Competence frameworks
• Digital Competence framework for citizens (DigComp)
• Digital Competence framework for educators (DigCompEdu)
• Digital Competence framework for educational organisations (DigCompOrg) and a self-reflection tool for schools (SELFIE)

Why all these frameworks?
• Capacity building for the digital transformation of E&T and for addressing 21st century skills challenges.

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[4] Digital skills and jobs | Shaping Europe's digital future (europa.eu)

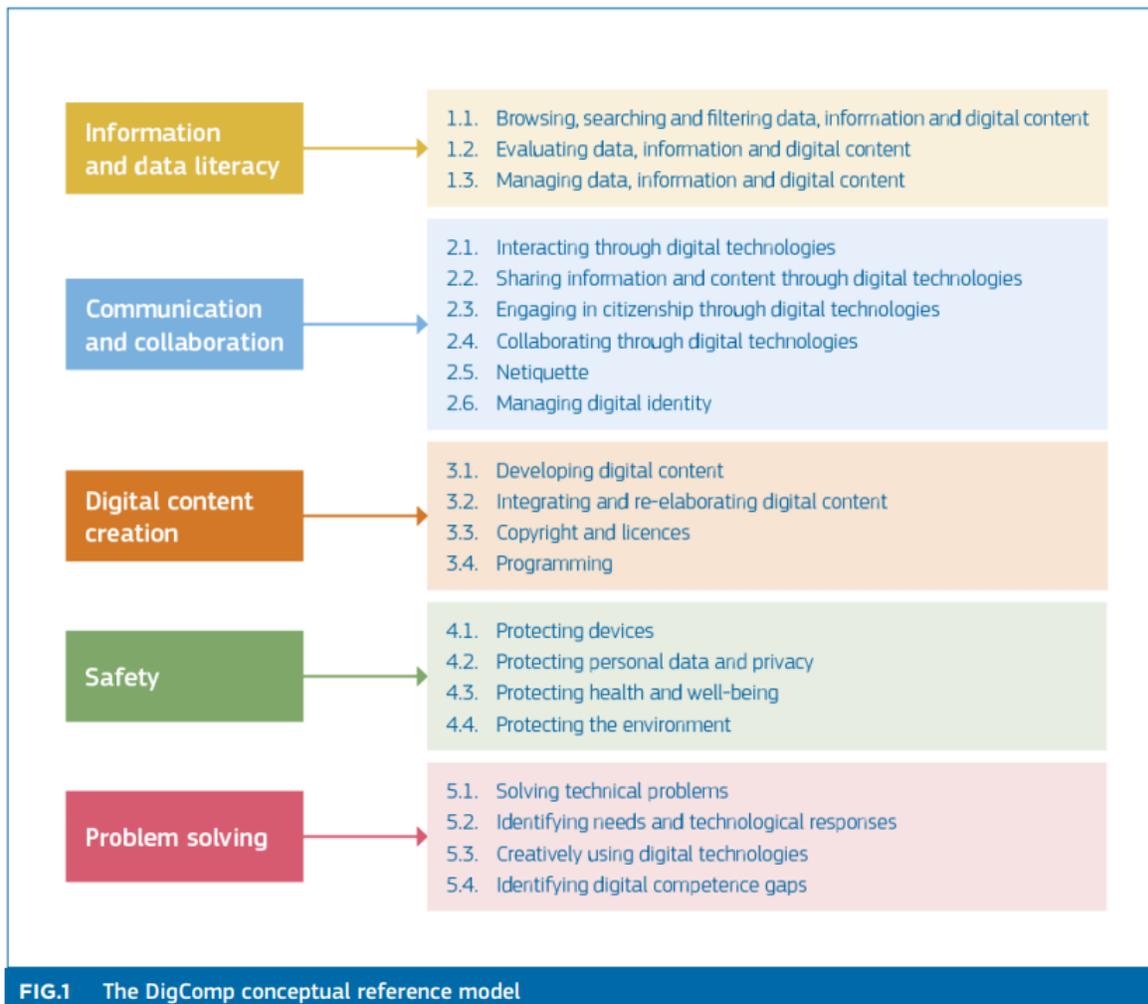- Reference frameworks providing an overall, complete and shared understanding: a common language.

What?
- Conceptual model, proficiency levels & (self-) assessment modules.
- Competence defined as Knowledge, Skills and Attitudes.

ii. TheDigComp 2.2

More than 250 new examples of knowledge, skills and attitudes to help education and training providers update their DigComp curriculum and course material to face today's challenges

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The list of DigComp competences and areas remain the same:

Information and data literacy
1.1. Browsing, searching and filtering data, information and digital content
1.2. Evaluating data, information and digital content
1.3. Managing data, information and digital content

Communication and collaboration
2.1. Interacting through digital technologies
2.2. Sharing information and content through digital technologies
2.3. Engaging in citizenship through digital technologies
2.4. Collaborating through digital technologies
2.5. Netiquette
2.6. Managing digital identity

Digital content creation
3.1. Developing digital content
3.2. Integrating and re-elaborating digital content
3.3. Copyright and licences
3.4. Programming

Safety
4.1. Protecting devices
4.2. Protecting personal data and privacy
4.3. Protecting health and well-being
4.4. Protecting the environment

Problem solving
5.1. Solving technical problems
5.2. Identifying needs and technological responses
5.3. Creatively using digital technologies
5.4. Identifying digital competence gaps

FIG.1   The DigComp conceptual reference model [5]

One of the key themes of DigComp 2.2 update is well-being and safety. In each area there are 10-15 statements per competence to illustrate timely contemporary themes. They do not represent an exhaustive list of what the competence itself entails and they are not on proficiency levels although some more complex than others but are useful curriculum planning and updating and developing DigComp training syllabus or course content.

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[5] European Commission, Joint Research Centre, Vuorikari, R., Kluzer, S., Punie, Y., DigComp 2.2, The Digital Competence framework for citizens : with new examples of knowledge, skills and attitudes, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/115376

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SAFETY: "to protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have a due regard to reliability and privacy."[6]

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iii.   The DigCompEdu

The European Framework for the Digital Competence of Educators (DigCompEdu) is a scientifically sound framework describing what it means for educators to be digitally competent. It provides a general reference frame to support the development of educator-specific digital competences in Europe. DigCompEdu is directed towards educators at all

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[6] Luxembourg: Publications Office of the European Union, 2018 KE-01-18-834-EN-N.pdf
[7] Ibidem

levels of education, from early childhood to higher and adult education, including general and vocational education and training, special needs education, and non-formal learning contexts.

The DigCompEdu framework reflects the efforts conducted at an international level to capture and define the digital competences specific

digital competences of teachers and trainers.

The aim is to provide a framework for those who work in the educational and higher education sector and are in charge of developing digital competence models, e.g. the policy makers in Member

European Framework for the Digital Competence of Educators

States, regional/local authorities, educational educational organisations, institutions (public or private) that provide training and professional development services.

Thus the added value of the DigCompEdu framework is that it provides:

- – a sound background that can guide policy across all levels;
- – a template that allows local stakeholders to move quickly on to developing a concrete
- – instrument, suited to their needs, without having to develop a conceptual basis for this work;
- – a common language and logic that can help the discussion and exchange of best practices;
- – a reference point for Member States and other stakeholders to validate the completeness and
- – approach of their own existing and future tools and frameworks[8]

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[8] Redecker, C. European Framework for the Digital Competence of Educators: DigCompEdu. Punie, Y. (ed). EUR 28775 EN. Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-73494-6, doi:10.2760/159770, JRC107466

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iv.   BUILDING THE DIGITAL SKILLS CAPABILITY OF VET EDUCATOR

Using or developing self-assessment frameworks or tools is a good way to determine an educator's baseline level of digital skills capability. From there, targeted professional development activities can be mapped. Tied to the increasing need to use technologies in their teaching practice is the requirement to change pedagogy to ensure that digital tools are used effectively not only in teaching but also in course design and assessment. The European Framework for the Digital Competencies of Educators (DigCompEdu) outlines the key areas of competency required by educators as they deepen their engagement with digital learning and digital pedagogies. The key competency areas are shown in the figure below (Redecker 2017
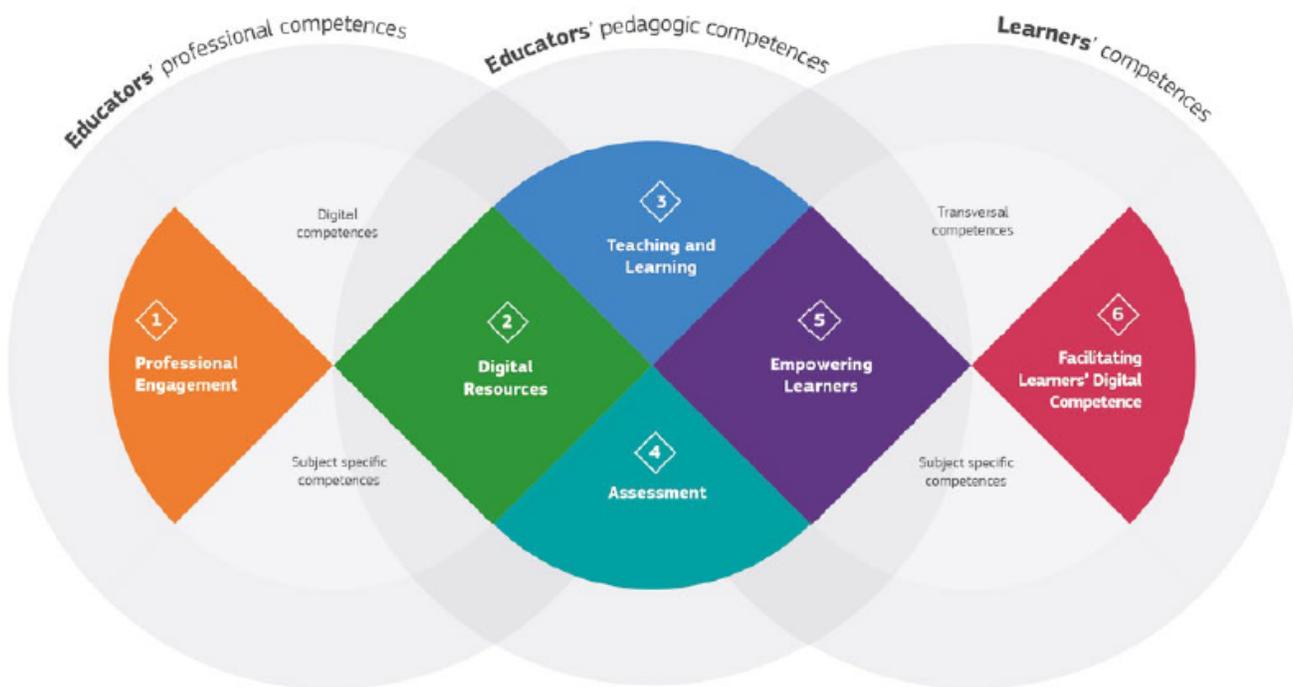

FIGURE 2: DIGCOMPEDU AREAS AND SCOPE

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v.   The DigCompOrg Framework

Several frameworks and self-assessment tools are in use in a number of European countries, but no attempt has hitherto been made to develop a pan-European approach to organisational digital capacity. A European reference framework that adopts a systemic approach can add value by promoting transparency, comparability, and peer-learning. The **DigCompOrg framework** can be used by educational organisations (i.e., primary, secondary and VET schools, as well as higher education institutions) to guide a process of self-reflection on their progress towards comprehensive integration and effective deployment of digital learning technologies.

In addition, it can facilitate transparency and comparability between related initiatives throughout Europe, and it can also play a role in addressing fragmentation and uneven development across the Member States. The DigCompOrg framework can also be used as a strategic planning tool for policymakers to promote comprehensive policies for the effective uptake of digital learning technologies by educational organisations at regional, national and European level. It can also be used as a means to create awareness about the systemic approach needed for effective use of digital learning technologies.

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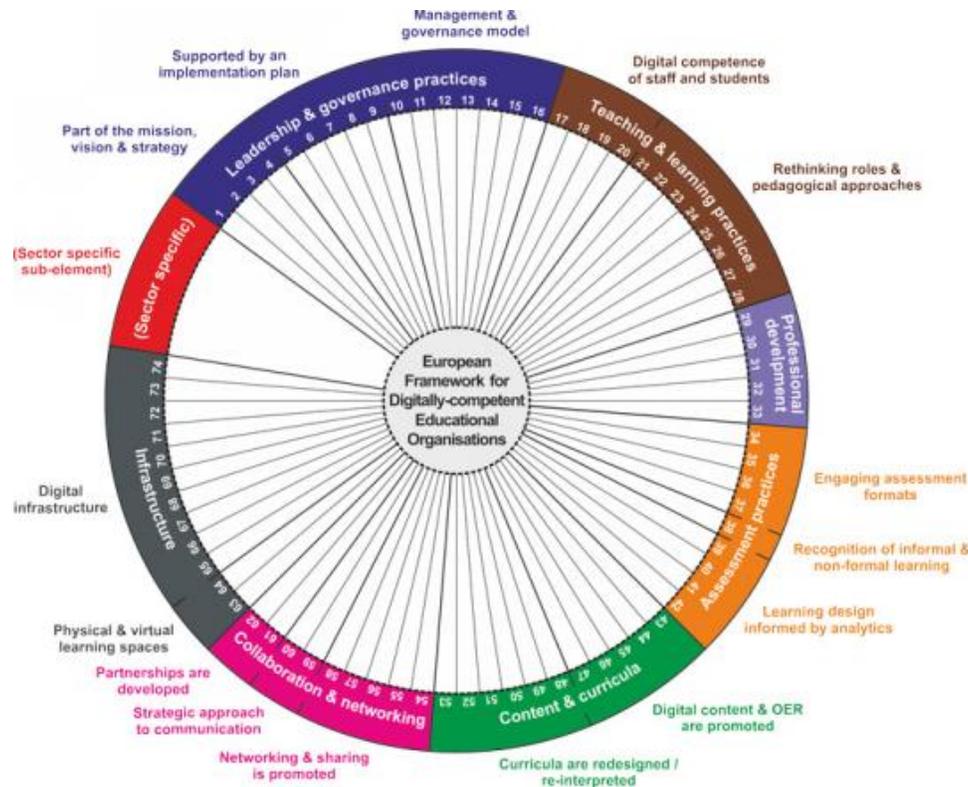
The primary purposes of DigCompOrg are:

- to encourage self-reflection and self-assessment within educational organisations as they progressively deepen their engagement with digital learning and pedagogies;
- to enable policy makers (at local, regional, national and international level) ;
- to design, implement and appraise programmes, projects and policy interventions forhe integration of digital learning technologies in E&T systems.

vi. SELFIE

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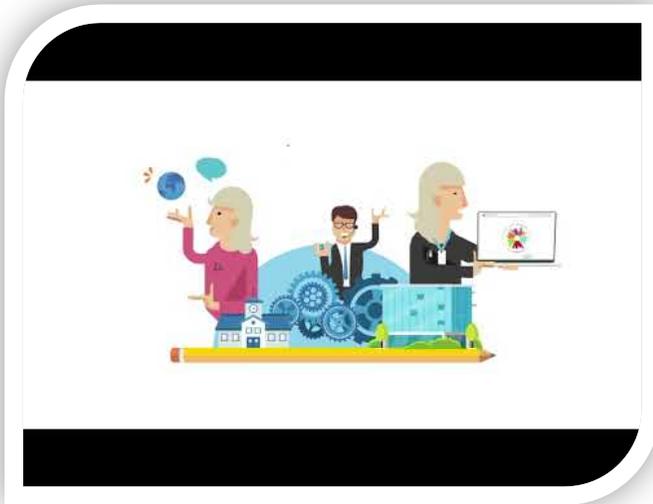
SELFIE for work-based learning (WBL) is a free online tool that supports Vocational Education and Training (VET) schools and companies to make the most of digital technologies for teaching, learning and training. SELFIE WBL supports schools and companies become fit for the digital age. In this way, it supports the digital transition, one of the key policy priorities of the European Commission. This adaption of SELFIE to the specific requirements of WBL is a necessary step **to support VET schools**.[9]

In total, some **35,000 participants** from around **150 VET schools** and **250 companies** in France, Germany, Hungary, Poland, Romania, Georgia, Montenegro, and Turkey were involved in the piloting. Results of these pilots are available for download [LINK to resources].[10]

The European Forum of Technical and Vocational Education and Training (EfVET) and European Training Foundation (ETF) gave invaluable support throughout.

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d)CYBER.EU.VET guidelines

The CYBER.EU.VET project sought to contribute to strengthen the European VET capacity to recognize and manage cybersecurity threats (e.g. phishing attacks, botnets, financial & banking frauds, data fraud) in a historical context where online training is more and more utilized.

To do so, it improved skills and competences of VET educators on cybersecurity threats management, given their central role in the knowledge transfer of good practices and skills to
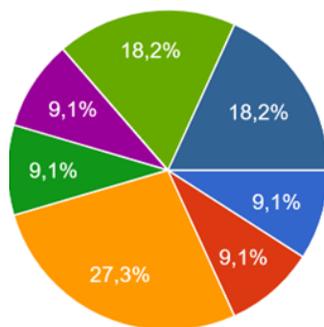
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[9] SELFIE for work-based learning | European Education Area (europa.eu)
[10] SELFIE resources | European Education Area (europa.eu)

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their students, also increasing awareness among VET teachers, students and their families as well on the importance to recognize such daily risks, that can have a both economic and social impact on all the European citizens. The project relied on a joint local, national and transnational circulation of capacities and expertise and a good level of access to and usability of digital information.

8 Gamejam session with 54 students and 15 national specific trainings for trainers were organized to debate the results of the research, the digital tools shared and the new ones created, exchanging experiences and considerations to develop a sort of "thematic collective narrative" preparatory for moving from exploration and analysis to management and digital problem-solving.

These events allowed youths to work together and show that also institutions that are perceived as far away from the average citizen (ex. EU Commission) provide interesting opportunities for the youth population.

A **training session** is defined in this guide as a single training session that takes place over the course of one day or a portion of a day. It could last 30 minutes, an hour, or even an entire day. A training session could include breaks throughout the day and cover one or more topics. A session could be held in a classroom, in a small group with a single family, or even one-on-one. A training program, for the purposes of this guide, is a collection of training sessions that complete a training cycle. For example, an agency might offer an 8-week training program once a week. The training program could then be restarted for a new group of people. (*Workshops and Courses, 2021*)

I. The Basis of a Workshop: Knowledge, Skills, and Attitudes

This guide follows a framework for raising awareness of learners on digital threats, which is based on the knowledge, skills and competences. Similarly, program supervisors and

teachers/trainers improve their knowledge, skills, and attitudes in order to be more effective. This section looks at teachers and trainers' knowledge, skills, and attitudes.

Knowledge, skills, and attitudes are the foundations of effective training. Effective trainers have knowledge, skills, and attitudes about training and the topics they teach, and the training programs and sessions they deliver should include knowledge, skills, and attitudes for participants who are focused on the topic and content.

Question to self: Who can you turn to if you have questions about program standards and content as a new VET practitioner?
Trainers must have a broad understanding of core content in order to respond to questions that may arise. If a practitioner does not know the answer to a question, it is critical that the practitioner states that he or she does not know the answer but will look into it and report back. Practitioners should not give false information or make up answers for the sake of the participants' well-being and understanding. It is the responsibility of a trainer to conduct research, find answers, and follow up with participants to ensure that they are receiving accurate information.

Do you want to learn more about what a teacher can do when dealing with the subject?
The following are examples of appropriate knowledge, skills, and attitudes that an effective trainer should possess according to the consortium' partners.

Knowledge necessary for the VET educator

Legend: Must (blue), Needed (red), Advisable (orange/yellow), Not needed (green)
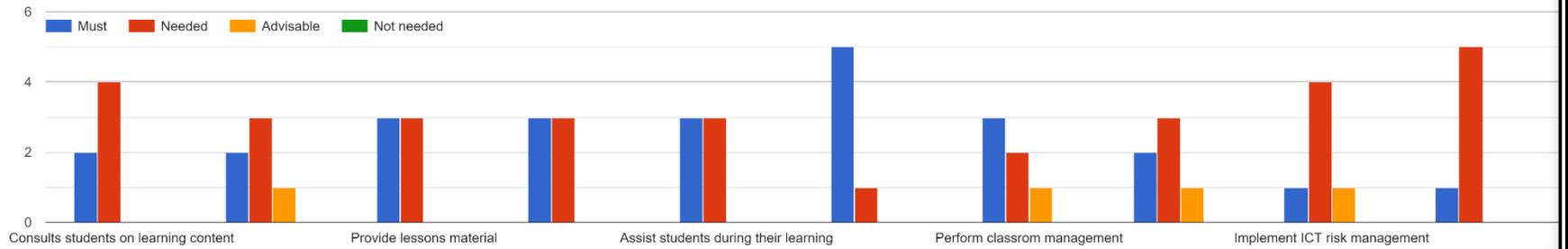
Categories: Assessment processes, E-learning, Office software, ICT hardware specifications, Teamwork principles, Learning difficulties, Computer history, emergent technologies, Cyber security, ICT resilience manager, ICT recovery techniques

Skill necessary for the VET educator

Legend: Must (blue), Needed (red), Advisable (orange/yellow), Not needed (green)

Categories: Consults students on learning content, Provide lessons material, Assist students during their learning, Perform classroom management, Implement ICT risk management

Competences necessary for the VET educator

Legend: Must (blue), Needed (red), Advisable (orange/yellow), Not needed (green)

Categories: Apply teaching stragies, Perform ICT troubleshooting, Work with virtual learning environment, Adapt VET Trainin to labour market, Utilise computer-aided software engineering tools, Define security policies
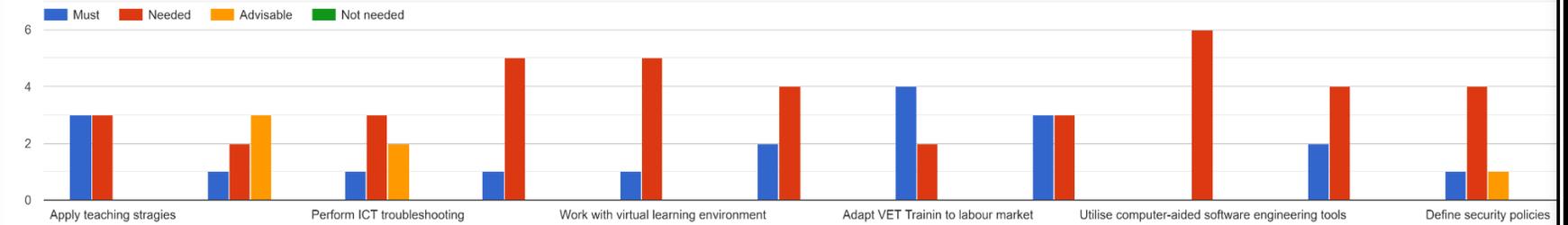
Activity: As a teacher/trainer, what are some examples of your knowledge, skills, and attitudes? Fill in the blanks on the chart. An example is given.

Examples of knowledge	Examples of skills	Examples of attitudes
I'm familiar with cybersecurity and emergent technologies.	I can develop digital educational materials and adapt teaching to target group.	I'm passionate about making the sessions as effective as possible for our participants, and I'm committed to doing so.

- **Knowledge**: Outcome of assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices related to a field of study or work.

- **Skill**: Ability to apply knowledge and use know-how to complete tasks and solve problems.

- **Competence**: Ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development. [11]

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II.   The CYBER.EU.VET website

The project consortium created from the very first step of the project a dedicated website developed with open-source technologies (Wordpress) and a modular approach, that may allow new partners from different countries to add and manage their own contents (once accepted the terms of conditions established by the project partners). Digital platforms as CYBER.EU.VET one can be opened in two ways to promote innovation and value generation (Boudreau 2010) .

Of course, digital platforms, and in this specific case the platform conceived as Open Educational Resource can be further exploited for follow-up activities.   This new system makes it possible to relate the traditional physical world with a digital interface capable of connecting and organising the demand and supply of tool or a service in a single virtual space.

These platforms create networks that connect people and services over the time.

Karhu, Gustafsson, and Lyytinen: *Exploiting and Defending Open Digital Platforms*
Information Systems Research, 2018, vol. 29, no. 2, pp. 479–497, © 2018 The Author(s)

Table 1. Two Forms of Platform Openness and Related Resources

Platform openness	Boundary resources	Shared resources	Actor who shares	Type of sharing	Platform owner's rationale
Access openness	API, app store	Complement, e.g., apps	Complementor	Shared for distribution	Generate network effects, and extract value from complementarities
Resource openness	Open-source license	Platform core, e.g., AOSP	Platform owner	Shared IPR	Strategic forfeiture of IPR while recovering costs from somewhere else

The integrity of the network is linked not only to the factors of the information infrastructure, its security, and the flow of data within the network, but also to the social and environmental changes that interfere with the human components.

For that reason, a Multiplier Event campaign has been organised to disseminate and advertise the developed CYBER.EUY.VET technological tools and handbook.
This campaign had also the objective to increase awareness among VET teachers,

students, and their relatives as well on the importance to recognize such daily risks, that can have a both economic and social impact on all the European citizens.
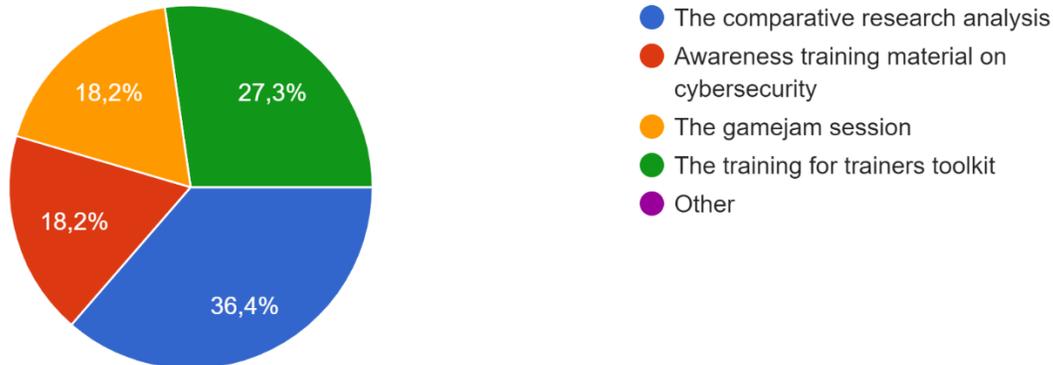
ICT systems leveraging the emerging "network effect" by combining open online social media, distributed knowledge creation and data from real environments in order **to create awareness of problems and possible solutions requesting collective efforts, enabling new forms of social innovation.**

III. "A practioner insight"

Partners and practitioners having been involved in the CYBER.EU.VET project claimed having benefitted their research goals with a better understanding of the perception of cybersecurity students in local and European context. Exchanges among stakeholders so different from each other has been an opportunity to gain different perspectives and approach to shared issues and to learn how to translate it into a more common language. In our partner's words: *"It was very beneficial to learn more about the current state of the art in field of Cybersecurity and major cyber threats in partner countries. It is also interesting to be aware and be able to follow the trends in terms of cyberattacks that seem to be very similar in each country"*. 81,8% of the partners stated that they intend to use the material shared or created within the CYBER.VET.EU project in the future, 36,4% Locally, 36,4% Nationally and 27,3% at international level, throughout training sessions and workshops, forums and of course, social media.

The context of the countries participating in the project is very different one from each other, although as European countries they share certain similarities. Cybersecurity is very changeable since the threats are different over time. Therefore, it is interesting that the results obtained are updated by both trainers and researchers so that they are valid at the time they are used.

Significant is the graph showing which shared tools were most useful for the operators of the different services of the 8 consortium partners:

- The comparative research analysis
- Awareness training material on cybersecurity
- The gamejam session
- The training for trainers toolkit
- Other

IV.   A final note

The CYBER.EU.VET handbook was designed to assist VET Trainers and digital practitioners with the usage of tools for cybersecurity as well as instructions on how to utilize the CYBER.EU.VET material listed in the Appendix. It provides suggestions for how training may be arranged, as well as operational recommendations for enabling practitioners to provide students with the knowledge and the tools they need to recognize cybersecurity threats. This e-book was designed for the benefit of VET teachers, VET Students, students' families, and VET institutions internationally or locally. Practitioners (or case workers/managers) who deliver training and orientation, supervisors, or training coordinators, and those who deliver orientation, such as volunteers, interns, other resettlement support staff, other service providers, and community members, can all benefit from it. An increased awareness of the risks caused by data frauds, malware and other online security threats, at all levels, from the VET institution management to the families of the student are a fundamental steps to defend EU citizens from damages caused by cybersecurity threats, in a moment already characterized by an epochal crisis.

This e-book contains several suggestions that we hope will prompt program VET teachers and practitioners to rethink the aims of their training and how they might enhance the quality of education, by developing innovative ways of e-learning.

e)Appendix

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I. GLOSSARY

DATA
a sequence of one or more symbols given meaning by specific act(s) of interpretation (data has no intrinsic meaning). Data can be analysed or used in an effort to gain knowledge or make decisions. Digital data is rep-resented using the binary number system of ones (1) and zeros (0) as opposed to its analogue representation. [12]

DIGITAL COMMUNICATION
Communication using digital technology. Various modes of communication exist, e.g. synchronous communication (real time communication, e.g. using skype or video chat or Bluetooth) and asynchronous ones (not concurrent communication, e.g. email, sms) using for example, oneto- one, one-to-many, or many-to-many modes.[13]

DIGITAL COMPETENCE
Digital competence can be broadly defined as the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society.[14]

DIGITAL CONTENT
Any type of content that exists in the form of digital data that are encoded in a machine-readable format, and can be created, viewed, distributed, modified and stored using digital technologies. Examples of digital content include: web pages and websites, social media, data and databases, digital audio, such as mp3s, and e-books, digital imagery, digital video, video games, computer programmes and software. For the DigCompEdu framework, digital content is divided into digital resources and data.[15]

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12 Modified from: en.wikipedia.org/wiki/Data_(computing)

[13] Source: *DigComp Framework* https://ec.europa.eu/jrc/digcomp

[14] *Ibidem*

[15] Redecker, C. European Framework for the Digital Competence of Educators: DigCompEdu. Punie, Y. (ed). EUR 28775 EN. Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-73494-6, doi:10.2760/159770, JRC107466

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DIGITAL ENVIRONMENT

a context, or a "place", that is enabled by technology and digital devices, often transmitted over the internet, or oth-er digital means, e.g. mobile phone network. Records and evidence of an individual's interaction with a digital envi-ronment constitute their digital footprint. In DigComp, the term digital environment is used as a backdrop for digital actions without naming a specific technology or tool.

DIGIRTAL SERVICE

allows a user (citizen, consumer) to create, process, store or access data in digital form and to share or interact with data in digital form uploaded or created by the same or other users of that service (Directive (EU) 2019/770).

DIGITAL TECHNOLOGY

Any product that can be used to create, view, distribute, modify, store, retrieve, transmit and receive information electronically in a digital form. For example, personal computers and devices (e.g. a desktop, laptop, netbook, tablet computer, smart phones, PDA with mobile phone facilities, games consoles, media players, e-book readers), digital television, robots.[16]

DIGITAL TOOLS

Digital technologies used for a given purpose or for carrying out a particular function of e.g. information processing, communication, content creation, safety or problem solving.[17]

EDUCATIONAL CONTENT

(Digital) content relevant, in one way or another, to the educational context. This term is broader than "educational resource" in that it also comprises content marginal to the instructional process, e.g. communication with students, parents, colleagues; administrative content, etc.[18]

EDUCATIONAL RESOURCES

Resources (digital or not) designed and intended to be used for educational purposes.[19]

MEDIA LITERACY

refers to skills, knowledge and understanding that allow citizens to use media effectively and safely. In order to enable citizens to access information and to use, criti-cally assess and create media content responsibly and safely, citizens need to possess advanced media litera-cy skills. Media literacy should not be limited to learning about tools and technologies, but should aim to equip citizens with the critical thinking skills required to exer-cise judgment, analyse complex realities and recognise the difference between opinion and fact. [20]

OPEN EDUCATIONAL RESOURCES

Teaching, learning and research materials in any medium, digital or otherwise, that are in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. [21]

SELF-ASSESSMENT

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[16] Modified from source: http://www.tutor2u.net/business/ict/intro_what_is_ict.htm

[17] *Ibidem*

[18] *Ibidem*

[19] *Ibidem*

[20] Source: the EU's Audiovisual Media Services Directive (2018)

[21] Source: UNESCO definition http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/what-are-open-educational-resources-oers/

Self-assessment involves the ability to be a realistic judge of one's own performance. Proponents of self assessment suggest it has many advantages, for example, it: provides timely and effective feedback and allows students to assess their own learning quickly; allows instructors to understand and provide quick feedback on learning; promotes academic integrity through student self-reporting of learning progress; promotes the skills of reflective practice and self-monitoring; develops self-regulated learning; increases student motivation; improves satisfaction from participating in a collaborative learning environment; helps students develop a range of personal, transferrable skills to meet the expectations of future employers.[22]

SOCIAL INCLUSION The process of improving the terms for individuals and groups to take part in society (by the World Bank). Social inclusion aims to empower poor and marginalized people to take advantage of burgeoning global opportunities. It ensures that people have a voice in decisions which affect their lives and that they enjoy equal access to markets, services and political, social and physical spaces.[23]

STRUCTURED ENVIRONMENT
where data resides in a fixed field within a record or file, e.g. relational databases and spreadsheets. Technological response/solution refers to the attempt to use technology (and/or engineering) to solve a problem.

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[22] Source: *Cornell University Centre for Teaching Excellence* http://www.cte.cornell.edu/
[23] Source: *DigComp Framework* https://ec.europa.eu/jrc/digcomp

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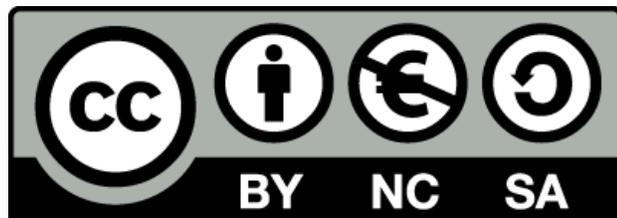
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